EDUCATION AND TREATMENT OF CHILDREN Vol. 39, No. 1, 2016

Parent Training on Generalized Use of Behavior Analytic Strategies for Decreasing the Problem Behavior of Children with Autism Spectrum Disorder: A Data-Based Case Study

Regina M. Crone and Smita Shukla Mehta

University of North Texas

Abstract

Setting Variables such as location of parent training, programming with common stimuli, generalization of discrete responses to non-trained settings, and subsequent reduction in child problem behavior may influence the effectiveness of interventions. The purpose of this study was to evaluate the effectiveness of home- versus clinic-based training to increase the use of discrete applied behavior analytic strategies by parents for decreasing the problem behavior of their children with autism spectrum disorders (ASD) during meal-times. A partially non-concurrent multiple baseline design across dyads was used to document the effects of training procedures. Results of training diverse parent-child dyads to implement a function-based behavior intervention plan demonstrated that the intervention appeared to be clinically effective in increasing parents' use of trained strategies, promoting generalization to the real meal-time routine and decreasing child problem behavior. The mag-

Author note: At the time of this study, Regina M Crone was a doctoral candidate in Special Education (Autism) in the Department of Educational Psychology, University of North Texas. The research described in this article constituted her dissertation. She has since earned her doctorate and serves as the Executive Director of Teach Me LLC, Dallas, Texas. Smita Shukla Mehta is an Associate Professor in Special Education (Autism), Department of Educational Psychology, University of North Texas, Denton, TX, USA.

Authors would like to express their sincere appreciation to the US Department of Education's Office of Special Education Program for funding a Leadership Preparation grant called Project STARS (Systematic Training for Autism Researchers and School Personnel - H325D060017-09) that supported the conduct of this study. We also wish to thank Jessie Harkins, a graduate of the autism research and leadership program (Project STARS) for her expert assistance in data collection procedures.

Address correspondence to: Smita Shukla Mehta, Ph.D., Associate Professor in Special Education, Department of Educational Psychology, University of North Texas, 1155 Union Circle #311335, Denton, TX 76203-1335. E-mail : smita .mehta@unt.edu. Phone: 940-369-7168 (Voice); 940-565-2185 (Fax).

nitude of effect was found to be large. Implications for bridging the research and practice gap are discussed.

Keywords: autism, autism spectrum disorder, parent training, function-based behavioral intervention, generalization, applied behavior analysis

Autism is a neurodevelopmental disorder that presents many challenges to parents as well as teachers, therapists and other professionals in part because of the severity of problem behavior. Problem behavior such as tantrums, aggression and self-injury can make dealing with a child with autism spectrum disorder (ASD) very challenging even for professionally trained individuals. It has been noted that the most common problem behaviors of children with ASD include tantrums (76%), aggression (56%), stereotypy (14%), and self-injury (11%) (Horner, Carr, Strain, Todd, & Reed, 2002). Such problem behaviors are a source of parental stress due in part to self-perceived lack of competence in this area (Baker-Ericzén, Brookman-Frazee, & Stahmer, 2005; Brookman-Frazee, 2004; Tomanik, Harris, & Hawkins, 2004). While the current literature on parent-training shows sufficient documentation of effectiveness, three issues have been noted. First, many studies have focused on skills-instruction on core deficits of autism, not problem behavior (Bearss, Johnson, Handen, Smith, & Scahill, 2013). Second, the discrepancy in the duration of intervention across studies (Fettig & Barton, 2013) has made it difficult to determine the optimal time period for training or whether training was massed or distributed over time. Third, most studies have not assessed or reported effects of generalization and/or maintenance (Fettig & Barton, 2013).

Although there currently does not appear to be a cure for ASD, a number of behavioral interventions have been documented as being effective for managing child problem behavior (National Autism Center, 2009; National Professional Development Center, 2013; Wong et al., 2013). Since the 1980s, research has shown that interventions utilizing applied behavior analytic (ABA) methods have been effective in decreasing problem behavior and promoting acquisition of new skills for children with autism (Lafasakis & Sturmey, 2007; Lovaas, 1987; Reagon & Higbee, 2009; Stokes, Cameron, Dorsey, & Fleming, 2004; Waters, Lerman, & Hovanetz, 2009). While the use of ABA techniques for implementing function-based interventions for decreasing the problem behavior of children with autism has been extensively documented in the literature (Eikeseth, 2001; Harris & Handleman, 2000; Healy, O'Connor, Leader, & Kenny, 2008; Sheinkopf & Siegel, 1998; Wood, Blair, & Ferro, 2009), training staff or parents to implement the interventions with procedural fidelity continues to be challenging

(Biddy, Eikeseth, Martin, Mudford, & Reeves, 2002; Reichow, Doehring, Cicchetti, & Volkmar, 2011; Sarokoff & Sturmey, 2004; Shayne & Miltenberger, 2013).

Crockett, Fleming, Doepke, and Stevens (2007) evaluated the ability of parents to acquire and generalize discrete trial training (DTT) procedures with their children with autism beyond the training setting. They noted that following training, both parents were able to teach functional skills to their children using DTT. Crockett et al. ascertained that parent training was effective because participants were provided with opportunities to improve teaching skills with one child behavior before programming for generalization. Additionally, systematic procedures were used for training including delivery of specific instructions, demonstrations, role-play, and practice with feedback across the training and generalization settings.

Effective outcomes were also reported for parent training that was implemented through distance education procedures. In one study, Heitzman-Powell, Buzhardt, Rusinko and Miller (2013) evaluated the use of web-based and telecommunication methods to train seven parents (from four families) of children with ASD to implement ABA strategies at home. The training program called *Online and Applied System for Intervention Skills* (OASIS) included eight modules covering basic and applied concepts of ABA. Additionally, parents completed online activities associated with various modules and also received direct and live distance coaching through video-conferencing tools after the online training was completed. The training lasted for at least 16 weeks. Post-test outcomes showed that parents indicated an increase in basic knowledge and application of ABA strategies even though low scores were noted for application of principles of behavior (e.g., reinforcement). In spite of several limitations of the study including a small number of participants or not having a comparison group, the authors suggested that the extensive training format was effective because parents were trained to criterion. These and other studies suggest that the intensity of parent training and the extent to which training procedures are contextually relevant are likely to determine the success of outcomes for parents and their children with disabilities.

In another study, Lucyshyn et al. (2007) also documented successful outcomes of parent training. They conducted a 10-year longitudinal study to evaluate the effects of a function-based behavior intervention plan (BIP) across four settings with one child with autism and severe problem behavior. The intervention model was individualized in relation to contextual fit with each family's ecology. The intervention focused on generalization of procedures to non-trained

settings through a self-monitoring checklist, guided practice, and encouragement to use strategies in non-trained environments. The intensive and systematic intervention documented through a multiple baseline design indicated decreases in child problem behavior which maintained over time. The goal of that study was to show changes in child problem behavior, the primary dependent variable, but not track changes in parent behavior as a function of their training.

In a review of research, McLaughlin, Denny, Snyder and Welsh (2012) noted that behavior supports implemented by families of young children with autism spectrum disorder (ASD) indicated contextual fitness (i.e., intervention alignment with family values, resources, skills and routines). Specific assessment of contextual fit showed that only three of eighteen studies reported family training in native languages; eight studies reported collaboration with families in the functional assessment process; three studies collected information on family ecology, and eight studies reported that the location for training was selected by families. Additionally, family education programs were conducted for the most part at home (6 studies) or in a clinic (6 studies) and 50% of studies reported measuring family perspectives about the behavior support intervention. Results also showed that studies with positive outcomes for children and/or parents were characterized by specific components including: (a) strategies for preventing or reducing problem behavior and increasing replacement behavior; (b) family-implemented interventions; (c) individualized instruction, modeling of intervention procedures and use of a manual; (d) implementation of intervention within specific routines; and (e) assessment of family quality of life changes. The implications of this review were to incorporate the above noted components in parent or family education programs for maximum impact.

In another review of parent training interventions that utilized single subject research designs, Patterson, Smith and Mirenda (2011) evaluated eleven studies that met inclusion criteria for methodological rigor. Those studies were evaluated based on the improvement rate difference analysis for various individualized interventions including DTT, reciprocal imitation training, milieu teaching, general case teaching, pivotal response treatment, natural language training, alternative and augmentative communication training, joint attention and the Early Start Denver Model. All interventions were designed to teach parents to increase the social and communication responses of children with autism. While all of those intervention methods documented positive effects for both parents and children, the authors reported limited documentation of outcomes for generalization and follow-up.

The relative lack of empirical documentation on generalization training for parents appears to be a weakness in the current research literature on parent training for decreasing child problem behavior (Fettig & Barton, 2013). In addition, "treatment generalization is a particularly important issue in parent training because parents often report difficulty managing a range of problem behaviors in different settings and sometimes with more than one child" (O'Reilly & Dillenburger, 2000, p. 763). New behaviors learned in one setting may not easily or naturally transfer to another setting for either parents or children. In addition, problem behavior that may diminish within the school environments may nonetheless continue to occur at home and vice versa (Reeve, Reeve, Townsend, & Poulson, 2007). Further, parent behavior may not generalize from the training setting to the natural setting (Miller & Sloane, 1976) unless specific procedures (e.g., sequential modification, the use of common stimuli, natural maintaining contingencies) are included in the intervention (Gianoumis & Sturmey, 2012).

Researchers have suggested that response generalization would most likely occur if trainers demonstrated the use of various teaching strategies with the children of participants for whom they were modeling, rather than with someone else's child (Biddy et al., 2002; Crockett et al., 2007; Lafasakis & Sturmey, 2007). Important to treatment generalization is the use of specific strategies across settings, for example, the use of common stimuli (e.g., similar dinner table mats), multiple exemplars (e.g., training in clinic and home), sequential modification (e.g., similar contingencies), and natural maintaining contingencies (e.g., high preference food items only at meal-time). Such training may help parents increase generalization of learned skills to non-trained settings and behaviors. However, the likelihood of decreases in child problem behavior in a non-trained setting following parent training in one setting has not been presented in the existing literature. Although a multitude of variables can greatly impact the behavior of children with ASD, the question of whether parents can be taught to implement effective instructional and behavioral skills with their children in natural settings still needs to be explored.

The primary purpose of this study was to evaluate the: (a) effectiveness of training procedures for teaching parents of children with ASD to implement a function-based behavior intervention plan in a non-trained setting; (b) effectiveness of systematic parent training with decreases in the level of child problem behavior in a non-trained setting; and (c) role of training location on response generalization.

Method

Participants

Following approval from the Institutional Review Board at our university, participant recruitment was initiated. The inclusion criteria were: (1) the parent participant(s) must have had a child already diagnosed with ASD through the local public school district by a team of multidisciplinary professionals using a comprehensive educational evaluation procedure; (2) the child with ASD must have been displaying problem behavior during at least one activity routine in the home environment (e.g., bed time, bath time, meal-time, transition time) as reported by a parent; (3) the parent participant(s) must have committed to parent training sessions either at home or at a clinic and expressed willingness to implement the intervention as demonstrated; and (4) the child with ASD must have been between 2 to 15 years of age and resided at home with the participating parent(s). No *exclusion criteria* were established regarding any demographic variables (e.g., gender, race, and ethnicity).

The first four parents who returned the signed informed consent letters within 3 weeks of distribution of a flier soliciting participation were selected to participate in the study. Parents (mothers) were the primary participants with whom the intervention procedures were directly implemented whereas children with ASD were the secondary participants (see participant characteristics in Table 1).

All participants belonged to relatively upper middle class families, were married, educated and employed, communicated primarily in English regardless of ethnicity, and had one or two children including the child with ASD. All children demonstrated delayed expressive language and used no more than five sign language approximations and limited receptive language skills (e.g., no response to parent directives like "listen to your choices," or "show me what you want" or remained standing after a parent pointed to the chair at the dining table cueing child to sit down). At the start of the study, all children displayed severe problem behavior during meal-time as indicated by Functional Behavior Assessment (FBA) procedures; however, they did not appear to be related to food sensitivity or preferences. All four children were on gluten-free and casein-free diets.

Setting and Materials

Two parent-child dyads (i.e., Dyads A and C) received training in the simulated home setting whereas two other dyads (i.e., B and D)

Table 1
Participant Characteristics

Dyad and Setting	Parent Characteristics	Child Characteristics
A (Christian and his Mother)	• 35 years old • Lebanese/Hispanic • 1 child	• 8 years old (Autism Diagnosis; Non-Verbal) • Hispanic • 0 Siblings
(Home)	• Primary Language: English • Married • Master's Degree • Employed	• Self-Contained Classroom • ABA Therapy: Public Center • Problem behavior: Flops on floor, gets out of chair during routine, pushes items away, turns off lights
B (Matt and his Mother)	• 39 years old • Caucasian • 1 child	• 6 years old (Autism Diagnosis; Non-Verbal) • Caucasian • 0 Siblings
(Clinic)	• Primary Language: English • Married • Bachelor's Degree • Employed	• Self-Contained Classroom • ABA Therapy: Private • Problem behavior: Stands up, puts head below table, grabs mom, hugs mom while eating, hits or rubs head with hand on table or on mom, throws food on floor, shows stereotypic and repetitive hand gestures
C (Ryan and his Mother)	• 37 years old • African American • 3 children	• 8 years old (Autism Diagnosis; Non-Verbal) • African American • 2 Siblings
(Home)	• Primary Language: English • Married • Bachelor's Degree • Employed	• Self-Contained Classroom • ABA Therapy: Public School • Problem behavior: Continues preferred activity (e.g., computer) when asked to eat lunch, elopes from parent, shuts doors repeatedly
D (Kenny and his Mother)	• 41 years old • African American • 2 children	• 6 years old (Autism Diagnosis; Non-Verbal) • African American • 1 Sibling
(Clinic)	• Primary Language: English • Married • Master's Degree • Homemaker	• Self-Contained Classroom • ABA Therapy: Public Center • Problem behavior: Stands in front of seat (instead of sitting down), walks away from the table, jumps, or puts one knee on seat (instead of sitting down to eat)

received training in a simulated clinic-based setting. In addition, sessions to assess generalization were conducted in real meal-time routines in the home. Clinic and home-based parent training sessions simulated the real meal-time routines at the families' homes by programming for common stimuli. In other words, stimulus materials relevant to meal time routines (e.g., table mat, dinner plates and silverware) and parent cues (e.g., "Take a bite") were common across both the real and simulated settings. However, the physical location and the furniture for real meal-time routines were different from the simulated session even in cases where the study was conducted at home (i.e., regular dining area vs. kitchenette). Training sessions were implemented in simulated settings to allow for assessment of generalization of accurate implementation of antecedent and consequence strategies to the real routine at home by mothers. Parent training sessions implemented in the clinic were conducted in a room measuring 210 square feet with a one-way mirror for observation.

Common materials used in both clinic and home simulated and real settings included using the same place mat and silverware that the children used for all meal-time routines. Parents also prepared the food for the training sessions (whether at home or the clinic) based on known child preferences for the types of food items, textures, and tastes. This was done in order to limit problem behaviors that might have been occasioned by issues of food selectivity and sensory sensitivity. Throughout the study, low and moderately preferred food items were used to start meal-time routines and highly preferred items were used only as rewards when bites of food items were eaten by the child as requested.

Measurement Variables

During all experimental phases of the study, parent behavior was measured in terms of demonstration of specific and discrete antecedent and consequence strategies that affected the level of child problem behavior (CPB). Parent behavior was the primary dependent variable related to decisions regarding phase change. These parent behaviors were classified as accurate or inaccurate implementation of antecedent and consequence strategies with respect to preventing or maintaining child problem behavior, respectively. The accurate procedures for implementation of antecedent and consequence strategies were incorporated into the Behavior Intervention Plan (BIP) for each child. In addition, child problem behavior was also

measured to indicate any change in the behavioral pattern as a function of the parents' use of antecedent and consequence strategies accurately.

Accurate implementation of antecedent and consequence (AIAC) strategies

AIAC strategies was the primary decision-making variable associated with phase change decisions (not the rate of child problem behavior or inaccurate implementation of antecedent and consequence strategies). The accurate antecedent strategies were operationally defined as: (a) parent conducts a preference assessment prior to each dinner routine in order to assess the motivational value of rewards before starting the meal (e.g., parent presents a choice card with pictures of 3 activities or objects and asks the child to point or say what he would like to do after finishing his meals. These activities were available to a child only after meal-time); (b) parent presents clear expectations by using declarative language when communicating with the child (e.g., *"sit down"* or *"take a bite"*); (c) parent puts all the materials needed for the dinner routine at the table before calling the child to eat (e.g., dining room lights turned on, utensils on table, rewards—pictures or objects are visible, child has shirt on, and the parent is present); and (d) parent makes sure the environmental cues for starting and completing the meal-time routine are clear to the child (e.g., a chair at the dining table is pulled out so child knows where to sit; appropriate silverware is set on the placemat; meal items minus the high preference item served in small portions on the dinner plate). Data were recorded to note the individual occurrence of each of these strategies (see Table 2).

The consequence based AIAC strategies were operationally defined as: (a) parent contingently delivers rewards (e.g., gives a bite of a preferred food item after child follows prompt to eat at least 3 bites of something less preferred); (b) parent delivers three bites of a preferred food item after child follows initial direction without additional prompts; (c) parent makes sure the tangible terminal session reward is visible but not easily accessible; (d) parent blocks the child from hurting self or others and does not allow him to get out of the chair in case of occurrence of problem behavior; and (e) parent redirects child using one verbal prompt and physical guidance with verbal prompt (e.g., *"sit in your chair"* first followed by *"sit in your chair"* accompanied by physical redirection) following occurrence of problem behavior. As before, data were recorded to note the individual occurrence of each of these strategies.

Inaccurate implementation of antecedent and consequence strategies (IIAC)

The inaccurate antecedent strategies were defined as: (a) parent fails to conduct a preference assessment prior to each dinner routine; (b) parent presents behavioral expectations by using generic or vague language when communicating with the child (e.g., *"are you hungry?"* or *"don't do that"*); (c) parent does not have all the materials needed for the dinner routine at the table before calling the child to eat (e.g., lights are not turned on, utensils not placed on table, rewards not present or visible, child does not have clothes on or the parent leaves area after asking the child to come to eat); and (d) parent fails to present clear environmental cues for starting and completing the meal-time routine (e.g., too many objects on the table; no placemat or a specific area to indicate where to sit; the meal containers are on the table but the plate is not served; if meal served, then items on the plate are served in large portions).

The inaccurate consequence based strategies were defined as: (a) parent uses only verbal praise to reward without labeling the child's behavior (e.g., *"good job!"*); (b) parent does not contingently reward child behavior (e.g., forgets to give preferred food item or gives preferred food before eating less preferred items); (c) parent allows the child to get out of the chair during a problem behavior incident (e.g., lets child run to another room); and (d) parent repeatedly redirects child following occurrence of problem behavior without clear prompts or providing 5-s wait time for the child to respond (e.g., *"come here now"* or *"you need to listen to me"*).

Parent accurate (AIAC) and inaccurate (IIAC) use of antecedent and consequence strategies were recorded using a parent strategies checklist designed to document the occurrence ("+") or non-occurrence ("–") of discrete responses (see Table 2; this checklist was used by the trainer and parent to guide the intervention procedure). This checklist was completed by the primary observer using video recordings made by parents during the training and probe sessions during the real meal-time routine. The meal-time routine for each dyad was different in duration and ranged from 15 to 30-min sessions, depending on the amount of time it took for the child to complete a meal. The total duration for each meal-time routine was determined on the basis of the time recorded on the video card for each session. Parent behaviors were not mutually exclusive in that during any given time interval, a parent could display both accurate (e.g., "*come sit at the table*") and inaccurate strategies (e.g., "*get started with food*") or not display either

Table 2

Parent Strategies Checklist

Antecedents Strategies					
Objective	*Operational Definition*	*Accurate Implementation*	*+/–*	*Inaccurate Implementation*	*+/–*
1. Preference assessments are conducted prior to each routine	Child's reinforcers are identified before the routine begins.	Dinner may or may not be on the table. Value of reinforcers is assessed before he begins to eat.	—	Preference assessment is not completed prior to routine.	—
2. Parent gives clear instructions during routine	Parent sets expectations by using declarative language when communicating to child.	"Sit down" "Take a bite" "It's time to eat"	—	"Are you hungry?" "Don't do that!" "You need to finish"	—
3. Materials are present	Materials needed for the dinner routine are available.	Parent present. Dinner at the table with utensils. Reinforcers are visible from where Child is sitting. Light on. Child's shirt is on.	—	Light is off. Child's shirt is off. Reinforcers not visible from where Child is sitting. Child is asked to sit without dinner on the table.	—
4. Appropriate environmental cues are clear within the environment	Child knows expectations of appropriate behaviors to complete routine.	A chair is clearly indicates where to sit by meal being in front of it. Appropriate silverware is set by dinner (spoon- soup, chicken- fork, finger food- no utensils)	—	Meal is not on the table to show Child where to sit. Several utensils that are not need for the meal are present.	—

Consequence Strategies					
Objective	*Operational Definition*	*Accurate Implementation*	+/–	*Inaccurate Implementation*	+/–
5. Reinforcement is delivered differentially	When Child does the appropriate (prompted or not prompted) behavior reinforcement matches the effort of the behavior.	Reinforcer is tangible. A behavior is done with prompts so the reinforce delivered is a bite of a preferred food.	—	Reinforcement is praise only. Reinforcement is not given based on effort of behavior.	—
		A behavior is evoked without prompts so the reinforcer delivered is 3 bites of a preferred food.	—	For example reinforcement of one bit of preferred food is always given.	—
6. Reinforcement is received by the child (Did the child take it or engage with it?)	Child takes the reinforcer when offered.	He accepts it by eating it, or engaging in it.	—	He puts it down. He walks away.	—
Parent blocks child behavior	Parent blocks Child from engaging in problem behavior	Physically does not allow him to get out of chair.	—	Allows him to get up from his chair without attempting to block	—
7. Parent redirects problem behavior	Following problem behavior Parent redirects using one verbal prompt and then physically guide with verbal prompt	For example "sit in your chair"—no response- the next verbal statement "sit in your chair" should be accompanied by physical redirection.	—	Verbal redirects are repeated.	—

AIAC or IAC. At the end of each observation period, the total number of occurrences and non-occurrences for accurate and inaccurate strategies were summed to generate a percentage for target behavior per observation session.

Child problem behavior (CPB)

Child problem behavior was classified into four categories as displayed by each child: (a) Christian, Dyad A: flopping on the floor, pushing or throwing silverware away, turning off lights; (b) Matt, Dyad B: head below table, grabbing or hugging a parent while eating, hitting or rubbing head with hand, climbing on table or parent, throwing food, and self-stimulatory behavior with food items; (c) Ryan, Dyad C: continuing to engage in preferred activity initiated prior to meal-time, attempting to elope from the parent or house, engaging in ritualistic behavior like shutting the doors; and (d) Kenny, Dyad D: out of seat but not abandoning meal-time (e.g., standing up or in front of the seat, walking away from the table to grab something else, flopping on the floor, jumping, or putting one knee on the seat but not sitting down).

Child problem behavior was measured using what was judged to be the most appropriate unit of measurement for the topography of behavior [e.g., interrupting meal-time (Christian, Dyad A) was measured in terms of rate per minute, off-task behavior (Matt, Dyad B) was measured in terms of 30-second time intervals, delay in following parent request to come to the table (Ryan, Dyad C) was measured using latency, and out of seat behavior (Kenny, Dyad D) was measured in terms of 30-second time intervals].

Measurement Procedures

Equipment and materials

Parent training and observation sessions for generalization in the home and clinic settings were recorded using a digital video camcorder. Additionally, a video camcorder and compatible Secure Digital (SD) memory cards were provided to each parent participant to video-record probe sessions. The SD cards were capable of recording video data for up to 4 hours at a time.

Direct observation of behavior

Data were collected separately throughout the phase for training (in simulated setting) and generalization probes (in real meal-

time routines) after conducting at least one parent training session in the simulated setting at home or the clinic. Given that meal-time was a daily recurring routine at home, families were asked to video-record any three real meal-time routines during the week as long as they were not on consecutive days. These video clips were used to assess generalization of parent behaviors from simulated training sessions to real meal-time routines.

Interobserver agreement (IOA)

There were a total of four data collectors in the study. The primary observer was a doctoral student in special education (autism) and a Board Certified Behavior Analyst (BCBA). She collected data for the dependent variables (i.e., parent and child behavior) of the study. The first author, also a doctoral student in special education (autism) and a BCBA, served as a secondary observer who only assessed 25% of the sessions for interobserver agreement on parent behavior and also tracked procedural fidelity of intervention as she implemented parent training. A Master's level behavior analyst (BCaBA) working at a private facility for autism services, coded 25% of the sessions for interobserver agreement on child problem behavior. The fourth observer was a second-year doctoral student in special education (autism) whose primary responsibility was to watch the video data and document procedural fidelity for the interventionist's responses for all (100%) parent training sessions for all participants. Other than the first author, all observers were naïve to the purpose of the study. All four observers had basic coursework and practical training in data collection prior to the study. Each person had invested 5–6 hours of direct training in data collection specific to measurement of dependent variables and on procedural fidelity measures. Data collection was initiated only after the primary and secondary observers achieved an IOA score of 90% or higher for three consecutive training sessions on all measurement variables.

IOA for the dependent variables was measured for a minimum of 25% of all observations across baseline and intervention phases of the study for all participants. IOA was computed for accurate and inaccurate implementation of antecedent and consequence strategies and child problem behavior across each dyad. An event was counted as an agreement if both observers recorded occurrence and/or nonoccurrence of discrete target responses within a 3-s window of each other's notation. The IOA was calculated by dividing agreements by the sum of agreements plus disagreements and multiplying by 100 to obtain a percent (%) value for each measurement variable. Results for IOA

Table 3
Mean and Range IOA for AIAC, IIAC, and CPB across Dyads

Dyad	Accurate Implementation of Antecedent and Consequences (AIAC)	Inaccurate Implementation of Antecedent and Consequences (IIAC)	Child Problem Behavior (CPB)	Overall
A	95.5% (94–97%)	92.5% (91.5–93.5%)	100%	96% (92–100%)
B	93% (92–94%)	91.5% (91–92%)	97% (95–99%)	93.83% (93.5–94.2%)
C	100%	100%	100%	100%
D	99.5% (99–100%)	100%	96% (95–97)	98.5% (96–100%)

for AIAC, IAC and CPB per dyad are presented in Table 3. The overall mean IOA per dyad was 97.1% [Dyad A, $m = 95.9\%$ (range 92–100%); Dyad B, $m = 93.83\%$ (range 93.5–94.2%); Dyad C, $m = 100\%$, and Dyad D, $m = 98.6\%$ (range 96–100%)].

IOA data were also collected on the procedural fidelity for all eight sessions (i.e., 100%) of the study. Data on the fidelity of implementation of intervention procedures were already being tracked by the interventionist (i.e., first author) using the fidelity checklist *before* and *during* parent training. The fourth data collector independently watched the intervention videos for each dyad and recorded procedural fidelity using the same checklist that was used by the interventionist (i.e., first author). Data were recorded only for occurrence and non-occurrence of interventionist behaviors. An agreement was noted if the data collector's record of interventionist's behavior was displayed as operationally defined (e.g., prompted and contingently reinforced parent behavior while practicing the meal-time routine), and it matched with the record maintained by the interventionist herself. A disagreement would have been noted if the data collector and interventionist disagreed on the occurrence or non-occurrence of the interventionist's behavior (e.g., interventionist gave verbal feedback to parent but data collector recorded as non-occurrence). Results of IOA on procedural fidelity showed 100% agreement between both observers on all of the interventionist's behaviors across all intervention sessions with all four dyads.

Research Design and Procedures

A partially non-concurrent multiple baseline design across dyads was used to document the effects of parent training on the use of effective strategies for decreasing child problem behavior in the real meal-time routine at home (Lumpkin, Silverman, Weems, Markham, & Kurtines, 2002). As Lumpkin and colleagues note, an advantage of the partially non-concurrent multiple baseline design is that it is "ideal for use in clinical settings where it is often not possible to run different group treatments concurrently due to practical considerations (e.g., insufficient numbers of clients to begin running groups at the same time; an obligation not to delay treatment inordinately)" (p. 164).

While a concurrent multiple baseline design across dyads would have been preferred (Barlow, Nock, & Hersen, 2009; Gast & Ledford, 2014), in this study, baseline data collection was concurrent in real time for only Dyads C and D whereas it was not concurrent in real time for Dyads A, B and C. The fact that at least the baselines for Dyads C and D were concurrent, makes it stronger than a traditional non-concurrent multiple baseline design where none of the baselines are concurrent (Lumpkin et al., 2002).

Functional assessment of child problem behavior (FBA)

The Functional Assessment Screening Tool (FAST; Iwata, 2002) with an author-designed structured interview protocol was first completed with each parent. All four parent participants reported that child problem behaviors occurred at the highest rate during the meal-time routine. Upon probing regarding the extent to which problem behavior was related to food selectivity or sensitivity issues, parents reported that they tended to serve the child with autism only preferred food items to ensure that they ate their meal. The parent interview was followed by a direct observation of problem behavior in the real lunch or dinner routine using the Antecedent-Behavior-Consequence method (Cooper, Heron, & Heward, 2007). Information from both procedures was used to identify the potential function of child problem behavior, and generate a hypothesis leading to the development of the behavior intervention plans.

Baseline

Baseline probe data were collected for each participant prior to implementation of parent training in the real meal-time routine at home using the measurement system described above. During this phase, no attempts were made to alter or manipulate parent or child

behavior. The parents were asked to complete the meal-time routine in the same manner that they followed on a daily basis.

Parent training

The implementation of the intervention involved two stages. First, a function-based BIP was developed for each child in collaboration with the parents as noted previously (Moes & Frea, 2000) and included information on: (a) problem behavior topographies (operationally defined) that appeared to have been positively or negatively reinforced (either social mediated or automatic); and (b) explanations of antecedent and consequence strategies that were hypothesized as needing to be displayed to prevent or eliminate child problem behavior (CPB). This was to facilitate parents learning how to develop and implement a function-based BIP. Second, parent training was conducted to teach parents how to implement the individualized BIPs to address CPB during the simulated meal-time routine. In order to evaluate the role of training location on response generalization of parent behavior, the first author implemented the intervention in the simulated (i.e., kitchenette) home settings with Dyads A and C and in the simulated clinic settings with Dyads B and D.

The effectiveness of parent training was then evaluated at each child's home within the real meal-time routine for each dyad using the same checklist that was used for assessment in baseline. These procedures were implemented to assess response generalization of parent behavior to non-trained settings and correlated changes in child behavior.

Specific procedures and components of parent training. The first training session consisted of two steps including an explanation and discussion (average 45 minutes) followed by modeling and practice (average 50 minutes) for each dyad. To facilitate consistent implementation of intervention across all four dyads, the interventionist reviewed the fidelity checklist *before* and *during* the training to ensure that the following six specific components of training were delivered accurately, precisely and consistently and as defined for all the participants.

Delivering clear and specific instructions. A session started with reviewing the function-based BIP with the parent (mother) and differentiating between Accurate Implementation of Antecedent and Consequence (AIAC) Strategies and Inaccurate Implementation of Antecedent and Consequence (IIAC) for addressing child problem behavior (i.e., discrimination training). In addition, selected ABA terminology noted on the BIP (e.g., antecedents, behavior, consequence, and reinforcement) were reviewed with specific and individualized examples

and non-examples. The instructions presented to the parent were not general solutions or recommendations but a specific script for action or observable behavior the parent needed to do to prevent or manage child problem behavior (CPB). These instructions defined not just the behaviors the parent needed to use (AIAC), but also those behaviors (IIAC) that parents needed to refrain from using during the routine. This was done to ensure parents understood how their own behavior contributed to child behavior, both appropriate and inappropriate. A discussion was held with parents regarding the point during the routine when they needed to implement antecedent (i.e., before child behavior to prevent problem behavior) and consequence (i.e., after child behavior to maintain appropriate behavior or not reward problem behavior) strategies.

Providing a parent checklist. Each parent was also provided with a checklist of strategies to use (see Table 2) during the meal-time routine with a discussion on what not to use. Parents were encouraged to use this checklist throughout all meal-time routines to facilitate using the strategies consistently and accurately. Additionally, they were provided with photocopies of the checklist for immediate access and to facilitate self-monitoring of daily behavior before, during, or after the meal-time routine.

Modeling specific strategies for parents. The interventionist first modeled the use of AIAC with the child during the simulated meal-time routine prior to the parent implementing the strategies. Behavior modeling allowed the parents to see and understand how to execute these as listed on the parent checklist. Additionally, the interventionist responded to parent questions regarding specific strategies and how these were individualized for each child respectively.

Guided practice in a simulated setting. Each parent participant directly engaged with her child during the simulated meal-time routine at the clinic (Dyads B and D) and home-kitchenette (Dyads A and C) to practice application of AIAC listed on the Parent Checklist and as previously modeled by the interventionist.

Direct and immediate feedback from interventionist. During the simulation, the interventionist was present and provided immediate oral and physical prompts, as needed, to guide parents' implementation of AIAC. For example, if the child engaged in appropriate behavior and the parent did not positively reinforce child behavior, the interventionist pointed to the tangible item to prompt the parent. In another example, if the child engaged in problem behavior, such as throwing food but the parent ignored the behavior, the interventionist verbally prompted the parent to remove the preferred item, have the child pick up the food that had been thrown on the floor or the table, toss it in

the trash can and return to the table to continue the routine. In addition to prompts delivered during training, the interventionist provided immediate praise such as "good job, _____ [name of parent] for _____ [using this procedure]" or corrective feedback such as "make sure to give [the preferred food item] *after* he takes a bite of _____."

Opportunities to generalize learned skills to the real meal-time routine. Following each training session, generalization probes were arranged by requesting that the mother video-tape the real family meal-time routine where she implemented the strategies as practiced in the simulated routine. Mothers were told that video recordings would be evaluated by the research team and would be used to provide performance feedback.

Implementation of effective strategies by parents. The second training session (an additional 50 minutes) for each dyad was utilized to (a) provide mothers with direct feedback based on the video they recorded during real meal-time routine in the absence of the interventionist (i.e., generalization probe), and (b) address any questions or concerns expressed by parents. Following the second training session, each parent video-taped three additional sessions within 10 days of training based on their convenience.

Interventionist characteristics

The first author served as the interventionist. She had completed extensive coursework and practical experiences in managing problem behavior. She had a Master's degree in special education (autism), was working towards a doctoral degree in special education (Autism) and had was a BCBA at the time of this study.

Fidelity of implementation of intervention

Procedural fidelity data were collected for all eight training sessions (two per dyad). This included whether or not the interventionist: (1) reviewed the fidelity checklist *before* and *during* the training; (2) demonstrated how to correctly implement the meal-time routine while interacting directly with the child; (3) prompted and contingently reinforced parent behavior while practicing the meal-time routine; (4) provided critical feedback for maintaining newly learned skills when a parent demonstrated the procedures listed on the parent behavior checklist; (5) allowed a parent to practice working hands-on with child during the training routine; (6) provided training in the simulated rather than the real meal-time routine, and (7) remained present to provide any assistance or guidance to a parent in case of occurrence of child problem behavior (Table 4).

Table 4
Checklist to Evaluate the Fidelity of Implementation of Parent Training

Components	Definition	Questions to Confirm	Y/N
1. The Interventionist reviewed the Fidelity Checklist *before* and *during* the training.	The interventionist reviewed the Fidelity Checklist *before* and *during* the training to ensure that all components of training were delivered accurately.	1. Did the interventionist review the Fidelity Checklist *before* and *during* the training to ensure that all components of training were delivered accurately?	—
2. Interventionist demonstrates routine with child	The interventionist worked hand son with the child during the routine	2. Did the interventionist work directly with the child before asking the parent to run the routine?	—
3. Interventionist prompts and confirms parent behavior with child	Interventionist gives additional cues to guide parent as needed and gives verbal confirmation to praise parent	3. Did Interventionist give verbal feedback to parent, both praise and correction as needed?	—
4. Parent demonstrates intervention while trainer provides feedback	Parent implements child's BIP	4. Did parent use tangible reinforcement? If not, did the Interventionist prompt parent to use it?	—
5. Parent works hands-on with child	Parent directly interacts with child to complete the meal-time routine	5. Did the Interventionist allow the parent to work hands-on with child without interruption unless needed?	—
6. Training setting is different than targeted natural environment	Training setting is a simulated setting	6. Did the Interventionist make sure that training was always in the simulated and not the natural setting?	—
7. Interventionist is present	Interventionist is within the room to support parent if needed	7. Is the Interventionist in the room to support parent if needed and not on the phone or doing something else?	—

Results

Visual analysis

The intervention (parent training) appeared to increase the use of parent AIAC, decrease parent IIAC, with correlated decrease child problem behavior (CPB) for all four Dyads as shown in Figures 1 and 2 respectively. Data showed immediate effect, a stable and predictable pattern of behavior by phase for all participants, no overlap in data across adjacent phases, and significant level changes on all the dependent variables.

Effect Size

Effect size (ES) was calculated for all participants to assess the magnitude of the strength of the relationship between the independent and dependent variables (Dunst, Hamby, & Trivette, 2004; Parker, Vannest, & Brown, 2009). Such measures of accountability are suggested for reporting experimental procedures (Reichow et al., 2011) and appear to be even more important when there are limitations in the research design (e.g., a partial non-concurrent multiple baseline). The ES was measured using Cohen's *d* index. For the purpose of this study, effect sizes (*d*) were calculated on the three dependent variables AIAC, IIAC and CPB for each participant across baseline and generalization probes for each dyad (see Table 5). Finally, the overall effect size for all participants was computed as well.

Although not surprising and as typical of single case experimental designs, overall and individual effect sizes indicated a large effect implying statistical significance of the change in the dependent variables from baseline to parent training.

Social Validity

At the end of the study, the first author presented the participating parents with the option to respond to a questionnaire or speak with her to determine the social significance of the study and their satisfaction with the outcomes (Baer, Wolf, & Risley, 1987; Gresham, Cook, Crews, & Kern, 2004; Reichow et al., 2011). Parents chose to speak face-to-face or on the phone with the interventionist rather than respond to a questionnaire. Interview data were recorded and then reviewed with parents to ensure accurate interpretation of their perspectives.

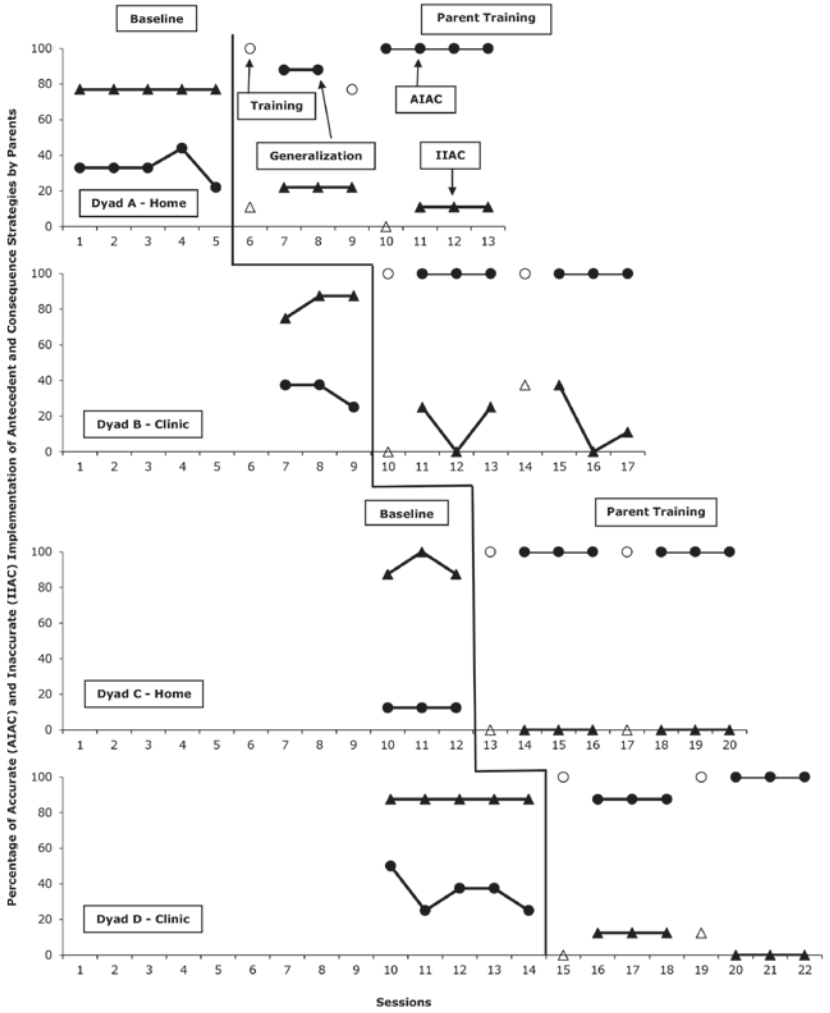

Figure 1. Percentage of accurate (AIAC) and inaccurate (IIAC) implementation of antecedent and consequence strategies by parents during baseline and parent training.

Christian's mother (Dyad A; home-based training) verified that training was helpful and that his grandmother living with them also learned the procedures in order to assist more effectively. The family did not seek additional advice or consultation following the training procedures and reported continued use of some procedures (e.g., access to preferred item only after compliance with request) in other settings.

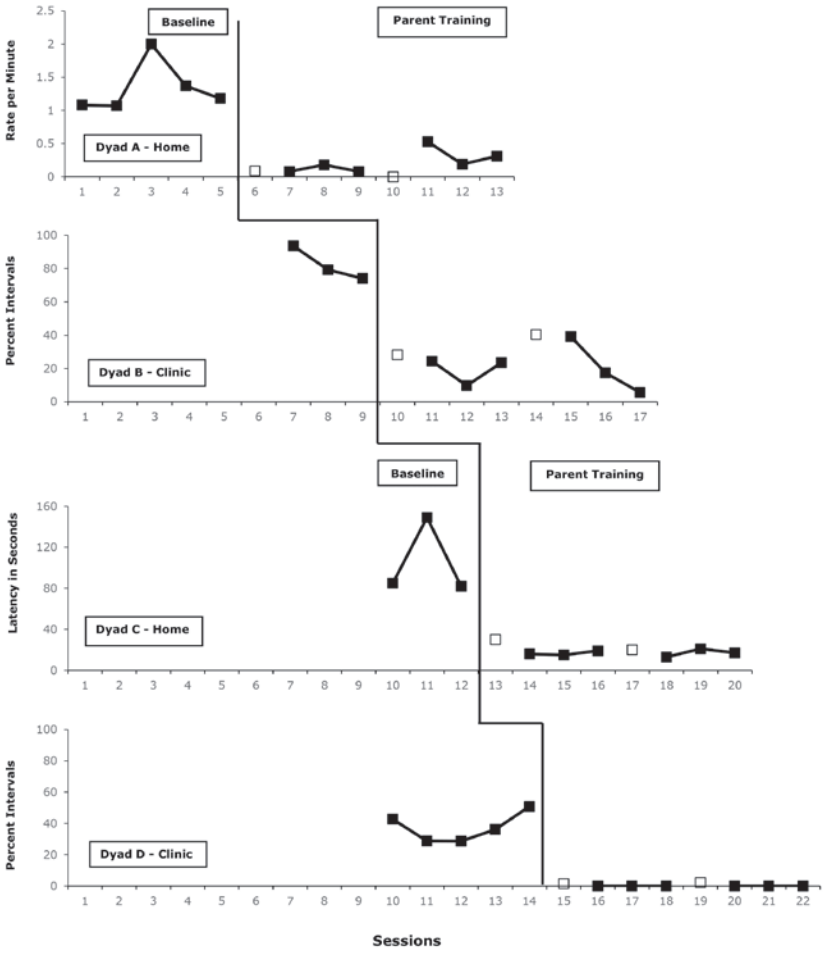

Figure 2. Rate per minute, latency, or percent occurrence of child problem behavior (CPB) during baseline and parent training.

Mothers of the other three children also reported their ability to accurately use the antecedent and consequence strategies in other settings and expressed great appreciation for the "free" training. They found the feedback and guidance valuable and reported that all the strategies were easy to understand and use. Matt's mother (Dyad B; clinic-based training) sought further training opportunities to maintain success rates; Ryan's mother (Dyad A; home-based training) initiated ABA services at home in order to continue parent training opportunities because of the conviction that her son's progress depended on such

Table 5
Effect Size (*d*) of the Impact of Parent Training by Location on AIAC, IIAC, and Child Problem Behavior (CPB)

Training Location	Dyad	AIAC *d*	IIAC *d*	CPB *d*
Home	A, C	5.48	5.8	2.40
Clinic	B, D	6.50	4.45	4.53
Overall Effect	A, B, C, D	5.25	4.64	3.5

Small (*d* = .25); medium (*d* = .50); large (*d* = 1.0 or greater)

strategies; and Kenny's mother (Dyad D; clinic-based training) also scheduled additional consultation with the interventionist following the study to continue to receive guidance and recommendations for settings outside the home (e.g., public places). Overall, the parents reported satisfaction with the outcomes of the study.

Discussion

Results of this study appear to illustrate the effectiveness of the parent training procedures implanted in this study for decreasing the problem behaviors of four children with ASD. While the literature has supported the need to teach parents skills for effectively teaching their children with autism (Bolton, & Mayer, 2008; Briesmeister & Schaefer, 2007; Harris, 1984; Hume, Bellini, & Pratt, 2005; O'Reilly & Dillenburger, 2000; Shriver & Allen, 2008), much of this research is characterized by two possible limitations: (1) dependent variables are designed to assess changes only in child or parent behavior but not both concurrently; (2) and measurement of child behavior is focused on skill acquisition, not necessarily problem behavior, as a function of parent training. This study focused on the acquisition of parent effective strategies during the meal-time routine, generalization of those parent behaviors to an untrained real meal-time routine, and on decreases in child problem behavior. There are several possible explanations for the outcomes including the delivery of the intervention as designed for this study that was function-based, structured and scripted, utilized ABA strategies culled from the literature, and including programming for generalization, and contextualized to fit with family preferences.

The intervention was designed and implemented to focus not just on strategies for decreasing child problem behavior but also on

modifying environmental factors (e.g., parent and setting variables) that contributed to problem behavior (Horner et al., 2002). In this study, parents were taught to manipulate both antecedent and consequence stimuli that maintained child problem behavior by making them focal components of a structured and scripted parent training program. Parents were provided with specific tools (e.g., the parent checklist, list of materials that needed to be ready ahead of time, etc.) that may have made the instructions much easier to follow with consistency each time the meal-time routine was implemented.

Parent behavior was also targeted by using six specific and integrated ABA strategies including: (1) delivering clear and specific instructions to parents; (2) providing parents with a checklist designed to serve as a script for effectively implementing antecedent and consequence strategies (to promote the use of consistent and clear messages to the children); (3) interventionist modeling of the specific practices for parents while using the checklist, allowing the parents to match-to-sample the strategies they needed to use; (4) providing guided practice in a simulated setting; (5) providing direct feedback to the parents after observing parent behavior; and (6) providing opportunities for parents to generalize learned skills to the real untrained setting. Additionally, anecdotal notes suggested that the parents were surprised at how well their children responded to the implementation of antecedent and consequence strategies when first modeled by the interventionist, which may have increased their confidence in implementing the strategies with their children in untrained settings. These were taught as antecedent and consequence strategies hypothesized to be effective and ineffective based on the existing literature. Even though these six strategies are not new and were drawn from previous research (Ducharme & Drain, 2004; Lafasakis & Sturmey, 2007; Lerman, Tetreault, Hovanetz, Strobel, & Garro, 2008; Lucyshyn et al., 2007; Sarokoff & Sturmey, 2004), program effectiveness could be related to how they were integrated into a package for parent training. Future research might consider the use of similar integrated packages for parent training interventions.

Location of training (home vs. clinic) appeared not to be significant in the amount of skill acquisition and generalization by mothers. Results showed that both home-based and clinic-based parent training methods were equally effective in decreasing child problem behavior perhaps because aspects of generalization training were incorporated at the planning stage (Crockett et al., 2007; Gianoumis & Sturmey, 2012; Handleman & Harris, 1980; Stokes & Baer, 1977). The use of common stimuli in the form of materials (i.e., same place mats, plates and silverware, having a table, chairs, utensils, food items, preferred food

items and tangible reinforcers) and parent behavior (i.e., the prompts, actions and reinforcers) provided consistency and predictability for both parents and children across settings. Additionally, based on generalization probes following parent training, the interventionist modeled the accurate use of antecedent and consequence strategies in specific areas where the percent of desired behavior was less than 100% or undesired behavior was higher than 10% (i.e., sequential modification). This process enabled mothers to generalize their behavior to untrained situations leading to a concurrent decrease in child problem behavior. It is possible that without the use of these strategies, response generalization may not have occurred (Miller & Sloane, 1976) after only two training sessions.

Finally, it is possible that some of the parent characteristics may have contributed to intervention success as well. All participants were educated and employed, belonged to a relatively upper middle class family with a fairly stable life, and appeared able to fluently communicate with the interventionist. They also appeared highly motivated to learn the intervention strategies and understand how their behavior contributed to child behavior.

Limitations of the Study

Some limitations of this study need to be noted that directly pertain to the use of a less rigorous research design. A partial nonconcurrent multiple baseline was used. Even though relatively immediate and large magnitude changes were observed with individual participants following implementation of intervention, in the absence of a systematically staggered demonstration of effect, we can at best suggest that the components of the intervention appear to have been effective. Additionally, no maintenance data were collected so no assumptions can be made about the long term effects of parent training even in the context of real meal-time routines. Finally, as is common for within-participant experimental studies, the findings can be generalized only to parents of children with ASD who share similar characteristics as participants in this study.

References

Baer, D., Wolf, M., & Risley, R. (1987). Some still current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis, 20,* 313–327.

Baker-Ericzén, M., Brookman-Frazee, L., & Stahmer, A. (2005). Stress levels and adaptability in parents of toddlers with and without autism spectrum disorders. *Research & Practice for Persons with Severe Disabilities, 30*, 194–204.

Barlow, D. H., Nock, M. K., & Hersen, M. (2009). *Single case experimental designs* (3rd ed.). New York: Pergamon Press.

Bearss, K., Johnson, C., Handen, B., Smith, T., & Scahill, L. (2013). A pilot study of parent training in young children with autism spectrum disorders and disruptive behavior. *Journal of Autism and Developmental Disorders*, *43*(4), 829–840. doi: 10.1007/s10803-012-1624-7

Biddy, P., Eikeseth, S., Martin, N., Mudford, O., & Reeves, D. (2002). Progress and outcomes for children with autism receiving parent-managed intensive interventions. *Research in Developmental Disabilities, 23,* 81–104.

Bolton, J., & Mayer, M. D. (2008). Promoting the generalization of paraprofessional discrete trial teaching skills. *Focus on Autism and Other Developmental Disabilities, 23*, 103–111.

Briesmeister, J. M., & Schaefer, C. E. (2007). *Handbook of parent training: Helping parents prevent and solve problem behaviors* (3rd ed.). Hoboken, NJ: John Wiley & Sons.

Brookman-Frazee, L. (2004). Using parent/clinician partnerships in parent education programs for children with autism. *Journal of Positive Behavior Interventions, 6*, 195–213.

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis* (2nd ed.). Upper Saddle River, NJ: Prentice-Hall.

Crockett, J. L., Fleming, R. K., Doepke, K. J., & Stevens, J. S. (2007). Parent training: Acquisition and generalization of discrete trials teaching skills with parents of children with autism. *Research in Developmental Disabilities*, *28*, 23–36.

Ducharme, J. M., & Drain, T. (2004). Errorless academic compliance training: Improving generalized cooperation with parental requests in children with autism. *Journal of the American Academy of Child and Adolescent Psychiatry, 43*, 163–171.

Dunst, C. J., Hamby, D. W., & Trivette, C. M. (2004). Guidelines for calculating effect sizes for practice-based research syntheses. *Centerscope, 3*, 1–10.

Eikeseth, S. (2001). Recent critiques of the UCLA young autism project. *Behavioral Interventions, 16*, 249–264.

Fettig, A., & Barton, E. E. (2014). Parent implementation of function-based intervention to reduce children's challenging behavior: A literature review. *Topics in Early Childhood Special Education, 34*, 49–61.

Gast, D. L., & Ledford, J. R. (2014). *Single case research methodology. Applications in special education and behavioral sciences* (2nd ed.). New York, NY: Taylor & Francis.

Gianoumis, S., & Sturmey, P. (2012). Generalization procedures in training interventionists for individuals with developmental disabilities. *Behavior Modification*, *36*, 619–629.

Gresham, F. M., Cook, C. R., Crews, S. D., & Kern, L. (2004). Social skills training for children and youth with emotional and behavioral disorders: Validity considerations and future directions. *Behavioral Disorders, 30,* 32–46.

Handleman, J. S., & Harris, S. L. (1980). Generalization from school to home with autistic children. *Journal of Autism and Developmental Disorders, 10*, 323–333.

Harris, S. L. (1984). The family and the autistic child: A behavioral perspective. *Family Relations*, *33*, 127–134.

Harris, S. L., & Handleman, J. S. (2000). Age and IQ at intake as predictors of placement for young children with autism: A four- to six- year follow-up. *Journal of Autism and Developmental Disorders, 30*, 137–142.

Healy, O., O'Connor, J., Leader, G., & Kenny, N. (2008). Three years of intensive applied behavior analysis: A case study. *Journal of Early and Intensive Behavior Intervention, 5*, 4–22.

Heitzman-Powell, L., Buzhardt, J., Rusinko, L., & Miller, T. (2013). Formative evaluation of an ABA outreach training program for parents of children with autism in remote areas. *Focus on Autism and Other Developmental Disabilities.* doi: 10.1177/1088357613504992

Horner, R., Carr, E., Strain, P., Todd, A., & Reed. H. (2002). Problem behavior interventions for young children with autism: A research synthesis. *Journal of Autism and Developmental Disorders, 32,* 423–446.

Hume, K., Bellini, S., & Pratt, C. (2005). The usage and perceived outcomes of early intervention and early childhood programs for young children with autism spectrum disorder. *Topics in Early Childhood Special Education, 25*, 195–207.

Iwata, B. (2002). *Functional analysis screening tool* (5th ed.). Gainesville, FL: The Florida Center on Self-Injury at the University of Florida.

Lafasakis, M., & Sturmey, P. (2007). Training parent implementation of discrete-trial teaching: Effects on generalization of parent teaching and child correct responding. *Journal of Applied Behavior Analysis, 40*, 685–689.

Lerman, D. C., Tetreault, A., Hovanetz, A., Strobel, M., & Garro, J. (2008). Further evaluation of a brief, intensive teacher-training model. *Journal of Applied Behavior Analysis, 41*, 243–248.

Lovaas, O. I. (1987). Behavioral treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting and Clinical Psychology, 55*, 3–9.

Lucyshyn, J., Albin, R., Horner, R. H., Mann, J. C., Mann, J. A., & Wadsworth, G. (2007). Family implementation of positive behavior support with a child with autism: A longitudinal, single case experimental and descriptive replication and extension. *Journal of Positive Behavior Interventions, 9*, 131–150.

Lumpkin, P. W., Silverman, W. K., Weems, C. F., Markham, M. R., & Kurtines, W. M. (2002). Treating a heterogeneous set of anxiety disorders in youths with group cognitive behavioral therapy: A partially nonconcurrent multiple-baseline evaluation. *Behavior Therapy*, *33*, 163–177. doi: 10.1016/S0005-7894(02)80011-9

McLaughlin, T. W., Denney, M. K., Snyder, P. A., & Welsh, J. L. (2011). Behavior support interventions implemented by families of young children: Examination of contextual fit. *Journal of Positive Behavior Interventions*, *14*, 87–97.

Miller, S. J., & Sloane, H. N. (1976). The generalization effects of parent training across stimulus settings. *Journal of Applied Behavior Analysis, 9*, 355–370.

Moes, D. R., & Frea, D. R. (2000). Using family context to inform intervention planning for the treatment of a child with autism. *Journal of Positive Behavior Interventions, 2*, 40–46.

National Autism Center (2009). *National standards report*. Randolph, MA: National Autism Center.

National Professional Development Center (2013). *The NPDC on ASD and the National Standards Project.* Retrieved from http://autismpd.cfpg.unc.edu/content/national-standards-project.

O'Reilly, D., & Dillenburger, K. (2000). The development of a high-intensity parent training program for the treatment of mod-

erate to severe child conduct problems. *Research on Social Work Practice, 10*, 759–786.

Parker, R. I., Vannest, K. J., & Brown, L. (2009). The improvement rate difference for single-case research. *Exceptional Children, 75*, 135–150.

Patterson, S., Smith, V., & Mirenda, P. (2011). A systematic review of training programs for parents of children with autism spectrum disorders: Single subject contributions. *Autism, 16*, 498–522.

Reagon, K. A., & Higbee, T. S. (2009). Parent-implemented script fading to promote play-based verbal initiations in children with autism. *Journal of Applied Behavior Analysis*, *42*, 659–664.

Reeve, S. A., Reeve, K. F., Townsend, D. B., & Poulson, C. L. (2007). Establishing a generalized repertoire of helping behavior in children with autism. *Journal of Applied Behavior Analysis*, *40*, 123–136.

Reichow, B., Doehring, P., Cicchetti, D. V., & Volkmar, F. R. (2011). *Evidence-based practices and treatments for children with autism*. New York: Springer.

Sarokoff, R. A., & Sturmey, P. (2004). The effects of behavioral skills training on staff implementation of discrete-trial teaching. *Journal of Applied Behavior Analysis, 37*, 535–538.

Shayne, R., & Miltenberger, R. G. (2013). Evaluation of behavioral skills training for teaching functional assessment and treatment selection skills to parents. *Behavioral Interventions, 28*, 4–21.

Sheinkopf, S. J., & Siegel, B. (1998). Home-based behavioral treatment of young children with autism. *Journal of Autism and Developmental Disorders, 28*, 15–23.

Shriver, M. D., & Allen, K. D. (2008). *Beyond noncompliance: Developing evidence-based parent training interventions.* Washington, DC: American Psychological Association.

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis, 10*, 349–367.

Stokes, J. V., Cameron, M. F., Dorsey, M. F., & Fleming, E. (2004). Task analysis, correspondence training, and general case instruction for teaching personal hygiene skills. *Behavioral Interventions, 19,* 121–135.

Tomanik, S., Harris, G. E., & Hawkins, J. (2004). The relationship between behaviors exhibited by children with autism and

maternal stress. *Journal of Intellectual and Developmental Disability, 29*, 16–26.

Waters, M., Lerman, D., & Hovanetz, A. (2009). Separate and combined effects of visual schedules and extinction plus differential reinforcement on problem behavior occasioned by transitions. *Journal of Applied Behavior Analysis, 42*, 309–313.

Wood, B. K., Blair, K. C., & Ferro, J. B. (2009). Young children with challenging behavior: Function-based assessment and intervention. *Topics in Early Childhood Special Education, 29*, 68–78. doi: 10.1177/0271121409337951

Wong, C., Odom, S. L., Hume, K. Cox, A. W., Fettig, A., Kucharczyk, S., & Schultz, T. R. (2013). *Evidence-based practices for children, youth, and young* a*dults with Autism Spectrum Disorder.* Chapel Hill: The University of North Carolina, Frank Porter Graham Child Development Institute, Autism Evidence-Based Practice Review Group.