Research Article

Functional Assessment Based Parent Intervention in Reducing Children’s Challenging Behaviors: Exploratory Study of Group Training

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This study examined the effects of group parent training on children’s challenging behaviors in home settings. Eight parents of young children with challenging behaviors were trained in a large group setting on using functional assessment to design interventions that fit the strengths and needs of individual families. The training included information sharing and collaborating with parents on designing functional-assessment based interventions. An Interrupted Time Series Design was used to examine the effects of large group training by comparing parent and child behaviors prior to intervention with behaviors after the intervention. Data were analyzed using Repeated Measures ANOVA. The results indicated that group training increased parents’ ability to implement functional assessment based strategies and these strategies resulted in a significant reduction in children’s challenging behaviors. Furthermore, parent implementation of functional assessment based strategies and children’s decreased levels of challenging behaviors were maintained after the completion of the intervention.

1. Group Parent Training on Functional-Assessment Based Intervention in Reducing Children’s Challenging Behaviors

Challenging behaviors often are a source of confusion and frustration to teachers, parents, and other caregivers. Challenging behavior has been defined as any behavior that interferes with children’s learning and development, is harmful to children and to others, and puts a child at high risk for later social problems or school failure [1, 2]. Early in life challenging behavior is developmentally appropriate, and all children continue to engage in it periodically as they grow. However, some children rely on challenging behavior as a way to get their needs met [2]. Such children may need individualized interventions to help reduce their challenging behaviors and increase positive behaviors.

While teachers have reported that children’s disruptive behavior is one of the biggest challenges they face, parents also report these difficult experiences in home settings. Children’s challenging behaviors can impact a family’s ability to participate in community and family activities. These challenges make families ideal candidates for behavior interventions. One of the most important values of working with young children is the belief in family-based practices [3]. The Division for Early Childhood’s (DEC) position statement specifically emphasizes the critical role that families play in designing and carrying out effective interventions for challenging behaviors [4].

The treatment of young children’s challenging behavior has received considerable attention over the last two decades. Children often participate in behavioral interventions to reduce their challenging behaviors in school or therapy settings [5]. While this form of intervention has been proven effective, it is important that parents also learn strategies to interact with their children who may exhibit challenging behaviors outside of intervention sessions. Campbell [6] examined the prevalence, course, and correlates of behavior problems in preschool children, and the results indicated that serious externalizing problems identified early often persist.
Negative, inconsistent parental behavior and high levels of family adversity are associated with the emergence of problems in early childhood and predict their persistence to school age. Stormont [7] stated that negative and controlling parenting places children at risk for developing behavior problems. Also, research has shown that parental aggression toward children was differentially associated with children's sociometric ratings in later school years [8]. Parental aggression toward children at home was a significant predictor of children's social status at school, above and beyond the variance accounted for by children's aggression at school. Thus, parents' interaction with their children and their reactions to children's challenging behaviors are key components that require further investigation.

The importance of involving parents in designing effective interventions to treat young children's challenging behaviors cannot be ignored. The family is a child's most valuable and durable resource and exerts the most powerful influence on a child's development [9]. Parents are experts about their children and about their family's culture and ecology. Parents have unique knowledge about family goals and values, daily and weekly routines, resources, social supports, and stressors.

While parent training and intervention in the treatment and prevention of child externalizing problem behaviors have emerged as an important topic, much remains to be learned about the factors that affect the implementation of this type of intervention. Specifically, many interventions that target parent intervention are not based on the factors that maintain problem behaviors. Functional assessment (FA) refers to a set of procedures that are used to explicate the relationships between physiological or environmental events and problem behaviors. Functional assessment uses interviews, observations, and structural analysis to operationally define the topography, frequency, and duration of problem behaviors. FA is used to identify the antecedent events that occur before challenging behaviors and the consequences that maintain the behaviors [10]. By designing an intervention based on the function rather than the form of behavior, a number of benefits are realized. First, the emphasis is on skill building and supporting prosocial behavior, with less emphasis on punitive strategies that simply seek to reduce behavior problems. Second, by implementing hypothesis-driven strategies, positive outcomes are more likely. Third, function-based interventions increase the likelihood that the new behavior(s) will produce meaningful and long-lasting change, which is the objective of all intervention efforts [11].

A recent review was conducted to analyze the research on parent implemented functional assessment based interventions in reducing children's challenging behaviors [12]. The review indicated that functional assessment based interventions provide evidence in supporting parents to reduce children's challenging behaviors. However, most studies of this nature focus on working with parents individually (e.g., [13–16]). No studies were identified that investigated the effects of functional assessment based group parent trainings. While effective, the cost effectiveness of individually provided parent training is a concern. A group approach enables an interventionist to interact with a larger number of participants at one time, which can help relieve the critical shortage of professionals needed to treat child behavior problems. Additionally, group training has the potential to help families feel less isolated and might provide a context for parent-to-parent networking and support [17]. Finally, hearing other parents' concerns and the strategies they use with their children might broaden the "skill set" or "bag of tricks" available to any single parent.

There is a large body of research on the implementation of behavioral interventions by families with young children (e.g., [18–20]); however, few researchers have documented strong parent and child outcomes as a result of group training. Furthermore, many of the group studies utilized a preexisting parent training program such as the Incredible Years Program [21], Effective Black Parenting Program [22], and Behavioral Parent Training [23]. Because of the use of established parent training programs, the opportunities for parent-researcher collaboration were minimal. Programs of this nature do not assess individual parent and child behaviors, thus limiting collaboration with parents and not tailoring interventions to individual children and their families. When training programs are not individualized to meet families' unique needs, parents are less likely to take ownership of the interventions and the results are less likely to maintain.

In general, parent training programs are effective approaches for helping parents reduce aggressive and oppositional behaviors in their children [24]. However, many questions remain about the ideal format of parent training and the rigor of past research studies. Numerous factors could contribute to the variable parent and child outcomes realized across published studies. While many studies demonstrated that group training positively results in reductions in children's challenging behaviors (e.g., [21, 25, 26]) several factors related to validity and reliability must be addressed. The use of preexisting intervention programs versus interventions that researchers design in collaboration with parents to address individual needs must be considered. Although some commercially available parent programs have been shown to be effective in reducing children's challenging behaviors, these programs are often used for prevention purposes and might not be as effective for children who exhibit persistent challenging behaviors. It is important to look at the function of children's challenging behaviors and understand that they are unique to each child, in order to improve the effectiveness and efficiency of any intervention [27]. Also, when assessing the effectiveness of an intervention, direct observation is more reliable than parent report [28]. Observing parents and their children enables researchers to consider the relationship between adult and child behaviors.

The purpose of this exploratory study was to examine the effectiveness of group parent training on using functional assessment based interventions to reduce young children's challenging behavior. Specific research questions addressed were as follows: (a) to what extent did group training increase parents' use of functional-assessment based strategies to reduce their children's challenging behaviors?, (b) to what extent did parent implemented functional-assessment based strategies result in a reduction in their children's challenging behaviors?, and (c) to what extent did parents' and children's behaviors maintain after the completion of the intervention?.

**2. Design**

Using an Interrupted Time Series Design, the effects of group training were analyzed by comparing parent and child behaviors prior to intervention with their behaviors following intervention [29]. In this design, the group of participants was tested repeatedly before and after the treatment to allow the researchers to detect any confounding variables such as regression to the mean, history, and maturation.

**3. Recruitment and Participants**

Parent-child dyads were recruited from the Midwest. The inclusion criteria for the study were that child participants had to be between the age of 2 and 5 and their parents must have expressed concern regarding their children's challenging behavior at home. To increase the reliability of the study and reduce variability, child participants with severe intellectual disabilities whose parents reported that the child was functioning under the developmental age of two years old were not recruited as participants. Parents of children who were receiving services due to behavior issues also were excluded from the study.

Eight families completed all phases of this study. Three of the eight families had both mother and father participants present during the training sessions, while four of the families had mothers as participants. One family included a grandmother, who was the legal guardian of the child participant, and the child’s mother as participants in the study. While more than one family member attended many training sessions, not all “trained participants” were present at each of the home observation sessions. However, it was required that one parent participant from each family consistently attend all training sessions and be present at each of the home observations.

Of the eight children in the study, five were boys and three were girls. Child participants’ ages ranged from 2 years and 10 months old at the start of the study to 5 years old; four of the children had diagnosed special needs. A summary of demographic information on each parent and child participant is presented in Table I.

**4. Procedures**

4.1. Baseline. Prior to the start of the study, all interested parents were interviewed to ensure that their children met the criteria for the study. After all participants were identified, three home observations per family were conducted during the home routine which parents identified as the time when their child exhibited persistent challenging behavior. During these observations, parents were asked to interact with their children as they normally would during the routine they selected as being most problematic. The three observation sessions for each family were completed within a 3-week period. Across all eight families it took four weeks to videotape the 24 sessions.

4.2. Intervention. Immediately following the completion of all baseline observations, all parents participated in a 4-session training program over a 4-week period. Over the course of the 4 weeks, parent participants met in groups with the first author for 1-hour training sessions. Childcare was provided at the training site. Each session followed a similar format: a question-answer segment about information shared during the previous session, introduction and presentation of the new topic, and collaboration between the researcher and parents regarding the new topic. Each training session included lecture, discussion, scenario presentation, and videotapes. Parents received handouts about each topic and they were provided with the opportunity to describe their children’s challenging behaviors to the group so other participants could help them problem solve. Descriptions of each intervention session are presented in Table 2. (All materials used in training were adapted from training materials developed by the Center on the Social and Emotional Foundations for Early Learning (CSEFEL; http://www.vanderbilt.edu/csefel/).)

4.3. Postintervention. Three home observation sessions were conducted following the completion of all training sessions. All three observations were completed for all families within 3 weeks following the last training session.

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Table 1: Participant demographics.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Ethnicity</th>
<th>Child sex</th>
<th>Child age a (year, month)</th>
<th>Child diagnosis</th>
<th>Parent education level</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Mother, father</td>
<td>Caucasian</td>
<td>M</td>
<td>4 y 2 m</td>
<td>Soto's Syndrome</td>
</tr>
<tr>
<td>B</td>
<td>Mother</td>
<td>African American</td>
<td>F</td>
<td>3 y 10 m</td>
<td>None</td>
</tr>
<tr>
<td>C</td>
<td>Mother, father</td>
<td>Asian</td>
<td>M</td>
<td>4 y 6 m</td>
<td>ASD&lt;sup&gt;b&lt;/sup&gt;, sensory integration needs</td>
</tr>
<tr>
<td>D</td>
<td>Grandmother, mother</td>
<td>Caucasian</td>
<td>M</td>
<td>4 y 8 m</td>
<td>ASD&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>E</td>
<td>Mother</td>
<td>Caucasian</td>
<td>F</td>
<td>3 y 7 m</td>
<td>None</td>
</tr>
<tr>
<td>F</td>
<td>Mother</td>
<td>Caucasian</td>
<td>M</td>
<td>5 y 0 m</td>
<td>Autism</td>
</tr>
<tr>
<td>G</td>
<td>Mother</td>
<td>Caucasian</td>
<td>M</td>
<td>3 y 0 m</td>
<td>None</td>
</tr>
<tr>
<td>H</td>
<td>Mother, father</td>
<td>Caucasian</td>
<td>F</td>
<td>2 y 10 m</td>
<td>None</td>
</tr>
</tbody>
</table>

<sup>a</sup>Age at the beginning of the study.  
<sup>b</sup>Autism spectrum disorder—diagnosis made prior to the release of DSM-V. The child was diagnosed with Asperger’s syndrome under DSM-IV.  
<sup>c</sup>Diagnosis made prior to the release of DSM-V. The child was diagnosed with pervasive developmental disorder not otherwise specified.  
<sup>d</sup>Information not provided.
Table 2: Training session descriptions.

<table>
<thead>
<tr>
<th>Session</th>
<th>Topic</th>
<th>Focus</th>
</tr>
</thead>
</table>
| 1       | Understanding young children’s social and emotional development and challenging behaviors | (i) Importance of social emotional development and why challenging behaviors occur  
(ii) Ways to promote children's social emotional development  
(iii) Benefits of descriptive praise  
(iv) Introduction to functional assessment |
| 2       | Functional assessment (FA) and FA-based strategies                   | (i) The purpose and importance of FA  
(ii) FA interview and FA observation  
(iii) Identifying forms and functions of children's challenging behaviors |
| 3       | Designing FA-based parent intervention strategies                    | (i) Identifying suitable strategies  
(ii) Formulating detailed behavior plans based on all information gathered  
(iii) Creating materials to support implementation (e.g., picture cue cards, picture schedules) |
| 4       | Implementing the strategies and self-monitoring                     | (i) Implementation strategies  
(ii) Self-monitoring |

4.4. Maintenance. Four weeks after the completion of the last observation session in the postintervention phase, all parents were observed one more time (within a three-week time frame) to determine if parent and child behavior changes maintained. At the end of this observation session, the researchers debriefed each parent regarding the results of the study and ideas for continued implementation of the strategies. Parents also were provided a parent questionnaire, which focused on parents’ perceptions of the strategies and the effectiveness of the intervention. Parents were provided with a stamped envelope that was addressed to a university graduate student, who had volunteered to compile the questionnaire data and omit parent names before sharing the responses with the researchers. Parents were assured of their anonymity.

5. Dependent Measures and Coding

5.1. Parent. Parent dependent variables were defined as functional-assessment indicated strategies (FA-indicated strategies). FA-indicated strategies were identified by using a functional assessment; they were strategies parents would implement to reduce children's engagement in challenging behaviors. FA-indicated strategies were derived by identifying functions of children's challenging behaviors and then reviewing the Functional Assessment Interview (FAI), Functional Assessment Observation (FAO), and baseline observations to determine which strategies would directly address children's behavior functions. Together, the first author and the parents brainstormed and generated strategies suitable for each family to implement to help reduce the children's challenging behavior during the targeted routine. An example of an FA-indicated strategy was when a parent offered her child a drink before bedtime to eliminate the need for the child to ask for water after she had climbed into bed. By doing so, the child would not engage in challenging behavior (e.g., whining, crying, and refusing to follow directions) in order to gain access to water once in bed.

Parent behaviors were coded by determining how many FA-indicated strategies parents used in each session. The researcher used a FA-indicated strategies matrix developed for each parent to document the strategies that the parents used. Parent data were analyzed by calculating the percentage of FA-indicated strategies implemented in each session. This was calculated by dividing the total FA-indicated strategies used in each session by the total FA-indicated behaviors possible during the routine and multiplying this number by 100.

5.2. Child. Child dependent variables were challenging behaviors identified and defined by each parent in collaboration with the researcher using the FAI, FAO, and the baseline observations. Challenging behaviors exhibited by the 8 children included hitting, kicking, screaming, and refusing to follow directions given by parents. Challenging behaviors were not the same for all child participants.

When gathering data on child behaviors, a 15-second partial time sampling interval-recording method was used. For each observation session coders assessed the presence or absence of the predetermined challenging behaviors within each 15-second interval. The percentage of intervals that the child exhibited challenging behaviors was calculated by dividing the total number of intervals the child exhibited challenging behavior by the total number of intervals of that observation session and multiplying by 100.

5.2.1. Support during Postintervention. The researcher provided parents with support during the postintervention phase to facilitate the implementation of FA-indicated strategies. Some of the support strategies used were affirming parent behavior, modeling a specific strategy, and suggesting the use of a specific strategy. The amount of support provided to each parent differed based on his or her unique needs. Some parents needed consistent support to prompt the usage of the FA-indicated strategies throughout most of the postintervention phase while other parents did not need any support to
accurately implement FA-indicated strategies. Support was not provided to any parent during the maintenance session. Supports provided to parents were coded as the presence or absence of support during each observation session.

6. Data Analysis

Repeated Measures ANOVA was used to analyze both parent and child behaviors. Unlike a between-subject design in which differences between subjects are not controlled and are treated as error, in a Repeated-Measures ANOVA the same subjects are tested in each condition. Therefore, differences between subjects can be measured and separated from error [30]. This type of analysis was selected given different parent and child behaviors targeted for each family.

7. Treatment Fidelity

In order to increase the reliability of drawing causal inferences between children’s challenging behavior and the group training, it was essential to ensure that parent training was implemented with high fidelity. Treatment fidelity checklists were developed for each of the training sessions to assure procedural integrity. To assess the fidelity of treatment, the second author conducted fidelity checks on all training sessions to ensure that all parent training procedures were followed. The treatment verification data were 100% of 32 items for session 1, 100% of 10 items for session 2, 90% of 10 items for session 3, and 100% of 20 items for session 4. The mean for combined training fidelity was 97.5%.

8. Interrater Reliability

To assess interrater reliability, a graduate student in early childhood special education was trained to code parent and child behaviors captured on the videotapes; she independently coded 20% of the tapes. The reliability tapes were randomly selected across phases (12 sessions total; 5 baseline, 5 intervention, and 2 maintenance) and across 7 families. The videotapes for one of the families were not selected for interrater reliability coding because the family spoke both English and Chinese at home and the reliability coder did not understand Chinese. The first author, who is fluent in Chinese, was able to code these videos. However, due to the second language used, this family’s video was not selected for interrater reliability coding.

Mean reliability on randomly selected tapes was 93.1% for challenging behavior (range: 75.5%–100%) and 95.8% for parents’ FA-indicated strategies (range: 83.4%–100%). Reliability on the presence or absence of support provided by the researcher to the families was 100%.

9. Results

The percentages of parent behaviors and child behaviors for each session were entered into SPSS to calculate significance of behavior change before and after intervention. Data were then aggregated across all eight families. Dependent variable definitions for child measures and parent measures are presented in Table 3. The mean percent of children’s challenging behaviors and mean percent implementation of FA-indicated strategies in each phase per family are presented in Table 4.

Results show that all parent participants increased their implementation of FA-indicated strategies from baseline to the postintervention and maintenance phases. All 8 children’s challenging behaviors decreased from baseline to postintervention and maintenance. Group means and ranges of parent and child behaviors for each observational session are presented in Table 5.

A one-way Repeated Measures ANOVA was conducted to compare scores on the parents’ use of FA-indicated strategies and children’s behavior change at baseline, postintervention, and maintenance. The means and standard deviations for parent and child behaviors are presented in Table 6. There was a significant effect for the three different phases for parents’ use of FA-indicated strategies (with the Sphericity Assumption intact, $F(2,6) = 128.54, P < 0.0005$, multivariate partial eta squared = 0.948) as well as for children’s behavior change (with the Sphericity Assumption intact, $F(2,6) = 120.73, P < 0.0005$, multivariate partial eta squared = 0.945). The statistical test revealed that parent training was effective, and behavior changes were observed across all 8 parent and child participants. Parents increased their use of FA-indicated strategies following group parent training which led to decreases in children’s challenging behaviors. Parent and child data are represented graphically in Figure 1.

Overall, the results indicate that group training resulted in increased parent ability to implement FA based strategies. Subsequently, these strategies resulted in a significant reduction in children’s challenging behaviors. Furthermore, parents’ implementation of FA based strategies and children’s low level of challenging behaviors maintained after the completion of the intervention.

10. Discussion

Results of the current study show that parents were able to effectively implement a functional assessment based intervention, which effectively reduced children’s challenging
<table>
<thead>
<tr>
<th>Family</th>
<th>Target routine</th>
<th>Child’s challenging behaviors</th>
<th>FA hypothesis</th>
<th>FA-indicated strategies performed by parents</th>
</tr>
</thead>
</table>
| A      | Dinner time    | (i) Cries, whines, yells, and screams  
(ii) Hits/pushes adults hand away when being fed  
(iii) Throws food on the floor and plays with toys at dinner table during dinnertime  
(iv) Leaves seat and refuses to eat by yelling “no” and turning head away from food  
(v) Plays with food | Escape | (i) Provide Tripp Trapp chair for child to sit on  
(ii) Use first/then picture schedule to facilitate dinner routine and describe expectations  
(iii) Use descriptive praise  
(iv) Engage child in conversation  
(v) Do not provide toys at dinnertime  
(vi) Redirect child’s challenging behavior by referring to first/then picture schedule or by asking the child if he is all done with dinner |
| B      | Dinner preparation | (i) Cries and whines  
(ii) Screams for attention  
(iii) Engages in off task (e.g., playing with water instead of washing hands) behaviours  
(iv) Continues action when adult requests that child stop  
(v) Refuses to follow adult directions  
(vi) Runs around the house | Attention seeking | (i) Use descriptive praise  
(ii) Use a picture schedule to facilitate chore selection  
(iii) Allow child to help with chores  
(iv) Redirect child to select chores when challenging behaviors occur |
| C      | Bedtime routine | (i) Cries  
(ii) Engages in off task behaviors  
(iii) Refuses to cooperate with adults when directions are given  
(iv) Jumps on the bed/couch  
(v) Hits, pushes, or takes toys away from sibling  
(vi) Destroys property  
(vii) Laughs uncontrollably  
(viii) Leaves bedroom after book reading routine has started | Escape and attention seeking | (i) Provide calm activity prior to bedtime routine (e.g., drawing, writing, and reading books)  
(ii) Use picture schedule to facilitate bedtime routine  
(iii) Use descriptive praise  
(iv) Do not provide child with free play time once bedtime routine has started  
(v) Redirect child’s challenging behavior by referring to the picture schedule or by setting the timer |
| D      | Dinner time    | (i) Cries, yells, and screams  
(ii) Moves/swirls chair all the way around  
(iii) Gets out of seat  
(iv) Hits, kicks, pinches, bites, pushes, and throws objects at or attempts to hurt an adult in any way | Escape | (i) Provide child with dinnertime warning by directing him to wash his hands  
(ii) State dinnertime expectations at the start of dinner  
(iii) Use descriptive praise  
(iv) Engage child in conversation during dinnertime  
(v) Redirect child’s challenging behavior by referring to dinnertime expectations or ask child if he is all done with dinner |
| E      | Bedtime routine | (i) Cries, whines, yells, and screams  
(ii) Whines about completing routine  
(iii) Throws objects  
(iv) Hits, pushes, or grabs toys from siblings  
(v) Leaves bedroom to play in the living room once bedtime routine has started  
(vi) Hides or tries to escape from an adult during bedtime routine  
(vii) Plays with toys in the bedroom once bedtime routine has started  
(viii) Plays and talks in the bedroom once bedtime routine has started | Escape and attention seeking | (i) Use picture schedule to facilitate bedtime routine  
(ii) Use descriptive praise  
(iii) Make sure child completes all routines before bedtime  
(iv) Redirect child’s challenging behavior by referring to her picture schedule  
(v) State bedtime expectations  
(vi) Put on quiet/bedtime music |
behaviors. For all child participants, their challenging behaviors were inversely related to their parents’ implementation of FA-indicated strategies. These results provide strong support for a causal relationship between parent implemented FA-indicated strategies and a reduction in children’s challenging behaviors. Also, the group parent training format extends previous research (e.g., [21, 31]) by highlighting the effectiveness and efficiency of training parents in small groups.

The current study extends previous research through the use of a behavioral approach that provided parents with strategies to meet their individual family needs. Unlike studies that used established parent training programs and focused on prevention (e.g., [21, 32]), the current study utilized a training program that included collaboration with each family in identifying strategies that would effectively reduce their children’s persistent challenging behaviors. This study provides support for the idea that individualized behavior support plans yield positive effects across families. The positive outcomes realized in this study might be attributed to the process of collaborating with parents who were involved in the design and implementation of interventions that resulted in decreases in children’s challenging behaviors. This extends previous research (e.g., [31, 33]) and supports collaboration with parents in designing interventions that fit family needs and child rearing philosophies.

The current study demonstrates that parents are able to implement FA-indicated strategies at high levels. Unlike previous research that used self-report measures of parental stress and self-efficacy as measures of parent behavior change (e.g., [34, 35]), observational data were utilized in the current study to document parents’ use of intervention strategies. Data reveal that parents increased their implementation of FA-indicated strategies from a baseline mean of 12.2% to a mean of 97.8% postintervention; all parents implemented all strategies during at least one of the postintervention sessions.

Previous studies of this nature also used parent report as the primary measure to evaluate child behavior change. Although other researchers have reported positive outcomes

<table>
<thead>
<tr>
<th>Family</th>
<th>Target routine</th>
<th>Child's challenging behaviors</th>
<th>FA hypothesis</th>
<th>FA-indicated strategies performed by parents</th>
</tr>
</thead>
</table>
| F      | Post-school activity time | (i) Yells  
(ii) Pulls or takes objects away from the adult  
(iii) Takes turn out of sequence  
(iv) Escapes from adult or an activity  
(v) Engages in off task behaviors  
(vi) Stands on couch or table  
(vii) Hits, pushes, or kicks the adult | Escape and seeking sensory needs | (i) Use picture schedule to facilitate activity time  
(ii) Use picture schedule to facilitate transition from one activity to the next  
(iii) Use descriptive praise  
(iv) Use turn taking card to facilitate games that require child to take turns  
(v) Have “break” card available for child to request a break  
(vi) Provide a break when child requests one  
(vii) Provide sensory input during breaks  
(viii) Redirect child by using picture schedule/turn taking card/break card when challenging behaviors occur |
| G      | After nap | (i) Cries, whines, yells, and screams  
(ii) Hits and kicks adult or sibling  
(iii) Takes toys away from sibling | Escape and seeking sensory needs | (i) Use picture schedule to facilitate activities after waking up from a nap  
(ii) Read a social story  
(iii) Use descriptive praise  
(iv) Facilitate child using toilet before snack  
(v) Redirect child by using the picture schedule or the social stories when challenging behaviors occur |
| H      | Dinner time | (i) Cries and whines  
(ii) Leaves seat  
(iii) Completely turns away from the dinner table  
(iv) Put her legs on adult or leans against adult when sitting next to the adult | Escape | (i) Provide dinnertime expectations prior to start of dinner  
(ii) Provide child with the “break” card and the “all done” card  
(iii) Use descriptive praise  
(iv) Provide child with a booster seat at dinnertime  
(v) Provide child with a break when needed/requested  
(vi) Redirect child to use the “break” card or the “all done” card  
(vii) Engage child in conversation during dinnertime |
Table 4: Mean percent of children’s challenging behaviors and mean percent implementation of FA-indicated strategies by family and phase.

<table>
<thead>
<tr>
<th>Family</th>
<th>Phase</th>
<th>Implemented FA-indicated parent strategies (% strategies performed)</th>
<th>Child challenging behavior (% intervals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Baseline</td>
<td>22.1</td>
<td>64.2</td>
</tr>
<tr>
<td></td>
<td>Postintervention</td>
<td>88.8</td>
<td>24.6</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>100.0</td>
<td>18.3</td>
</tr>
<tr>
<td>B</td>
<td>Baseline</td>
<td>16.6</td>
<td>51.1</td>
</tr>
<tr>
<td></td>
<td>Postintervention</td>
<td>100.0</td>
<td>11.1</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>100.0</td>
<td>4.5</td>
</tr>
<tr>
<td>C</td>
<td>Baseline</td>
<td>0.0</td>
<td>52.6</td>
</tr>
<tr>
<td></td>
<td>Postintervention</td>
<td>100.0</td>
<td>25.6</td>
</tr>
<tr>
<td></td>
<td>Maintenance</td>
<td>83.3</td>
<td>5.7</td>
</tr>
<tr>
<td>D</td>
<td>Baseline</td>
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<td>51.2</td>
</tr>
<tr>
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<td>Postintervention</td>
<td>93.3</td>
<td>15.4</td>
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<tr>
<td></td>
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<td>2.8</td>
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<tr>
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<tr>
<td></td>
<td>Maintenance</td>
<td>85.7</td>
<td>2.7</td>
</tr>
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</table>

Table 5: Means and ranges for parent and child behaviors.

<table>
<thead>
<tr>
<th>Session</th>
<th>% FA-indicated strategies parents performed</th>
<th>% Intervals of children’s challenging behaviors</th>
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</thead>
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<tr>
<td></td>
<td>Mean</td>
<td>Range</td>
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<tr>
<td>Baseline #1</td>
<td>18.5</td>
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<tr>
<td>Baseline #2</td>
<td>11.6</td>
<td>0–33.3</td>
</tr>
<tr>
<td>Baseline #3</td>
<td>6.4</td>
<td>0–20</td>
</tr>
<tr>
<td>Postintervention #1</td>
<td>97.9</td>
<td>83.3–100</td>
</tr>
<tr>
<td>Postintervention #2</td>
<td>97.9</td>
<td>83.3–100</td>
</tr>
<tr>
<td>Postintervention #3</td>
<td>97.5</td>
<td>80–100</td>
</tr>
<tr>
<td>Maintenance</td>
<td>88</td>
<td>60–100</td>
</tr>
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</table>

for children as a result of intervention provided the parents (e.g., [25, 26]), parent report as the primary source of data raises questions of reliability. In the current study, children’s challenging behaviors were systematically observed and the results showed significantly fewer challenging behaviors (a mean of 48.4% at baseline and a mean of 12.8% at postintervention) as parents’ implementation of FA-indicated strategies increased. This study extends previous research of this nature by including observation data to document child behavior changes [25, 35].

The level of children’s behavior change from baseline to postintervention is noteworthy. While all children’s challenging behaviors significantly decreased from baseline to postintervention, the magnitude of behavior change differed for each child. The differences of each child’s behavior change can be seen on Table 4. For example, E and H’s level of behavior change was larger (a mean of 54.4% at baseline to a mean of 5.2% postintervention and a mean of 49.5% at baseline to a mean of 3.4% postintervention, resp.) than G’s (a mean of 25.4% at baseline to a mean of 6.8% postintervention). This could be attributed to the fact that G’s challenging behavior was lower than the other children at the start of intervention.

The maintenance data in this study are consistent with research conducted by Briggs et al. [34], Gross et al. [25], and Myers et al. [26]. It is impressive that the results of the current study were maintained one month following completion of the intervention. Low rates of challenging behaviors coincided with parents’ continuous use of FA-indicated strategies. Parents continued to implement FA-indicated strategies at high levels following completion of the intervention. It is important to note that some parents showed a decrease in implementing FA-indicated strategies at maintenance when compared to postintervention because some strategies were no longer necessary. For example, C’s parents and G’s mother no longer needed to use visual schedules with their children because both C and G had learned the routines and were able to complete the steps of the routines without many prompts. Additionally, D’s mother and grandmother and H’s parents did not have to review dinnertime expectations prior to the start of mealtime because both D and H had learned the expectations and were able to participate in the routine without reminders.

Positive outcomes observed in this study also might be attributed to the characteristics of the families who participated. All parent participants were recruited through the Autism Network and parenting listservs in the community. These families already belonged to local parent support groups and might have been more committed to finding resources and opportunities that would increase the quality of their lives, thus, making parent collaboration more easily achieved. Four of the 8 participating families who lived more than 20 minutes from the training site were willing to travel to attend the weekly trainings, and although parents were required to commit to an intensive training and observation schedule, attrition was low. Only one family dropped out of the study for they relocated to a city more than 2 hours away.

In addition to the observational data that were gathered, parent questionnaires distributed at the end of the study revealed some insights regarding the effects of the intervention. Overall, parents were very satisfied with the outcomes of the study. Parents were pleased that they were able to learn practical strategies (e.g., descriptive praise, visual charts, and cue cards) that effectively reduced their children’s challenging behaviors. One parent reported that she learned strategies for
interacting positively with her daughter throughout the day. Several parents shared examples of their children being better listeners and following directions since they began making their expectations clearer.

Several parents also reported that their own behavior outside of the targeted routine had changed, which had positively affected their children’s behavior. For example, one parent stated the following.

Much of what we learned from the study has been applicable for her other routines. Bedtime routine has gotten a lot easier now. My child has shown much better listening skills and she feels empowered that she knows what to do to get ready for bed. I am much less stressed and am able to spend more quality time with her.

Another parent reported the following.

We have implemented a morning routine, which has worked just as marvelously as the bedtime routine chart. She now has fewer tantrums in the morning and is willing to get dressed and eat breakfast with all of us. She is now able to use the chart on her own and complete her tasks without much adult prompts.

Parents also noted on the questionnaire that they would definitely recommend a training of this nature to others parents. All parents felt that the experience was positive and the individual observations, strategies, and support provided were helpful. One parent stated that this type of training could help parents become more aware of ways to address children’s behaviors rather than using typical punitive responses such as timeout, negative consequences, and removal of desired materials. Another parent stated the following.

This study forced us to think about our routines and how important it is to be organized and prepared. We are now more ready and prepared for fits/tantrums. We think through things better on outings with more visuals, staying calmer, getting out of the mayhem and going to a bathroom to regroup, and so forth.

11. Limitations

First, the number of participants poses a concern in this group design study. Previous research involving group parent training showed a high effect size of 0.83 [36]. With an ideal power of 0.80 suggested by Cohen [37], involving 20 parent-child dyads is ideal. However, despite several attempts to recruit additional participants, it was not possible to secure consent from 20 families. While the results indicate significant behavioral changes for the 8 parent participants and their 8 children, a larger sample size might provide more variation in family characteristics (e.g., level of commitment, resources available) that could provide further insights into the complexity of parent collaboration and behavior change. Moreover, in the current study an analysis of behavior based on specific demographic factors (e.g., family socioeconomic status, child diagnosis) was not conducted. Further analysis might provide a deeper understanding of the impact of group training on families from different backgrounds. Lastly, the complexity of dependent measures and coding cannot be ignored. For example, parent behaviors were coded by determining the percent of FA-indicated strategies parents used in each session. Due to the different number of FA-indicated strategies targeted for each parent participant, using percentage as the primary means of comparison might not represent an accurate picture of parent behaviors implemented.

Several factors need to be considered when conducting home-based parent implemented intervention research in the future. Researchers must take into consideration the complexity of family values and routines in home-based interventions [38]. While a specific strategy may have much research and evidence to support its effectiveness, parents might be unwilling to implement the strategy due to their child rearing values and philosophy.

Furthermore, the complexities of identifying FA-indicated strategies that match the function of children’s challenging behaviors merit further investigation. While the FA-indicated strategies selected for each family effectively reduced children’s challenging behaviors, it is unknown whether other strategies would have resulted in decreased levels of challenging behaviors quicker or more thoroughly.

Conducting maintenance checks after a longer time period also is worth investigating. While the current study demonstrated that all parents were able to continue implementing FA-indicated strategies and children’s challenging behaviors remained low at the 4-week maintenance check, maintenance checks at later points in time would provide information on whether parents continued to use the FA-indicated strategies and whether children’s low levels of challenging behaviors remained several months after intervention.
Generalization data also can provide insight into parents' ability to utilize training information in settings other than the target routine. Postintervention questionnaire data revealed that several parents noticed positive changes in their children's behaviors in settings other than the targeted routine. Systematic data collection during these nontarget routines could provide information on the generalizability of the FA-indicated strategies.

The complexity of defining and coding target behaviors also needs to be addressed in future studies. While challenging behaviors have been studied for many years, targeting parent behaviors as the main dependent variable has not been systematically evaluated. Identifying FA-indicated strategies prior to intervention can be challenging. Until a child's challenging behavior has been carefully observed and defined, it is impossible to identify parent behaviors that might support children's behavior change. Also, designing an observational coding scheme for parent behaviors that are linked with child outcomes is worthy of further investigation.

12. Implications for Practice
The results of this study provide promising implications for parents, practitioners, and other service providers who work with young children with challenging behaviors. Parent involvement with their children with challenging behaviors is critical. Since parents spend a significant amount of time with their children, collaborating with them to design interventions is a promising approach to help reduce children's challenging behaviors. Additionally, the importance of linking functional assessment data to interventions is critical. Functional assessment, which focuses on the identification of variables that influence the occurrence of problem behaviors, is needed to guide parents and practitioners in determining what strategies might be most effective and efficient in addressing children's challenging behaviors. At the present time, functional assessment is not consistently used when designing interventions to reduce young children's challenging behaviors [13]. Results from the current study successfully demonstrated that positive effects could be realized when functional assessment data are linked with parent implemented strategies.

Finally, the positive results of group parent training in reducing children's challenging behaviors provide practitioners with insight into a cost effective approach to collaborating with parents. While several studies have documented success in decreasing children's challenging behavior when parents were trained individually (e.g., [15, 16]), the cost effectiveness and efficiency of these interventions have been questioned. The current study provides a promising approach to addressing young children's challenging behaviors through group training. Practitioners and service providers should consider how trainings of this nature could be designed and implemented by professionals who work with families.

13. Conclusion
The results of the current study provide important information about the effects of group training in reducing children's challenging behaviors. Results demonstrate that parents are capable of effectively applying FA-indicated strategies acquired through a group training format. Changes in parent behaviors resulted in reductions in their children's challenging behaviors, and both parents' and children's behaviors were maintained after the completion of intervention. Additional research on group training to reduce children's challenging behaviors needs to be completed with larger groups of diverse parents to better understand this approach.

Conflict of Interests
The authors declare that there is no conflict of interests regarding the publication of this paper.

References


