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RUBI parent training as a group intervention for children with autism: A community pilot study

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ABSTRACT

Background: Children with autism spectrum disorder (ASD) frequently present with co-occurring problem behaviors that interfere with daily living skills and educational placement. The Research Units in Behavioral Intervention (RUBI) parent training manualized intervention was developed as a stand-alone intervention for problem behavior in children with ASD. Group-based parent training options are a low-cost alternative that allow providers to simultaneously serve multiple clients. Currently, no community feasibility studies exist examining the RUBI Parent Training program when delivered as a group intervention.

Method: This study sought to provide preliminary evidence supporting the use of the RUBI Parent Training program as a group intervention. The manualized RUBI Parent Training intervention was delivered to four small groups of caregivers (N = 11) of children (M age = 4.82 years) with ASD. Feasibility data were collected on treatment acceptability, fidelity, and effectiveness. Exploratory treatment effectiveness was evaluated through structured observations of child compliance and parent-report of child problem behavior.

Results: Overall, the group-implemented RUBI Parent Training program was found to be feasible as demonstrated by high levels of parent acceptableness, attendance, and treatment fidelity. Additionally, the majority of the children demonstrated improvements in problem behavior.

Conclusions: The current findings provide initial support for the delivery of the RUBI Parent Training in a group of parents. This could provide a cost-effective alternative for the treatment of problem behavior in children with ASD.

1. Introduction

Autism Spectrum Disorder (ASD) is a life-long neurodevelopmental disorder that is characterized by difficulties in social communication and social interaction as well as restricted or repetitive interests and behaviors (American Psychiatric Association, 2013). Symptoms of ASD become evident during infancy and early childhood, and care for the individual is likely needed throughout the lifespan. Recent reports by the Centers for Disease Control and Prevention (Baio et al., 2018) suggest that approximately 1 in 59 children are diagnosed with ASD, which increased over the past 10 years. In addition to the symptoms affiliated with an ASD diagnosis, it is estimated that between 25% and 53% of children with ASD display clinically significant externalizing, disruptive, or aggressive behavior (Mazurek, Kanne, & Wodka, 2013; Hill et al., 2014; Soke et al., 2016). These problem behaviors often function to gain access to preferred items or caregiver attention or to escape from demands. More specifically, aggressive behaviors in children

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with ASD frequently occur to escape demands that interfere with repetitive behaviors, to access items for repetitive routines, and to avoid aversive sensory stimuli (Reese, Richman, Belmont, & Morse, 2005). Children with ASD that exhibit more atypical eating, sleeping, self-injurious behavior, aggression, and temper tantrums tend to have lower levels of expressive language, nonverbal IQ, and social skills (Dominick, Davis, Lainhart, Tager-Flusberg, & Folstein, 2007). The presence of problem behavior has also been associated with deficits in adaptive functioning, lower family quality of life, increased parental stress, and more injuries (Gardiner & Iarocci, 2015; Giovagnoli et al., 2015; Soke et al., 2016). Problem behavior can interfere with language, communication, and social skills development and prevent the acquisition of adaptive behaviors required for daily living (Gardiner & Iarocci, 2015; Mazurek et al., 2013).

Difficulties engaging in daily living skills or communicating with others will ultimately affect a child's prognosis and hinder their independence in home and school settings (Bearss, Johnson, Handen, Smith, & Scahill, 2013; Johnson et al., 2007). Interventions are warranted to target ASD symptomology in addition to the problem behavior to provide the best prognosis for these children and their families. This would involve increasing effective communication and compliance, while decreasing repetitive behaviors that may interfere with their daily functioning. Without interventions, problem behavior (e.g., aggression and self-injury) may intensify with age and become more resistant to behavioral interventions, ultimately interfering with the child's ability to benefit from other medical treatments or educational offerings (Nixon, 2002). By providing parents with the necessary skills to combat child problem behavior early on, parents are more likely to be better prepared for potential future challenges related to ASD (Hayes & Watson, 2013).

One of the most popular and widely examined interventions for problem behavior is behavioral parent training (BPT; Kazdin, 2005). BPT for problem behavior involves educating and training parents to manage and treat their child's behavior without a therapist directly intervening with the child, allowing the parents to continue to utilize the behavioral techniques in settings other than the clinical environment and after treatment ends (Steiner, Koegel, Koegel, & Ence, 2012). A number of evidence-based and efficacious BPT programs exist, including Incredible Years, Positive Parenting Program, and Parent-Child Interaction Therapy (Eyberg, Nelson, & Boggs, 2008; Kazdin, 2005). The majority of these BPT programs demonstrate positive outcomes in children with ASD (e.g., Zlomke, Jeter, & Murphy, 2017); however, the programs were originally developed for children without developmental disabilities and do not specifically target ASD symptomology, such as deficits in verbal and nonverbal communication and restricted/repetitive behaviors and interests (American Psychiatric Association, 2013). For the greatest gains, BPT programs should attempt to reduce problem behavior using function-based interventions, while simultaneously teaching functional skills and replacement behaviors to prevent the future occurrence of problem behavior and increase independence. Through targeting behavioral deficits, in addition to excessive problem behaviors, the individual will be more likely to meet personal, familial, and educational goals related to adaptive functioning and social communication (Horner, Carr, Strain, Todd, & Reed, 2002).

In an attempt to fill this void, the Research Units on Pediatric Psychopharmacology and Psychosocial Interventions (RUPP Autism Network) developed a parent-mediated manualized intervention to examine the benefits of BPT in conjunction with risperidone for problem behavior in children with ASD (RUPP Autism Network, 2007). The RUPP BPT intervention was developed within an applied behavioral framework based on the large amount of evidence for behavior analytic interventions in children with ASD (Bearss et al., 2015). The intervention consisted of 11 core sessions covering various topics such as behavioral principles, reinforcement, functional communication training, and compliance training. Additionally, up to three optional sessions and three booster sessions were offered. The first half of core sessions were designed to first teach caregivers how to reduce the frequency and severity of problem behavior using antecedent and differential reinforcement-based strategies. The second half of core sessions are designed to increase compliance and teach new skills through the use of prompting strategies. Finally, the optional sessions discussed specific issues that may not be relevant to all children, such as feeding, sleeping, toileting, and time out. In early studies examining the effectiveness of the RUPP BPT in combination with risperidone in children with ASD, parents who received the combination of BPT and medication reported greater improvements in child adaptive behaviors and problem behavior (e.g., irritability, noncompliance, aggression) as compared to those who received medication alone (Aman et al., 2009; Scahill et al., 2012). At the one-year follow up, significant differences were no longer found between the two groups in problem behavior (Arnold et al., 2012); however, parents who were in the combination BPT/medication group were more likely to seek out BPT programs and implement behavioral techniques when compared to the parents in the medication alone group.

Based on the results from the initial RUPP studies, follow-up research by the Research Units in Behavioral Intervention (RUBI) Autism Network then examined the effectiveness of the RUPP BPT program as a stand-alone intervention for problem behavior for children with ASD (Bearss et al., 2013). Bearss et al. (2013) implemented an open trial pilot study to examine the feasibility and preliminary efficacy of the intervention for parents of preschool-aged children with ASD. All parents reported feeling more confident in managing their child's behavior on the Parent Satisfaction Questionnaire (PSQ), therapist adherence to the treatment manual was high (93%), and significant reductions in parent reports of child disruptive behaviors were found (Bearss et al., 2013). Qualitative data provided guidance on needed intervention modifications for preschoolers (i.e., adding video vignettes focusing on younger children). Bearss et al. (2015) then implemented a six-site randomized controlled trial (RCT) to examine the effectiveness of the manualized intervention in a sample of 180 children between the ages of three and seven with ASD. Parents were randomized to either RUBI parent training or parent education, which covered topics related to children with ASD (i.e., evaluation, advocacy, current treatment options). Parents who received individual BPT reported increases in compliance and decreases in problem behavior as measured by parent-report on the Aberrant Behavior Checklist (ABC) and Home Situations Questionnaire (Bearss et al., 2015). Additionally, the BPT program demonstrated excellent treatment fidelity (96.7%).

Although the findings described above provide initial support for the use of the RUBI parent training manual, more research is needed to determine if the intervention is feasible and effective in community-based clinical practices (Smith et al., 2007). At the

current time, all published research on the RUBI has been conducted in university-affiliated hospitals or outpatient clinics with either a primary developer of the manual or a therapist specifically trained in the RUBI BPT program provided the intervention or closely supervised the interventionists (e.g., Bearss et al., 2015). Additionally, research should examine potential adaptations that community providers may find beneficial. For example, group-based parent training would be one cost-effective alternative that would allow providers to offer services to multiple clients simultaneously (Steiner et al., 2012). Children with ASD experience more difficulties accessing care when compared to children of other medical diagnoses and group-based services may alleviate such challenges (Tregnago & Cheak-Zamora, 2012). Moreover, research on BPT groups suggests that parents may benefit from social support of parents with similar child behavior difficulties (McAleese, Lavery, & Dyer, 2014).

The primary purpose of this study was to examine the feasibility of the RUBI BPT program when delivered as a group intervention within a community clinic. The feasibility was evaluated by therapist fidelity, parent attendance, parent adherence, and parent satisfaction. Additionally, a secondary purpose of the study was to present exploratory analyses that examined changes in disruptive behavior in children with ASD through parent-report measures of child irritability and observations of child compliance.

2. Method

2.1. Participants

Eligible participants were parents of children between the ages of two and seven years old. Children had parent-reported problem behavior and a diagnosis of ASD that was provided by a qualified health professional based on the Autism Diagnostic Interview-Revised or the Autism Diagnostic Observation Schedule (Rutter, Le Couteur, & Lord, 2003). Children were deemed eligible for treatment based on parent report of problem behavior using the Eyberg Child Behavior Inventory (ECBI) and the ABC. The child was expected to have either a 130 or greater on ECBI intensity scale or a 15 or greater on the ABC Irritability (ABC-I), which would indicate significant problem behavior. It was also required that problem behavior be manageable by one person and did not result in severe property destruction or injury. If children presented with problem behavior too significant for group parent training, necessary referrals would have been initiated. Finally, parents were excluded from the study if English was not their primary language or if the child failed to demonstrate receptive language abilities that were at least 18 months of age using the Battelle Developmental Inventory (BDI-2; Newborg, 2004).

Of the 26 families referred, 23 completed the screening appointment where inclusion criteria were evaluated. Nineteen families were identified as study eligible and were assigned to the next BPT group with available slots. Eleven of the 19 families completed post-treatment measures. Fig. 1 depicts the flow of participants from referral to the end of treatment.

2.2. Measures

2.2.1. Demographic questionnaire

Parents completed a demographic questionnaire at the initial screening appointment, which provided information regarding their

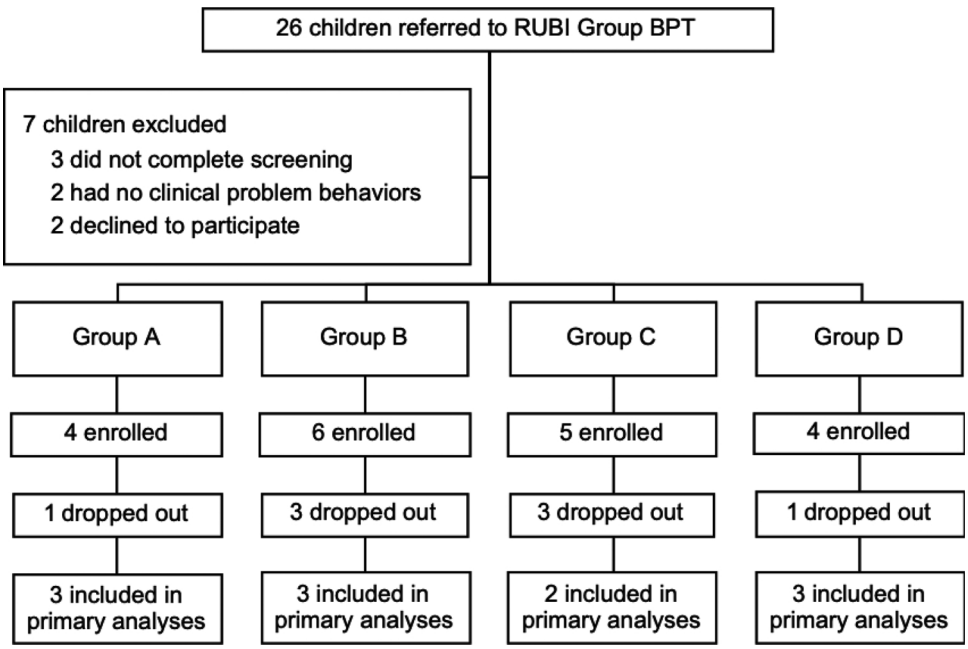

Fig. 1. Flow of Participants from Referral to Post-Treatment.

child's diagnoses, living situation, family income and make-up, parent education and occupation, and previous psychological interventions for problem behavior. The demographic questionnaire also provided information related to child medication and health conditions.

2.2.2. Parent satisfaction questionnaire

The PSQ (Bearss et al., 2013) is a measure of satisfaction developed specifically for the RUBI BPT program. The PSQ asks parents to rate their acceptableness of specific aspects of the intervention (e.g., number of treatment sessions, length of treatment sessions, problem behaviors targeted, use of video vignettes, etc.) and also includes items related to parental confidence in handling future problem behaviors, use of behavioral techniques, and likelihood of recommending the program to other parents. The questionnaire consists of 22 items. Thirteen of the items are related to program characteristics, three of the items are related to parent confidence and use of strategies, one question asks if caregivers would recommend the program, and three questions ask caregivers if they had any comments related to characteristics of the program. Parents completed the questionnaire during the post-treatment assessment session.

2.2.3. Treatment fidelity and parent objective checklist

Treatment fidelity checklists (Bearss et al., 2015; Johnson et al., 2007) included in the RUBI BPT manual were utilized for the current study to assess adherence to the protocol by therapists and parent attainment of session objectives. No modifications were made to the treatment fidelity checklists included in the treatment manual for the current study. The checklists consist of therapist goals to promote treatment adherence by ensuring clinicians cover relevant topics and techniques to reliably implement the intervention (e.g., "Introduce overall goals of parent training, session format, and requirements"). The checklists are rated on a 0–2 scale (0 = goal not met; 1 = goal partially met; 2 = goal met), which provides an overall percentage for therapist fidelity and parent skill attainment. A parent objectives section is included in each session fidelity checklist. Parent objectives included completion of assigned homework activities, participation in session role plays, and parent's ability to identify relevant targets within the treatment session. The primary therapist completed the treatment fidelity checklist as the session progressed and 40% of sessions were rated by a secondary observer.

2.3. Exploratory measures

2.3.1. Parent instruction-giving game with youngsters

The Parent Instruction-Giving Game for Youngsters (PIGGY; Hupp, Reitman, Forde, Shriver, & Kelley, 2008) is a standardized observation system of parent and child interactions. Prior to the observation, parents are oriented to a playroom with numbered pictures on the wall where each picture corresponds with an instruction. For example, if the picture is a chair, the caregiver should instruct the child to sit in the chair. Using picture prompts for parent commands allow the parent to present the demands as they would normally say them instead of modeling the demands after a therapist's vocal prompt. During the observation, a recording device says a number every 35 s that corresponds with one of the pictures on the wall. Behavioral coding during the PIGGY results in categories of: parent antecedents (e.g., command), child response (e.g., compliance), and parent consequence (e.g., warning, restate commands). Hupp and colleagues (2008) examined the psychometrics of the PIGGY and found the observational system to demonstrate high interobserver agreement for child behaviors (93–97%), parent praise (96–100%), and direct commands (99%).

The PIGGY was administered at the pretreatment assessment session following completion of baseline measurement, at the mid-treatment assessment session, and at the post-treatment assessment session. The PIGGY was coded live by the primary therapist and also by a blind independent observer through video recordings. All coders were trained in the observation system and are required to meet 80% reliability prior to conducting observations. The observations were conducted with the target child and primary parent identified who is attending BPT sessions. Inter-observer agreement was calculated for eight of the 22 available pre- and post-treatment PIGGY observations (36.36%), the total percent agreement obtained was 82.6%.

2.3.2. Aberrant behavior checklist

The ABC (Aman, Singh, Stewart, & Field, 1985) is a 58-item parent-report measure of disruptive behaviors that includes five subscales: Irritability (15 items), Withdrawal (16 items), Stereotypic Behavior (7 items), Hyperactivity (16 items), and Inappropriate Speech (4 items). Items are measured on a 4-point Likert scale (0–3), with higher scores indicative of more severe problem behavior (e.g., disrupts others, odd and bizarre behavior, disrupts group activities, etc.). In children with ASD, the ABC subscales demonstrate adequate internal consistencies (α = .77–.94) and convergent validity (Kaat, Lecavalier, & Aman, 2014).

For the current study, the ABC was administered at pre-treatment, mid-point, and post-treatment assessment sessions, and the ABC-I was used. The ABC-I was the primary effectiveness measure for the RUBI Autism Network pilot study and randomized control trial (Bearss et al., 2013, Bearss et al., 2015). The ABC-I subscale assesses the presence of problem behavior such as tantrums, aggression, and self-injury (Kaat et al., 2014).

2.4. Procedures

Prior to beginning the study, approval to recruit participants, implement the intervention, and collect data was obtained from the university-affiliated Institutional Review Board. Parents and children were recruited from special education classrooms within the county's public school system and three specialty clinics serving children with ASD. Additionally, flyers were sent out through local

parent support group emails. All parents provided written/documented informed consent. Prospective parents were required to attend a screening appointment in order to determine if the parent and child met study inclusion criteria.

Four separate BPT groups were run over the course of 15 weeks. Therapists consisted of four advanced graduate students in a psychology doctoral program, with specialized emphasis on BPT and ASD. The therapists received weekly supervision from a clinical supervisor who was a licensed clinical psychologist and doctoral level Board Certified Behavior Analyst. In addition to supervision, the participating therapists attended weekly training meetings where the session content was reviewed. The therapists followed the manualized procedures and utilized treatment fidelity checklists provided by the RUBI Autism Network treatment manual.

Each session consisted of a primary therapist and secondary therapist. The primary therapist completed treatment fidelity checklists and parent objective checklists as the group progressed through the session. The secondary therapist was available to assist in reviewing activity sheets, homework, and role plays.

2.4.1. Intervention

The current study implemented the RUBI Parent Training for Disruptive Behaviors manualized intervention (Bearss et al., 2015). The RUBI Parent Training program was developed for children diagnosed with ASD and co-occurring behavior problems and was conducted in an individual therapy format. For the current study, all core BPT sessions from the RUBI manual were provided in a group of three to six parents. The group size was determined based on space available in the clinic where services were provided and when caregivers were available at the start of treatment.

The intervention consisted of 11 core RUBI BPT sessions, one telephone booster, and two assessment sessions (14 total sessions). Optional sessions were not completed due to the specific topics discussed as this information may not be relevant to all caregivers. Additionally, only one telephone booster was conducted due to time restrictions. During the core RUBI sessions, the primary therapist read from the therapist script included in the RUBI manual (RUBI Autism Network, 2015). The content consisted of behavioral strategies and skills such as principles of behavior (i.e., antecedents and consequences), prevention techniques, reinforcement, ignoring, teaching strategies, compliance training, and functional communication training. Sessions were also included on maintenance and generalization to ensure that parents were able to continue managing child behavior following discharge from the program. The optional and home visit sessions that are included in the manual were not conducted. For detailed information and therapist scripts, refer to the RUBI manual (RUBI Autism Network, 2015). All sessions lasted between 60 and 90 min.

All session activities and discussions included in the manual were completed as a group. At the beginning of each session, caregivers shared the results from any homework or data collected at home during the previous week with the other caregivers and therapists. Additionally, the therapists asked all questions to the group, and the caregivers would answer aloud. When role plays were included in the session, the caregivers would practice with each other and the primary and secondary therapists would provide feedback. Finally, for the mid- and post-treatment assessment sessions, therapists provided feedback and coaching following the observation based on skills taught in prior sessions. Feedback included praise for skills that the caregiver implemented correctly (e.g., providing labeled praises) and areas where practice was still needed. The caregivers were also provided an opportunity to continue practicing certain skills with their child, and the therapist continued to provide feedback on the caregiver's treatment integrity. Assessment sessions were conducted with the parent and child alone and lasted between 60 and 90 min.

2.4.2. Data analytic approach

Descriptive statistics were used to describe the feasibility and acceptability of the RUBI group program. Specifically, percentages were calculated for various caregiver responses. Additionally, questions related to session topics were combined to obtain an overall satisfaction percent to determine the number of sessions found to be acceptable by caregivers. Open-ended answers were not analyzed due to the low number of caregivers who provide responses.

For exploratory efficacy analyses, a reliable change index (RCI) was calculated for the ABC-I subscale. The RCI was calculated for each participant using the standard deviation (SD = 9.7) and coefficient alpha (α = 0.92) for the ABC-I scale based on the norms (n = 1893) provided by Kaat et al. (2014). The RCI (Bauer, Lambert, & Nielsen, 2004) is calculated by dividing the client's pre- and post-test scores by the standard error of the measure based on the normative sample. An RCI greater than 1.96 indicates that the change was reliable and not a result of measurement error. Additionally, changes in child compliance, visual analysis of data from the PIGGY administration at pre- and post-treatment was conducted.

3. Results

The primary aim of the study was to evaluate the feasibility of the RUBI BPT group intervention, which includes parent attendance, parent attainment of the treatment objectives, parent acceptableness of the intervention, and treatment fidelity. Eight families dropped out of the intervention prior to completing all sessions. No significant differences were found between the treatment completers and non-completers on demographic factors, with the exception of the number of children in the home. Specifically, caregivers who had more children in their home were more likely to not complete treatment. Within the families who completed post-treatment measures (n = 11), the majority of children were white boys (64.0%), and the average age was 57.82 (SD = 19.90) months. Caregivers were mostly white mothers. In regards to education, 36.4% of the caregivers were high school graduates, 18.2% attended technical school or some college, and 27.3% were college graduates. Income was reported by nine of the 11 participants and the majority of families earned more than $40,000. It is also notable that only 44.4% (four out of nine) black participants completed treatment while 70% (seven out of 10) white participants completed treatment. Participant demographics are available in Table 1 below.

Table 1
Demographic data for children and caregivers.

	Completed Treatment (n = 11)	Dropped Out (n = 8)	p Value
Children			
Mean age (in months)	57.82 (SD = 19.9)	50.25 (SD = 21.5)	0.44
Age range (in months)	28-84	29-94	
Male (%)	9 (82.0)	4 (50.0)	0.18
Race			0.29
White (%)	7 (64.0)	3 (37.5)	
Black (%)	4 (36.0)	5 (62.5)	
Caregivers			
Mothers (%)	10 (90.9)	4 (50.0)	0.79
Race			0.29
White (%)	7 (63.6)	3 (37.5)	
Black (%)	4 (36.4)	5 (62.5)	
Education			0.83
Less than high school (%)	2 (18.2)	1 (12.5)	
High school graduate (%)	4 (36.4)	1 (12.5)	
Some college (%)	2 (18.2)	5 (62.5)	
College graduate (%)	3 (27.3)	1 (12.5)	
Marital Status			0.42
Married (%)	7 (63.7)	4 (50.0)	
Single (%)	3 (27.3)	2 (25.0)	
Divorced/Separated (%)	1 (9.09)	2 (25.0)	
Mean household income			0.74
< $20,000 (%)	1 (9.09)	4 (50.0)	
$20,000–$40,000 (%)	3 (27.3)	0 (0.00)	
$40,000–$60,000 (%)	2 (18.2)	1 (12.5)	
$60,000–$90,000 (%)	3 (27.3)	1 (12.5)	
> $90,000 (%)	0 (0.0)	1 (12.5)	
Income not reported	2 (18.2)	1 (12.5)	
Mean number of adults in home	1.91 (SD = 0.30)	1.75 (SD = 0.71)	0.57
Mean number of children in home	1.82 (SD = 0.98)	4.13 (SD = 2.42)	0.03*

Note: * indicates statistical significance ($p < 0.05$).

Of the families that completed the group and the post-treatment assessment session (n = 11), families attended 87.60% of the scheduled core BPT sessions (106 of the possible 121). On average, families attended 9.64 appointments (SD = 1.43), and appointments attended ranged between seven and 11. Eight of the 11 parents attended at least 80% of the appointments. In terms of parent attainment of treatment objectives, caregivers on average attained 86.83% (range of 63%–95%) of objectives listed in the RUBI manual. These objectives included participating in role plays, responding to therapist questions, and developing plans to practice in the home. More than half of the caregivers (63.64%) attained at least 80% of the possible parent objectives during treatment.

Parent acceptableness was calculated based on the PSQ completed at the post-treatment assessment session. The majority of caregivers (78%) rated the content of treatment sessions as “very helpful.” Most of the caregivers (91%) reported that following BPT they felt more confident with managing current target problem behaviors, and all (100%) of caregivers reported that they felt more confident in managing new problem behaviors (e.g., problem behaviors that develop in the future). The highest rated treatment session was the session on ignoring problem behavior, which 91% of the caregivers rated “very helpful.” The lowest rated treatment session was the session on behavioral principles, which was rated as “very helpful” by only 64% of the caregivers. At post-treatment, all caregivers (100%) reported that they were currently using the information learned in working with their child, and 91% of the caregivers reported that their child’s behavior improved since participating in the RUBI group BPT program. Finally, all caregivers (100%) reported that they would recommend the program to other families of children with ASD.

Therapist fidelity was calculated using the treatment fidelity checklists included in the RUBI manual. The primary therapist completed treatment fidelity checklists for all appointments during the session. Treatment fidelity ranged from 89.6% to 92.8%, with a mean fidelity of 90.1%. Additionally, a secondary observer completed treatment fidelity checklists for 40.0% of sessions, which resulted in a treatment fidelity of 89.9%.

An exploratory aim of the study was to evaluate the preliminary effectiveness of the RUBI BPT group intervention, which includes examining the effect of the intervention on child problem behavior and compliance. To examine changes in reported problem behavior, an RCI was calculated individually for all participants in an attempt to determine the number of participants who exhibited a reliable change. All but one participant demonstrated a decrease on the ABC-I; however, only five of the 11 (45.5%) participants demonstrated a reliable change in scores on the ABC-I. All participant RCIs are available in Table 2.

In addition to parent-reported disruptive behavior, pre- to post-treatment changes in child compliance to parental demands during structured observations was assessed. Overall, 8 of the 11 participants (73%) demonstrated an increase in child compliance from pre- to post-treatment. Fig. 2 provides a visual presentation of the compliance scores for all participants.

Table 2
Reliable Change Indices for the ABC-I.

Participant	% of Sessions Attended	Pre-treatment	Post-treatment	RCI
Carter	82%	23	12	2.84*
Noah	64%	29	26	0.77
Aiden	73%	43	44	−0.26
Rylen	91%	9	7	0.52
Sarah	91%	20	8	3.09*
Cameron	100%	19	15	1.03
Toby	100%	25	11	3.61*
Chris	91%	11	9	0.52
James	73%	42	36	1.55
Beau	91%	21	8	3.35*
Oliver	91%	26	13	3.35*

Note. * Indicates a clinically significant RCI (> 1.96).

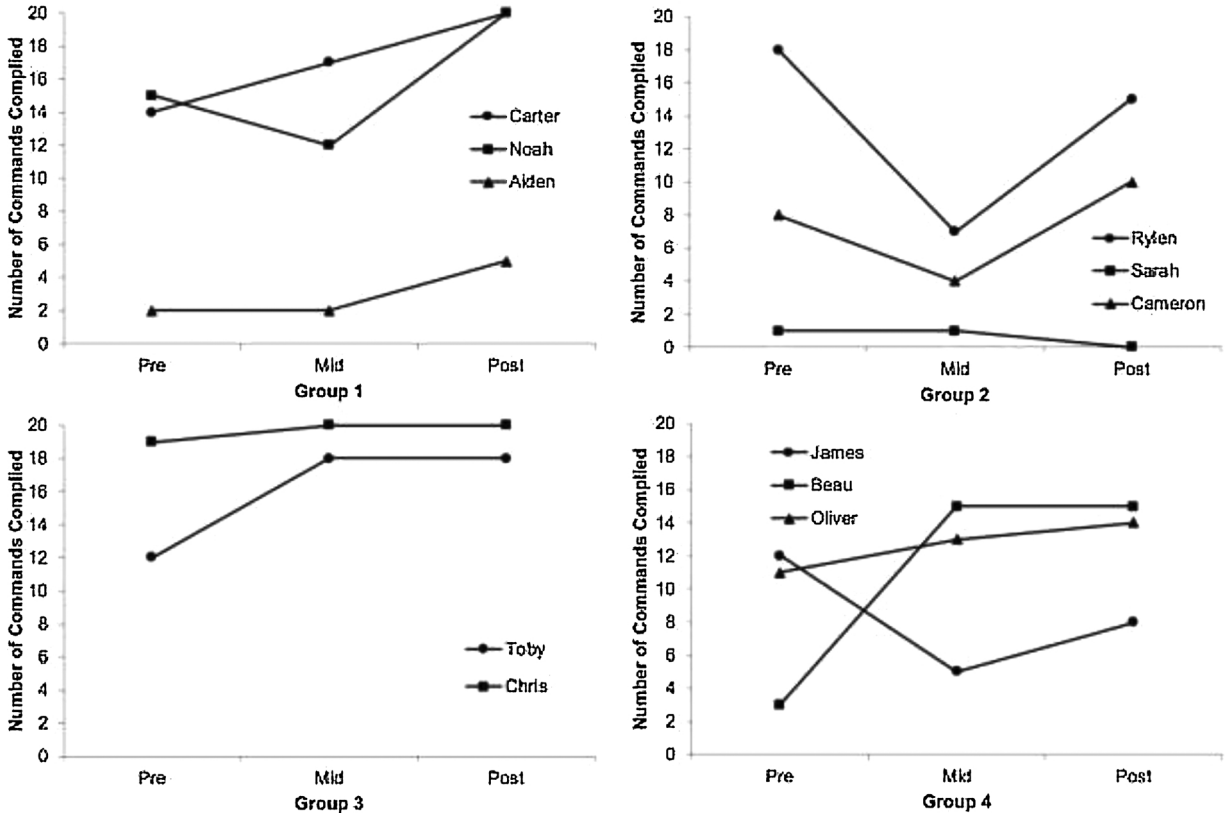

Fig. 2. Child Compliance at Pre-and Post-Treatment.

4. Discussion

The current study sought to examine the feasibility of a group adaptation of the RUBI BPT manualized intervention in 11 families of young children with ASD and co-occurring problem behaviors. A number of previous studies examined the effect of parent training in reducing problem behaviors in children with ASD; however, the RUBI BPT program is the first manualized intervention specifically developed for children with ASD that targets functional communication, adaptive skill deficits, and compliance (Bearss et al., 2015). Additionally, to the author's knowledge, this is the first study to evaluate the group adaptation of the RUBI BPT program in a community clinic. It was hypothesized that the group adaptation of the RUBI manualized intervention would be feasible to deliver and acceptable by parents. Although the feasibility and acceptability of the RUBI group BPT program was the primary aim of the current study, preliminary effectiveness data was collected utilizing both parent-report and behavioral observation measures. Overall, the findings provide support for the feasibility of a group-based RUBI BPT intervention. Parents rated 78% of the sessions as "very helpful" and attended 88% of the scheduled core BPT sessions, which is similar to those found in previous RUBI BPT research (Bearss et al., 2013, 2015). Of the enrolled participants, 58% (11 of 19) completed the program. Previous research related to attrition

during individually delivered RUBI BPT suggested that more than 88% of the participants completed the intervention (Bearss et al., 2013, 2015). However, research on group-based interventions frequently have high attrition rates with estimates as up to 70% of participants dropping out of treatment (Lees & Ronan, 2008). Similarly, estimates of attendance for group-based parent training have been reported to be as low as 40% (Reid, Webster-Stratton, & Baydar, 2004). Therefore, findings are particularly appealing, and future research should attempt to replicate the findings. Lower attendance and attrition rates may be due to the limited amount of scheduling flexibility in a group-based program. Group-based programs typically have a set day and time, which may be difficult for all caregivers to consistently attend. Moreover, if a caregiver cancels an individual session, the possibility to reschedule the appointment is more likely when compared to a group-based program. Therefore, it may be helpful for clinicians to offer more than one session per week or find ways to offer recordings of past sessions to make it easier for parents to make-up missed sessions. A recent pilot study by Bearss et al. (2017) suggests that RUBI BPT conducted through telehealth may be beneficial in reducing child problem behavior, which could be another alternative for caregivers who miss sessions. It is also of note, that the majority of caregivers who dropped out of treatment reported an income less than $20,000. This finding is consistent with past research suggesting that families of a lower socio-economic status are more likely to drop out of services (Chacko et al., 2016). Therefore, it is important to identify barriers that lead to these patterns of attrition and develop solutions that increase access to services for families of diverse socio-economic backgrounds. Parents included in the current study also met 83.63% of the parent objectives, which suggests that caregivers are able to acquire skills and knowledge in a group format as with the individualized format. The parent objectives relate to responding to therapist questions during the session, participating in role plays, and completing homework. Finally, the findings for the current study provide initial support for the implementation of the RUBI BPT manual in a consistent manner by community providers. With that said, it is necessary to more systematically evaluate the use of therapist fidelity checklists and caregiver objective checklists when the intervention is delivered to a group of parents rather than individual parents to determine if revisions are necessary.

The current study also presents exploratory data on changes in child irritability and compliance following participation in the group-based intervention. Following the intervention, 10 of the 11 parents reported reductions in irritable behavior with the ABC-I scale. Furthermore, five of the 11 parents reported reductions in irritable behaviors that were clinically significant. Reductions in the ABC-I were similar to those observed following individual RUBI PT (Bearss et al., 2013), which suggests that caregivers of children with ASD and co-occurring problem behaviors may benefit from group RUBI BPT. Furthermore, improvements in child compliance were observed during structured observations with the PIGGY for 54% of the children included in the study. This is the first known attempt to document changes in child behavior following RUBI BPT with the use of a structured observational measure. Although child compliance was the only behavior evaluated in the current study, the PIGGY may be a valuable tool for clinicians to also examine changes in caregiver behavior following the intervention. Additionally, it provides a structured observation to use prior to providing feedback to caregivers. More research is needed to determine if the PIGGY provides a feasible and effective method for evaluating the change in parent and child behavior following completion of group-based RUBI BPT. Finally, on the PSQ, the majority of caregivers (91%) reported that they saw improvements in their child's behavior since beginning the program. It would have been beneficial to conduct a post-treatment follow-up assessment to determine if children continued to show reductions in problem behavior and if parents continued to implement skills acquired in parent training. In summary, improvements in parent-reports of child behavior and child compliance to parent commands were observed for a majority of the participants. The current study replicates findings from previous research with the RUBI BPT program and extends evidence for behavior change using observational measures. While these findings are favorable, further research on the efficacy of the intervention is necessary before effectiveness can be argued. Future studies should evaluate treatment effects with a larger sample and attempt to control for extraneous factors that may interfere with findings. Finally, it may be beneficial to also assess the effects of group-based RUBI BPT on adaptive behavior and the development of new skills that result in greater independence for children.

Although the current study adds to the previous literature of intervention programs for children with ASD and co-occurring problem behaviors, it is not without its limitations. First, the current sample only includes 11 participants, which limited the number and array of statistical analyses available. Future research is necessary to extend the current findings in a larger and more diverse sample of parents and children. Second, the current study did not include a control group, and future research should attempt to evaluate the group-based intervention in a randomized control trial in a more diverse sample of children and caregivers. Third, the current study did not evaluate potential extraneous factors that could have impacted changes in child and parent behavior over the course of treatment. It may be of benefit for future researchers to evaluate this by having parents complete questionnaires each week asking about changes in caregivers, child illness, medication changes, or any other potential factors that could interfere with treatment. Fourth, the study primarily relied on parent-report measures in analyses. Although a behavioral observation system for child compliance was used, more observations are needed to make meaningful inferences regarding changes in child behavior. Future research may attempt to conduct more frequent behavior observations during the baseline period and throughout treatment for a more objective evaluation of the intervention. Additionally, there were discrepancies between changes in the ABC-I and child compliance in that some children demonstrated an increase in child compliance, but no change in irritability or vice versa. It would be beneficial to also code observed changes in child irritability rather than only relying on parent report. The observation system can also be used to track parent attainment of skills throughout treatment rather than relying on therapist ratings of parent objectives. Finally, the current study excluded children without problem behavior or without receptive communication abilities above 18 months. Future studies should attempt to evaluate the group-based RUBI BPT intervention with a variety of children, such as older children, children with receptive language abilities less than 18 months, and children of various socio-economic status. A BPT program may be useful for parents whether or not a child has problem behavior and may potentially prevent the development of problem behaviors later in life. In addition, parents of children with receptive communication less than 18 months would likely still

benefit from learning how to use behavioral procedures to teach new skills such as communication.

4.1. Implications

The current study extended and replicated previous research by providing initial evidence for the feasibility of a group-based adaptation of the RUBI BPT intervention. Additionally, data is presented on the effects of the intervention on child irritability and child compliance. Due to the increasing prevalence of children being diagnosed with ASD and the likelihood of children with ASD having problem behaviors, a highly acceptable, manualized intervention that can be implemented by a variety of practitioners is of great benefit. Previous group-based BPT interventions were primarily developed for typically developing children and later adapted for children with ASD. The RUBI BPT intervention targets behaviors specific to symptoms of ASD (i.e., communication delays) and attempts to teach parents strategies to increase their child's communication and independence.

Declaration of competing interest

All authors declare that there is are no conflicts of interest.

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