Parent Implemented Training for Autism through Teleconsultation (PITA-T)
West Virginia University, Psychology Department and Center for Excellence in Disabilities
Final Comprehensive Report

Introduction

Nature of the Research Problem

Over the past 20 years, a large body of literature has developed supporting the use of Applied Behavior Analysis (ABA) to treat individuals with ASD (Green, 1996; Lovaas, 1987; McEachin, Smith, & Lovaas, 1993). Although ABA is effective, it is often labor intensive, expensive, and therapists must have extensive training to effectively implement the treatment. ABA services are often readily available in urban areas, but lacking in less-affluent rural and geographically dispersed areas, where training in ABA techniques may be more difficult to obtain (Ruskin et. al, 2004). Unfortunately, few studies have focused on the needs of this underserved population.

Purpose, Scope, and Methods of Investigation

The purpose of the Parent Implemented Training for Autism through Teleconsultation (PITA-T) Project was to conduct innovative research aimed at improving access to, and implementation of, an empirically established intervention for autism called discrete-trial teaching (DTT), which is based on ABA. Specifically, PITA-T was originally designed to test the efficacy of a novel ABA delivery method (asynchronous video modeling to parents) to address service and training barriers associated with rural and low-income families. Because of unanticipated barriers in addressing our initial aims, we expanded the scope of the study to further novel research findings in three areas: (a) <u>investigation of effective strategies for dissemination of ABA practices</u>; (b) <u>intervention barriers for rural families</u>; (c) <u>means of addressing barriers that may promote adoption of empirically based strategies.</u>

To address the revised aims of the project, we adopted a mixed-method approach. In the first three years of the grant, we randomized parents into treatment and control groups to be able to answer questions about differences in training method. During the final year and no-cost extension, we changed our focus to repeated-measures evaluations with smaller samples of parents. We did this to more accurately measure the timing at which parents acquired implementation skills or abandoned the treatment strategy. We also began to conduct research on other caregivers, such as classroom instructors.

Nature of the Findings

In general, we found that rural parents encounter several difficulties when attempting to implement ABA interventions with their children. These barriers may be due to the unique stressors faced by rural parents of children with autism. Regardless of the source of the barriers, the net result is that adherence to the ABA intervention was low overall.

We identified several factors that may promote adherence to ABA interventions by parents (which are described in more detail below). Parents who have video contact with trainers are more likely to adhere to intervention than do parents who receive only written training materials, suggesting that instruction format is a predictor of training success (St. Peter et al., 2014). In a subsequent study funded by the grant, we found that parents who receive in-person training and video-based follow-up continued to have issues with adherence, but were able to accurately implement the ABA treatment procedures with minimal assistance from the trainers during the follow-up phase.

Another factor potentially influencing parental adherence is the extent to which children engage in problem behavior when the parent attempts the intervention. For many young children with autism, ABA-based instruction may be the children's first formal instructional situation. We identified statistically significant correlations between the occurrence of problem behavior and decreased likelihood of adults attempting an instructional session the same day, and on following days (Subramaniam et al., *in preparation*). Additionally, we identified an interaction between treatment adherence and challenging behavior; initial decreases in adherence caused temporary increases in problem behavior (Marsteller & St. Peter, 2012). These increases in problem behavior may then further reduce the parent's willingness to implement the intervention.

Given the barriers faced by parents who attempt to implement ABA interventions, an alternative strategy may be to teach classroom instructors (such as teachers and paraprofessionals) to implement the intervention. We demonstrated that teachers can learn to effectively implement ABA procedures during brief staff-training sessions. These training sessions result in generalized performance to implementing the procedures accurately with students with autism and related developmental disabilities in the classroom context (Giles, Kowcheck, & St. Peter, in prep; Pence, St. Peter, & Giles, 2013).

In addition to learning more about effective training procedures, we assessed the extent to which measurement strategies may influence obtained data on parental adherence to intervention. We established that assessing individual components of intervention implementation provides a different "picture" of parent performance, and may allow trainers to provide more individualized or detailed feedback that promotes parent adherence (Cook et al., under review).

A brief description of each of our major findings appears below.

Video-Based Instruction Improves Parental Adherence to ABA Intervention

St. Peter, C. C., Brunson, L. Y., Cook, J. E., Subramaniam, S., Larson, N. A., Clingan, M., & Poe, S. (2014). Video Instruction Improves Parental Adherence with a Distance-Learning Training Package. *Behavioral Interventions, 29,* 200-212.

Review of the Literature

Discrete-trial training (DTT) is a common component of early intensive behavioral interventions for children with autism spectrum disorders (ASD), and improves a wide range of social, language, and academic skills with this population (Ahearn & Tiger, 2013; Green, 1996; Lovaas, 1987; Smith, 2001; Thomson, Martin, Arnal, Fazzio, & Yu, 2009). Although effective, DTT is labor-intensive and requires specialized training to implement; making DTT expensive and difficult for some families to access (Ahearn & Tiger, 2013). To address these issues, researchers have trained parents to implement ABA interventions, including DTT with their children (Crockett, Fleming, Doepke, & Stevens, 2007; Koegel, Glahn, & Nieminen, 1978; Lafasakis & Sturmey, 2007; Lerman, Swiezy, Perkins-Parks and Roane, 2000; Thomson et al. 2009).

Distance-learning, or teleconsultation, approaches may increase rural parents' access to training and services. However, teleconsultation may be difficult to implement in rural areas, which often have poor high-speed internet access (National Telecommunications & Information Administration, 2013). When streaming video over the internet is not an option, written instructions and feedback may be a viable alternative. The extent to which written instructions improve DTT implementation, in the absence of performance models, is unclear. However, including videos in the instruction could be a viable way to provide models from a distance. Video instructions also allow trainers to avoid potential issues associated with written instructions, such as trainee illiteracy or poor reading skills and comprehension. We evaluated

the extent to which rural parents were able to acquire the skills necessary to conduct DTT with their children following written or asynchronous video instructions and models.

Study Design and Methods

Study Design

The study used a randomized control group design. Parents were randomized into groups that received either written instructions and feedback or video-based instructions and feedback. Parents were instructed to record themselves conducting DTT sessions with their children and mail the videos to researchers for review.

Population Studied and Sample Selection

Eleven fathers and 21 mothers participated. All parents had children under 5 years of age with a diagnosis on the autism spectrum. The mean age of parents was 35.87 years (range, 24 to 69). Of parents who reported educational level, the majority (54.17%) had received a college degree. Parents lived in rural Appalachian counties in West Virginia, Kentucky, Maryland, Virginia, or Pennsylvania.

Instruments Used

The primary measure was parental adherence. We classified parent responses as "adherent" if we received at least one memory card that contained at least one 12-trial DTT session with the parent and child dyad in the mail during a given month. The percentage of parents adhering was calculated by dividing the number of parents in each group who mailed in videos by the total number of parents in the group who had their training materials for a minimum of two weeks.

Statistical Techniques Employed

We compared adherence between groups through visual analysis of graphs depicting the percentage and number of parents who were adherent across months, and used the Mantel-Haenszel test to statistically compare adherence percentages between groups each month.

Detailed Findings

Parents in the video group were more adherent than parents in the written group each month. The mean percentage of adherent parents in the video group was 57.61% (range, 38.46% to 71.43%), as compared to 20.87% (range, 9.09% to 40.00%) for parents in the written group. There were no significant differences in the percentage of adherent mothers (39.02%) as compared to adherent fathers (36.64%).

The Mantel-Haenszel test revealed a significant difference between groups, $\chi^2_{MH} = 24.20$, $p < .001$. Effects were quite large, with an odds ratio (video to written group) of 5.59, and 95% confidence limits from 2.83 to 11.07.

Discussion and Interpretation of Findings

Conclusions Drawn from Findings

Alterations to the training format can result in large differences in the extent to which parents adhere to empirically established treatment procedures like DTT.

Explanation of Study Limitations

Although parents in the video group were over five times more adherent than parents in the written group, average adherence was still around only 58%. The reasons for this low level of adherence remains unclear. Additionally, our measure of adherence (mailed a video-recorded session) was limited in that it required each parent to engage in an additional response (mailing the video) beyond the technical definition of adherence to the intervention (merely conducting a session). This additional step may have artificially reduced our obtained levels of adherence.

Comparison with Findings from Other Studies

Other studies have identified strategies that improved overall parental adherence, including the use of lottery systems. Although we incorporated these strategies into our evaluation, we were unable to boost adherence to the levels identified in some previous studies.

Possible Applications to MCH Health Care Delivery Situations

Our results suggest that video-based training strategies, including those that use asynchronous video systems when high-speed internet is not available, may effectively train parents to implement teaching strategies based on ABA. However, those adopting video-based training should be aware that this approach may not result in optimal levels of adherence.

Suggestions for Future Research

Future research could explore other cost-effective strategies for training parents when geographic or economic barriers prevent parents from receiving in-person training. Future studies could also more carefully examine different methods of measuring adherence to determine the extent to which the measurement strategy influences obtained results.

Videoconferencing Allows Parents to Maintain ABA Skills

Subramaniam, S., Brunson, L. Y., Cook, J. E., Larson, N. A., Poe, S. G., & St. Peter, C. C. (in preparation for submission).

Review of the Literature

Maintenance of DTT skills is especially important for rural parents who have limited access to behavior-analytic supports. Vollmer, Sloman, and St. Peter Pipkin (2008) advised that one way to promote maintenance is through performance monitoring and feedback during periodic supervision. Praise and assistance from the trainer during this supervision process may help to maintain high integrity (Fleming & Sulzer-Azaroff, 1989) over time, even when the parents must balance conducting the therapy with other responsibilities.

Parents in rural communities are disadvantaged when they lack access to periodic in-person supervision. Fortunately, recent research has indicated that videoconferencing can be used to train staff to implement DTT and maintain trained skills at a 2-month follow up (Hay-Hansson & Eldevik, 2013). In addition, videoconferencing has been reported to be a reliable way to monitor live teaching (Dymond, Renzaglia, Halle, Chadsey, & Bentz, 2008) and may be a means of providing remote supervision to new practitioners in rural communities (Wood, Miller, & Hargrove, 2005). The extent to which videoconferencing technology, which has been in use for over a decade, can prevent performance drift and override competing activities for parents in rural communities has yet to be reported in the literature. The aim of the present study was to evaluate the long-term integrity with which rural parents of children with ASD implemented DTT.

Study Design and Methods

Study Design

We used a multiple-baseline-across-subjects design to determine the extent to which parents acquired and maintained DTT implementation skills. Parents were individually trained to implement DTT at a local clinic with a confederate and asked to conduct DTT in their homes with their children during video-based follow-up.

Population Studied

Parents were rural mother-child dyads with no previous training in DTT or ABA. All children had a diagnosis of autism except one, who had a diagnosis of Autism Spectrum Disorder, level 1. Mothers ranged in age from 29 to 43. Children ranged in age from 2 to 11 years.

Sample Selection

We enrolled the first four mother-child dyads who contacted the research team following flyers, news and radio advertisements in the local community.

Instruments Used

The dependent measure was parental treatment integrity during 12-trial teaching sessions. Trainers calculated integrity in real time using a checklist based on the Discrete-Trials Teaching Evaluation Form (DTTEF; Fazzio, Arnal, & Martin, 2010) for seven components of DTT: Materials, securing attention, instruction, prompt delivery, reinforcer delivery, error correction, and data collection. We defined integrity as the percentage of opportunities in which parents implemented components correctly. Trainers calculated treatment integrity by dividing the total number of correct responses across all DTT components by the total number of opportunities to respond in the session and multiplying by 100. During each videoconferencing session, trainers asked parents to report the number of targets their children mastered since the last videoconferencing session and the date of mastery. Mastery was defined as correct independent responses on at least 90% of trials across three consecutive sessions. We used these data to describe the rate of skill acquisition by children during the videoconferencing phase.

Statistical Techniques Employed

Consistent with the typical analysis for multiple-baseline studies, we visually inspected graphed data and used descriptive statistics to further summarize the outcomes.

Detailed Findings

All parents implemented DTT with low integrity after receiving only written instructions about how to implement the procedures. Across parents, neither scores on the open-book written manual quiz (which ranged from 84% to 96%) nor fluency measured by the time it took to complete the quiz (ranging from 7.1 to 37.5 minutes) predicted baseline treatment integrity.

An in-vivo behavioral skills training package was sufficient to train all parents to implement DTT with near-perfect accuracy. All parents met the 90% mastery criteria within three to six post-training sessions with a confederate. In the last three post-training sessions, treatment integrity increased by an average of 51.3% (range 27.1% to 67.5%) relative to baseline. Additionally, all parents met the 80% mastery criteria during the second teaching probe conducted with their child. The extent to which parents correctly implemented DTT procedures with their children improved by an average of 57.4% (range 28.5 to 80.6%), indicating the teaching skills learned during training generalized from a confederate to a child learner. These skills maintained through the use of videoconferencing for up to 26 weeks after training was completed. This maintenance occurred despite gradual reductions in the frequency of videoconferencing supervision from twice per week to twice per month.

Discussion and Interpretation of Findings

Conclusions to be Drawn from Findings

Parents who experienced in-person trainings were able to quickly (i.e., following 1.5 hours of training) learn the skills necessary to implement DTT, and were able to generalize those skills from working with a confederate to their child with no further instruction. Parents maintained their skills across 26 weeks of video-based follow-up.

Explanation of Study Limitations

Adherence and attrition remained problems. The majority of parents repeatedly canceled video-based follow-up sessions, which resulted in inconsistent attempts to implement the procedures with the children across time. As trainers reduced the frequency of follow-up sessions from twice a week, to weekly, then bi-weekly, children acquired new skills more slowly. This

suggests that parents were unlikely to implement the procedures in the absence of scheduled video sessions with trainers, and were likely to cancel those sessions even when they were scheduled.

Comparison of Findings of Other Studies

Our findings are consistent with those reported from other research teams regarding the potential efficacy of video-based consultation for parents who live in rural or remote areas.

Possible Applications to MCH Delivery Situations

When extended contact with trainers is not possible due to geographic or economic barriers, in-person training followed by remote follow-up should be considered.

Suggestions for Future Research

Future research should assess strategies for improving parental adherence to scheduled appointments. As part of this line of future studies, researchers should examine factors that affect parental motivation to implement empirically established procedures for their children with autism, and ways to enhance parental motivation or remove other barriers to accessing empirically established intervention.

Training Classroom Staff to Implement ABA Procedures

Pence, S. T., St. Peter, C. C., & Giles, A. F. (2014). Teacher acquisition of functional analysis methods using pyramidal training. *Journal of Behavioral Education, 23,* 132-139. DOI 10.1007/s10864-013-9182-4

Giles, A. F., St. Peter, C. C., & Pence, S. T. (in preparation for submission). A Teacher-Developed Workshop to Improve Discrete-Trial Training Skills of Paraprofessionals.

Review of the Literature

One way to address the barriers associated with having parents implement ABA procedures is to teach classroom staff to implement those procedures. Several studies have demonstrated that teachers and paraprofessionals can acquire the skills necessary to implement ABA in the classroom context, thus increasing the extent to which children with autism access this empirically established treatment.

Teachers can be taught to implement DTT (e.g., Catania, Almeida, Liu-Constant, & DiGennaro Reed, 2009; LeBlanc, Ricciardi, & Luiselli, 2005; Lerman, Tetreault, Hovanetz, Strobel, & Garro, 2008; Sarokoff & Sturmey, 2004), but the established teacher-training packages may be time and resource intensive. We developed and assessed a rapid (3- or 6-hour) training procedure for teachers, and assessed the extent to which teachers initially acquired and maintained the skills taught.

In a subsequent study, we extended group training and pyramidal training procedures to teach special-education teachers ABA techniques.

Study Design and Methods

Study Design

We used a multiple-baseline-across-subjects design to determine the extent to which special-education teachers (Pence et al., 2014) or paraprofessionals (Giles et al., *in prep*) acquired ABA skills.

Population Studied

Participants included special educators (Pence et al., 2014) or paraprofessionals working in special-education classrooms (Giles et al., *in prep*).

Sample Selection

We recruited participants through an ongoing partnership between the PI and a local school district. We enrolled the first special educators and paraprofessionals who agreed to participate in the trainings.

Instruments Used

The dependent measure was the extent to which school personnel implemented the procedures correctly. To measure this, we developed standardized checklists of intervention components. The dependent variable across both studies was the percentage of treatment components that the school personnel completed correctly during each observation.

Statistical Techniques Employed

Consistent with the typical analysis for multiple-baseline studies, we visually inspected graphed data and used descriptive statistics to further summarize the outcomes.

Detailed Findings

Both special educators and paraprofessionals were able to rapidly acquire new ABA skills. Previously trained special educators trained their peers. Before training, special educators implemented the procedures with relatively low treatment integrity (between 0% and 65%). Treatment integrity increased dramatically after training to the point that all teachers were implementing several variations of the procedure with above 80% integrity when role-playing with a confederate. These high levels of integrity maintained (in the absence of further training) when teachers implemented the procedures with students in their classrooms).

Paraprofessionals acquired the skills necessary to implement foundational DTT programs with students in as little as 3 hours. Before training, paraprofessionals did not use DTT skills as a core feature of their academic instruction with students. After training, integrity with DTT procedures increased to nearly 100%. As with the findings from the teachers and parents, skills that were taught to the paraprofessionals in a role-play context generalized to working with new academic skills with students in the classroom in the absence of additional training. That is, paraprofessionals actively and accurately implemented DTT in their work with students after training.

Discussion and Interpretation of Findings

Conclusions to be Drawn from Findings

School personnel can be taught to implement ABA-based procedures in a relatively short period of time. Trained school personnel can effectively teach other personnel new skills in the absence of an "expert" trainer.

Explanation of Study Limitations

The multiple-baseline design used allowed us to carefully examine the point in the training at which school personnel acquired the new skills, but we did so with a limited sample of teachers and paraprofessionals. Additionally, we only trained teachers and paraprofessionals who signed up for the training procedures; these personnel may have been more motivated to learn than typical school personnel. The generality of our findings, particularly to larger-scale training procedures, remains unknown.

Comparison of Findings of Other Studies

Our findings are consistent with those reported from other research teams regarding the efficacy of brief training and train-the-trainer models to disseminate skills based on ABA.

Possible Applications to MCH Delivery Situations

Building capacity within school systems by training school employees may be one way to further enhance the extent to which children with autism are able to access ABA services.

Suggestions for Future Research

Future research should replicate the procedures with larger samples of teachers, and should include school personnel with different demographics.

Global Measures of Treatment Integrity may Mask Errors in DTT

Review of the Literature

Behavior-analytic interventions must be implemented consistently and correctly to be highly effective (e.g., Allen & Warzak, 2000; St. Peter Pipkin, Vollmer, & Sloman, 2010; Vollmer, Sloman, & St. Peter Pipkin, 2008). The term *treatment integrity* describes the precision with which interventions are implemented (e.g., Peterson, Homer, & Wonderlich, 1982). Treatment integrity is a measure of the correspondence between a behavior-change plan and the execution of that plan.

Treatment integrity is typically calculated by averaging across all components of an intervention. This kind of global integrity measure is frequently reported as the outcome measure of caregiver and staff training protocols (Catania et al., 2009; Hardy & Sturmey, 1994; Lafasakis & Sturmey, 2007; LeBlanc et al., 2005; Lerman et al., 2008; Sarokoff & Sturmey, 2004). Global integrity is calculated by dividing the total number of correct responses made by the implementer across all treatment components by the total number of opportunities to respond, and multiplying that value by 100. A global treatment integrity score for multi-component treatment packages is convenient to display visually and communicate verbally. Global scores also provide a "big picture" view of the accuracy with which the intervention was implemented.

Although global treatment integrity scores provide an overall quantification of integrity, such measures may not always be sufficient representations of implementation. Assessing integrity on individual components may be especially important because integrity failures on particular components can differentially affect treatment outcomes. Carroll et al. (2013) conducted a descriptive assessment of teacher-implemented DTT. The most common integrity error was delivering a consequence: Teachers failed to provide a preferred item following a correct response on 79% of opportunities. Other frequent errors included failing to deliver a controlling prompt, presenting inappropriate instructions, and repeating instructions. In their third experiment, Carroll and colleagues manipulated the integrity of these components and measured child outcomes. Across three conditions, the researchers made programmed integrity errors in implementing an individual component (i.e., delivering instructions, prompts, or reinforcers) in 8 of 12 DTT trials, but otherwise implemented DTT with high integrity. Skill acquisition of children with ASD was disrupted when therapists omitted controlling prompts, gave multiple instructions, or omitted reinforcers for correct responses. This study experimentally demonstrated the importance of ensuring individual components of DTT are implemented with high integrity.

The objectives of this study were to: 1) measure effects of training on treatment integrity globally and on individual components, 2) compare global and component treatment integrity scores, and 3) systematically assess how training and feedback differentially affect treatment integrity globally and across individual components DTT.

Study Design and Methods

Study Design

We used a multiple-baseline-across-participants design to evaluate the effects of training procedures on global and individual-component treatment integrity scores.

Population Studied

Four undergraduate therapists who worked in a classroom for children with disabilities participated.

Sample Selection

We recruited participants through an ongoing partnership between the PI and a local school district. We enrolled all undergraduate therapists working in one particular classroom during an academic semester.

Instruments Used

Observers used a modified version of the Discrete-Trials Teaching Evaluation Form (DTTEF; Fazzio, Arnal, & Martin, 2010) to calculate integrity from videos of sessions.

Statistical Techniques Employed

Consistent with the typical analysis for multiple-baseline studies, we visually inspected graphed data and used descriptive statistics to further summarize the outcomes.

Detailed Findings

Following only written instructions, global treatment integrity scores ranged from 59% to 71% across participants. Global integrity scores increased to above 80% for all participants after training. Despite this increase in global integrity scores, scores on individual components of the intervention sometimes remained as low as 0%. These exceptionally low scores often occurred on critical components of the intervention, such as consistently rewarding correct responses and correcting errors.

Discussion and Interpretation of Findings

Conclusions to be Drawn from Findings

Global treatment integrity scores were not necessarily representative of individual-component treatment integrity scores. Specifically, we found therapists frequently implemented the reinforcer component with low integrity.

Explanation of Study Limitations

The multiple-baseline design used allowed us to carefully examine the point in the training at which therapists acquired the new skills, but we did so with a limited sample (only 4 therapists, who were all undergraduate students). The generality of our findings, particularly to larger-scale training procedures, remains unknown.

Comparison of Findings of Other Studies

Our results replicates outcomes obtained by Carroll and colleagues (2013), and extends them to a different population.

Possible Applications to MCH Delivery Situations

Practitioners should be aware of different levels of analysis when training parents and staff to implement new procedures. In some cases, retraining on specific components of the procedure may be a better use of resources than refreshing on the entire procedure.

Suggestions for Future Research

Future research should replicate the procedures with larger samples of therapists, and should include therapists with a wider array of experiences.

Differential Effects of Treatment Challenges on Children's Problem Behavior

Review of the Literature

The extent to which ABA procedures are correctly implemented is directly related to the efficacy of the procedure (e.g., St. Peter Pipkin, Vollmer, & Sloman, 2010; Vollmer, Sloman, & St. Peter Pipkin, 2008). That is, ABA procedures that are implemented with higher levels of treatment integrity are typically associated with better short- and long-term treatment outcomes.

Despite the knowledge that high levels of treatment integrity improve clinical outcomes, integrity often suffers during real-world implementation of procedures. Previous studies have demonstrated that decreased integrity on the implementation of behavioral interventions may lead to increases in the likelihood that the child experiencing the procedure will engage in challenging behavior (e.g., Marsteller & St. Peter, 2012; St. Peter Pipkin et al., 2010; Volkert et al., 2009). This increase in challenging behavior may make it more difficult for a caregiver to implement the intervention, leading to further integrity failures and even more challenging behavior. Although there is some evidence to suggest that different kinds of integrity failures differentially affect treatment outcomes, it is unclear whether the reemergence of challenging behavior when integrity drops is related to the way in which the intervention is misapplied. In this study, we evaluated the extent to which successfully treated challenging behavior reemerged during different kinds of integrity failures.

Study Design and Methods

Study Design

We used a within-subject reversal design to evaluate the extent to which children engaged in challenging behavior when treatments were correctly implemented, or implemented with two different kinds of integrity failures.

Population Studied

Four children (aged 5-10) with developmental disabilities, including autism spectrum disorders, participated.

Sample Selection

We recruited participants through an ongoing partnership between the PI and a local school district. All four participants completed the study at their local elementary schools.

Instruments Used

We collected direct observational data on the rate at which children engaged in challenging behavior and appropriate requests using the InstantData™ software.

Statistical Techniques Employed

Consistent with the typical analysis for reversal designs, we visually inspected graphed data and used descriptive statistics to further summarize the outcomes.

Detailed Findings

Before treatment, all children engaged in high rates of challenging behavior (about 2 instances of challenging behavior per minute). When the treatment was implemented with 100% integrity, challenging behavior decreased. By the final three sessions of treatment, challenging behavior was eliminated for all participants. When we reduced treatment integrity by giving the children free access to toys or attention, challenging behavior remained suppressed. In contrast, when treatment integrity was reduced by withholding toys and attention, challenging behavior increased to rates that, at times, were comparable to or exceeded pretreatment levels.

Discussion and Interpretation of Findings

Conclusions to be Drawn from Findings

Even relatively brief exposures to particular kinds of low integrity may result in near-complete loss of treatment effects. However, not all kinds of low integrity produce these negative outcomes.

Explanation of Study Limitations

Our results were highly consistent within and across participants. However, our sample size was small, and all sessions were conducted in a barren classroom in the children's schools.

Therefore, the generality of our findings across populations and experimental arrangements remains unknown.

Comparison of Findings of Other Studies

Our findings are consistent with a growing body of evidence suggesting that certain types of treatment challenges are likely to result in complete loss of treatment effects. Our study extends this existing literature to a new population, and demonstrates that not all forms of integrity failures may be highly detrimental.

Possible Applications to MCH Delivery Situations

Once detrimental forms of integrity failures are identified for procedures, practitioners may want to spend more training time on the aspects of procedures that must be well-implemented to produce and maintain treatment effects. Our study suggests that, at least for common treatment procedures based in ABA, there may be some kinds of treatment integrity failures that are less detrimental to overall treatment outcomes.

Suggestions for Future Research

Future studies should more fully examine the kinds of integrity failures that occur during naturalistic implementation of ABA treatment and then isolate the effects of those integrity failures on treatment outcomes.

Products from Grant

Peer-Reviewed Publications

Pence ST, St. Peter CC, Giles AF. Teacher acquisition of functional analysis methodology using pyramidal training. J Behav Educ. 2014;23(1):132-149. doi:10.1007/s10864-013-9182-4.

St. Peter CC, Brunson LY, Cook JE, Subramaniam S, Larson NA, Clingan M, Poe SG. Adherence to discrete-trial instruction procedures by rural parents of children with autism. Behv Interv. 2014;29:200-212. doi: 10.1002/bin.1386.

Marsteller TM, St. Peter CC. Effects of fixed-time reinforcement schedules on resurgence of problem behavior. J Appl Behav Anal. 2014; 47:455-469. doi: 10.1002/jaba.134

Publications under Review

Cook JE, Subramaniam S, Brunson LY, Larson NA, Poe SG, St. Peter CC. Global measures of treatment integrity may mask important errors in discrete-trial training. [submitted to Behav Anal Pract 2014].

Publications in Preparation

Giles AF, Kowcheck KC, St Peter CC. Teaching paraprofessional staff to implement discrete-trial training procedures.

Subramaniam S, Brunson LY, Cook JE, Larson NA, Poe SG, St. Peter CC. Maintenance of parent-implemented discrete-trial instruction using videoconferencing.

Publications for Lay-Person Consumption/Training Materials

PITA-T Training Manual (2011)

PITA-T Training DVD (2011)
Challenging Behavior Guide (2013)

Conference Papers, Symposia, and Invited Addresses

Brunson L, St. Peter C, Cook JE, Larson N, Subramaniam S, Poe S. Using teleconsultation to maintain parent implementation of discrete-trial training procedures. Paper presented at: 40th Annual Association for Behavior Analysis International Meeting; May, 2014; Chicago.

Cook JE, St. Peter C, Brunson L, Subramaniam S, Larson N. Use of feedback to improve treatment integrity globally and in individual components of discrete-trial instruction. Paper presented at: 40th Annual Association for Behavior Analysis International Meeting; May, 2014; Chicago.

Brunson L. Addressing provider shortages through parent training: parent-implemented training for autism through telemedicine. Presented at: Mid-Atlantic Telehealth Resource Center Summit; 2013; Richmond, VA.

Brunson L, St. Peter C, Clingan M, Poe S. Parent-implemented training for autism through telemedicine (PITA-T). Presented at: Appalachian Health Summit; 2012; Lexington, KY.

St. Peter C. Efficient and effective caregiver training procedures. Presented at: Behavior Analysis Student Association (BASA) Conference; 2012; Melbourne, FL.

Clingan M, Brunson L. Parent-implemented training for autism through telemedicine. Presented at: Association of University Centers on Disabilities Conference; 2011; Crystal City, VA.

Costello K, Giles AF, St. Peter C. Teaching paraprofessional staff to implement discrete-trial training procedures. Presented at: Berkshire Association for Behavior Analysis and Therapy Annual Meeting; 2011; Amherts, MA.

Costello K, St. Peter Pipkin C, Giles A. Teaching paraprofessional staff to implement discrete-trial training procedures. Paper presented at: 37th Annual Association for Behavior Analysis Meeting; May, 2011; Denver, CO.

St. Peter Pipkin C. Achieving mainstream relevance through caregiver-training programs. Presented at: Southeastern Association for Behavior Analysis Meeting; 2010; Asheville, NC.

Conference Poster Presentations

Subramaniam S, Brunson L, Cook J, Larson N, St. Peter C. Promoting maintenance of parent implemented discrete-trial instruction using videoconferencing. Poster presented at: Virginia Association for Behavior Analysis Meeting; 2014; Leesburg, VA.

Cook JE, Subramaniam S, Brunson L, Larson N, Poe SG, St. Peter C. Global measures of treatment integrity may mask important errors in discrete-trial training. Poster presented at: Virginia Association for Behavior Analysis Meeting; 2014; Leesburg, VA.

St. Peter C, Brunson L, Clingan M. Video-Based Instruction Improves Parental Adherence to a Distance-Learning Training Package. Poster presented at: 7th Annual Association for Behavior Analysis International Autism Conference; January 2013; Portland, OR.

St. Peter Pipkin C, Ott S, Poe S, Tetreault AS, Jarmolowicz DP, Clingan MR. Dissemination of behavior-analytic procedures in rural areas. Poster presented at: 37th Annual Association for Behavior Analysis Meeting; May, 2011; Denver, CO.

Costello K, Giles AF, St. Peter C. Teaching paraprofessional staff to implement discrete-trial training procedures. Poster presented at: 6th Annual Association for Behavior Analysis International Autism Conference; January 2012; Philadelphia, PA.

Giles AF, Costello K, St. Peter C, Pence ST. Evaluation of a DTT training package in a large-group format. Poster presented at: 6th Annual Association for Behavior Analysis International Autism Conference; January, 2012; Philadelphia, PA.

Giles AF, Costello K, St. Peter C, Pence ST. Evaluation of a DTT training package in a large-group format. Poster presented at: Maryland Association for Behavior Analysis Annual Meeting; 2011; Baltimore, MD.

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