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A Sustainable Model for Training Teachers to Use Pivotal Response Training

A dissertation submitted in partial satisfaction of the requirements for the degree

Doctor of Philosophy

in

Psychology

by

Jessica Brooke Suhrheinrich

Committee in charge:

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2010

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Chair

University of California, San Diego

2010

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- Schreibman, L., Stahmer, A. C., Suhrheinrich, J. (2009). Enhancing generalization of treatment effects via pivotal response training and the individualization of treatment protocols. In C. Whalen (Ed.) *Real Life, Real Progress for Children with Autism Spectrum Disorders: Strategies for Successful Generalization*, Baltimore, MD: Paul H. Brookes Publishing Co.
- Suhrheinrich, J., Stahmer, A. C., Schreibman, L. (2007). A preliminary assessment of teachers' implementation of pivotal response training. *Journal of Speech, Language Pathology and Applied Behavior Analysis*, 2 (1), 8-20.

### Funding

- 2007-10 *Co-Investigator*. U.S. Department of Education Grant: R324B070027 "Translating Pivotal Response Training into Classroom Environments." Rady Children's Hospital San Diego. (\$1,964,143)
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## ABSTRACT OF THE DISSERTATION

A Sustainable Model for Training Teachers to Use Pivotal Response Training

by

Jessica Brooke Suhrheinrich

Doctor of Philosophy in Psychology

University of California, San Diego, 2010

Professor Laura Schreibman, Chair

The increase in the rate of autism diagnoses has created a growing demand for teachers who are trained to use effective interventions. Research supports behavioral interventions as effective methods for teaching children with autism, however dissemination of these methods has been problematic. Ineffective training and lack of ongoing support after formal training ends may be to blame. The train-the-trainer (TTT) model, which involves training supervisors to train others, may be ideal for providing cost-effective training and ongoing support to teachers.

This study assessed the benefits of using the TTT model to disseminate Pivotal Response Training (PRT), an evidence-based practice for educating children with autism, to school settings. A multiple baseline design was conducted across three training groups, each consisting of one school staff member (trainer), three special



education teachers, and six students. During baseline, each trainer observed interactions between teacher/student dyads and provided feedback to the teachers. During treatment, trainers learned to implement and assess PRT themselves and conducted a workshop to educate teachers on PRT. After the teacher-training workshop, trainers continued to observe interactions between teacher/student dyads and provide feedback to teachers during weekly classroom observations. A follow-up assessment was conducted three months after training was complete. Assessments included trainer and teacher ability to implement PRT, trainer ability to assess PRT and provide feedback, and student language and behavioral changes.

All trainers conducted the teacher-training workshop with high adherence to training protocol and met mastery criteria in their ability to implement PRT, assess implementation of PRT, and provide feedback to teachers. Both trainers' assessment of PRT and feedback to teachers were variable during post-workshop classroom observations. Six of the nine teachers mastered all components of PRT. The remaining three teachers implemented 89% of the PRT components correctly. The majority of trainers and teachers maintained their abilities at follow-up. Students demonstrated limited behavioral change, although this was not unexpected as the intervention was minimal and exposure to other interventions was not controlled for as part of the study. These results provide support for the use of the TTT model as an effective method of disseminating evidence-based practices in school settings.

## INTRODUCTION

There is a shortage of teachers with specialized training in how to educate children with autism. Several factors contribute to a chronic lack of highly qualified teachers: the rapid increase in rate of autism diagnoses, the limited and varied autism-specific training in current credential programs for special education teachers, and the high rates of attrition among special education teachers. Additionally, there is an historic disconnect between researchers, who develop strategies for educating children with autism, and the teachers who work with these children on a daily basis. This research-to-practice gap is influenced by the lack of effective training for teachers.

Fortunately, adapting current methods of post-certification professional training for teachers may provide a sustainable solution. Incorporating effective strategies into current “in-service” training programs and utilizing existing specialists employed by school districts minimizes additional expense while increasing the sustainability of professional training for teachers of children with autism. Research supports a train-the-trainer (TTT) method as an effective practice for training and supporting educators. The TTT model, which has also been called pyramidal training, triadic training, and helper model training, focuses on initially training a person or people who then train other people at their home agency. This study will propose a new training protocol that employs existing school staff as trainers, who, in turn, train teachers to use an effective strategy for educating children with autism.

### Limitations to Services for Children with Autism

#### *Shortage of Trained Teachers for Children with Autism*

Autism is a pervasive developmental disorder characterized by impairments in

communication and social functioning, along with restricted, repetitive, and stereotyped patterns of behavior (American Psychiatric Association, 2000). Over the last two decades, estimates of the prevalence of autism have increased from 4-5 per 10,000 children to current estimates of 1 per 150 children (Baird et al., 2001; Center for Disease Control and Prevention, 2002 & 2006; Fombonne, 2003). The increase in the diagnosis of autism has led to growing demand on service providers to improve programming for children with autism. Nationwide, enrollment of children served under the autism educational category grew from 94,000 during the 2000-2001 school year (U.S. Department of Education, 2002) to 258,000, or 5% of the total special education student population, in the 2006-2007 school year (U.S. Department of Education, 2009). Similarly, of the 683,178 children who received special education services in the state of California during the 2005-2006 school year, approximately 5.1% (34,668 children) were served under the autism educational category (California Department of Education, 2006). Since public education systems are required to provide appropriate care for children with autism, there is a growing need for teachers to be trained to adequately educate these children (California Health and Human Services Agency, 2003). Preparing qualified teachers of children with autism is one of the most significant challenges facing the field (Simpson, 2003).

Teachers who provide treatment for children with autism may have inadequate autism-specific training as part of a special education credential program and limited access to effective training in evidence-based practice (EBP; Lord & McGee, 2001; National Research Council, 2001, Scheuermann, Webber, Boutot, & Goodwin, 2003). Criteria for special education certification vary from state to state, and only five states

offer a licensure specifically for the area of autism: Michigan, Delaware, West Virginia, Nevada, and Florida (Müller, 2005). Additionally, until very recently, there were no national teaching standards for autism (Council for Exceptional Children, 2009). Even well-developed credential programs that attempt to incorporate best practices in autism education may have difficulty adapting curricula to stay current. The lack of consistent standards across credential programs suggests that teachers begin their professional career with varied training in how to educate children with autism.

Teachers of children with autism may be especially at risk for professional “burnout” because of the pervasive deficits associated with autism and limited access to training in teaching strategies (Jennett, Harris, & Mesibov, 2003). Special education teachers who work with children who have severe handicaps, such as autism, appear to experience a higher rate of turnover than other teachers. In 1984-1985, their attrition rate was 30% compared to 6% for all teachers and 12% for general special education teachers (Howe, Thomas, & Bowen, 1987). More recently, in a survey of 156 first-year special education teachers, 36% reported that they plan to leave special education within the next five years (Whitaker, 2000). Similarly, in a national Study of Personnel Needs in Special Education with over 8000 participants, only 63% of teachers reported they planned to stay in special education until retirement or as long as they were able (2002).

High attrition rates are problematic because they lead to a chronic shortage of highly qualified special education teachers (McCleskey & Billingsley, 2008). Upon hire, new teachers likely need additional training to meet the specific needs of specific students. Further training may be required when uncertified teachers are hired for positions that cannot be filled by certified teachers. National reports confirm that the

number uncertified special education teachers increased from 7.4 to 12.4% from 1993-2003 (Department of Education, 1993, 2003). Teachers who have not received training in how to educate children with severe handicaps through a certification program likely need extensive specialized on-the-job training. Therefore, the elevated rates of attrition within the special education teaching community may place increased strain on school districts already struggling to provide high-quality education to children with autism.

One reason for these elevated attrition rates may be a lack of adequate specialized training and ongoing support. Kaiser and McWhorter (1990) suggest that enhancing the quality of training and support teachers receive is the best approach to decreasing attrition rates. They propose that a well-trained, well-supported teacher is likely to be an effective teacher, an effective teacher is more likely to be a satisfied teacher, and a satisfied teacher is more immune to burnout and turnover. Therefore, adequate training and support for current teachers may reduce future expenditures of money and time on training new teachers. Indeed, McLeskey and Billingsley (2008) suggest that attrition of special education teachers, leading to a constant influx of teachers untrained in EBP, is a key factor influencing the gap between research and practice.

#### *Research-to-Practice Gap*

Both autism researchers and educators report frustration regarding the gap between research and practice (National Research Council, 2005). Historically, special education and intervention scholars have focused primarily on developing effective interventions, with less attention given to the pragmatics of teacher training (Sindelar, Brownell, & Billingsley, 2010). There is currently more acknowledgment of the need to improve both the content and the delivery methods involved in professional development

for special education teachers (Sindelar, Brownell, & Billingsley, 2010). Teacher training (both pre-service and in-service) has been highlighted as a primary explanation for the existence of the research-to-practice gap in special education (McLeskey & Billingsley, 2008).

EBP for educating children with autism exist, but they are often not incorporated into programs serving children with autism (Stahmer, 2004). The complexity and specificity of these interventions often requires that teachers receive additional training beyond their initial credentialing program. Due to limited training for teachers, researchers report skepticism about the ability and/or willingness of public programs to utilize EBP (McGee, Morrier, & Daly, 1999). Teachers in recent studies report using EBP with students who have autism, but they are just as likely to use techniques that do *not* have an evidence-base (Stahmer, 2007; Stahmer, et al., 2004). Teachers in these studies report that they use EBP in a highly modified form, combining several methodologies to develop individualized programs based on each child's specific characteristics and adapting the program from the training protocol. Additionally, the majority of participants reported that adequate training for themselves and the paraprofessionals in their classrooms had not been provided (Stahmer et al., 2004). This calls into question the fidelity of implementation (FI) of these interventions, which refers to the degree to which an intervention is implemented as intended (Gresham, 1989). FI for most EBP for children with autism has only been tested in highly controlled environments and rarely in combination with other methods. Implementation fidelity is important because it connects EBP to positive outcomes for students. These findings

suggest that inadequate training may be related to inaccurate application of EBP in school settings.

As researchers and educators come together to address the increasing need for high-quality services for children with autism, two important issues must be addressed. First, there is a need to develop and put into practice effective methods for training and providing ongoing support in EBP to a large number of teachers. These methods should be both cost-effective and sustainable to ensure the maximum number of children have access to highly trained educators. Sindelar and colleagues (2010) charge the research community to determine how much time teachers need to spend in various learning opportunities to truly improve their effectiveness with students and how these learning opportunities can be provided in cost-efficient ways. Second, quality control must be assessed regularly to ensure the trained educators continue to use EBP as they were designed to be used. Ensuring high FI through regular assessment and correction of procedures increases the likelihood that children will receive the maximum benefit from an intervention.

#### Addressing Current Limitations through Improved Teacher Training

Increase in rate of autism diagnoses, inadequate pre-service teacher training, attrition of special education teachers and poor dissemination of EBP from the research community to special education teachers have created a demand for effective teacher training methods. Specifically, there is a need for training models that are inexpensive and effective for training current and future teachers in EBP, and that incorporate ongoing assessment of FI. Each of these issues can be addressed by improving the



training practices used to educate teachers on-the-job and by engaging existing school staff in the training and supervision process.

Supplemental training is a common and necessary method of educating teachers in best practices for educating children with autism. In contrast to university-based credential programs, post-certification professional development is likely to provide an immediate form of effective training in new or recently modified EBP (Bailey, Simeonsson, Yoder, & Huntington, 1990). Such training is typically provided after teachers are already “in service” as professional educators and is often completed during paid work time. It has been suggested that in-service training in special education should be provided on a continuous basis because of frequent changes in school policy, staff placement, and student diagnoses (Fredericks & Templeman, 1990). However, there is concern over the scope and depth of many such trainings (Odom, 2009; Scheuremann, Webber, Boutot, & Goodwin, 2003). In-service training often takes the form of a 1- or 2-day training workshop that does not include an opportunity for participants to practice the skills being taught with children. Odom (2009) summarizes that although these “one-shot workshops” can be beneficial for sharing general knowledge or influencing teacher attitudes, they typically do not result in effective adoption of teaching strategies. This type of presentation may result in teachers learning new information, but it is unlikely that the information will translate into the ability to implement specific instructional skills. A more effective training method includes instruction, opportunities to practice skills while receiving coaching and feedback, and ongoing supervision with immediate feedback (NRC, 2001; Odom, 2009; Scheuermann, Webber, Boutot, & Goodwin 2003). Therefore, while in-service training is a critical element of training teachers in strategies

for educating children with autism, the training must be “hands-on” and include learning opportunities beyond the workshop to maximize effectiveness. Additionally, to support staffs’ use of newly acquired skills, active and ongoing supervision should be part of every staff-training program (Reid, Parsons, and Green, 1989). In-service training is a useful method for introducing teachers to new teaching strategies, but it must include opportunities for teachers to practice these strategies and receive ongoing support.

Although it is common to use outside consultants to provide in-service training to teachers, their services are often expensive and their time commitment to trainees may be limited. The use of outside consultants to provide direct teacher training may not provide a long-term cost-effective solution. As an alternative, equipping existing school district staff members to train and support teachers should provide substantial benefits to teachers with no additional cost. School district personnel in roles as Autism Specialists or Behavior Specialists often lend support and training to classroom teachers. Such specialists are likely to have collaborative relationships with teachers, as they train and provide feedback to teachers as a regular part of their job. Preparing staff specialists to provide increased supervision and ongoing support in the form of FI assessment and feedback to teachers who receive training is likely to enhance the sustainability of effective methods (Lerman, Vondran, Addison, & Kuhn, 2004). These specialists are in schools on a regular basis and can provide long-term training and support to teachers. Existing school staff can play a key role in addressing the need for dissemination of EBP and regular assessment of FI of these interventions.

### Effective Training Approaches

If staff specialists take on the role of trainers for special education teachers, it is essential that they possess the knowledge and skills necessary to provide effective training and ongoing supervision. Fredericks and Templeman (1990) suggest that training programs should be evaluated with regard to trainee satisfaction, trainee implementation of skills, and child behavior changes as a result of the skills acquired by the trainee. To have a positive impact in each of these areas of evaluation, the trainers themselves must be skilled in delivery of the intervention and able to provide useful assessment and feedback to trainees. High-quality in-service training provided by existing school staff is likely the most cost-effective and sustainable method for educating teachers in EBP. However, school district staff may need specific training in management skills, because often they have entered their supervisory role with only their clinical training (Reid, Parsons, & Green, 1989). Training staff to both train teachers in EBP and provide helpful feedback to teachers should address both issues of practicality and sustainability in school programs for children with autism.

The train-the-trainer (TTT) model, which has also been called pyramidal training, triadic training, and helper model training, focuses on initially training a person or people who, in turn, train other people at their home agency. For consistency, those who receive training initially will be referred to as trainers, and those who are trained by participant trainers as trainees. The TTT model has promise of being both efficient and cost-effective (LaVigna, Christian, & Willis, 2005). The TTT model may be especially useful in addressing issues of translating interventions from research to practice and providing ongoing support to trainees.

TTT has several advantages. Page, Iwata, and Reid (1982) suggest several potential benefits of using TTT strategies: 1) The number of employees requiring direct structured training may be reduced to include only supervisory personnel, 2) participant trainers can provide training in the work environment where trained skills will be implemented, 3) once trainers are trained, they will be present in the work environment to help maintain trainees' behavior, and 4) the trainers will be capable and available to train new staff as they are hired. It has also been suggested that TTT multiplies the efforts of an outside consultant while building "in-house" expertise, thus reducing costs associated with training and establishing a system for quality control and skill maintenance (Jones, Fremouw, & Carples, 1977). Indeed, research supports TTT as having a positive impact on the sustainability of intervention programs (LaVigna et al., 2005).

The TTT model has a sound body of literature supporting its effectiveness in a variety of contexts, including residential centers (Page, Iwata, & Reid, 1982; Parsons & Reid, 1995; Shore, Iwata, Vollmer, Lerman, & Zarcone, 1995), hospitals for the mentally disabled (Whalen & Henker, 1971), experimental laboratories (Hester, Kaiser, Alpert, & Whiteman, 1995), and schools (Jones et al., 1977). TTT has also involved multiple types of trainees, including direct care providers (Page et al., 1982; Parsons & Reid, 1995; Shore et al., 1995), university students (Fremouw & Harmatz, 1975), parents (Hester et al., 1995; Kuhn, Lerman, & Vorndran, 2003; Neef, 1994), and teachers (Jones et al., 1977; LaVigna et al., 2005). The broad scope of these studies demonstrating the effectiveness of TTT highlights the strong potential for applicability of TTT methods to translating EBP for children with autism into school environments.

TTT has been effectively used to implement training in a naturalistic behavioral intervention. Hester and colleagues (1995) trained novice trainers to train parents of young children with developmental disabilities to use Milieu Teaching procedures. Milieu Teaching is a naturalistic intervention that has been effectively used to increase children's language abilities. In this study, three participant trainers worked with three untrained families (parent and child) individually. Participant trainers received instruction on how to implement Milieu Teaching procedures until they reached an 80% criterion for correct implementation. Then, participant trainers were instructed on basic information and strategies for training parents. After trainers completed both aspects of training, they began training parents to use the intervention. During training, all three trainees demonstrated an accelerating trend in their use of Milieu Teaching strategies. Targeted language for each child systematically increased as a result of the intervention. These data support the use of the TTT model with a naturalistic behavioral intervention, and provide evidence for effective language training in young children with developmental disabilities.

TTT has also been shown to be effective for large-scale training with psychologists and special education teachers. LaVigna and colleagues (2005) implemented a TTT program in New Zealand. A national training team was developed for the purpose of providing continued training to special education teachers in assessment of behavioral support plans. Psychologists (n=38 participant trainers) received training in both completing assessments of behavioral support plans and training teachers (n=23) to complete these assessments. Specifically, the psychologists received access to materials and ongoing support from the experimenters throughout their

participation in the project. Psychologists' mean score for correct implementation of the assessment procedures increased from 23.29% at pre-training to 78.50% at post training. Similarly, participating teachers' mean score for correct implementation of the assessment procedures increased from 30.14% at pre-training to 79.91% at post training. These results suggest the effectiveness of TTT when implemented with a large group of participants. However, a limitation of this project was that it did not measure change in student behavior as a result of teachers' increased skill.

The effectiveness of using TTT methods with classroom teachers to produce child change has also been demonstrated. Jones and colleagues (1977) trained elementary school teachers to implement a classroom management skill package and to train other teachers to use this package. Trainers first learned to implement the classroom management plan, and data were collected on students' disruptive behavior. Then, participant trainers received instruction in how to train other classroom teachers, and completed the training with their peers. Student disruptiveness decreased in all participating teachers' classrooms. Data indicate that completing the training process by training other teachers provided additional benefit for two of the trainers who profited least from the original training. Students in these two teachers' classrooms demonstrated even less disruptive behavior after their teacher began instructing trainees than when their teacher received initial training in the skill package. The experimenter's time investment in trainees was one-fourth the amount of time invested in participant trainers. This suggests not only the efficiency of the TTT model in training teachers, but also the added benefit of improved skill implementation by participant trainers after they train others.

One critical component of using a TTT program is development of a training structure that requires the trainer to provide feedback to trainees. Providing feedback appears to be an important component of maintaining proficient performance after initial training. Fleming and Sulzer-Azaroff (1989) emphasize the utility of combining feedback procedures with other methods when teaching behavioral interventions. Parsons and Reid (1995) assessed the effectiveness of a program for training paraprofessional supervisors to provide feedback to paraprofessional direct care staff working with people who have severe disabilities. Ten supervisors in a residential facility for people with severe disabilities received four hrs of training in how to give effective feedback. Training included written materials, direct instruction and role-playing. During baseline, the average implementation of feedback procedures was 41% correct. However, after receiving the training in specific elements of effective feedback, the average percentage for all supervisors increased to 86% correct. Additionally, the direct care staff members who received supervisor feedback averaged 100% correct teaching behavior as compared to the control group who averaged 72% correct teaching behavior. These data suggest that training supervisors to provide feedback is an effective way to improve the quality of care provided by direct care staff (Parsons & Reid, 1995).

In summary, both the TTT method and supervisor feedback are supported as effective training practices. However, absent in the literature is a description of how both practices affect teacher acquisition of EBP for children with autism in settings with a less-formal supervisory structure. Also relevant to the literature is how the TTT method and supervisor feedback affect maintenance of newly acquired skills after formal training ends.

### Pivotal Response Training

Behavioral interventions are well supported by research as a form of effective treatment for children with autism (Lovaas, Schreibman, & Koegel, 1974; Schreibman, 1988; Schreibman, 2005). Pivotal Response Training (PRT) is a naturalistic behavior intervention that was developed to facilitate generalization, increase spontaneity, reduce prompt dependency, and increase motivation. The “pivotal” responses trained in PRT vary based on a child’s developmental level, but typically include motivation and responsivity to multiple cues (i.e., increasing breadth of attention). Specific elements of PRT include providing clear and appropriate cues, allowing for child choice of and within an activity, turn-taking, interspersing maintenance tasks with acquisition tasks, reinforcing attempts, responding to multiple cues, and providing contingent reinforcement that is directly related to the child’s response. PRT was developed and has been supported as a method to increase verbal and nonverbal communication skills. A review of the research base for use of PRT concludes that it is an efficacious EBP for children with autism (Humphries, 2003).

Numerous research studies support the utility of PRT. When compared with other more structured techniques, PRT has been found to be more effective for increasing verbalizations and contingent language use (Koegel, Koegel, & Surrat, 1992; Koegel, O'Dell, & Koegel, 1987). PRT has been shown to improve a variety of language functions including speech imitation (Koegel, Camarata, Valdez, Menchaca, & Koegel, 1998; Laski, Charlop, & Schreibman, 1988), labeling (Koegel et al. 1998), question asking (Koegel et al. 1998), spontaneous speech (Laski et al., 1988), conversational communication (Koegel et al. 1998), and rapid acquisition of functional speech in



previously nonverbal children (Sze, Koegel, Brookman, & Koegel, 2003). PRT has also been adapted to teach symbolic play (e.g., Stahmer 1995), sociodramatic play (e.g., Thorp, Stahmer, & Schreibman, 1995), peer social interaction (e.g., Pierce & Schreibman, 1997), self-initiations (Koegel, Carter, & Koegel, 2003), and joint attention (e.g., Rocha, Schreibman, & Stahmer, 2007; Whalen & Schreibman, 2003). The various skills that have been taught through PRT suggest that it is an appropriate intervention for teachers of children with autism. Additionally, because PRT was developed for use in the natural environment, school classrooms are an appropriate setting for PRT implementation.

Although teachers report using PRT, there is limited evidence of *how* PRT is being translated into school programs for children with autism. Research examining usual care in the Southern California region indicates that over 70% of the 80 teachers surveyed reported using PRT, or some variation of PRT, in their programs (Stahmer, 2007a; Stahmer, 2007b). Twelve percent of the teachers using PRT use it as the primary intervention in their program. They reported using the technique with 75-100% of their students in both group and one-to-one settings. Although PRT was their primary intervention, only two of the seven teachers reported that they use all aspects of the intervention. The remainder of these teachers indicated using parts of the intervention or using PRT in conjunction with other treatment methods. These findings suggest that teachers may not be implementing PRT accurately.

Researchers in Oregon have been working with the State Department of Education to implement EBP in public school programs. A program was developed that included PRT along with other research-supported behavioral practices. Arick and

colleagues (2003) reported outcome data for over 100 children with autism participating in the program, showing that the majority of children made significant progress in the areas of social interaction, expressive speech, and use of language concepts. Children enrolled in the program gained, on average, more than one month of language age for every month of instruction. In addition, they displayed significant decreases in inappropriate/negative behaviors associated with autism. These findings are encouraging and support PRT as one part of an effective program being implemented in school programs.

Despite findings that many teachers report using PRT as a primary or secondary intervention in their classrooms, FI of PRT in classrooms has not been systematically monitored. FI, or treatment integrity, is the degree to which a treatment is implemented as planned or intended, and is essential for any successful behavioral program (Gresham, 1989). The effectiveness of any behavioral treatment depends on how well it is implemented by an individual researcher, clinician, parent or teacher. Gresham and colleagues (2000) state that fidelity of implementation is particularly problematic when third parties (e.g. teachers, parents) are adopting complex intervention programs. The next step, then, was applying assessment of implementation to existing school-based PRT programs.

Suhrheinrich, Stahmer, & Schreibman (2007) observed San Diego County special education teachers who had been previously trained to use PRT. Teachers reported receiving various types of training: reading the PRT training manual, observation, didactic instruction, and feedback from a professional. None of the 10 participating teachers met the mastery criteria (80%) for correct implementation for all areas of PRT.

Therefore, teachers may need more thorough or systematic training to accurately use PRT with their students. Data indicated that teachers who received some feedback from a professional, in addition to a combination of other types of training, used PRT more accurately than those who did not receive feedback. It is likely that a teacher-specific research-based protocol for training and monitoring implementation of PRT will lead to more effective implementation.

### PRT Training for Teachers

A pilot study was designed to experimentally evaluate the effectiveness of a protocol for training teachers to use PRT. Drawing from previous research (Suhreinerich et al., 2007), the new protocol included didactic instruction, modeling, practice with feedback from a professional, and ongoing support to the point of mastery in all areas of PRT. Specifically, participating teachers (n=10) attended a 6-hr training session that included: 2 hrs of didactic instruction, 1 hr of modeling via videotaped PRT sessions, 1 hr of modeling live with a child with autism, 1 hr of practice implementing PRT with feedback from a professional, and 1 hr discussing questions and implementation techniques. After the 6-hr training session, post-training video probes were taken in each teacher's classroom and scored to assess the FI of PRT. Teachers received feedback and suggestions for improved implementation based on video scoring. Post-training videotaping continued until each participating teacher met the mastery criteria (80%) for FI for all areas of PRT during two consecutive probes. Preliminary results indicate that this training protocol was effective in training teachers to use PRT in their classrooms. Training to the point of mastery of PRT took an average of 7.75 hrs ( $r = 6.5 - 9.5$  hrs) including the 6-hr group training session and additional time as weekly 30-min blocks of

individual classroom-based training. However, follow-up data indicate that 50% of the participating teachers did not maintain PRT skill implementation at a mastery level.

These data demonstrate the type and amount of training necessary for teachers to reach mastery of PRT, but they also suggest teachers who can implement PRT at a mastery level may lose skills without ongoing support.

### Current Investigation

There is a growing need for teachers who are trained to educate children with autism. Specifically, teachers need access to training in EBP, such as PRT. To ensure maximum benefit to students, training must prepare teachers to implement PRT with high fidelity and maintain high FI after training ends. This project will address areas of need by building upon existing research on both behavioral interventions for children with autism and effective training methodologies. The proposed research will pose three questions that are not currently addressed in the literature: 1) is the TTT model effective for training teachers to implement PRT, 2) is the TTT model sustainable, such that trainers who master the training and feedback strategies continue to implement them at a mastery level, and 3) is the model sustainable, such that teachers who master PRT implementation during training continue to implement PRT at a mastery level? This research will also add to the existing literature on teacher implementation of PRT and training protocols for school-based programs for children with autism in general.

## METHOD

## Participants

### *Trainers*

Three school staff participated as trainers in this investigation. School staff participants met the following inclusion criteria: (a) a primary job description that allowed them to provide training to special education teachers (e.g., Behavior Specialist, Autism Specialist), (b) no prior training in teaching others to use PRT, (c) direct contact with at least 3 teachers willing to participate in this study as trainees. Staff participants will be referred to as Trainers A, B and C.

All three trainers were female with an age range of 29 to 32 years. Trainers A and C were Caucasian and Trainer B was Latino. Trainers A and B completed a Master's degree in Special Education with a specialization in autism, and Trainer C held a Bachelor's degree in Special Education. All trainers had some specialized training in autism and some exposure to or training in PRT. Each trainer reported some job related stress, with Trainer A reporting that her job was "occasionally stressful," Trainer B reporting her job was "stressful, but manageable" and Trainer C reporting that "stress overwhelms me." All trainers were satisfied or very satisfied with their job. See Table 1 for a full description of trainer demographics. Each trainer worked with three teachers for the purposes of the current study.

### *Teachers*

Nine special education teachers participated in this investigation. Teachers met the following inclusion criteria: (a) a full or part-time position as lead teacher in a special education classroom, (b) at least two students with a primary educational classification of

autism who had parental consent to participate in this study. Teachers will be referred to as A1, A2, A3, B1, B2, B3, C1, C2, C3 with the letter corresponding to their trainer.

All nine teachers were female with an age range of 25 to 55 years. Six teachers were Caucasian, one teacher was Filipino, one teacher was Native American, and one teacher chose not to report ethnicity. One teacher (A2) had a Master's degree in education technology and elementary science, whereas the other teachers all had Bachelor's degrees. Number of years teaching children with autism ranged from 1 to 13. All teachers reported having some training on how to educate children with autism, described as either "on the job" or through university coursework. Additionally, five teachers (A2, B1, B2, B3, and C3) reported having received some "on the job" training specifically in PRT. Teachers reported that they were satisfied (A3, B1), very satisfied (A2, B3, C2, C3) or as satisfied as possible (C1) with their job. All teachers reported job related stress. Specifically, some teachers considered their job occasionally stressful (C1, C2), others said their job was stressful but manageable (A1, A2, A3, B1, B3) and still others reported that job-related stress overwhelmed them (B2, C3; see Table 2).

### *Students*

Twenty-one students participated in this investigation. Students met the following inclusion criteria: (a) a primary educational classification of autism, and (b) a chronological age of three to eight years. This age group was chosen because the majority of the evidence supporting PRT in children with autism focuses on this age group. Each teacher selected two students, and parental consent was gathered. Students will be referred to as A1a, A1b, A2a, A2b, A2c, A3a, A3b, B1a, B1b, B2a, B2b, B2c, B3a, B3b, C1a, C1b, C2a, C2b, C2c, C3a, C3b, corresponding with the teacher identification codes.

Teacher B2 worked with a third student (B2c) because student B2b was transferred to a new classroom during the treatment phase of the study. Teachers A2 and C2 also worked with a third student (A2c and C2c, respectively) during the follow-up assessment because their other participating students were transferred to other classrooms during the follow-up period.

### Design

This study employed a single-subject, multiple baseline design across training groups. This type of design has the advantage of controlling for developmental maturation and exposure to the treatment (Kazdin, 1982). Each training group consisted of one trainer, three teachers, and six students (i.e. Trainer A, Teachers A1, A2, and A3 and Students A1a, A1b, A2a, A2b, A3a, and A3b). Each group participated in a baseline condition for three to seven weeks, according to the multiple baseline design. Baseline durations were three, five, and seven weeks, with seven weeks being about equal to the length of the intervention. For each trainer, data were obtained during baseline, treatment and at a 3-month follow-up visit. Seven of the nine teachers participated in the baseline, treatment, post-treatment and follow-up conditions. One teacher discontinued participation during treatment due to change of employment. Additionally, one teacher discontinued participation during the follow-up period due to personal matters and an extended leave from her classroom. Data for some students were obtained during baseline, treatment and at a 3-month follow-up visits, while other students only participated in a portion of the conditions. Five of the students (A3b, B1a, B2a, C3a, C3b) participated in the baseline, treatment and follow-up conditions. Thirteen students (A1a, A1b, A2a, A2b, A3a, B1b, B2b, B3a, B3b, C1a, C1b) participated in baseline and



treatment conditions only because they were transferred to different classrooms during the follow-up period. One student (B2c) participated in only the treatment condition because he joined the study during treatment after student B2b was transferred to a different classroom. Two students (A2c and C2c) participated in only the follow-up condition because both of the other students who previously worked with their teacher had been transferred to different classrooms.

### Setting

#### *UCSD Autism Intervention Research Laboratory*

Trainer training was conducted at the UCSD Autism Intervention Research Laboratory. A large living room style room was used for the following elements of the trainer training: didactic instruction, video modeling, and question and answer sessions. A 6 x 8-ft carpeted room furnished with a small table, two small chairs, toys and a one-way mirror for observation was used for the following elements of the trainer training: modeling PRT, practice of PRT with experimenter feedback, observing and providing feedback to trainers.

#### *Special-Education Classrooms*

Teacher training workshops and all classroom observations were conducted in participating teachers' classrooms in San Diego County, California. Classroom size and layout varied, but all classrooms included the following: a play area, child-sized tables and chairs or individual desks, toys or other academic materials, and adult-sized chairs.

### Materials

Materials included various developmentally appropriate toys such as children's books, figurines, cause-and-effect-toys, art supplies, educational games, and puzzles.

The trainer or teacher working with the student selected materials. Toys used in the UCSD Autism Intervention Research Laboratory were the property of the laboratory, and toys used in special-education classrooms were the property of the participating teachers or school district. Other materials used during trainer training at the UCSD Autism Intervention Research Laboratory and during teacher training in classrooms included a laptop computer and projector for presenting the didactic instruction lecture and videos, a stopwatch, and a digital video camera for recording.

### Procedure

*Baseline.* See Table 3 for a flow chart of the research procedures. Trainers, teachers, and students participated in baseline sessions for the first three, five, or seven weeks. One month prior to the start of baseline sessions, each teacher and trainer completed a demographics questionnaire (see Appendices A and B) and received a copy of a PRT manual, adapted from *How to teach pivotal behaviors to children with autism: A training manual* (Koegel, Schreibman, Good, Cerniglia, Murphy & Koegel, 1989). All baseline sessions were completed prior to trainers beginning their training. Classroom observations occurred once each week throughout baseline. During each classroom observation assessment information was gathered and each teacher was instructed to work for 10 min with both participating students in her class. Specifically, the teacher was instructed to complete a Weekly Update form summarizing the amount of time she spent interacting with each participating student and identifying each student's maintenance and acquisitions skills for the week (see Appendices C and E). The teacher was also instructed to use PRT (or attempt to use PRT) with both student participants. A trained research assistant videotaped the teacher/student interaction. The trainer was also

instructed to complete a Weekly Update form (see Appendices D and E), summarizing the amount of time she spent observing or interacting with the teacher during the week. The trainer was instructed to observe both 10-min teacher/student interactions for a total of 20 min of observation and to assess the teacher's use of PRT to the best of her ability using the PRT Assessment form (see Appendix F). At the completion of the 20 min of observation, the trainer was instructed to provide feedback to the teacher based on the teacher/student interactions using the PRT Feedback form (see Appendix G). The trainer/teacher interaction was videotaped by a trained research assistant. Videotaped classroom observations were used to assess student behavior, teacher implementation of PRT, and trainer ability to assess teachers' use of PRT and provide accurate feedback. All forms completed by the trainer and teachers were collected by a trained research assistant and returned to the UCSD Autism Intervention Research Program facilities.

*Trainer Training.* Each trainer participated in 15 total hrs of training over the course of three weeks. Training took place in either three 5-hr sessions or five 3-hr sessions based on the availability of the trainers. The specific components of training were constant across participants (see Appendix H). Initially, trainers received the training materials and completed the informed consent process. Next, the experimenter presented didactic instruction on the history and components of PRT, how to use PRT in classroom settings and how to assess implementation of PRT. Video examples of PRT being implemented with children were used to illustrate correct and incorrect implementation of each PRT component. Trainers practiced implementing PRT with children in the laboratory and received feedback from the experimenter and learned to assess implementation of PRT by observing research assistants use PRT with children in

the laboratory. The experimenter explained and modeled the following process to trainers: observe the teacher and complete the PRT Assessment form based on the PRT Behavioral Definitions (see Appendix I), complete the PRT Feedback form based upon the assessment, and provide verbal feedback based upon the PRT Feedback Form. Based on their assessment of research assistants' implementation of PRT, trainers completed the PRT Feedback form and provided verbal feedback. Finally, the experimenter reviewed the procedures and materials for the teacher-training workshop, and answered any questions. Overall, trainers received instruction and were assessed in four areas: 1) how to implement PRT, 2) how to assess implementation of PRT, 3) how to provide feedback based on Parsons and Reid's (1995) model for training supervisors to provide feedback to direct care staff, and 4) how to conduct the PRT workshop with their teachers (see Appendices J and K). Each trainer was required to meet an implementation criterion of 80% correct use of all PRT components, a reliability criterion of 80% agreement with the experimenter for assessing implementation of PRT, and an implementation criterion of 80% correct completion of the PRT Feedback form before teacher training was complete.

*Teacher Training.* After completing trainer training, trainers conducted all aspects of teacher training. Each teacher participated in 10 hrs of training over the course of nine weeks. The first six hrs of training were conducted as a group in-service workshop, referred to as the teacher-training workshop. The trainer scheduled the workshop during the teachers' regular work hrs. The workshop included the following components: didactic instruction on the history and elements of PRT, video modeling of correct and incorrect examples of PRT, didactic instruction and discussion of how PRT may be implemented in classrooms environments, observation of PRT being implemented by the

trainer, practice implementing PRT with feedback from the trainer, and a brief introduction to how PRT FI is assessed. The remaining hrs of training took place as 30-min classroom observations, once a week for seven weeks. If both participating students, the teacher, or the trainer was absent from school, a scheduled classroom observation was cancelled. All cancelled sessions were rescheduled. However, two teachers (A1, A2) only completed six classroom observations after the teacher-training workshop because the end of the school year occurred before the final classroom observation could be rescheduled. During each classroom observation assessment, each teacher was instructed to work for 10 min with each participating student in his or her class. Specifically, the teacher was instructed to use PRT (or attempt to use PRT) with both participating students. The teacher/student interaction was videotaped. The trainer was instructed to observe both 10-min teacher/student interactions for a total of 20 min of observation and assess the teacher's use of PRT by completing the PRT Assessment form. At the completion of the 20 min of observation, the trainer was instructed to provide feedback to the teacher based on the teacher/student interactions using the PRT Feedback form. A trained research assistant videotaped the participant trainer/teacher interaction. Videotaped classroom observations were used to assess student behavior, teacher implementation of PRT, and trainer ability to assess teachers' use of PRT and provide accurate feedback.

*Fidelity of Implementation of Research Protocol.* The experimenter's adherence to research protocol was assessed to ensure correct implementation and protect against experimenter bias. FI was scored using a checklist for each research procedure and yielded 100% for delivery of research materials, 100% for recording of baseline

classroom observations, 97% for completion of trainer training protocol (Trainer B did not complete the fourth practice session for assessing implementation of PRT and providing feedback), 97% for recording of treatment classroom observations (Teachers A1 and A2 only completed six of the seven observations), and 100% for recording of follow-up classroom observations (see Table 4).

### Assessments

*Behavioral Coding.* Trained research assistants coded behavioral data for each trainer, teacher and student from videotape. Research assistants were blind to the research questions addressed by the investigation.

*Interobserver agreement.* Interobserver agreement, or reliability, was calculated on coding of the trainers' and teachers PRT implementation and on student behavior. Interobserver agreement was calculated across all participants and for each behavior separately. PRT implementation was coded using a four-point scale, and reliability was defined as 80% agreement, or no more than .8 point difference. For example, if the first coder gave a score of 3.5 and the second coder gave a score of 3.8, they were determined to be in agreement, or reliable, because the scores did not differ by more than 20%. Reliability was calculated on 28% of PRT FI assessments and was 100% for Attention, 100% for Clarity, 100% for Appropriateness, 96% for Maintenance/Acquisition, 96% for Child Choice, 100% for Contingent, 98% for Direct Reinforcement, 92% for Reinforcement of Attempts and 96% of Turn Taking. Student behavior was coded using a five-point scale, and reliability was defined as 80% agreement, or no more than one point difference. Reliability was calculated on 100% of student behavior assessments and was 84% for student language ability and 95% for student cooperative behavior.

*Participant Assessments.*

*Trainer.* The trainers were assessed in four areas: PRT implementation, assessment of PRT implementation, implementation of feedback procedures, and implementation of the PRT teacher-training workshop. To assess participant trainers' implementation of PRT, probes were conducted. Probes occurred at the start of the trainer training, at the completion of the trainer training, during the teacher-training workshop and again at the follow-up classroom observation. During each probe, the participant trainer was instructed to use PRT with one student for 10 min. The interactions were videotaped and coded using PRT Behavioral Definitions and the PRT Assessment form.

Trainers completed the PRT Assessment form during each teacher/student classroom observation. The trainers' ability to assess PRT implementation was measured by calculating the percent of agreement between how trainers scored their teachers' implementation of PRT in-vivo and how trained research assistants scored the same teacher/student interactions via videotape. Additionally, percent of agreement was calculated between the verbal feedback trainers' provided to their teachers about components of PRT that were not implemented correctly and the trained research assistants' scoring of components of PRT that were not implemented correctly. That is, what the trainers said to the teachers was compared with research assistants' scoring.

Implementation of feedback procedures was assessed to determine if trainers accurately conveyed information gathered on the PRT Assessment form. Trainers' use of the PRT Feedback form was evaluated for completion. In addition, for components of

PRT that the teacher did not implement correctly, agreement between the PRT Assessment form, the PRT Feedback form, and the verbal feedback was evaluated.

*Teacher.* Each teacher's ability to implement PRT was assessed. Videotaped teacher/student interactions were observed and coded using PRT Behavioral Definitions and the PRT Assessment form.

*Student.* The behavioral response of each student was assessed. Teacher/student interactions were videotaped during classroom observations, and student behavior was coded via videotape using the Student Language and Behavioral Definitions (see Appendix L).

*Satisfaction.* A consumer satisfaction questionnaire (see Appendices M and N) was distributed to participants to assess the trainers' and teachers' satisfaction with the intervention. The questionnaire was mailed to all trainers and teachers with a stamped return envelope. Participants were encouraged to complete and return the form anonymously. Questions assessed attitudes toward PRT as well as the usefulness and difficulty of specific components of the training. Some questions required one or two written sentences and others required a Likert-type response.

*Data Analysis.* Analysis of the data gathered during trainer training, the teacher-training workshop and classroom observations was conducted using visual analysis, as is customary in studies employing a multiple-baseline design (Gliner, Morgan & Harmon, 2000).



## RESULTS

## Trainers

*Trainer Training.* All trainers successfully completed the trainer training; that is, they accurately demonstrated proficiency in implementing PRT, assessing implementation of PRT, and providing feedback based on the PRT implementation assessment, and they followed the training procedures during the teacher-training workshop.

All three trainers demonstrated a high level of competency in using the components of PRT at the start of trainer training. On day one of trainer training, Trainers A and C met the 80% fidelity of implementation criteria and Trainer B's implementation of PRT was 60% correct. After attending the training lecture portion and practicing PRT with feedback from the experimenter, each trainer implemented PRT with 100% accuracy on the second day of the trainer training (see Figure 1). Trainer implementation of PRT remained high, with all trainers meeting fidelity of implementation criteria throughout the rest of the study.

During the trainer training, trainers correctly assessed implementation of PRT and provide accurate feedback. Percent agreement for the PRT implementation assessment was measured during each practice session. Each trainer surpassed an 80% agreement reliability criterion by the end of training (see Figure 2). All trainers also demonstrated feedback procedures (i.e. completing the feedback questionnaire based on PRT Assessment form) with 100% accuracy throughout all practice sessions. Thus, all trainers demonstrated proficiency in all procedures during the trainer training.

*Teacher-training Workshop.* Implementation of teacher-training workshop procedures varied by trainers. Trainers A and B completed 100% of procedures

correctly. Trainer C completed 91% of procedures correctly, failing to properly prepare toys and training materials and model PRT during one of three scheduled times (see Appendix). When trainers' implementation of PRT was assessed during the teacher-training workshop, Trainer A implemented all components of PRT correctly, whereas Trainers B and C both implemented 89% of components correctly – failing to accurately use turn taking procedures (see Figure 1).

*Classroom Observations.* During weekly classroom observations, all trainers demonstrated marked improvement in ability to assess teachers' correct implementation of PRT from baseline to treatment conditions. Difference scores of reliability for PRT implementation assessment from baseline to treatment showed 40% improvement averaged across all trainers. Specifically, Trainer A averaged 47% reliability during baseline and 70% reliability during treatment (23% improvement), Trainer B averaged 21% reliability during baseline and 83% during treatment (62% improvement), and Trainer C averaged 41% reliability during baseline and 74% during treatment (33% improvement; see Figure 3).

The verbal feedback trainers provided to teachers after each observation was also assessed. Accuracy of feedback improved over the course of the study. Difference scores from baseline to treatment showed 13% improvement averaged across all trainers. Specifically, Trainer A averaged 49% reliability during baseline and 67% reliability during treatment (18% improvement), Trainer B averaged 55% reliability during baseline and 64% during treatment (9% improvement), and Trainer C averaged 52% reliability during baseline and 64% during treatment (12% improvement; see Figure 4).

Implementation of feedback procedures was further assessed to determine how trainers conveyed information gathered on the PRT Assessment form (see Table 5). Trainers' use of the PRT Feedback Form was evaluated for completion during baseline and treatment conditions. Across all baseline observations, Trainers completed the PRT Feedback form either Fully 50% (A), 83% (B), 30% (C), Partially 44% (A), 17% (B), 70% (C), or Not at all 6% (A), 0% (B), 0% (C). Across all treatment sessions, Trainers completed the PRT Feedback form either Fully 0% (A), 65% (B), 13% (C), Partially 14% (A), 35% (B), 84% (C), or Not at all 86% (A), 0% (B), 3% (C). In addition, for components of PRT that the teacher did not implement correctly, agreement between the PRT Assessment form, the PRT Feedback form, and the verbal feedback was evaluated. If the trainer did not complete the PRT Feedback form, but did identify areas for improvement on the PRT Assessment form or through verbal feedback, a disagreement was noted. Agreement between the trainers' scoring of the PRT Assessment form and the PRT Feedback form was evaluated. Across all baseline observations, there was either Full 0% (A), 0% (B), 35% (C), Partial 28% (A), 22% (B), 14%(C), or No 72%(A), 78% (B), 51% (C) agreement between the two forms. Across all treatment observations, there was either Full 6% (A), 26% (B), 41% (C), Partial 3% (A), 26% (B), 13%(C), or No 92% (A), 47% (B), 46% (C) agreement between the two forms. Another comparison involved each trainer's scoring of the PRT Assessment form and the verbal feedback she provided to the teacher, specifically with regard to areas for improvement. Across all baseline sessions, there was either Full 0% (A), 10% (B), 24% (C), Partial 22% (A), 50% (B), 3% (C), or No 78% (A), 40% (B), 73% (C) agreement between the PRT Assessment form and the verbal feedback to the teacher. Across all treatment sessions, there was either

Full 26% (A), 18% (B), 42% (C), Partial 26% (A), 43% (B), 27% (C), or No 47% (A), 39% (B), 30% (C) agreement between the PRT Assessment form and the verbal feedback to the teacher. The final comparison included the trainer's completed PRT Feedback form and the verbal feedback provided to the teacher, specifically regarding areas for improvement. Across all baseline sessions, there was either Full 13% (A), 30% (B), 44% (C), Partial 27% (A), 35% (B), 8% (C), or No 60% (A), 35% (B), 47% (C) agreement between the PRT Feedback form and the verbal feedback to the teacher. Across all treatment sessions, there was either Full 6% (A), 29% (B), 33% (C), Partial 18% (A), 43% (B), 6% (C), or No 76% (A), 29% (B), 61% (C) agreement between the PRT Feedback form and the verbal feedback to the teacher.

### Teachers

The majority of teachers learned to correctly implement all components of PRT, with six teachers implementing 100% of all skills correctly and three teachers implementing up to 89% of components correctly (see Figure 5). The majority of teachers showed improvements throughout the course of the study. However, there was variability in how and what the teachers learned (see Figure 6).

Each teacher correctly demonstrated some components of PRT during baseline, so percent of skills learned was initially determined by dividing the number of components learned during treatment by the number of components unknown at the start of treatment (or those possible to learn; see Figure 7). Six of the nine teachers learned 100% of the previously unknown components as demonstrated with one or both of their participating students. One teacher (B2) learned 50% of previously unknown components as demonstrated with each of her students. Another teacher (C3) correctly used 33% of

previously unknown components with one of her students, but demonstrated no learning with her second student. The final teacher (C1) demonstrated no learning with either student.

Teacher learning was also evaluated by calculating the difference between the average implementation score for each component across all baseline sessions and across all treatment sessions. Teachers demonstrated a 15% average increase in correct implementation of PRT skills from baseline to treatment, with groups A, B and C demonstrating gains of 22%, 15% and 9% respectively. There was substantial variability between teachers, with a range of difference scores from 2(C3b) – 42(A3b)% improvement (see Figure 8). None of the participants had a negative difference score, which would indicate loss of skill from baseline sessions to treatment sessions.

Teacher learning varied across components. Teachers implemented some components of PRT correctly during the baseline condition. All teachers correctly implemented three skills during a majority of baseline sessions: Attention, Clarity, and Appropriateness. In addition over half of the teachers correctly implemented three additional skills through the majority of baseline sessions, with six teachers correctly using Contingent Consequence (B1, B2, B3, C1, C2, C3), five teachers correctly using Direct Reinforcement (B1, B2, C1, C2, C3), and five teachers correctly using Reinforcement of Attempts (A1, B1, B2, B3, C2). None of the teachers implemented Child Choice or Turn Taking correctly during the majority of baseline sessions, and only two teachers (A1, C3) implemented Maintenance/Acquisition correctly during a majority of the baseline sessions (see Figures 9 through 17). Six of the nine teachers (two from each training group) demonstrated an ascending baseline for one or two of the nine PRT

skills. The majority of improvement made during baseline sessions was with Direct Reinforcement.

### Follow-up

A final classroom observation was completed three months after completion of the training. Training groups A and C completed follow-up assessments upon returning from summer vacation.

Trainers maintained their ability to implement PRT, with Trainer A implementing all skills correctly and Trainers B and C implementing 89% of skills correctly (see Figure 1). Trainers also demonstrated maintenance of PRT FI assessment skills from treatment to follow-up (see Figure 18). Trainers showed variability in their maintenance of the accuracy of feedback provided to teachers (see Figure 19). Trainer C showed a slight improvement (3%) in accuracy of feedback from treatment to follow-up. Trainer A had a slight loss (5%) in accuracy of feedback, but maintained improved accuracy over feedback provided during the baseline condition. Trainer B had a more substantial loss (13%) in accuracy of feedback but was also highly variable in her accuracy between teachers. Trainer B's feedback to Teacher B2 at follow-up was only 22% reliable with a research assistant's assessment of Teacher B2's implementation of PRT (a 42% loss in accuracy from the treatment phase). However, Trainer B's feedback to Teacher B3 at follow-up was 78% reliable with a research assistant's assessment of Teacher B3's implementation of PRT (a 14% increase in accuracy from the treatment phase).

During the follow-up assessment, teachers correctly implemented 70% of PRT components, on average (see Figure 20). Five teachers maintained their ability (within 5% change from average implementation of PRT skills during treatment). One teacher

improved implementation of PRT skills by 7%, and one teacher regressed in implementation of PRT skills by 55%.

### Satisfaction

Trainer rate of response for the consumer satisfaction questionnaire was 67% (two of the three trainers) and teacher rate of response was 86% (six of the seven teachers who participated in the follow-up condition).

*Trainer Satisfaction.* Trainer response was very positive (see Table 6). Some questions related to the trainer's overall experience. Trainers were either very satisfied (one trainer) or satisfied (one trainer) with overall quality of training received. Additionally, both respondents would recommend this training to another person in their position. Both trainers were very satisfied with the organization and structure of the training they received in the laboratory setting. However, ratings of other research procedures were slightly lower with responses of satisfied (one trainer) or neutral (one trainer) for the organization and structure of weekly classroom visits. Respondents were very satisfied (one trainer) or satisfied (one trainer) with the PRT manual and both trainers were satisfied with both materials for monitoring student progress and materials for assessing fidelity of implementation. Practice with feedback and direct training were rated as the most helpful parts of the training. When asked about the least helpful parts of the training, one trainer felt all parts of the training were helpful, whereas the other respondent wished the experimenter would have provided comments on the feedback given to teachers.

Some questions related to the experimenter (referred to as 'trainer' in the questionnaire). Both respondents were very satisfied with the experimenter's ability to



implement PRT and to answer questions regarding PRT. They were either very satisfied (one trainer) or satisfied (one trainer) with the experimenter's delivery of important information. Ratings were lower for the experimenter's understanding of issues related to using PRT in a classroom with one trainer satisfied and one trainer neutral.

Other questions related to the trainers' perception of their own skills after completing the training. On a scale of 1-5, with 1 being "I know very little about it" and 5 being "I am very knowledgeable about it," one trainer rated herself as a 4 and the other as a 4.5 with regard to understanding of PRT. On a scale of 1-5, with 1 being "I am not comfortable implementing it" and 5 being "I am very experienced and comfortable," both trainers rated themselves as 4 with regard to their comfort level implementing PRT. Trainers were either neutral (one trainer) or satisfied (one trainer) with their own ability to train others to use PRT.

Finally, several questions related to PRT in general. Both trainers believe in this approach and consider it 'highly successful' for children with autism. Trainers considered the most difficult parts of PRT to implement to be responding to Multiple Cues, Turn Taking, and Reinforcement of Attempts. Trainers reported Turn Taking (one trainer) and creative play (one trainer) as being the most difficult parts of PRT to teach others.

*Teacher Satisfaction.* Six of the nine teachers anonymously completed and returned the satisfaction questionnaire at the completion of the study (see Table 7). Responses were very positive. Some questions related to the teachers' overall experience. Teachers were either very satisfied (50%) or satisfied (50%) with the overall quality of training they received. Additionally, 100% of respondents would recommend this training to another person in their position. Respondents were very satisfied (50%), satisfied (16%) or

neutral (30%) with the PRT manual and were very satisfied (16%), satisfied (50%) or neutral (33%) with materials for monitoring student progress. When asked about the organization and structure of weekly classroom observations, teachers were very satisfied (16%), satisfied (66%) or neutral (16%), and when asked about the organization and structure of the 6 hr training workshop, teachers were very satisfied (50%), satisfied (33%), or neutral (16%). Feedback (50%), the 6 hr workshop (16%), practice (16%), and turn taking (16%) were rated as the most helpful parts of the training. When asked about the least helpful parts of the training, 16% felt the initial training (workshop) was the least helpful, 16 % would like more breakdown of the PRT components, 16 % would like less time being videotaped, and 33 % had no response.

Some of the questions related to teachers' satisfaction with their trainer's performance. Teachers were either very satisfied (50%) or satisfied (50%) with their trainer's ability to deliver important information, implement PRT, and answer questions regarding PRT. Additionally, teachers were very satisfied (66%) or satisfied (33%) with their trainer's understanding of issues related to using PRT in the classroom.

Other questions related to the teachers' perception of their own skills after completing the training. On a scale of 1-5, with 1 being "I know very little about it" and 5 being "I am very knowledgeable about it," teachers rated themselves as either 4 (86%) or 3 (16%) with regard to their understanding of PRT. On a scale of 1-5, with 1 being "I am not comfortable implementing it" and 5 being "I am very experienced and comfortable," teachers rated themselves as 5 (16%), 4 (66%), or 3 (16%) with regard to their comfort level implementing PRT. Teachers were either very satisfied (50%) or satisfied (50%) with their own ability to use PRT.

Finally, several questions related to PRT in general. When asked, “How well do you think PRT works for children with autism in your program (scale of 1-5, 1 being “not at all successful,” to 5 being “highly successful),” teachers responded 4 (86%) and 5 (16%). Eighty-six percent of respondents believe in this approach. Trainers considered the most difficult parts of PRT to implement to be responding to Multiple Cues (50%), Turn Taking (50%) and Reinforcement of Attempts (50%). When asked about the most difficult aspects of implementing PRT with their students, teachers replied “finding time” (33%), being creative (16%), and that there are too many components of PRT (16%). The remaining 33% did not reply to this question. Teachers report using the entire intervention (50%), the entire intervention mixed with other interventions (33%), and parts of the intervention (16%). Half of the teachers report using PRT throughout the day but cannot estimate a percentage of time, some teachers (33%) report using PRT 51-75% of the day, and some teachers (16%) report using PRT 26-50% of the day. Teachers report using PRT with a student one-on-one (66%), with two students (33%), with a small group of students (50%), with a large group (16%), and in multiple settings (16%). Half of the respondents use PRT with 76-100% of their students, some (33%) teachers use PRT with 51-75% of their students, and others (16%) use PRT with 26-50% of their students. Teachers reported using toys (83%) and educational games/math manipulatives (16%) during PRT.

### Students

Student language and behavior ratings varied slightly from pre to post-treatment. Four students demonstrated an increase in assessed language ability, three students decreased in assessed language ability, and 12 students maintained their language rating

(see Figure 21). Similarly, four students showed improvements in behavior, five students had decreases in behavior ratings, and 10 students maintained their behavior rating (see Figure 22).

## DISCUSSION

### Trainers

The findings of this study address the initial aims of the research. Trainers and teachers benefitted from participation in the study, with the majority of participants learning new skills and maintaining these skills over time. These findings add support to the usefulness and effectiveness of the TTT model and expand the body of literature on training teachers to use a naturalistic behavioral intervention.

Trainers learned to implement PRT, assess PRT and give feedback to teachers. Each of these skill areas showed improvement during the course of trainer training. Trainers showed significant improvement in their ability to assess PRT as evidenced by increased reliability between trainer-scored PRT Assessment forms and research assistant-scored forms. Trainers made notable improvements in the accuracy of their assessment from baseline to completion of their training. This indicates that all trainers learned to complete the PRT assessment procedures in a relatively short time period. Although the assessment process was technically complex and required a solid understanding of specific behavioral coding definitions, trainers learned to assess PRT in only a few practice sessions.

Trainers also implemented all feedback procedures correctly during the trainer training, including completing the PRT Feedback form based on the scored PRT Assessment form and providing verbal feedback to trainees using the PRT Feedback form. Therefore, trainers correctly demonstrated each of the skills taught during the trainer training, and met the criteria for conducting teacher training independently.

Although trainers learned to implement PRT, assess PRT, and give feedback based on their assessment, their use of these skills was varied throughout the remainder of the treatment phase. Trainers continued to implement the components of PRT well

during the teacher-training workshop. Trainers' assessment of teachers' PRT implementation also remained significantly higher during treatment than during baseline; however, each trainer showed variability from day to day on accuracy of assessment. This indicates that skills the trainer could demonstrate in the research setting were not always performed as well in the classroom environment.

There are several possible reasons for higher variability of skill use in the classrooms. First, a typical special education classroom presents many distractions. Despite their best efforts, trainers may have been distracted from the scoring procedures by other adults or students in the classroom. In contrast, the laboratory environment in which the trainers learned these procedures was relatively free of distraction. Additionally, trainers may have felt pressure to complete the PRT Assessment forms quickly due to their own time constraints or those of the teacher they were observing. Working quickly to complete the form could lead to more trainer error or missing information. When the trainers were learning to assess PRT in the laboratory, research assistants with only a basic knowledge of PRT filled the role of "trainee." Thus, there was no external pressure for trainers to work quickly. Finally, the presence of the experimenter (i.e. demand characteristics) may have encouraged the trainers to be more diligent and detailed in their use of the PRT Assessment form in the laboratory setting. In the classrooms, although a research assistant was present to videotape all interactions, the trainers were the primary authority figures and may have felt less pressure to complete the form correctly.

Trainers' feedback to teachers during classroom observations was also varied. During the baseline phase, trainers' verbal feedback to teachers was more accurate than

actual numerical scoring on the PRT Assessment form. This indicates that trainers had a good enough understanding of the components of PRT to provide semi-accurate feedback without knowing how to use a specific scoring form. This finding makes sense in light of the trainers' demonstrated ability to implement some PRT components at the start of trainer training. Improvements in the accuracy of feedback from baseline to treatment were more limited than improvements in accuracy of using the PRT Assessment form. This suggests that although trainers learned how to give feedback based on the PRT Assessment form, they did not always use it to provide feedback. The trainers' ability to assess PRT implementation improved, but their accurate completion of the PRT Feedback form did not follow suit. The experimenter explained and modeled the following process to trainers: observe the teacher and complete the PRT Assessment form, complete the PRT Feedback form based upon the assessment, and provide verbal feedback based upon the PRT Feedback form. Although trainers completed these steps during trainer training, they often failed to do so during actual classroom observations with their own teachers. This lack of adherence to the assessment protocol may have a few possible causes: 1) Trainers may not have believed the PRT Feedback form was useful in conveying important information (i.e. they provided feedback based on their observation, but not specifically based on the PRT Assessment form or the PRT Feedback form). 2) Trainers may not have had time to follow the protocol. Both teachers and trainers reported less satisfaction with the classroom observations than with the other parts of the study. One trainer (C) also reported feeling rushed during the classroom visits and asked the experimenter for help to modify the schedule for these visits. 3) Trainers may have believed the forms were helpful and had time to complete them, but



they were not willing to provide criticism to the extent that it was indicated by the assessment forms (i.e. the trainers did not want to tell the teacher all the components that were not implemented well). This third option could explain lack of agreement between PRT Assessment forms and verbal feedback to the teachers, but does not directly address failure, or inaccuracy, in completing the PRT Feedback forms.

All trainers maintained their abilities to implement PRT and assess PRT from treatment to follow-up. Two of the trainers (A and C) had extended summer vacation during the follow-up period and therefore had no opportunity to practice skills learned during the course of the study. Still, all trainers implemented PRT as well at follow-up as they did during the treatment phase. Additionally, trainers maintained their ability to assess implementation of PRT at follow-up, performing as well as they did during the treatment phase.

Maintenance of feedback accuracy was slightly more varied, with one trainer (C) showing moderate improvement, one trainer (A) showing moderate loss, and one trainer (B) showing more substantial loss. Trainer B provided feedback to two teachers at follow-up and was highly variable in terms of the accuracy of her feedback between the teachers. Interestingly, Trainer B showed extremely low feedback accuracy with Teacher B2, who demonstrated a substantial loss in correct implementation of PRT herself. Overall, however these findings suggest that the initial trainer training was sufficient to provide trainers with the skills necessary to train a majority of their teachers, and the skills were maintained at a high level three months after treatment was completed.

Trainers were satisfied with their participation in the research study and reported they would encourage others in their position to participate in a similar project. One

trainer did report that she “wished the experimenter had provided comments on the feedback given to teachers.” This feedback aligns with the reliability data on trainer feedback to teachers and suggests that trainers would benefit from more explicit and on-going training on how to provide accurate feedback to teachers.

Overall, the trainer training was successful. Trainers learned the skills necessary to train teachers to implement PRT. Trainers also maintained the learned skills over a three-month follow-up period. Trainers effectively demonstrated the ability to assess implementation of PRT in classroom environments with their own teachers, however reliability of their assessments was variable. These findings suggest that providing additional training to trainers in their work environment may be beneficial. Additionally, ongoing support in the form of the experimenter accompanying the trainer during several classroom observations or providing feedback via phone or email may also be beneficial for trainers. Varied accuracy of PRT implementation assessment may also be explained, in part, by the complicated methods used in this study. Trainers would likely benefit from a less complex assessment tool for assessing PRT implementation. Additionally, trainers showed only modest improvement in the accuracy of the verbal feedback they gave to teachers. This suggests that despite their ability to accurately assess the teachers’ implementation of PRT, critical information on ways to improve was not always communicated. Trainers may benefit from more specialized instruction on how to provide accurate feedback in a sensitive and efficient manner. Overall, these findings suggest that in only 15 hrs of instruction, school staff members can be trained to provide comprehensive training in PRT to teachers.

### Teachers

The majority of teachers learned to implement PRT during the course of the study. However, teachers' skill level at the start of the study varied, with some teachers demonstrating more PRT components correctly than other teachers before receiving training. For example, all teachers correctly implemented some skills during a majority of the baseline sessions. Gaining the child's attention before presenting a cue, use clear and developmentally appropriate language when presenting a cue, and providing cues that are related to the activity are skills all the teachers could perform before any formal training. In addition, over half of the teachers correctly implemented three additional skills through the majority of baseline sessions: providing consequences contingent upon the child's response, providing reinforcement that is directly related to the child's behavior, and reinforcing the child's attempts (not only the best responses). Only two of the nine teachers interspersed maintenance (those already mastered) and acquisition (those not yet mastered) tasks during the lesson. Finally, none of the teachers shared control with their students by following the child's choice of activity or taking turns. Teachers had a broad range of experience in the field and specifically teaching children with autism. However, teachers were consistent in implementing some components of PRT correctly prior to any specific training. This suggests that some components of PRT may be considered "good teaching" and may be acquired during teacher education and certification programs or on the job. These findings have implications for how training time is allocated in future research studies and in clinical training programs. For example, less time may be needed when introducing and modeling the components that teachers knew before training: Attention, Clarity and

Appropriateness. Conversely, more time may need to be dedicated to training skills that are unique to PRT, such as the consequence strategies, Child Choice, and Turn Taking.

Teachers also demonstrated variability in how skills were acquired. Some teachers showed improvement in implementation of certain skills during the baseline condition. This indicates that exposure to PRT, via reading a brief manual and receiving feedback from an untrained supervisor, can lead to some improvement for some teachers. These findings are encouraging because in the educational community, it is common for teachers to attempt to learn new teaching strategies by reading a manual or talking with their supervisor. It is less common for a teacher to receive weekly feedback from a highly-trained supervisor. However, after being observed by and receiving feedback from the trainer for only 30 min each week, some teachers were able to improve implementation of one or two components of PRT. This suggests that incorporating regular times for observation and feedback may improve the quality of teaching for some teachers. During baseline, the trainers were proficient in implementing PRT themselves, but had no specialized knowledge in training others to implement the techniques. Therefore, it is likely that school staff who are knowledgeable, but untrained in specific training techniques will have a positive, but limited, impact on teachers by observing them and providing feedback on a regular basis.

Most teachers showed substantial improvements in implementation of PRT components during the treatment phase. However, teachers demonstrated gains both immediately following the teacher-training workshop and in a more gradual way over the course of the treatment classroom observations. Learning patterns varied, but not systematically by teacher or component. That is, some teachers improved in all

components immediately following the teacher-training workshop, others improved in some skills following the workshop and in other skills toward the end of treatment, and still others showed improvement only toward the end of treatment. These results suggest that both the training workshop and the ongoing feedback in the form of classroom observations were essential parts the training.

The majority of teachers maintained their ability to implement PRT at the follow-up assessment. This is encouraging because the follow-up period fell during an extended summer vacation for five of the teachers who participated in follow-up. Only two of the nine teachers were working during the regular school year during the follow-up period. One teacher slightly improved in PRT implementation, and one teacher showed a dramatic loss of skill. The teacher who appeared to have lost competency in implementing PRT was one of two teachers who was not on vacation during the follow-up period. At the start of the study, the teacher who lost competency during the follow-up period reported that job-related stress overwhelmed her. Additionally, her classroom maintained the highest teacher/student ratio with one adult for every four students. These elements of her profile may be related to her loss of skill; however, more data are required to determine causality. Since teacher C3 also reported that job-related stress overwhelmed her, but did not exhibit loss of skill from treatment to follow-up, it is likely that this is an isolated case and not a result of the TTT protocol used in this study.

Teachers were satisfied or very satisfied with their participation in the study, and all respondents to the Satisfaction Questionnaire reported that they would recommend the study to other teachers. This feedback is encouraging in terms of teachers accepting training and feedback from other school staff. Some teachers reported that they would

like more breakdown of the specific components of PRT. The teacher training included presentation of all PRT components in one lecture. Perhaps teachers would benefit from learning only a few components of PRT at a time, with an opportunity to practice before presentation of additional components.

Overall, the teacher training was successful. The majority of the teachers demonstrated all components of PRT correctly, and those who did not master PRT still correctly used a high percentage of the components correctly. The results of this study lend support to our previous findings that most teachers can learn to implement PRT correctly with 10 hrs of direct instruction and personalized feedback. These findings also provide a new contribution to the literature on the TTT model in a school setting. School staff members, with only 15 hrs of direct training from the experimenter, were able to successfully train the majority of the teachers to implement PRT.

### Students

Each participating teacher committed to use PRT with participating students for 10 min a week. This minimal intervention time was not expected to have a significant effect on student learning. Although data were gathered on student behavior and language, changes in student behavior as a result of participation in this study, were not anticipated. Additionally, these students were receiving other interventions during the course of the study, so any behavioral change cannot be attributed to only to PRT. However, previous research indicates that when intervention providers use PRT correctly, children do make gains in language, play, social, and academic skills. Therefore, we can anticipate that if the teachers who participated in this study use PRT with these students consistently and correctly, they will benefit from improvements similar to those

documented in other research. Further research is necessary to determine if using the TTT model to train teachers to use PRT has a positive effect on student learning.

### Limitations

There are some caveats one must consider when drawing conclusions from this research. First, due to the nature of applied research, there was limited control over the research environment and participants. The purpose of the baseline condition was to replicate training resources that are commonly available to teachers – the PRT manual, observation from a district staff member, and documents for assessing implementation of PRT. To allow time for reading, each trainer and teacher received a copy of the PRT manual one month before baseline assessments began. The baseline condition also introduced regular trainer observation and feedback to the teachers. Trainers were provided with the documents necessary for assessing teachers' implementation of PRT during baseline, although they did not receive training on how to use these documents until the trainer training. Under these conditions, some teachers showed improvements in one or two of the components of PRT. However, although trainers reported that observing and providing feedback to teachers was a part of their job, they typically did not observe the same teachers working with the same students each week. Thus, the baseline condition introduced in this study does not reflect “treatment as usual” for the participating trainers and teachers. This suggests that although school staff and teachers may have access to the skills and information necessary to help teachers make some improvements in ability to implement PRT, it is unlikely that they would typically dedicate regular time for training in this manner.

Another consideration involves loss of teacher and student participation due to change of school year. Training groups A and C completed their participation in treatment just at the end of their school year, and follow-up assessments were conducted after the summer break. Some students in these training groups transitioned to new classrooms or schools and could no longer participate in the study. Training group B used a “year round” academic schedule that included a brief summer break before beginning a new school year in July. One teacher in Group B left her job for a teaching position in another school district and could no longer participate in the study. In future research, it would be beneficial to schedule all phases of the study within one academic year.

A final consideration is the small number of participants. This study included a small sample of school staff, teachers and students in San Diego County, CA. The small sample size limits the possibility of evaluating trainer, teacher and student variables that may contribute to the effectiveness of this specific training model. For example, this study included trainers who all had previous experience with PRT and two who had advanced degrees in special education with a specialization in autism. All trainers had a good understanding of PRT at the start of the study as demonstrated by their ability to implement a high percentage of PRT components correctly before receiving any explicit training. Future research should evaluate the effectiveness of trainers with a broad range of professional experience and training. The training model should be revised based on findings from this study, and the research should be replicated with more training groups and in other geographic areas.

#### Future Research



The results of this study suggest several possible changes for how PRT training for teachers can be improved. These findings also contribute to literature examining dissemination of EBP for autism in general. Possible modifications to both trainer training and teacher training are suggested below.

The TTT model has been demonstrated to be successful for educating teachers in PRT. Specifically, training school district staff to train teachers to use PRT has been shown to be an effective and efficient method. A few adaptations may improve upon the current method. First, the training materials could be adapted. Although trainers reported that they were satisfied with materials used to assess implementation of PRT and provide feedback, the trainers did not always use them correctly during the treatment phase of the study. Even after trainers demonstrated proficiency in using the documents, they failed to complete them. This suggests that although trainers may have reported satisfaction with the forms, they did not consider them usable. Trainer error in filling out the forms often consisted of leaving segments blank, failing to transfer information from the PRT Assessment form to the PRT Feedback form, and failing to verbalize what was written on the PRT Feedback form. This suggests that modifications to the forms may improve trainer adherence to the suggested assessment and feedback protocol. Modifying the forms so they are easier to complete and clearly identify the most important areas for improvements may ultimately improve the quality of verbal feedback trainers provide to teachers.

A second suggested modification involves how classroom observations are conducted. Both trainers and teachers reported they were satisfied or neutral about the structure of the classroom observations. Although trainers and teachers in this study

scheduled classroom observations on their own, they were required to take place weekly, were videotaped by a research assistant, and a 30-min minimum time limit was strongly recommended. These criteria for classroom observations may not be sustainable for teachers and school staff trainers. Future research should include collaboration with participants to determine the most user-friendly and “do-able” format for observation and feedback.

Restructuring the teacher PRT training may also be beneficial. Results from this study indicate several possible modifications to the teacher training. First, training time for the components of PRT may be reallocated. Based on the findings that all teachers participating in this study knew three of the PRT components before training began, future trainings may not need to emphasize these areas. Instead, more training time can be dedicated to the other components that were less familiar to teachers not yet trained in PRT. A second possible modification to the teacher training involves how the components are presented. Teacher feedback indicated that it might be more helpful to learn the PRT components separately. Presenting one or two of the PRT components at one time may help teachers practice and integrate the skills more systematically. One participating teacher requested that the components of PRT be broken down and introduced more slowly. Instead of one six-hr workshop, teachers may benefit from a few short workshops, each introducing new PRT components. After each workshop, teachers would have the opportunity to practice the components, and trainers could observe them and provide feedback. These modifications to the teacher-training procedures may also make scheduling training times easier for both trainers and teachers.

Finally, the results of this study add to the literature supporting verbal feedback as an important part of training in new teaching strategies. None of the teachers implemented all the components of PRT correctly immediately following the lecture portion of the teacher-training workshop. Rather, the teachers benefitted from continued feedback from the trainer. Some teachers did not master certain PRT components until the final session of treatment. This suggests that observation and feedback after a training workshop improves upon teachers' ability to learn new teaching strategies.

In conclusion, this research supports the TTT model as an effective method for disseminating EBP to classrooms. If school staff can conduct effective training, the cost of sending teachers to workshops and paying outside consultants can be dramatically reduced. School districts are under increased strain to provide high-quality services for children with autism, and application of the TTT model may be one strategy for increasing the number of qualified teachers without additional training costs.

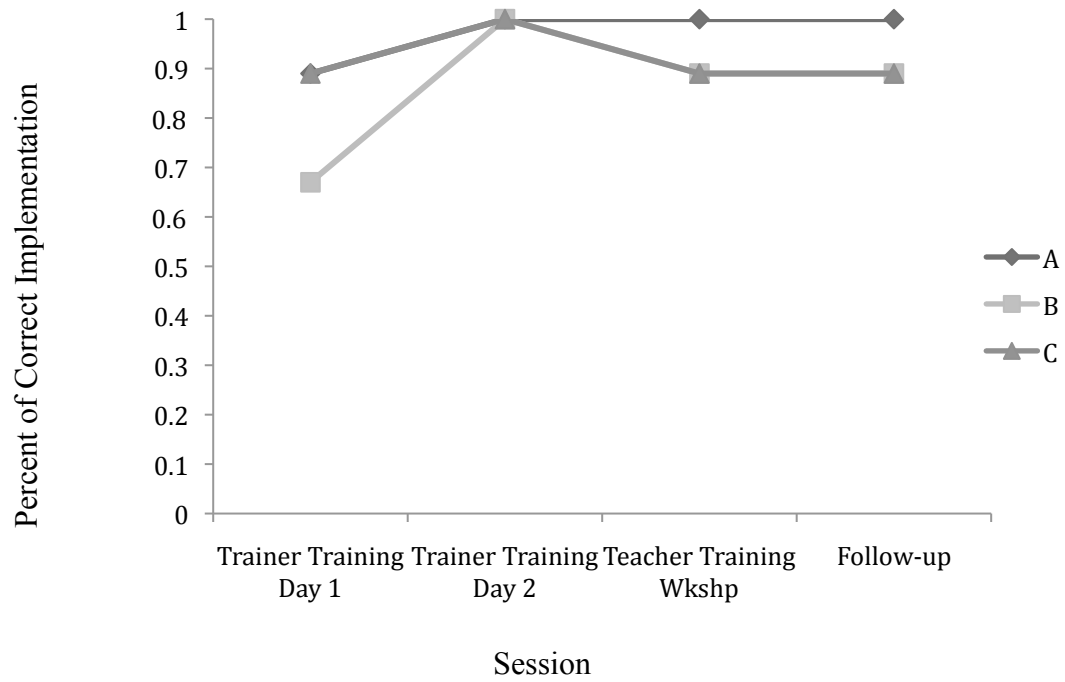


Figure 1. Trainer PRT implementation during trainer training, teacher training and at follow-up.

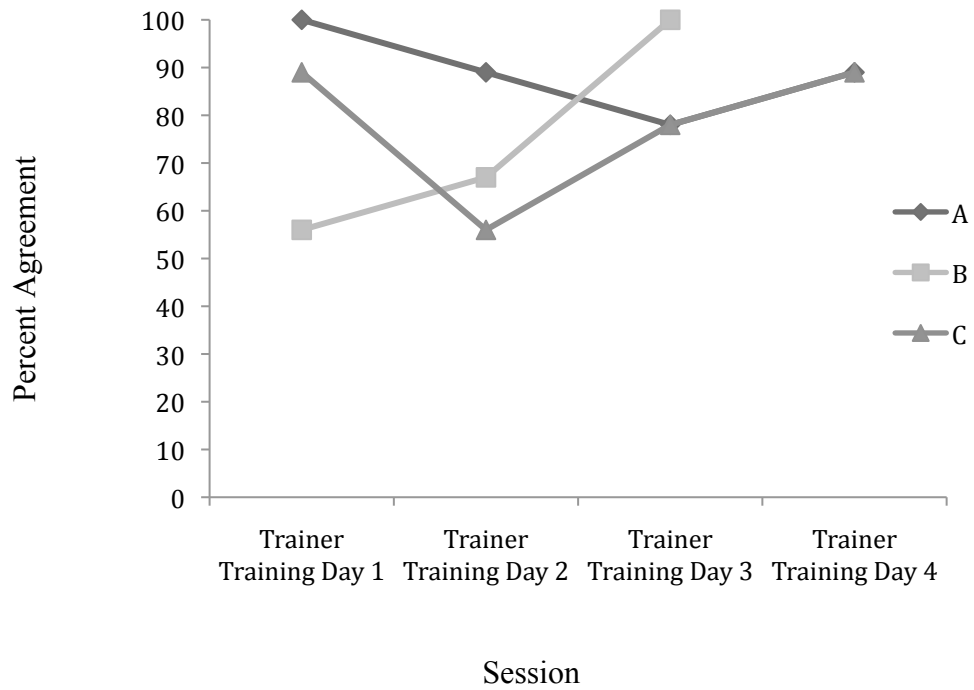


Figure 2. Percent agreement between the experimenter's scoring and each trainer's scoring of the PRT Assessment form during trainer training.

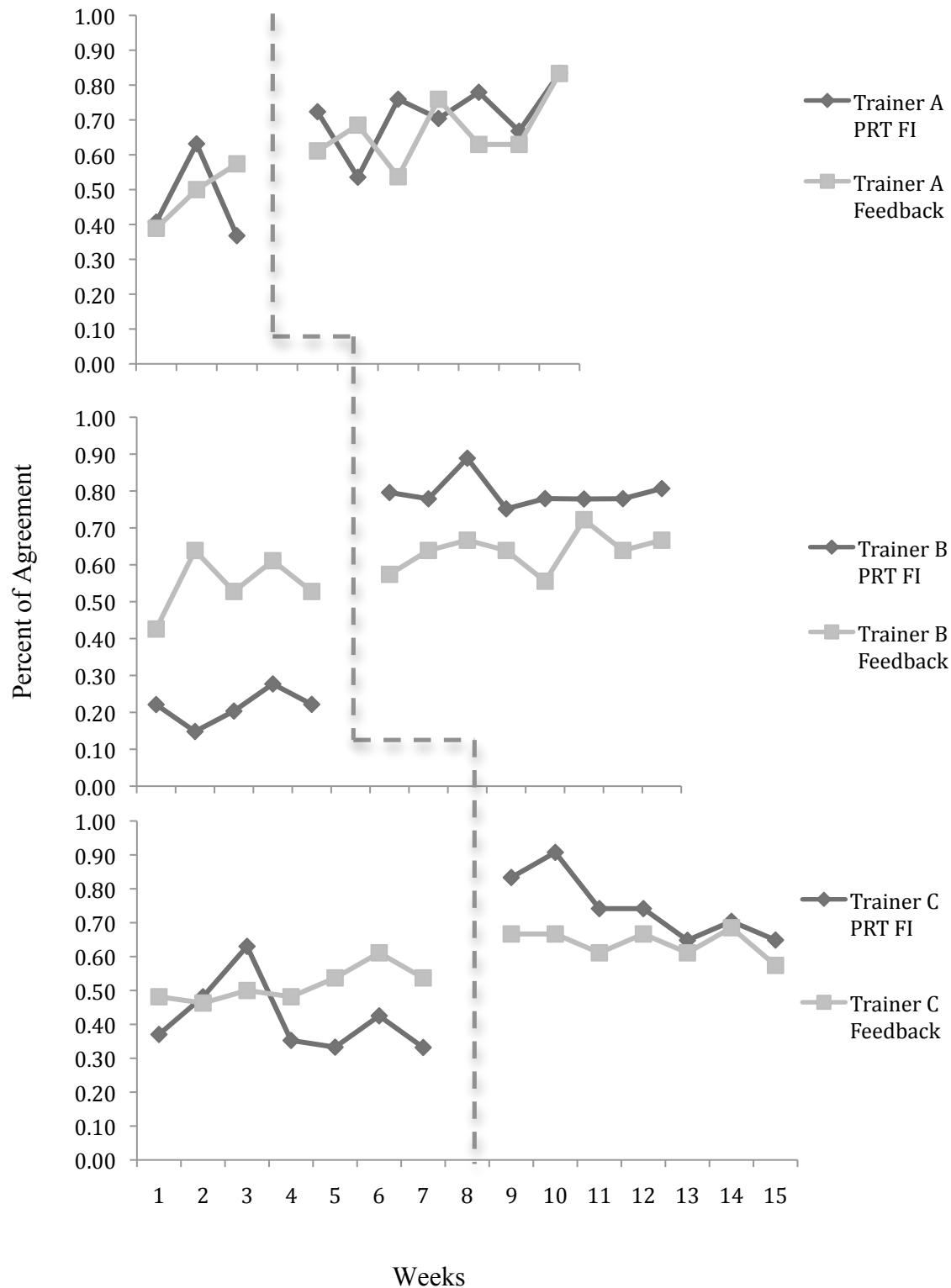


Figure 3. Percent agreement between research assistants' scoring of the PRT Assessment form and each trainer's scoring of both the PRT Assessment form and verbal feedback to teacher.

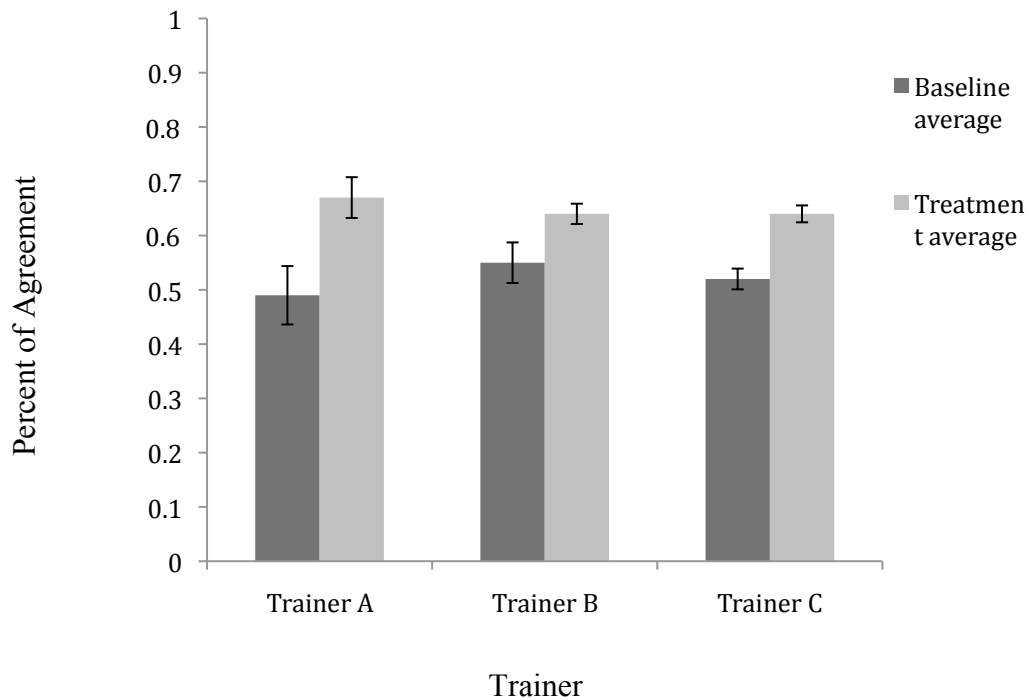


Figure 4. Percent agreement between research assistants' scoring of the PRT Assessment form and each trainer's verbal feedback to teacher. Error bars represent plus or minus one standard error of the mean.

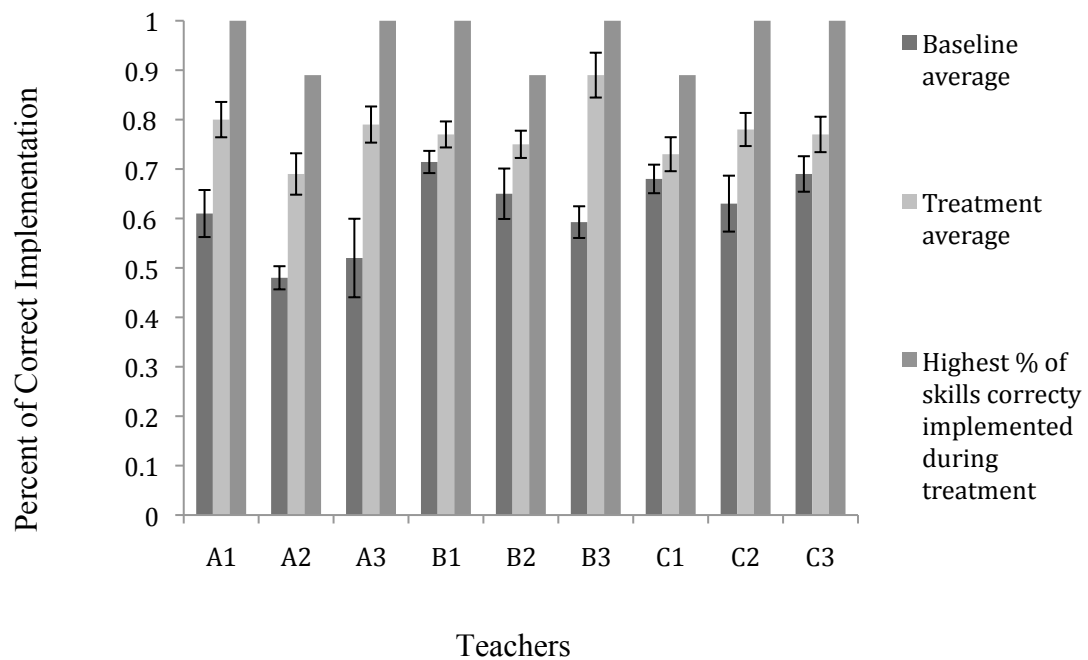


Figure 5. Teachers' average percent of PRT components correctly implemented during baseline and highest percent of PRT components correctly implemented during treatment. Error bars represent plus or minus one standard error of the mean.



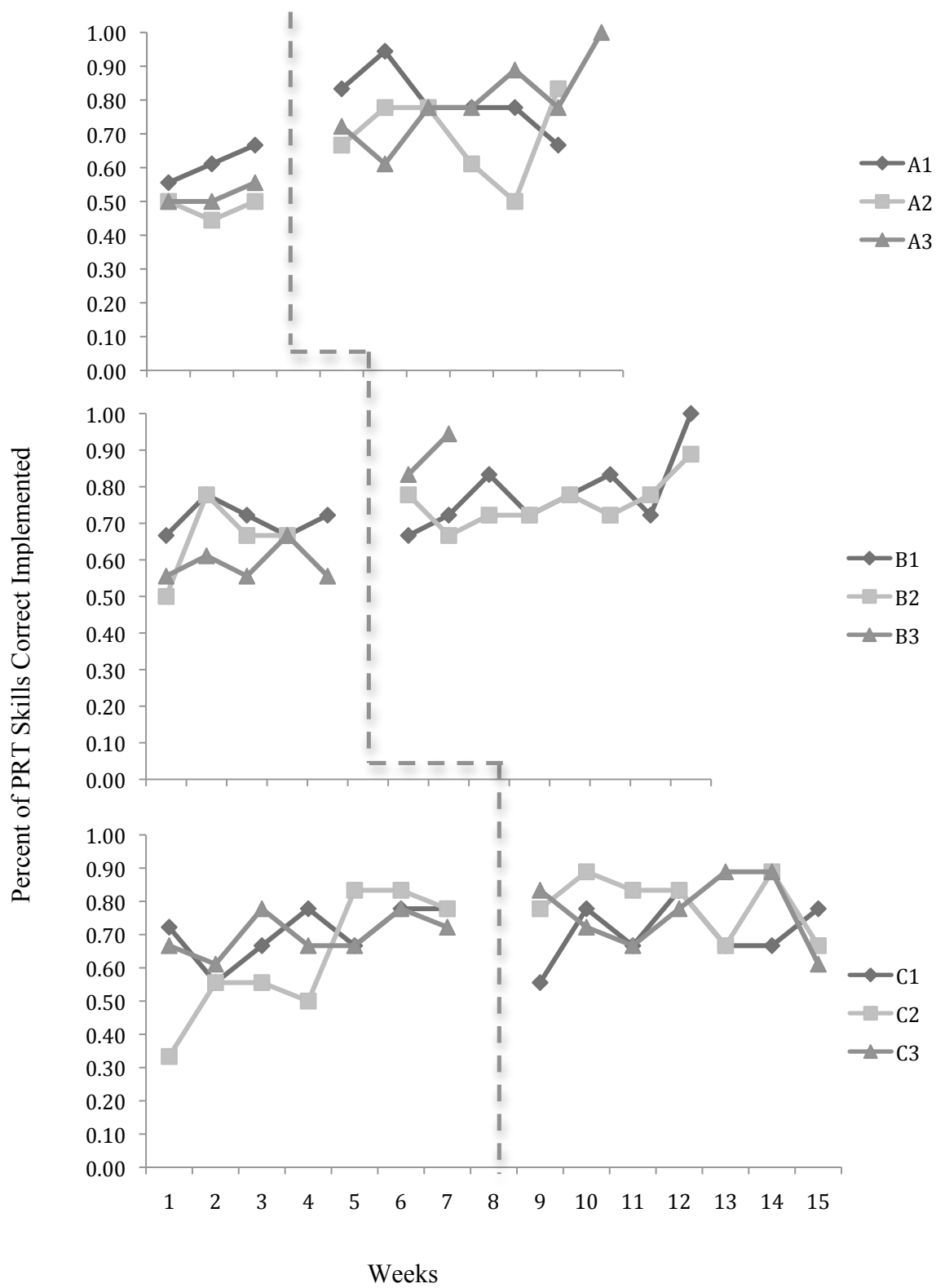


Figure 6. Teachers' correct implementation of PRT.

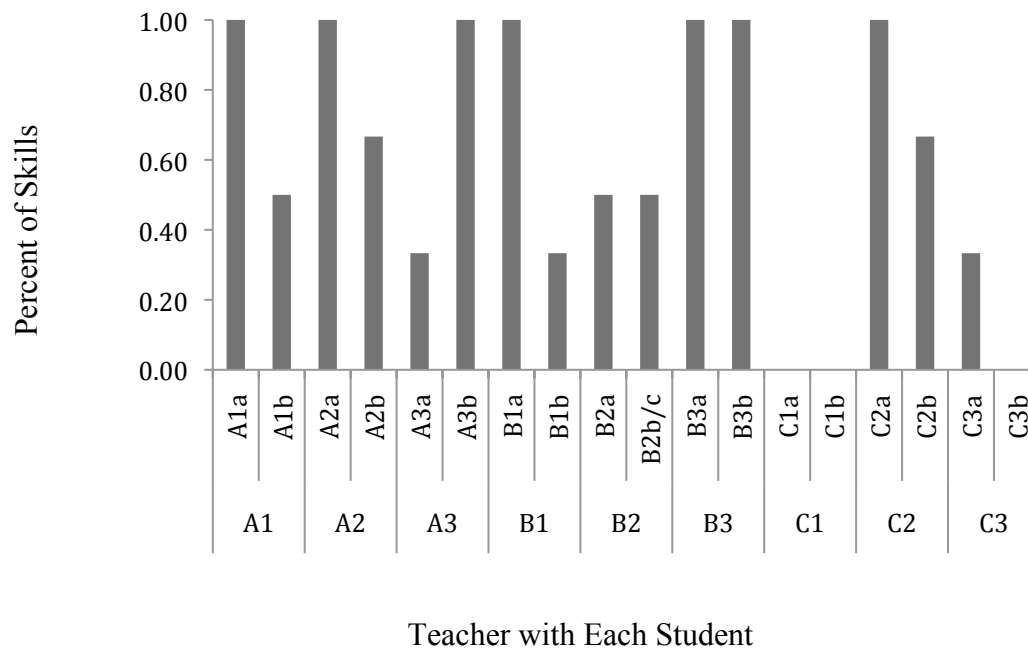


Figure 7. Teachers' percent of previously unknown skills learned during treatment.

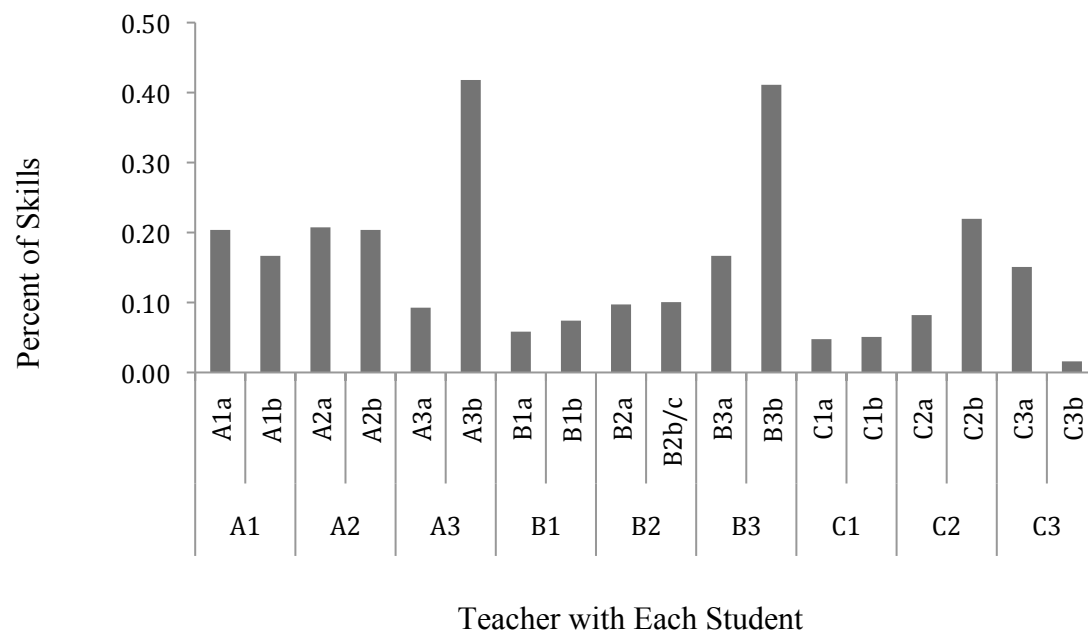


Figure 8. Teachers' percent difference (improvement) from baseline average to treatment average for all PRT components.

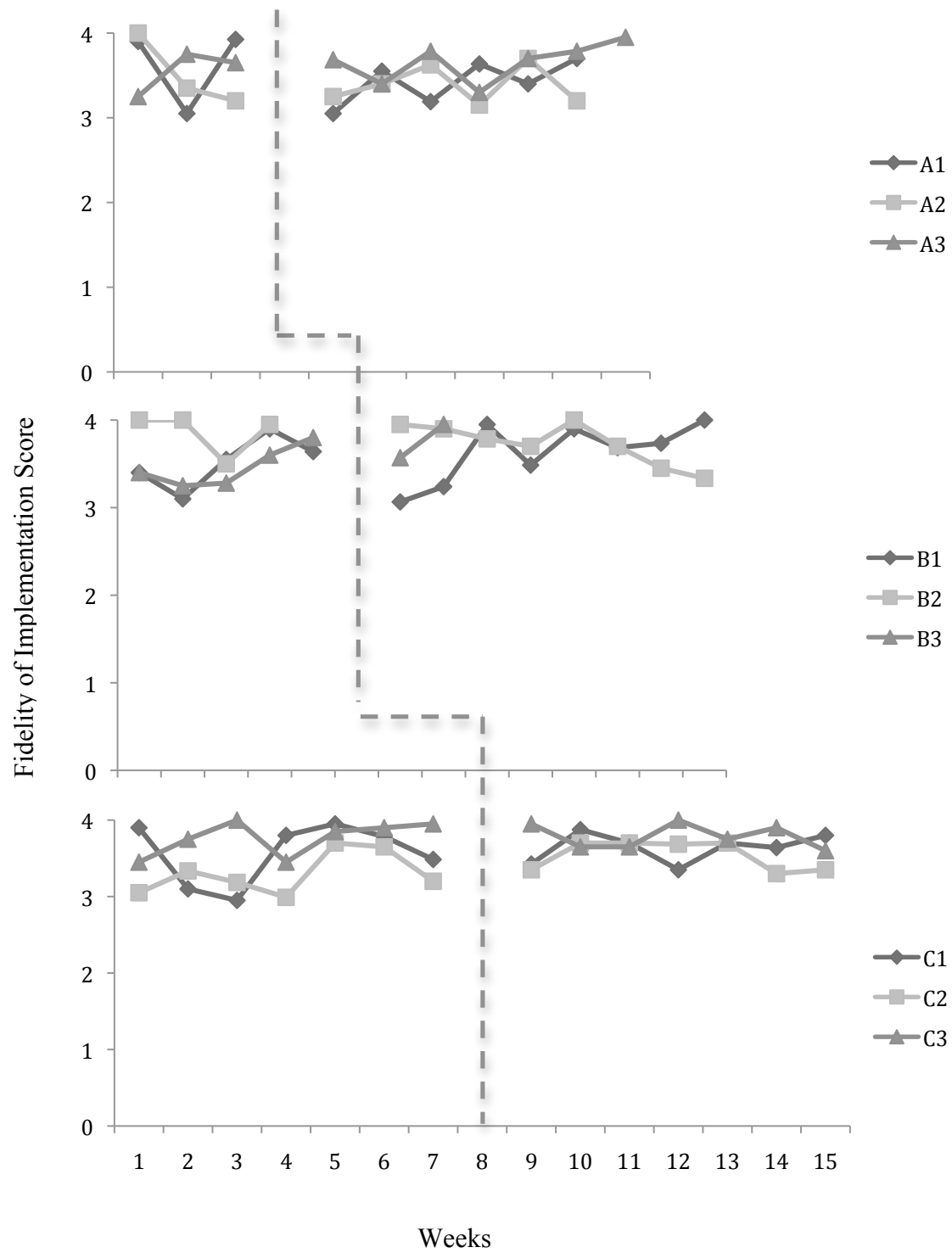


Figure 9. Teachers' correct implementation of Attention.

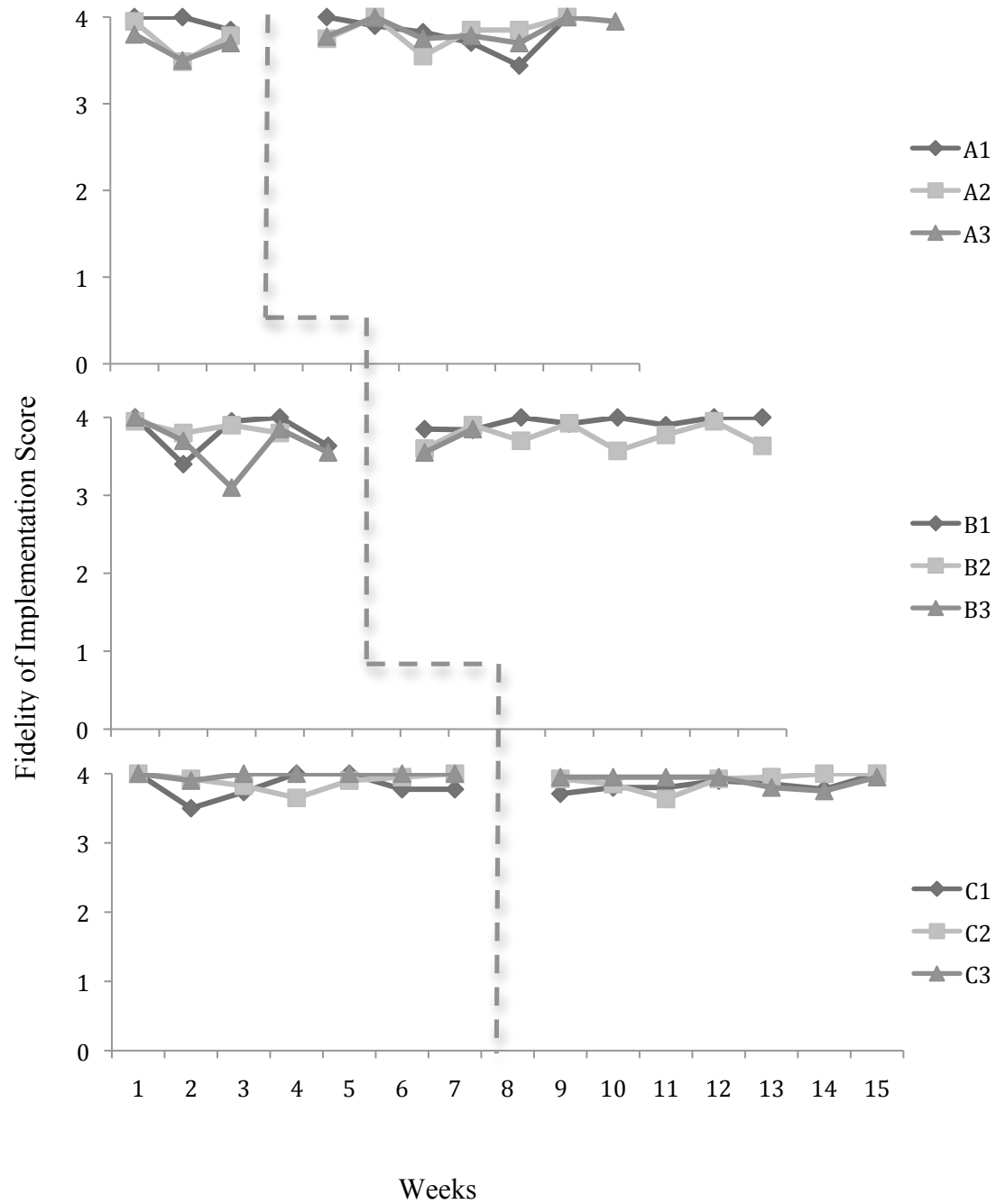


Figure 10. Teachers' correct implementation of Clarity.

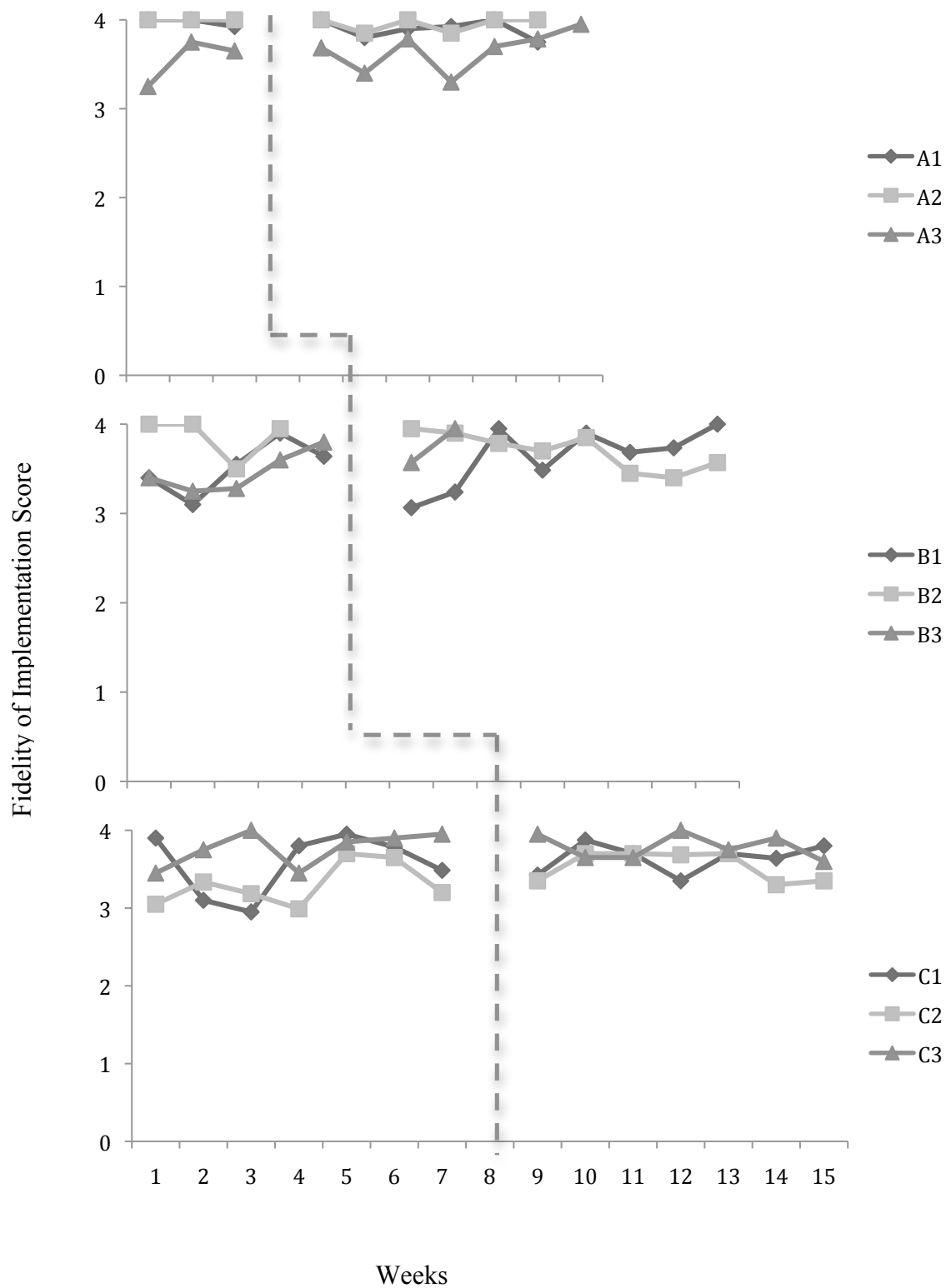


Figure 11. Teachers' correct implementation of Appropriateness.

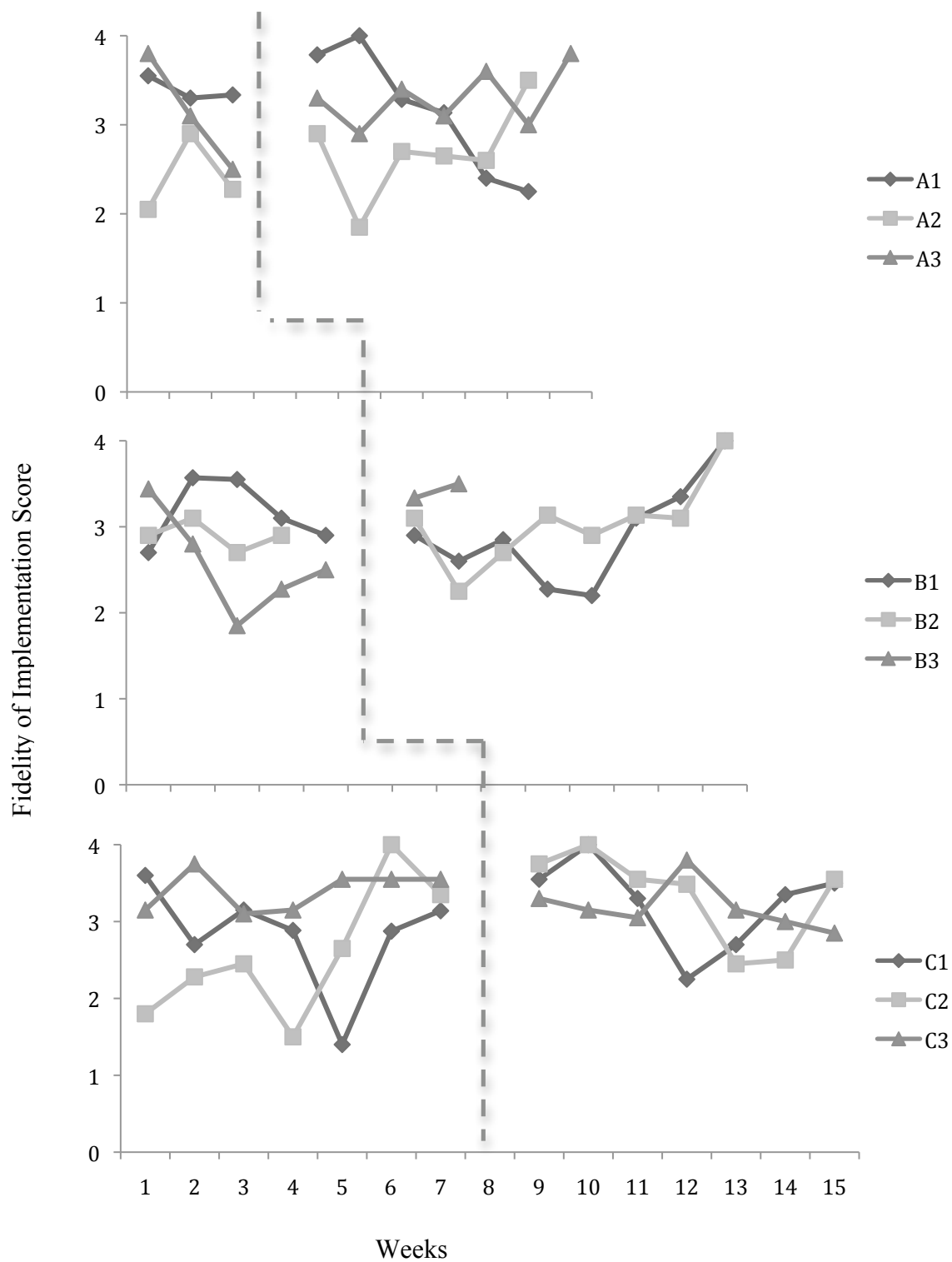


Figure 12. Teacher's correct implementation of Maintenance/Acquisition.

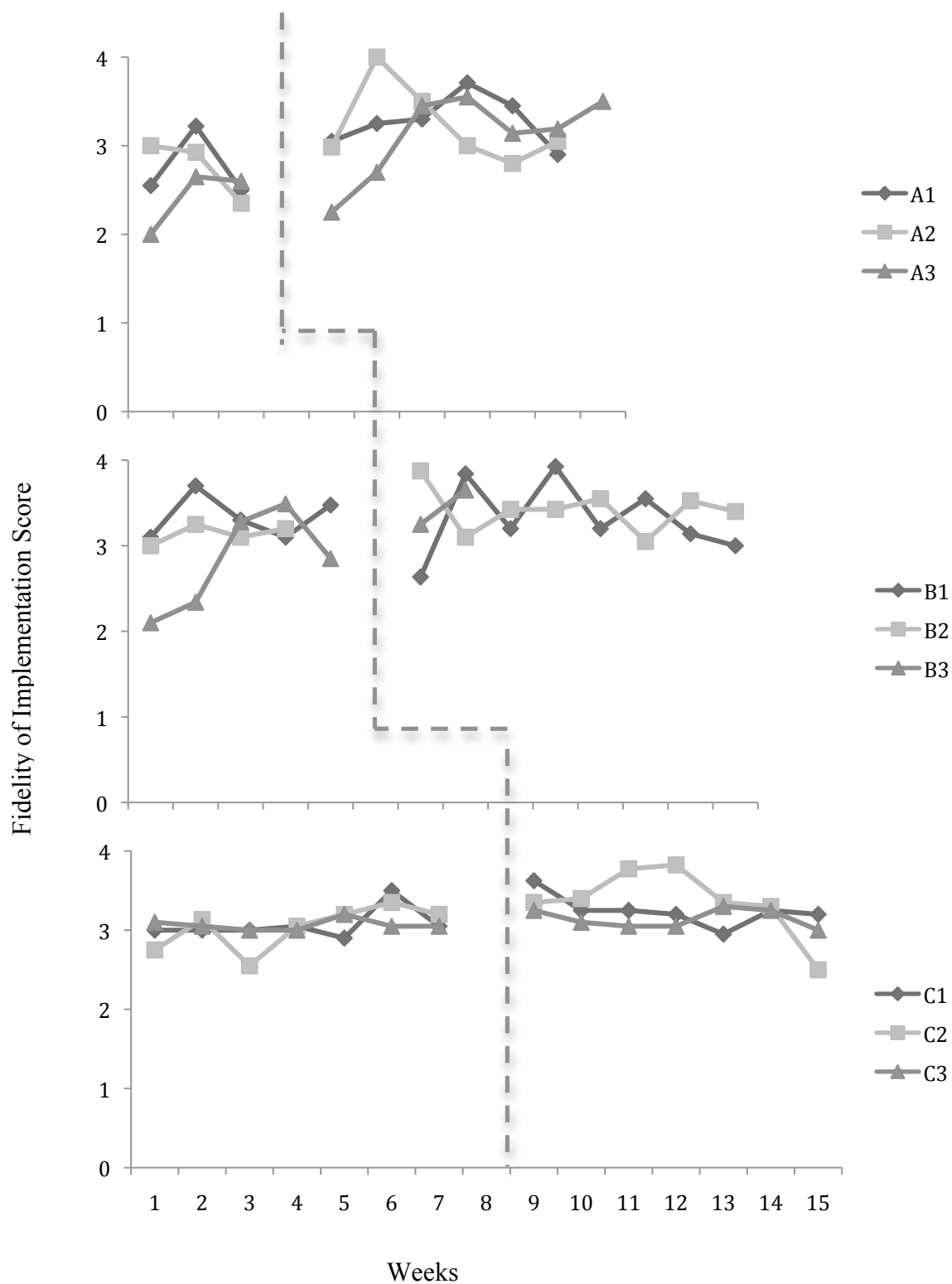


Figure 13. Teachers' correct implementation of Child Choice.



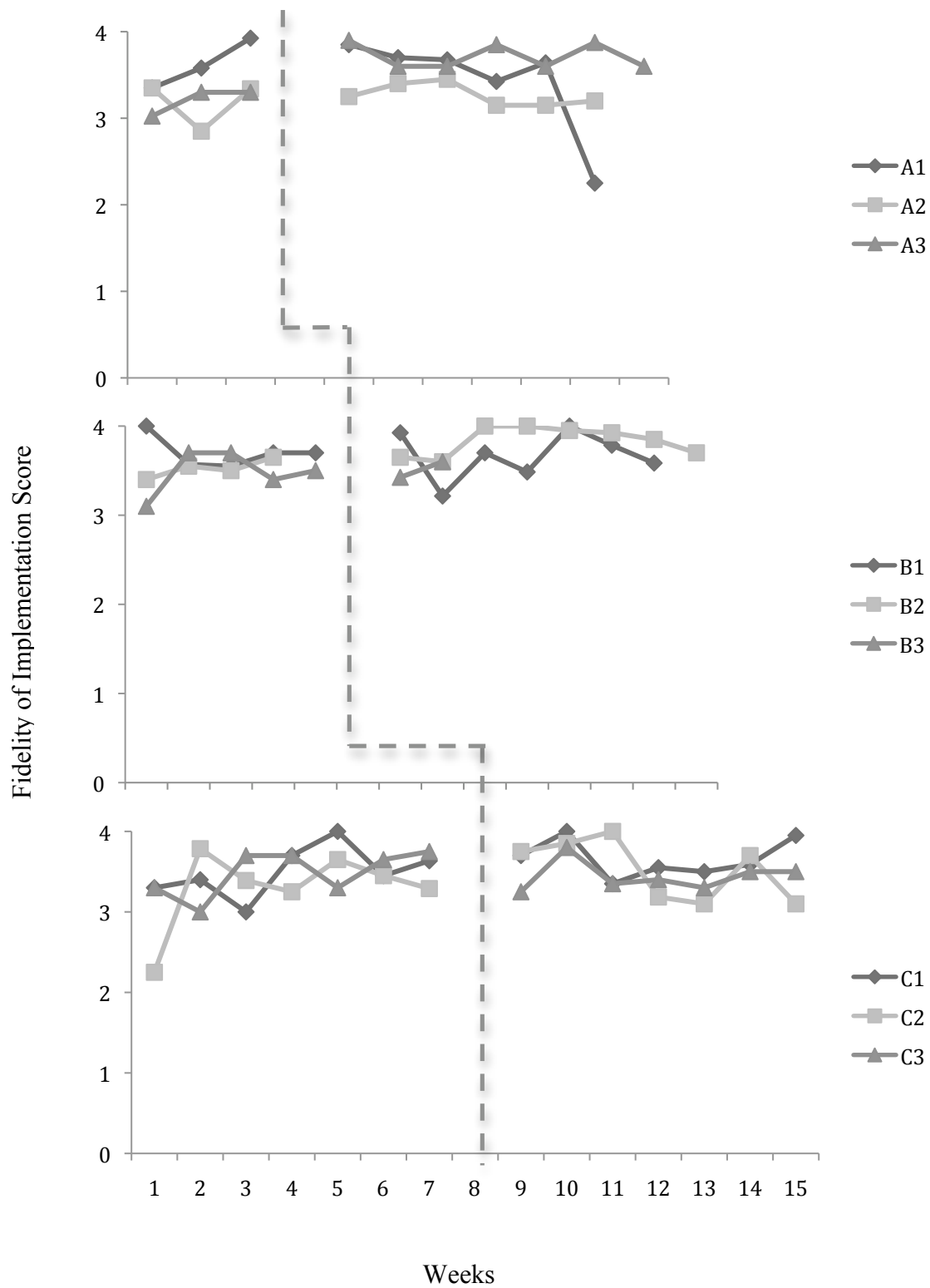


Figure 14. Teachers' correct implementation of Contingent.

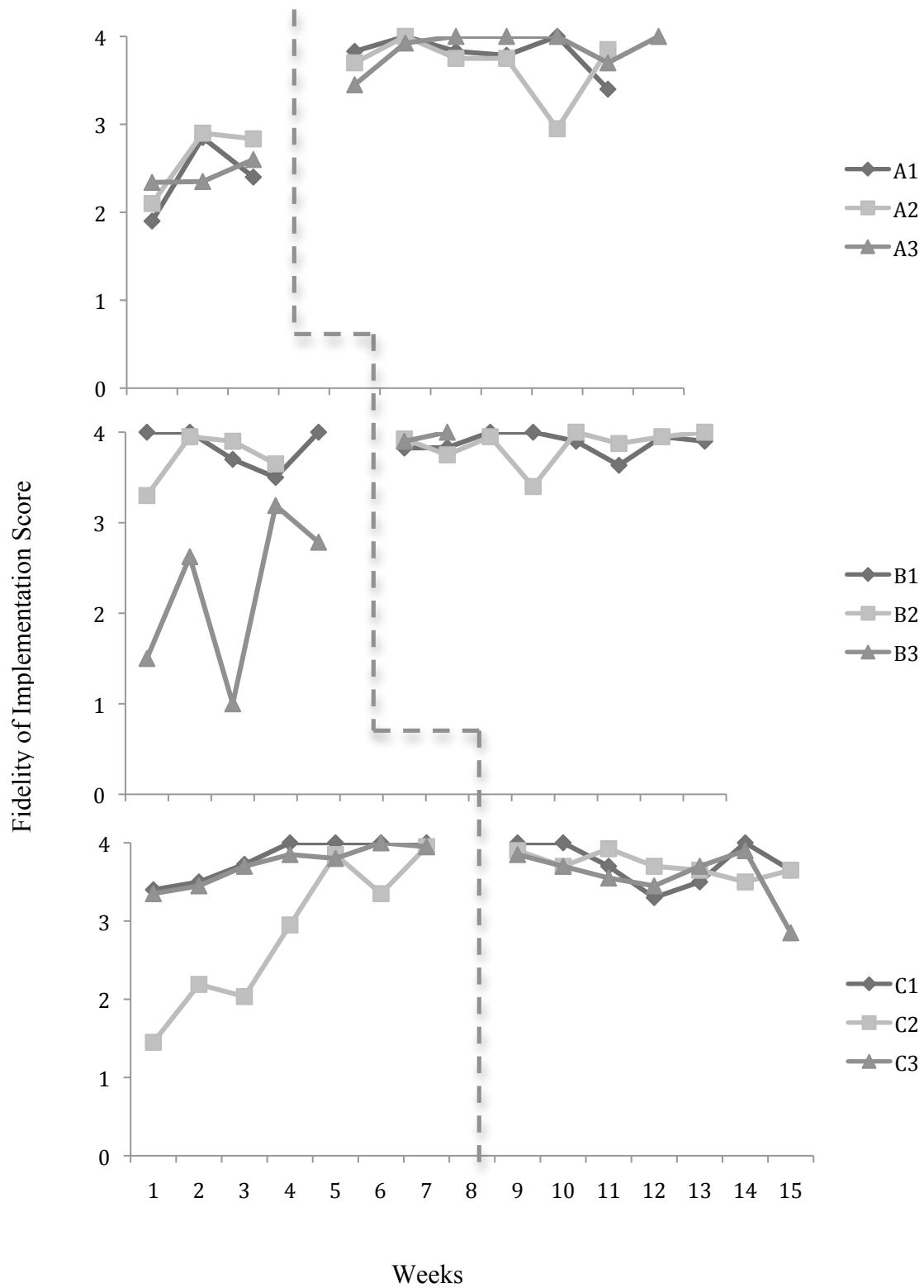


Figure 15. Teachers' correct implementation of Direct Reinforcement.

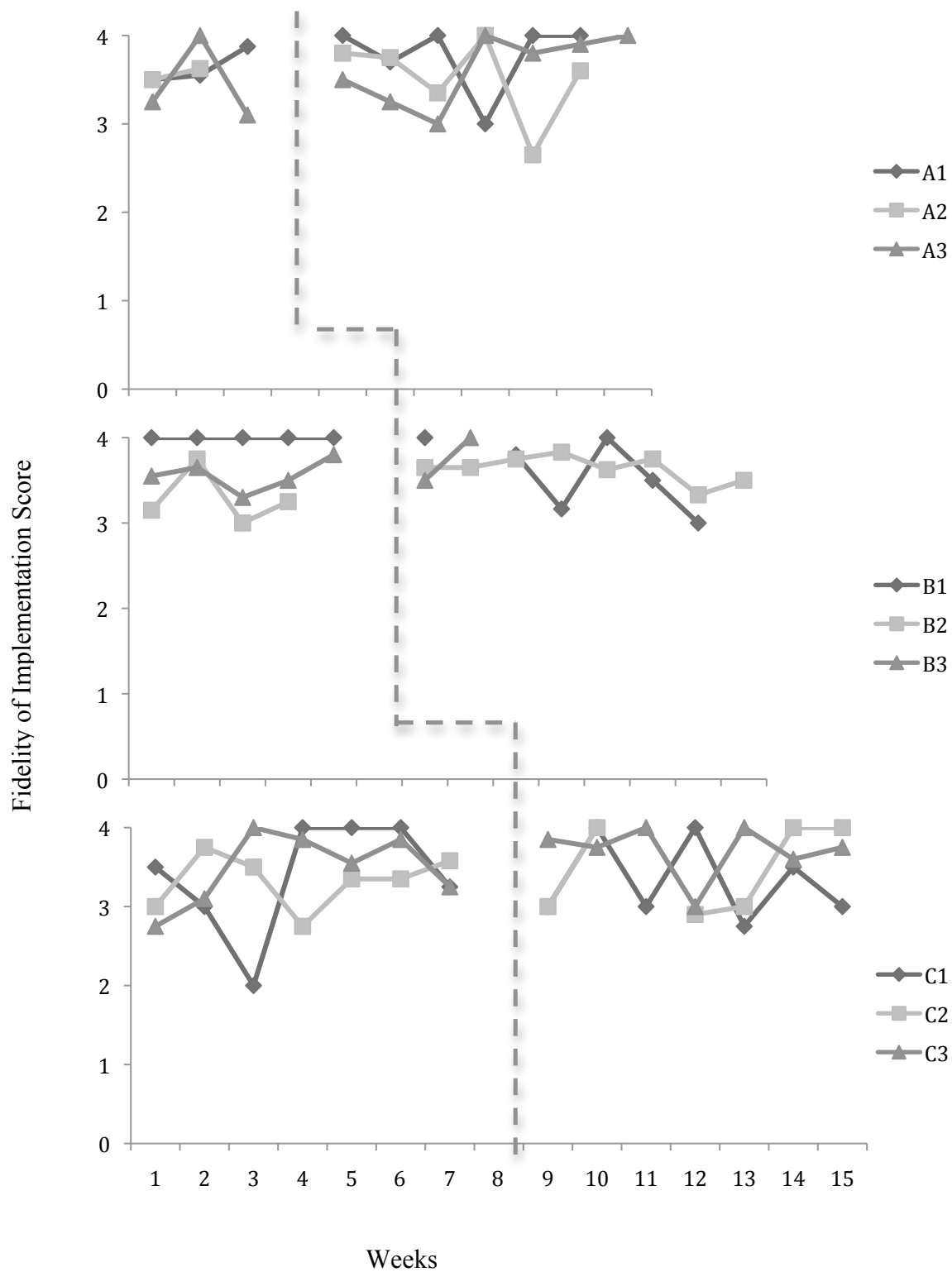


Figure 16. Teachers' correct implementation of Reinforcement of Attempts.

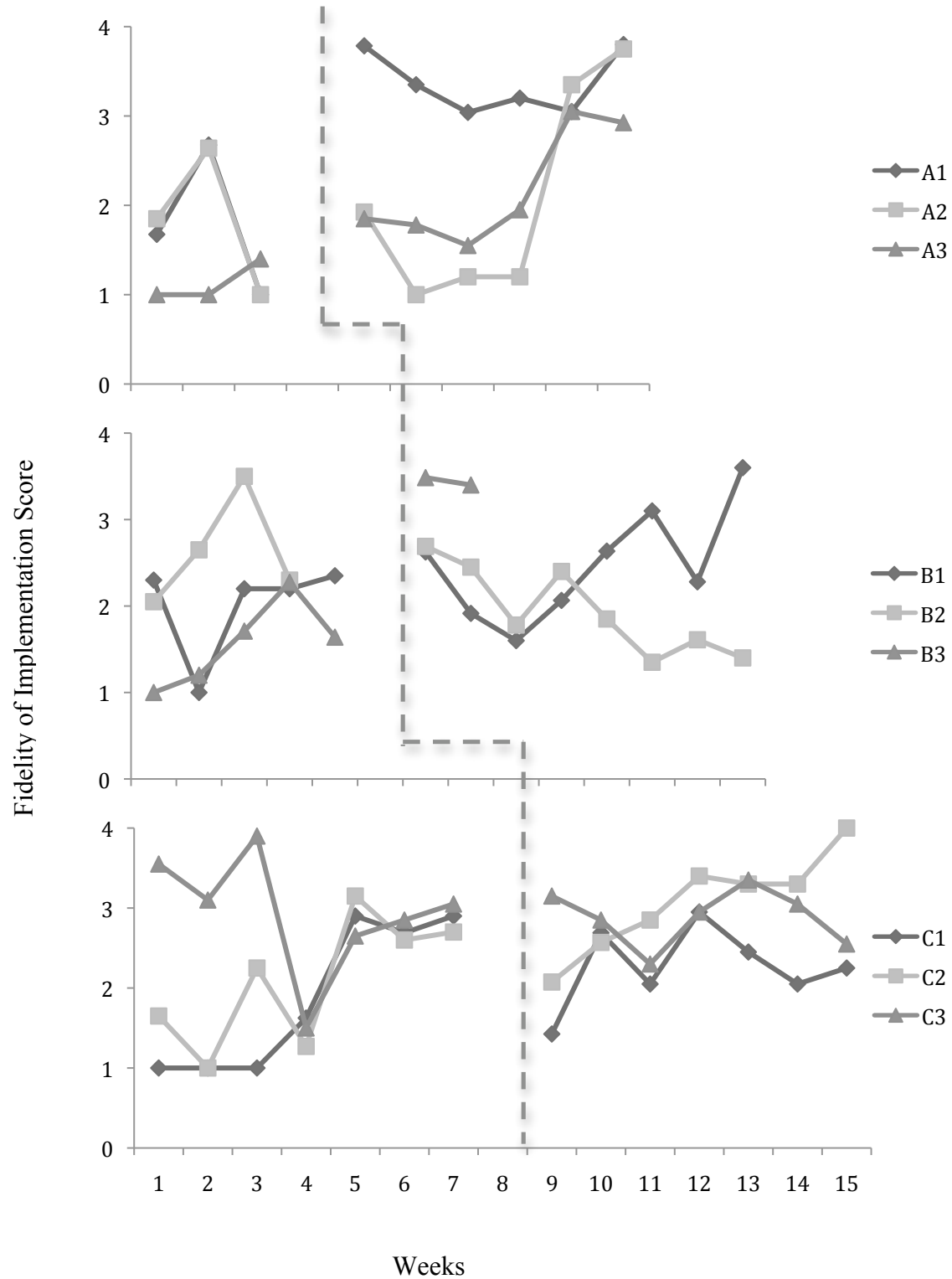


Figure 17. Teachers' correct implementation of Turn Taking.

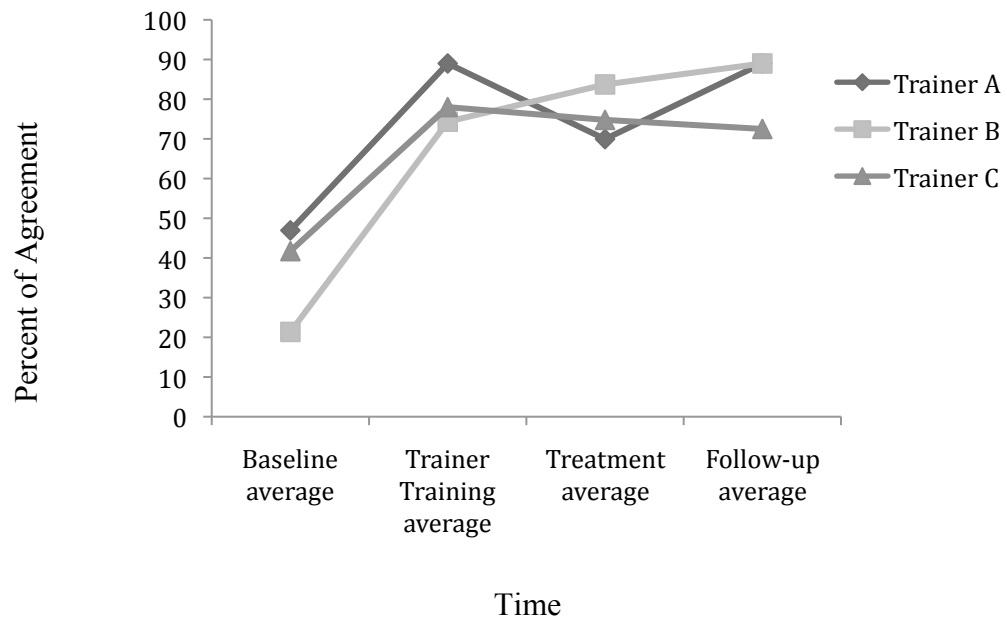


Figure 18. Percent agreement between research assistants' scoring and each trainer's scoring of the PRT Assessment form.

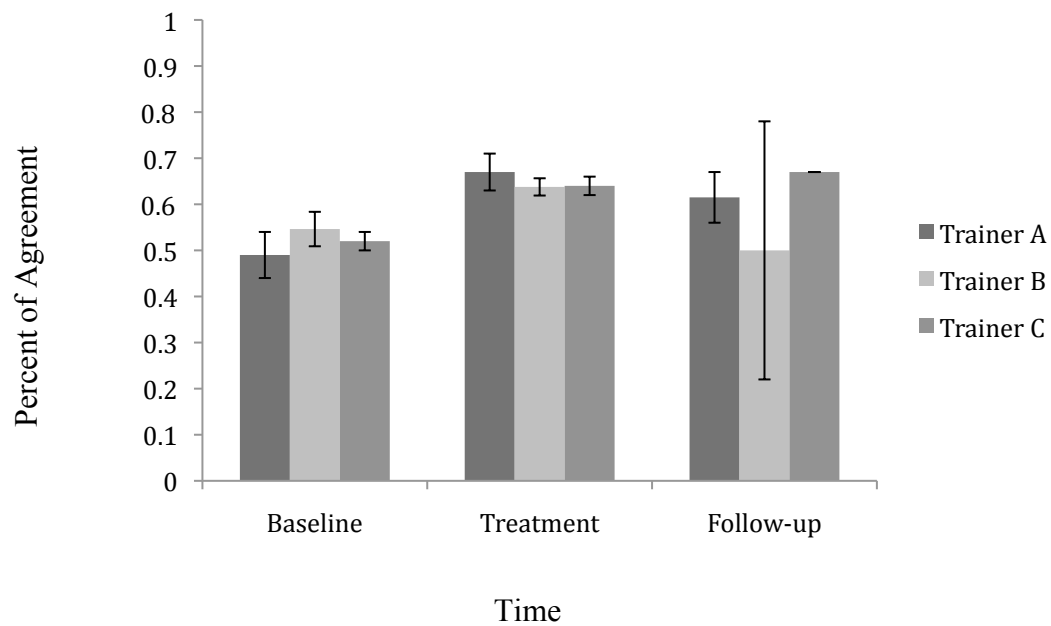


Figure 19. Percent of agreement between research assistants' scoring of the PRT Assessment form and each trainer's verbal feedback to teachers. Error bars represent plus or minus one standard error of the mean.

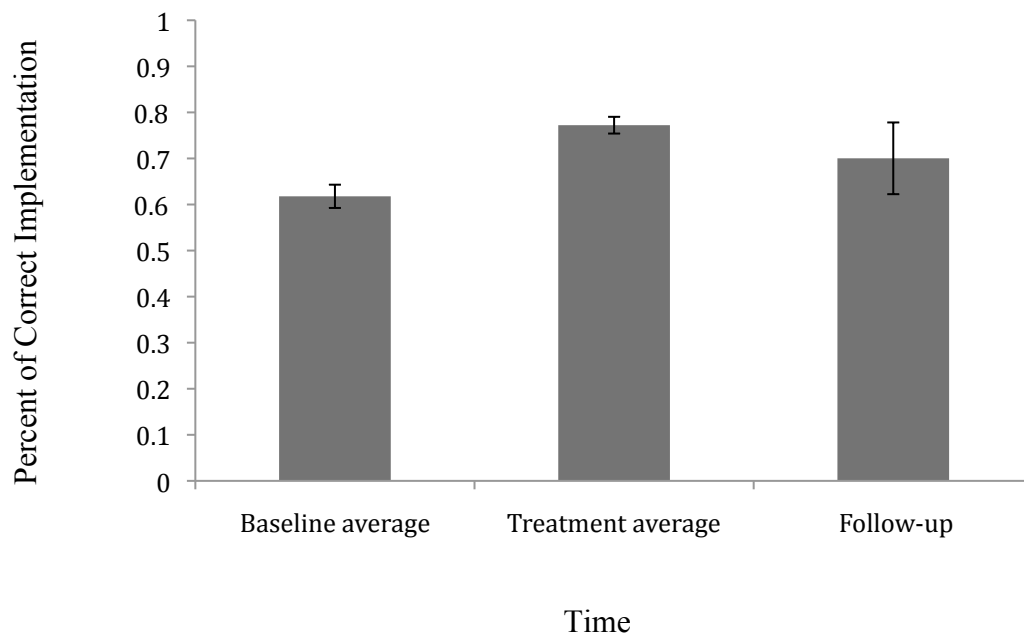


Figure 20. Teachers' percent of correct implementation of PRT skills over time. Error bars represent plus or minus one standard error of the mean.

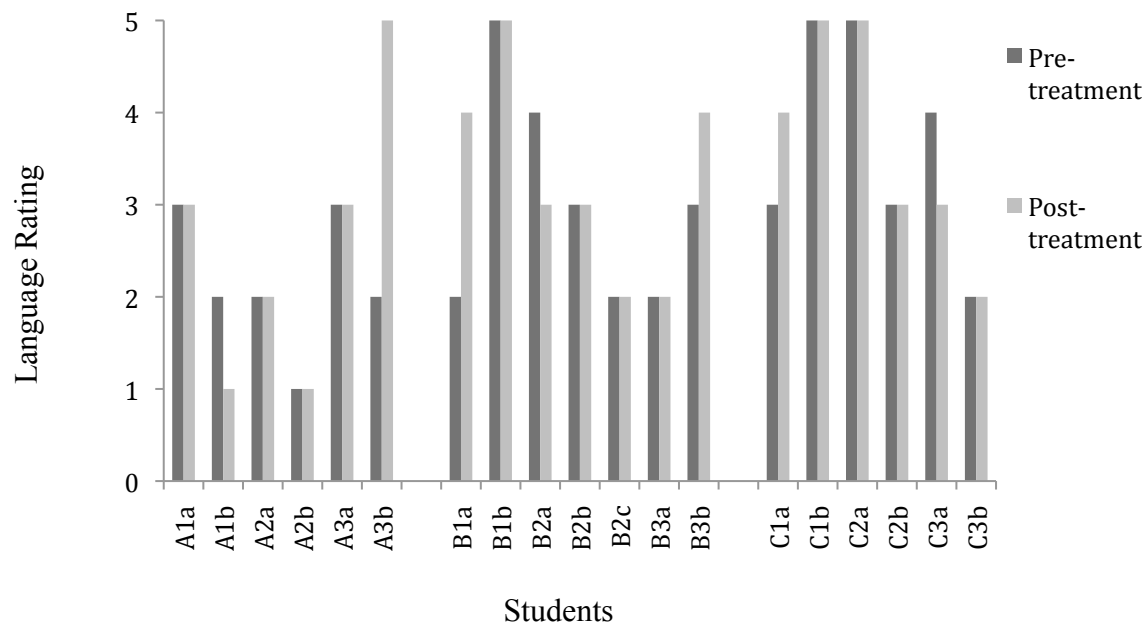


Figure 21. Students' language rating at pre- and post-treatment.



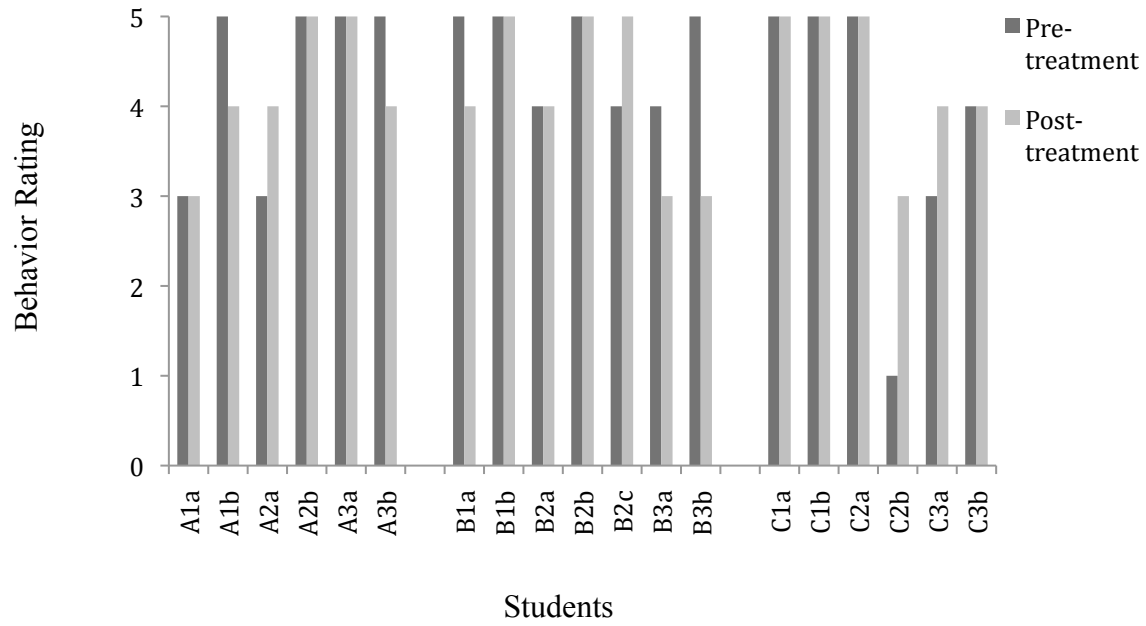


Figure 22. Students' behavior rating at pre- and post-treatment.

Table 1. Trainer demographics

	<i>Trainer A</i>	<i>Trainer B</i>	<i>Trainer C</i>
Sex	F	F	F
Ethnicity	Caucasian	Latino	Caucasian
Age	31	29	32
Highest level of education	M.A. in Special Education (specialization in Autism)	M.A. in Special Education (specialization in Autism)	B.A. in Education
Job Title	Program Specialist	Autism Resource Teacher	Autism/Behavior Specialist
Autism specific training	Yes (from Autism Specialist, Master's program)	Yes (on the job, workshops, reading, Master's program)	Yes (on the job, from Autism Specialist, workshops, reading/videos)
Training in PRT implementation	No specific training but attended a 12-hr workshop on current PRT research	Yes (on the job, from supervisor, reading)	Yes (reading, through Master's program) Also attended 12-hr workshop on current PRT research.
Hrs/wk training teachers/staff	4	2.5	5
Hrs/wk giving feedback to teachers/staff	6	2	7
Job Related Stress	Occasionally Stressful	Stressful, but manageable	Stress overwhelms me
Job Satisfaction	Somewhat Satisfied	Very Satisfied	Very Satisfied

Table 2. Teacher Demographics

	<i>A1</i>	<i>A2</i>	<i>A3</i>	<i>B1</i>	<i>B2</i>	<i>B3</i>	<i>C1</i>	<i>C2</i>	<i>C3</i>
Sex	F	F	F	F	F	F	F	F	F
Ethnicity	Fillipino	Caucasian	Native America n	Caucasian	Caucasian	Caucasian	(no reply)	Caucasian	Caucasian
Age	25	55	52	41	32	25	27	27	28
Highest level of education	BA	BA MA: Education Technology and Elementary Science	BA	BA TC: Early Childhood SpEd	BA TC: SpEd	BA TC	BA TC: Early Childhood SpEd	BA TC	BA TC: Early Childhood SpEd
Years teaching children with autism	1	5	1	13	10	1	3	2	4
Autism specific training	(no reply)	Yes: on the job	Yes: on the job	Yes: university class	Yes: on the job	Yes: on the job	Yes: on the job, university class	Yes: on the job	Yes: on the job

Table 2 continued. Teacher Demographics

Training in PRT	No	Yes: on the job	No	Yes: on the job	Yes: on the job	Yes: on the job	No	No	Yes: on the job
Job satisfaction	(no response)	Very satisfied	Satisfied	Satisfied	(no response)	Very satisfied	As satisfied as possible	Very Satisfied	Very Satisfied
Job-related stress	Stressful, but manageable	Stressful, but manageable	Stressful, but manageable	Stressful, but manageable	Stress overwhelms me	Stressful, but manageable	Occasionally stressful	Occasionally stressful	Stress overwhelms me
Most used intervention	ABA	PRT, PECS	ABA	PRT, DTT, Incidental Teaching, PECS	PRT, DTT, Incidental Teaching	PRT, DTT	ABA	ABA, TEACCH, Edmark	Play based

Table 3. Flow Chart of Research Procedures

Condition	Procedures	Time	Assessments
Baseline  ↓	Classroom observations	30 min/week (3, 5, 7 weeks)	Accuracy of trainer assessment of PRT implementation, Accuracy of trainer feedback to teacher, Accuracy of teacher implementation of PRT, Student Language and Behavior
Treatment  ↓	Trainer training	15 hrs	Accuracy of trainer implementation of PRT, Accuracy of trainer assessment of PRT implementation, Accuracy of trainer feedback to teacher
	Teacher-training workshop	6 hrs	Trainer adherence to workshop protocol, Accuracy of trainer implementation of PRT, Accuracy of teacher implementation of PRT
	Classroom observations	30 min/week (7 weeks)	Accuracy of trainer assessment of PRT implementation, Accuracy of trainer feedback to teacher, Accuracy of teacher implementation of PRT, Student Language and Behavior
Follow-up  ↓	Classroom observation	30 min/week (1 week)	Accuracy of trainer assessment of PRT implementation, Accuracy of trainer feedback to teacher, Accuracy of teacher implementation of PRT, Student Language and Behavior, Trainer and teacher satisfaction

Table 4. Research Protocol Fidelity of Implementation

<i>Research protocol</i>	<i>Delivery of materials</i>	<i>Recording of baseline classroom observations</i>	<i>Completion of Trainer Training Protocol</i>	<i>Recording of treatment classroom observations</i>	<i>Recording of follow-up classroom observations</i>
Group A	100%	100%	100%	90%	100%
Group B	100%	100%	92%	100%	100%
Group C	100%	100%	100%	100%	100%
Total	100%	100%	97%	97%	100%

Table 5. Trainer Feedback Analysis

<i>Trainer</i>	<i>Condition</i>	<i>Was the PRT Feedback form completed by the trainer?</i>	<i>There was Full, Partial or No Agreement between the trainer's scoring on the PRT Assessment form the PRT Feedback form regarding areas for improvement?</i>	<i>There was Full, Partial or No agreement between the trainer's scoring on the PRT Assessment form and the video feedback regarding areas for improvement?</i>	<i>There was Full, Partial, or No agreement between the trainer's scoring on the PRT Feedback form and the video feedback regarding areas for improvement?</i>
A	Baseline	50% Fully 44% Partially 6% Not at all	0% Full 28% Partial 72% No	0% Full 22% Partial 78% No	13% Full 27% Partial 60% No
	Treatment	0% Fully 14% Partially 86% Not at all	6% Full 3% Partial 92% No	26% Full 26% Partial 47% No	6% Full 18% Partial 76% No
B	Baseline	83% Fully 17% Partially 0% Not at all	0% Full 22% Partial 78% No	10% Full 50% Partial 40% No	30% Full 35% Partial 35% No
	Treatment	65% Fully 35% Partially 0% Not at all	26% Full 26% Partial 47% No	18% Full 43% Partial 39% No	29% Full 43% Partial 29% No
C	Baseline	30% Fully 70% Partially 0% Not at all	35% Full 14% Partial 51% No	24% Full 3% Partial 73% No	44% Full 8% Partial 47% No
	Treatment	13% Fully 84% Partially 3% Not at all	41% Full 13% Partial 46% No	42% Full 27% Partial 30% No	33% Full 6% Partial 61% No

Table 6. Trainer Responses to Satisfaction Questionnaire

<i>Question</i>	<i>Trainer Responses</i>
The overall quality of training you received?	50% very satisfied, 50% satisfied
Your trainer's ability to answer questions regarding PRT?	100% very satisfied
Your trainer's delivery of important information?	50% very satisfied, 50% satisfied
Your trainer's ability to implement PRT?	100% very satisfied
The trainer's understanding of issues related to using PRT in a classroom?	50% satisfied, 50% neutral
Your ability to train others to use PRT?	50% satisfied, 50% neutral
The organization/structure of the weekly classroom visits?	50% satisfied, 50% neutral
The organization/structure of the 15-hr training sessions?	100% very satisfied
The materials for monitoring student progress?	100% satisfied
The materials for assessing fidelity of implementation?	100% satisfied
The PRT manual?	50% very satisfied, 50% satisfied
What were the most helpful parts of the training you received?	50% practice and feedback, 50% direct training
What were the least helpful parts of the training you received?	50% all parts were helpful, 50% trainer did not provide feedback about feedback
What are the most difficult points of PRT to teach others to use?	50% taking turns, 50% creative play
What are the most difficult points of PRT to implement?	50% Multiple Cues and Turn Taking, 50% Reinforcing attempts
Do you believe in this approach?	100% A (Yes)
How well do you think PRT works for children with autism (scale of 1-5, 1 being "not at all successful," to 5 being "highly successful")?	100% '5' (Highly Successful)
How well do you understand PRT (scale of 1-5, 1 being "I know very little about it," to 5 "I am very knowledgeable about it")?	50% '4.5', 50% '4'
How comfortable are you implementing PRT? (scale of 1-5, 1 being "I am not comfortable implementing it," to 5 "I am very experienced and comfortable").	100% '4'
Would you recommend this training to another person in your position? If no, why not?	100% yes



Table 7. Teacher Responses to Satisfaction Questionnaire.

<i>Question</i>	<i>Teacher Responses</i>
The overall quality of training you received	50% very satisfied, 50% satisfied
Your trainer's ability to answer questions regarding PRT?	50% very satisfied, 50% satisfied
Your trainer's delivery of important information?	50% very satisfied, 50% satisfied
Your trainer's ability to implement PRT?	50% very satisfied, 50% satisfied
The trainer's understanding of issues related to using PRT in a classroom?	66% very satisfied, 33% satisfied
Your ability to use PRT with your students?	50% very satisfied, 50% satisfied
The organization/structure of the weekly classroom visits?	16% very satisfied, 66% satisfied, 16% neutral
The organization/structure of the 6 hr training workshop?	50% very satisfied, 33% satisfied, 16% neutral
The materials for monitoring student progress?	16% very satisfied, 50% satisfied, 33% neutral
The PRT manual?	50% very satisfied, 33% neutral, 16% very satisfied
What were the most helpful parts of the training you received?	50% feedback, 16% 6 hr workshop, 16% practice, 16% turn taking
What were the least helpful parts of the training you received?	33% did not reply, 16% reduce video time, 16% initial presentation of training, 16% break down components
What percentage of your classroom day do you typically use PRT?	50% (parts of the day, but can't estimate a percentage), 33%( 51-75% of the day), 16% (26-50% of the day)
With what percentage of children with autism in your classroom do you use PRT?	50% (E 76-100% of the kids), 33% (D 51-75% of the kids), 16% (C 26-50% of the kids)
In what setting(s) do you use PRT?	66% (A 1:1), 33% (B child + peer), 16% (C large group), 50% (D small group), 16% (E multiple settings)
What types of materials (toys, props, stimuli, etc.) do you use for PRT?	83% toys, 16% educational games/math manipulations
Do you implement the entire intervention as you learned it, or parts of it?	50% (A Entire intervention), 33% (C Entire intervention mixed with others), 16% (B Parts of the intervention)

Table 7 continued. Teacher Responses to Satisfaction Questionnaire.

What are the most difficult points of PRT to implement with your students?	33% finding time, 33% did not reply, 16% creativity, 16% too many components
Do you believe in this approach?	83% A (Yes), 16% B (No)
How well do you think PRT works for children with autism in your program (scale of 1-5, 1 being "not at all successful," to 5 being "highly successful")?	16% '5,' 86% '4'
How well do you understand PRT (scale of 1-5, 1 being "I know very little about it," to 5 "I am very knowledgeable about it")?	86% '4', 16% '3'
How comfortable are you implementing PRT in your program? (scale of 1-5, 1 being "I am not comfortable implementing it," to 5 "I am experienced and comfortable, and I would train others in this method").	16% '5', 66% '4', 16% '3'
What other interventions do you use in your classroom?	50% Discrete Trial, 33% ABA, 16% Visual Schedule/Visual + Verbal Rules, 16% PECS
What do you consider your primary intervention (if any)?	16% Verbal/Visual Rules, 16% Mixed approach, 16% PRT, 16% "whatever works", 16% ABA, 16% did not reply
Would you recommend this training to another teacher? If no, why not?	100% yes

## APPENDICES

## Appendix A: Teacher Intake Questionnaire

Name: \_\_\_\_\_

School district: \_\_\_\_\_

Job title: \_\_\_\_\_

Date: \_\_\_\_\_

Which age group do you teach?

1.  0-3
2.  3-5
3.  5-8

Your answers to the questions are confidential. They will NOT be made available to your supervisor or anyone else. Your name, school district, and/or program name will not be attached to the survey at any time.

Please answer each question to the best of your ability. There are no right or wrong answers.

1. How many years of experience do you have working in your field? \_\_\_\_\_

2. How many years of experience do you have working with children who have autism?  
\_\_\_\_\_

3. Would you mind sharing with us your race/ethnicity? (this is optional)

- African-American
- Asian (please specify: \_\_\_\_\_)
- Caucasian, not Latino
- Latino
- Native American
- Other \_\_\_\_\_

4. Would you mind sharing with us the year in which you were born?

19 \_\_\_\_

5. What is the highest level of education you have completed? Please also include any credentials you have received.

- High School/GED
- AA Degree \_\_\_\_\_ (list major)
- Bachelor's Degree \_\_\_\_\_ (list major)
- Teaching Credential \_\_\_\_\_ (list type)
- Master's Degree \_\_\_\_\_ (list type)
- Doctoral Degree \_\_\_\_\_ (list type)

- Autism Specific Degree/ program

\_\_\_\_\_ (list degree and program)

- Early Childhood Education Degree  
 Board Certified Behavior Analyst (BCBA)  
 Other: \_\_\_\_\_

8. What is the classification of your classroom?

- Special Day/Mixed Disabilities  
 Special Day/Autism-specific  
 Special Day/Severely Handicapped (SH)  
 Special Day/Non-severely (Learning) Handicapped (LH)  
 Special Education Inclusion Program (at least 50% typical kids in class)  
 Regular education classroom  
 1:1 pull-out instruction  
 Other \_\_\_\_\_

9. How many children are currently in your classroom/group program *at one time* (total, including those with and without autism/PDD)? \_\_\_\_\_

10. How many children with autism/PDD are in your classroom/group? \_\_\_\_\_

11. What is the maximum number of children with and without autism you can have, at any one time, in your classroom/group? \_\_\_\_\_

12. Are there any typically developing children in, or who come to, your classroom/group?

- Yes  
 No (skip to question 13)

12a. If "Yes," how many? \_\_\_\_\_

12b. How often do these typically developing children attend?

- The entire program  
 5 hours per week  
 5-10 hours per week  
 > 10 per week

13. What is the typical ratio of adults to children in your classroom/group? \_\_\_\_\_

14. Does your program/district have an autism specialist or autism consultant?

- Yes  
 No

14a. If yes, please describe the autism specialist or consultant's involvement in your classroom?

15. Which intervention do you use most often?

If you can't choose one, please list the most frequently used first:

- a. \_\_\_\_\_
- b. \_\_\_\_\_
- c. \_\_\_\_\_
- d. \_\_\_\_\_

16. Why did you adopt this intervention?

17. What types of materials (toys, props, stimuli, etc.) do you use for this intervention?

18. Do you implement the *entire* intervention as you learned it, or parts of it?

- Entire intervention
- Parts of the intervention
- Use the entire intervention but mix it with others as well.
- Other \_\_\_\_\_

18a. If "parts," what parts do you use and why?

19. How were you trained to use this method, and how many hours of training did you receive?

- |   | <u># hours</u> |
|---|----------------|
| <input type="checkbox"/> On-the-job training (learning while I work)                              | _____          |
| <input type="checkbox"/> Trained by supervisor/other teacher who had been trained in intervention | _____          |
| <input type="checkbox"/> Trained through the autism specialist at my program/district             | _____          |
| <input type="checkbox"/> Went to a workshop or training   | _____          |
| <input type="checkbox"/> Trained by a consultant in my classroom                                  | _____          |
| <input type="checkbox"/> Trained by a consultant outside my classroom (e.g., workshop)            | _____          |
| <input type="checkbox"/> Conference   | _____          |
| <input type="checkbox"/> _____  | _____          |
| <input type="checkbox"/> Reading  | _____          |
| <input type="checkbox"/> Video  | _____          |
| <input type="checkbox"/> Other: _____   | _____          |

19b. Please describe the length and type of training.

20. Have you received any training in Pivotal Response Training (PRT)?

- Yes  
 No

20a. If "Yes," how many hours of training did your receive?

- |   | <u># hours</u> |
|---|----------------|
| <input type="checkbox"/> On-the-job training (learning while I work)                              | _____          |
| <input type="checkbox"/> Trained by supervisor/other teacher who had been trained in intervention | _____          |
| <input type="checkbox"/> Trained through the autism specialist at my program/district             | _____          |
| <input type="checkbox"/> Went to a workshop or training   | _____          |
| <input type="checkbox"/> Trained by a consultant in my classroom                                  | _____          |
| <input type="checkbox"/> Trained by a consultant outside my classroom (e.g., workshop)            | _____          |
| <input type="checkbox"/> Conference   | _____          |
| <input type="checkbox"/> Reading  | _____          |
| <input type="checkbox"/> Video  | _____          |
| <input type="checkbox"/> Other: _____   | _____          |

20b. Please describe the length and type of training.

21. Have you received any autism-specific training?

- Yes  
 No

21a. If "Yes," what type?

- On-the-job training (learning while I work)  
 Trained by supervisor/other teacher who had been trained in intervention  
 Trained through the autism specialist at my program/district  
 Went to a workshop  
 Trained by a consultant  
 Reading  
 Video  
 Other: \_\_\_\_\_

22. Please describe your overall job satisfaction?

- I am very dissatisfied with my job.  
 I am somewhat satisfied with my job.  
 I am satisfied with my job.  
 I am very satisfied with my job.  
 I am as satisfied with my job as I could possibly be.

23. Please describe your overall job-related stress?

- Job-related stress overwhelms me.
- My job is stressful, but the stress is manageable.
- My job is occasionally stressful.
- My job is rarely stressful.
- My job is never stressful.

Thank you for your time!





- Early Childhood Education Degree
- Board Certified Behavior Analyst (BCBA)
- Other: \_\_\_\_\_

6. How much time do you spend on the following activities as part of your job?

- |   | <u># hours/week</u> |
|---|---------------------|
| <input type="checkbox"/> Observing students   | _____               |
| <input type="checkbox"/> Observing/providing feedback to teachers                     | _____               |
| <input type="checkbox"/> Observing/providing feedback to other staff                  | _____               |
| <input type="checkbox"/> Writing/assessing/modifying behavioral programs for students | _____               |
| <input type="checkbox"/> Writing/assessing/modifying academic programs for students   | _____               |
| <input type="checkbox"/> Preparing for and attending IEP meetings                     | _____               |
| <input type="checkbox"/> Preparing other reports or written documents                 | _____               |
| <input type="checkbox"/> Providing direct intervention for students (1:1)             | _____               |
| <input type="checkbox"/> Providing direct intervention for students (group)           | _____               |
| <input type="checkbox"/> Conducting training for teachers or other staff              | _____               |
| <input type="checkbox"/> Other (please describe) _____                                | _____               |

7. Which intervention do you use most often?

If you can't choose one, please list the most frequently used first:

- e. \_\_\_\_\_
- f. \_\_\_\_\_
- g. \_\_\_\_\_
- h. \_\_\_\_\_

8. Why did you adopt this intervention?

9. What types of materials (toys, props, stimuli, etc.) do you use for this intervention?

10. Do you implement the *entire* intervention as you learned it, or parts of it?

- Entire intervention
- Parts of the intervention
- Use the entire intervention but mix it with others as well.
- Other \_\_\_\_\_

10a. If "parts," what parts do you use and why?

11. How were you trained to use this method, and how many hours of training did you receive?

- |   | <u># hours</u> |
|---|----------------|
| <input type="checkbox"/> On-the-job training (learning while I work)                              | _____          |
| <input type="checkbox"/> Trained by supervisor/other teacher who had been trained in intervention | _____          |
| <input type="checkbox"/> Trained through the autism specialist at my program/district             | _____          |
| <input type="checkbox"/> Went to a workshop or training   | _____          |
| <input type="checkbox"/> Trained by a consultant in my classroom                                  | _____          |
| <input type="checkbox"/> Trained by a consultant outside my classroom (e.g., workshop)            | _____          |
| <input type="checkbox"/> Conference   | _____          |
| <br>  |                |
| <input type="checkbox"/> Reading  | _____          |
| <input type="checkbox"/> Video  | _____          |
| <input type="checkbox"/> Other: _____   | _____          |

11a. Please describe the length and type of training.

12. Have you received any training in Pivotal Response Training (PRT)?

- Yes  
 No

12a. If "Yes," how many hours of training did you receive?

- |   | <u># hours</u> |
|---|----------------|
| <input type="checkbox"/> On-the-job training (learning while I work)                              | _____          |
| <input type="checkbox"/> Trained by supervisor/other teacher who had been trained in intervention | _____          |
| <input type="checkbox"/> Trained through the autism specialist at my program/district             | _____          |
| <input type="checkbox"/> Went to a workshop or training   | _____          |
| <input type="checkbox"/> Trained by a consultant in my classroom                                  | _____          |
| <input type="checkbox"/> Trained by a consultant outside my classroom (e.g., workshop)            | _____          |
| <input type="checkbox"/> Conference   | _____          |
| <br>  |                |
| <input type="checkbox"/> Reading  | _____          |
| <input type="checkbox"/> Video  | _____          |
| <input type="checkbox"/> Other: _____   | _____          |

12b. Please describe the length and type of training.

13. Have you received any autism-specific training?

- Yes
- No

13a. If “Yes,” what type?

- On-the-job training (learning while I work)
- Trained by supervisor/other teacher who had been trained in intervention
- Trained through the autism specialist at my program/district
- Went to a workshop
- Trained by a consultant
- Reading
- Video
- Other: \_\_\_\_\_

14. Please describe your overall job satisfaction?

- I am very dissatisfied with my job.
- I am somewhat satisfied with my job.
- I am satisfied with my job.
- I am very satisfied with my job.
- I am as satisfied with my job as I could possibly be.

15. Please describe your overall job-related stress?

- Job-related stress overwhelms me.
- My job is stressful, but the stress is manageable.
- My job is occasionally stressful.
- My job is rarely stressful.
- My job is never stressful.

16. Do you provide training teachers or other staff on strategies for educating children with autism?

1.  Yes
2.  No

16a. If yes, please describe the training you provide.

Thank you for your time!

## Appendix C: Weekly Update – Teacher

## Weekly Update - Teacher

Name \_\_\_\_\_

Date \_\_\_\_\_

Please complete both sides of this form before each scheduled weekly visit. During the 30 minute classroom visit you should: work with student #1 for 10 minutes, work with student #2 for 10 minutes, and talk to your trainer for 10 minutes about the session.

Please list any questions or concerns to discuss with your trainer.

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 Name \_\_\_\_\_ Date \_\_\_\_\_

Student #1 name \_\_\_\_\_

How much time did you spend in each of these activities last week?

Working 1:1 with the student	
Working with the student in a small group	
Using Pivotal Response Training with the student	

Please list the current acquisition skills (skills that are not yet mastered) for this student.

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_
- 3) \_\_\_\_\_
- 4) \_\_\_\_\_
- 5) \_\_\_\_\_
- 6) \_\_\_\_\_

Please list the current maintenance skills (skills that have been mastered) for this student.

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_
- 3) \_\_\_\_\_
- 4) \_\_\_\_\_
- 5) \_\_\_\_\_
- 6) \_\_\_\_\_

Student #2 name \_\_\_\_\_

How much time did you spend in each of these activities last week?

Working 1:1 with the student	
Working with the student in a small group	
Using Pivotal Response Training with the student	

Please list the current acquisition skills (skills that are not yet mastered) for this student.

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_
- 3) \_\_\_\_\_
- 4) \_\_\_\_\_
- 5) \_\_\_\_\_
- 6) \_\_\_\_\_

Please list the current maintenance skills (skills that have been mastered) for this student.

- 1) \_\_\_\_\_
- 2) \_\_\_\_\_
- 3) \_\_\_\_\_
- 4) \_\_\_\_\_
- 5) \_\_\_\_\_
- 6) \_\_\_\_\_

## Appendix D: Weekly Update – Trainer

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 Weekly Update - Trainer
 

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Name \_\_\_\_\_

Teacher name \_\_\_\_\_

Date \_\_\_\_\_

Please complete this form before each scheduled weekly visit. During the 30 minutes classroom visit you should: observe the teacher working with student #1 for 10 minutes, observe the teacher working with student #2 for 10 minutes, and talk to the teacher for 10 minutes about the session.

How much time did you spend in each of these activities last week?

Observing this teacher working with students	
Providing feedback to this teacher	
Providing training or feedback on this teacher's use of PRT	

Please list any questions or concerns to discuss with your teacher.

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## Appendix E: Classroom Observation Instructions

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### Classroom Visit - Teacher Instructions

Complete Weekly Update form and give it to (trainer's name).

10 min. – Work 1:1 with the first student

10 min. – Work 1:1 with the second student

10 min. – Discuss sessions with (trainer's name)

Thank you!

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### Classroom Visit – Trainer Instructions

Complete Weekly Update form

10 min. – Observe teacher working with the first student; complete PRT Assessment form

10 min. – Observe teacher working with the second student; complete PRT Assessment form

10 min. – Discuss sessions with teacher

Return all forms to research assistant.

Thank you!





## Appendix G: PRT Feedback Form

Teacher \_\_\_\_\_  
 Student \_\_\_\_\_

Evaluation by \_\_\_\_\_  
 Date \_\_\_\_\_

Summary of observation:

- 1) What went well during the time you observed?

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- 2) What did the teacher do well?

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- 3) What components of PRT were used correctly? Give examples from the session?

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- 4) What components of PRT were not used correctly? Give examples from the session?

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- 5) How can the teacher improve his/her use of specific components of PRT?

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- 6) Does the teacher have any questions? Please document.

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- 7) What action steps should the teacher take?

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- 8) What was the best aspect of the session you observed?

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Please graph the teacher's score for each component of PRT.

Fluent	4										
Competent	3										
Needs Improvement	2										
	1										
Mastery level	Score	Attention	Clarity	Appropriateness	Maintenance and Acquisition	Child Choice of Activity	Multiple Cues	Contingent Consequence	Direct Reinforcement	Reinforcement of Attempts	Turn Taking

Comments:

## Appendix H: Components of Trainer Training

<i>Training component</i>	<i>Time (hrs)</i>	<i>Date completed</i>
Trainer receives training materials	.5	
Trainer completes informed consent process	.5	
Experimenter presents History and Components of PRT lecture	3	
Experimenter presents PRT Fidelity of Implementation definitions and practice videos	2	
Experimenter presents Classroom PRT and Troubleshooting lectures	1	
Trainer practices PRT FI assessment and feedback (#1)	1	
Trainer practices PRT FI assessment and feedback (#2)	1	
Trainer practices PRT FI assessment and feedback (#3)	1	
Trainer practices PRT FI assessment and feedback (#4)	1	
Trainer implements PRT (#1)	1	
Trainer implements PRT (#2)	1	
Trainer implements PRT (#3)		
Experimenter explains teacher-training workshop protocol and materials	.5	
Experimenter answers final questions	.5	
<b>Total</b>	<b>15 hrs</b>	<b>/13= %</b>

## Appendix I: PRT Behavioral Definitions

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### Basic Procedures

- PRT may be scored in-vivo (live) or from video.
- Before coding, please review the child's current maintenance and acquisition skills. Keep this list available as a reference.
- Always have the coding definitions accessible as a reference as you are coding.
- If you have difficulty deciding between two codes, choose the higher code. However, if your indecision is based on a change in the teacher's behavior over the course of the segment, consider all behaviors, not only the most recent.

Description of Codes These descriptions provide a general description of the quality of behavior associated with each code. Codes for each component of PRT should be used for actual scoring and are listed individually below.	
N/A	There is insufficient information to make a judgment. This code should be used when no cues are presented within a segment, or as indicated under individual components of PRT.
1	PRT is poorly implemented during a majority of the segment. The teacher has poor control over the learning environment and fails to engage the child.
2	PRT is implemented with significant error. There is a notable effort to include this component of PRT, but it is only correctly implemented about half of the segment.
3	PRT is implemented correctly during a majority of the segment. There are more strengths than weaknesses, and the teacher has good control over the child and the environment.
4	PRT is implemented with expertise. The teacher uses this element of PRT correctly throughout the entire segment.

### Components of PRT

#### *Instructional Cue (Antecedent)*

Attention The child should be attending before the teacher presents an instruction, question or other cue. The child may be attending to the teacher or to the activity. Directions that are provided by the teacher for the specific purpose of gaining the child's attention should not be considered instructional cues.	
N/A	The teacher does not present any cues during the segment.
1	The teacher fails to focus the child's attention before presenting a majority of the cues. The child is distracted by the environment, disinterested in the materials, crying, and/or engaged in stereotypy

	during the majority of the segment.
2	The teacher does not have the child's attention before about half of the cue presentations. The teacher may try to focus the child's attention but does so unsuccessfully, or the teacher has the child's attention at such a low frequency that the opportunity for child learning is compromised.
3	The teacher has the child's attention during the majority of cue presentations. The teacher may lose the child's attention momentarily, but identifies and corrects the problem before presenting another cue.
4	The teacher has the child's attention every time s/he presents a cue.

Clarity The teacher should present a clear cue, question or instruction that is developmentally appropriate for the child. It should be clear which response the teacher is targeting from the child. A clear cue will be developmentally appropriate, at the same level or just above the child's current level of functioning (e.g., The teacher could use a cue of "ball" or "want ball" for a child who routinely uses single words to request desired items).	
N/A	The teacher does not present any cues during the segment.
1	The teacher presents unclear cues throughout a majority of the segment. Instructions may be too long or complex for the child to understand. Alternatively, an unclear cue may be presented in such a way that the desired response is unclear.
2	About half of the cues the teacher presents are clear.
3	The teacher presents clear cues for the majority of the segment. There may be occasional presentations of an unclear cue, but overall the teacher communicates how the child should correctly respond.
4	Every cue the teacher presents is clear.

Appropriateness The teacher should present a cue, question or instruction that is appropriate to the task. The cue should be related to the desired item (e.g. If the child wants to play with a car, the cues should be related to the car: "car," "what do you want?," "go.")	
N/A	The teacher does not present any cues during the segment.
1	The teacher presents inappropriate cues throughout a majority of the segment.
2	About half of the cues the teacher presents are appropriate.
3	The teacher presents appropriate cues for a majority of the segment. There may be occasional presentation of cues that are not related to the desired item, but overall the teacher presents appropriate cues.
4	Every cue the teacher presents is appropriate to the task.

<p>Maintenance and Acquisition tasks The teacher should intersperse maintenance tasks and acquisition tasks when presenting cues. Maintenance tasks target skills the child has mastered. Acquisition tasks are skills that are currently being taught. Code based on the initial cue presented by the teacher regardless of the child's response (e.g., If the teacher provides an acquisition cue "ball" and the child responds with a maintenance skill, "buh," it should be coded as an acquisition skill). Maintenance and acquisition skills will change as the child learns new skills, so the teacher should review current maintenance and acquisition skills before each session. Child affect, in the form of heightened frustration, may be an indication the teacher is targeting too many acquisition tasks and too few maintenance tasks.</p>	
N/A	The teacher does not present any cues during the segment.
1	The teacher presents more than one cue, but all cues target only maintenance or only acquisition skills.
2	The teacher presents one cue during the segment, and the cue targets an acquisition skill.
3	The teacher presents one cue during the segment, and the cue targets a maintenance skill.
4	The teacher presents more than one cue and targets both maintenance and acquisition skills.

<p>Child choice of activity The teacher should give the child choices and follow the child's lead. The teacher may offer choices to generate child interest in new activities or within activities. Low child engagement may be an indication the teacher is not following the child's choice of activity. If the child is enjoying an activity and the teacher continues with that activity in a way the child prefers, consider that following the child's lead.</p>	
N/A	The teacher does not present any cues during the segment.
1	The teacher chooses the activity, fails to present choices, and fails to follow the child's lead during a majority of the segment.
2	The teacher presents choices or follows the child's lead during half of the segment, including any transitions.
3	The teacher presents choices and follows the child's lead during a majority of the segment, including any transitions.
4	The teacher presents choices and follows the child's lead during the entire segment, including any transitions. Additionally, the teacher must present choices within the activity.

<p>Multiple Cues/Multiple Discriminations If developmentally appropriate, the teacher should present opportunities requiring the child to make discriminations based on multiple simultaneous environmental cues. Targeting multiple cues is appropriate for children who are as verbally fluent as a typically developing 4-year-old. The teacher should present at least two cues (e.g., color and shape – red square, green square, red circle, green circle)</p>	
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and should require a verbal or receptive response.	
N/A	The teacher correctly identifies multiple cues as inappropriate for the child's developmental level.
1	Multiple cues are developmentally appropriate for the child, but the teacher does not target multiple cues within the session, or Multiple cues are NOT developmentally appropriate for the child and the teacher attempts to target multiple cues two or more times throughout the session.
2	Multiple cues are developmentally appropriate for the child, but the teacher incorrectly implements multiple cue procedures throughout the session.
3	Multiple cues are developmentally appropriate for the child, and the teacher correctly implements multiple cues at some points in the session. There may be incorrect implementation of multiple cues procedures as well.
4	Multiple cues are developmentally appropriate for the child, and the teacher correctly implements multiple cues throughout the entire session.

### *Consequence*

Contingent Consequence The teacher should present a consequence immediately following the child's behavior (within 3 seconds). If the child responds correctly or attempts to respond correctly, the teacher should present a reinforcer. It should be clear which behavior is being reinforced. If the child responds incorrectly or fails to respond, the teacher should withhold reinforcement and should represent an appropriate cue.	
N/A	The teacher does not present any cues during the segment.
1	The teacher fails to provide contingent consequences during a majority of the segment. Contingent consequences are rarely presented.
2	The teacher provides contingent consequences about half of the segment.
3	The teacher provides contingent consequences during a majority of the segment. Non-contingent consequences are rarely presented.
4	Every consequence the teacher provides is contingent upon the child's behavior.

Direct Reinforcement The teacher should provide a reinforcing consequence directly related to the child's response and the activity. If the child wants to play with a car, the teacher should present an appropriate cue ("I want car"), the child should respond ("I want car") and the child should get to play with the car. Similarly, if the child wants to spin the wheels of a car, the teacher should present an appropriate cue ("Down the ramp"), the child should respond by rolling the car down the ramp, and the child should have free	
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access to spin the car's wheels.	
N/A	The teacher does not provide any reinforcement during the segment.
1	The teacher provides reinforcing consequences unrelated to the child's behavior and the activity (e.g., The teacher says, "touch your nose," the child touches his nose, and the teacher gives him a car to play with) or the teacher provides verbal praise only.
2	The teacher provides reinforcing consequences directly related to the child's response about half of the segment.
3	The teacher provides reinforcing consequences directly related to the child's response a majority of the segment. The teacher rarely presents indirect reinforcement or verbal praise alone.
4	The teacher only provides reinforcing consequences directly related to the child's response and the activity. No indirect reinforcement occurs and no verbal praise is presented alone.

Reinforcement of attempts – The teacher should provide a reinforcing consequence following a majority of the child's goal-directed attempts. The teacher should reinforce child attempts to increase the overall amount of reinforcement, and therefore, increase child motivation. Child affect, in the form of increased frustration, and low child motivation may be an indication the teacher is not reinforcing the child's goal-directed attempts.	
N/A	The child makes no attempts during the segment.
1	The child makes multiple attempts during the segment, and none of the attempts are reinforced by the teacher.
2	The child makes multiple attempts during the segment, and the teacher reinforces fewer than half of the attempts.
3	The child makes only one attempt during the segment and it is not reinforced by the teacher.
4	The child makes one or more attempts during the segment, and the teacher provides a reinforcing consequence following at least half of the child's attempts.

*Other*

Turn taking The teacher should take turns while playing with the child. A turn occurs when the teacher partakes in the activity by modeling play or verbally indicating a turn (e.g. "my turn," "I want to play," "Let me try"). Turns are used to regain teacher control of the activity or materials and to model appropriate play and language at a level the child can understand. The length of a turn will vary according to the child's patience and motivation; however, a turn should clearly interrupt the child's play and refocus the child's attention on the teacher's behavior. The child may maintain some access to the activity, but the teacher should have control of the most desired item to maintain the child's attention.	
1	The teacher takes no turns during the segment.



2	The teacher verbally indicates a turn but fails to maintain the child's attention AND fails to present appropriate or play.
3	The teacher takes a turn but fails to maintain the child's attention OR verbally indicates a turn and fails to present appropriate language or play models as part of the turn.
4	The teacher takes turns, maintains the child's attention during the turn, and presents appropriate language or play models as part of the turn.

## Appendix J: Feedback Procedures

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**Feedback Steps**

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1. Make a positive or empathetic statement regarding the session. (e.g. “He’s really using a lot more language today,” or “I can tell that you enjoy working with John.”)
  2. Provide positive performance-specific feedback training. (e.g. “You did a great job keeping John actively engaged in the session.”)
  3. Provide appropriate praise by describing one component of PRT performed correctly. (e.g. “You got John’s attention each time before you presented a new activity.”)
  4. Identify each component of PRT in which errors were made. (e.g. “You only reinforced John’s verbal requests 65% of the time. This could make him more frustrated and lower his motivation.”)
  5. Describe how each component of PRT (for which an error was made) should be performed. (e.g. You should provide contingent reinforcement whenever John makes an appropriate request. Your goal is to do this at least 80% of the time. When John asks for his turn, allow him to have a turn holding the book.”)
  6. Solicit questions from the trainee.
-

Appendix K: Fidelity of Implementation Checklist for PRT Teacher Training
 

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## Teacher Training Procedures

Trainer \_\_\_\_\_

Date \_\_\_\_\_

Observer(s) \_\_\_\_\_

Please observe the trainer throughout the entire training. Place your initials in the appropriate box to indicate if each procedure is or is not observed.

Observed	Not Observed	Procedures
<b>Hours 1-2</b>		
		The trainer welcomed the teachers.
		The trainer explained the materials included in the binder.
		The trainer used the provided lecture to explain the Background and Components of PRT.
		The trainer explained the A-B-C of behavioral principles.
		The trainer compared Discrete Trial Training (DTT) to PRT.
		The trainer explained the benefits of DTT and PRT.
		The trainer explained “pivotal” elements of PRT.
		The trainer explained the individual components of PRT.
		The trainer followed the script for the PRT lecture.
		The trainer used and explained the videos with the lecture.
		The trainer answered teachers’ questions.
<b>Hour 3</b>		
		The trainer gave information about the participating student.
		The trainer had toys and other materials for the student.
		The trainer modeled PRT for approx. 10 min.
		The trainer observed each teacher for approx. 10 min.
		The trainer gave feedback to each teacher for approx. 5 min.
<b>Hour 4</b>		
		The trainer used the provided lecture to explain Application and Troubleshooting for PRT.
		The trainer followed the script for the PRT lecture.
		The trainer used and explained the videos with the lecture

		The trainer explained the data collection forms.
		The trainer explained the Task Record.
		The trainer explained how PRT implementation is assessed.
		The trainer answered teachers' questions.
Hour 5		
		The trainer gave information about the participating student.
		The trainer had toys and other materials for the student.
		The trainer modeled PRT for approx. 10 min.
		The trainer observed each teacher for approx. 10 min.
		The trainer gave feedback to each teacher for approx. 5 min.
Hour 6		
		The trainer gave information about the participating student.
		The trainer had toys and other materials for the student.
		The trainer observed each teacher for approx. 10 min.
		The trainer gave feedback to each teacher for approx. 5 min.
		The trainer answered teachers' questions.

Appendix L: Student Language and Behavior Definitions

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*Student Language and Behavioral Definitions*

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Language: How well does the student communicate?

Rank the student's language ability from 1-5, with 1 representing no verbal communication and 5 representing communication that seems appropriate for the student's chronological age.

Behavior: How difficult is it for the teacher to work with the student? For example, how well does the student stay on task, comply with instructions and avoid disruptive or violent behavior?

Rank the student's behavior from 1-5, with 1 representing behavior that is very difficult for the teacher to manage and 5 representing behavior that is cooperative, engaged and compliant.

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## Appendix M: Teacher Satisfaction Questionnaire

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### PRT Study Feedback Questionnaire

Please take a few minutes to give us your opinions about your participation in the UCSD Autism Lab sponsored PRT Training study. This information will be kept completely confidential and under no circumstances will it be available to other staff from your school site or district. We rely on your feedback to improve the quality of training we provide and the direction of future research. Thank you for your time.

How satisfied are you with:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
1) The overall quality of training you received?					
2) Your trainer's ability to answer questions regarding PRT?					
3) Your trainer's delivery of important information?					
4) Your trainer's ability to implement PRT?					
5) The trainer's understanding of issues related to using PRT in a classroom?					
6) Your ability to use PRT with your students?					
7) The organization/structure of the weekly classroom visits?					
8) The organization/structure of the 6 hour training workshop?					
9) The materials for monitoring student progress?					
10) The PRT manual?					

11) What were the most helpful parts of the training you received?

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12) What were the least helpful parts of the training you received?

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13) What percentage of your classroom day do you typically use PRT?

- a.  10-25%
- b.  26-50%
- c.  51-75%
- d.  76-100%
- e.  I used it during certain parts of the day, but cannot estimate an overall percentage. List what parts:

f.  Varies with the child

14) With what percentage of children with autism in your classroom do you use PRT?

- a.  < 10%
- b.  10-25%
- c.  26-50%
- d.  51-75%
- e.  76-100%
- f.  I use it with children who have a specific characteristic:

15) In what setting(s) do you use PRT?

- a.  1:1 (child + teacher)
- b.  1:1 (child + peer) and teacher
- c.  Large Group
- d.  Small Group
- e.  Multiple settings
- f.  Other: \_\_\_\_\_

16) What types of materials (toys, props, stimuli, etc.) do you use for PRT?

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17) Do you implement the *entire* intervention as you learned it, or parts of it?

- a.  Entire intervention
- b.  Parts of the intervention (please explain below)
- c.  Use the entire intervention but mix it with others as well (please explain below)
- d.  Other \_\_\_\_\_

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19) What are the most difficult points of PRT to implement with your students?

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20) Do you believe in this approach?

- a.  Yes
- b.  No
- c.  With certain children
- d.  Sort of
- e.  Other: \_\_\_\_\_

If “No” or “Sort of,” why do you continue to use it?

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21) How well do you think PRT works for children with autism in your program (scale of 1-5, 1 being “not at all successful,” to 5 being “highly successful”)?

1      2      3      4      5

22) How well do you understand PRT (scale of 1-5, 1 being “I know very little about it,” to 5 “I am very knowledgeable about it”)?

1      2      3      4      5

23) How comfortable are you implementing PRT in your program? (scale of 1-5, 1 being “I am not comfortable implementing it,” to 5 “I am experienced and comfortable, and I would train others in this method”).

1      2      3      4      5

24) What other interventions do you use in your classroom?

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25) What do you consider your primary intervention (if any)?

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26) Would you recommend this training to another teacher? If no, why not?

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Additional comments:



## Appendix N: Trainer Satisfaction Questionnaire

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 PRT Study Feedback Questionnaire
 

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Please take a few minutes to give us your opinions about your participation in the UCSD Autism Lab sponsored PRT Training study. This information will be kept completely confidential and under no circumstances will it be available to other staff from your school site or district. We rely on your feedback to improve the quality of training we provide and the direction of future research. Thank you for your time

How satisfied are you with:

	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied
1) The overall quality of training you received?					
2) Your trainer's ability to answer questions regarding PRT?					
3) Your trainer's delivery of important information?					
4) Your trainer's ability to implement PRT?					
5) The trainer's understanding of issues related to using PRT in a classroom?					
6) Your ability to train others to use PRT?					
7) The organization/structure of the weekly classroom visits?					
8) The organization/structure of the 15 hour training sessions?					
9) The materials for monitoring student progress?					
10) The materials for assessing fidelity of implementation?					
11) The PRT manual?					

12) What were the most helpful parts of the training you received?

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13) What were the least helpful parts of the training you received?

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14) What are the most difficult points of PRT to teach others to use?

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15) What are the most difficult points of PRT to implement?

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16) Do you believe in this approach?

- a.  Yes
- b.  No
- c.  With certain children
- d.  Sort of
- e.  Other: \_\_\_\_\_

If “No” or “Sort of,” why do you continue to use it?

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17) How well do you think PRT works for children with autism (scale of 1-5, 1 being “not at all successful,” to 5 being “highly successful”)?

1      2      3      4      5

18) How well do you understand PRT (scale of 1-5, 1 being “I know very little about it,” to 5 “I am very knowledgeable about it”)?

1      2      3      4      5

19) How comfortable are you implementing PRT? (scale of 1-5, 1 being “I am not comfortable implementing it,” to 5 “I am very experienced and comfortable”).

1      2      3      4      5

20) Would you recommend this training to another person in your position? If no, why not?

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