J Child Fam Stud (2016) 25:2508–2525
DOI 10.1007/s10826-016-0424-7

ORIGINAL PAPER

# Examining the Efficacy of Parent–Child Interaction Therapy with Children on the Autism Spectrum

**Joshua J. Masse[1] · Cheryl B. McNeil[2] · Stephanie Wagner[3] · Lauren B. Quetsch[2]**

Published online: 30 April 2016


**Abstract** Externalizing behaviors are a common component of the clinical presentation of autism spectrum disorders. Although traditionally used with typically-developing children, parent–child interaction therapy (PCIT) is one behaviorally-based parent training program that has demonstrated success in increasing child compliance, reducing problem behavior, and improving parent–child communication. The study examined the efficacy of PCIT as a treatment for children with autism spectrum disorders by employing a single subject, non-concurrent multiple baseline design across three subjects. Primary findings revealed increases in child compliance, reductions in child disruptive behavior, and improved parenting skills across participants. In addition, each caregiver reported high levels of satisfaction with the intervention. Results suggested that PCIT may be a treatment option for children on the autism spectrum with co-occurring behavioral difficulties. Although the non-concurrent nature of the multiple baseline design is a limitation, this study replicates and extends previous research investigating the efficacy of PCIT with children with autism and their parents.

**Keywords** Parent–child interaction therapy · Autism spectrum disorders · Externalizing behaviors · Evidence-based treatments · Community-based practice

✉ Joshua J. Masse
JMasse2@umassd.edu

[1] University of Massachusetts Dartmouth, 285 Old Westport Road, Dartmouth, MA 02747-2300, USA

[2] West Virginia University, Morgantown, WV, USA

[3] New York University Child Study Center, New York, NY, USA

## Introduction

The presence of behavioral difficulties such as aggression, irritability, and noncompliance in children with autism spectrum disorder (ASD) is widely recognized. A recent review found that approximately one in four children with ASD also meet diagnostic criteria for a disruptive behavior disorder (Kaat and Lecavalier 2013) with some reports noting that children with ASD represent up to 10 % of disruptive behavior disorder referrals (Brookman-Frazee et al. 2010). Given that untreated behavioral problems within this population can lead to impairment in classroom functioning, academic performance issues, social relationship difficulties, exacerbation of core ASD symptoms, and increased psychotropic medication use, early identification and intervention is essential in mitigating both short- and long-term negative outcomes (Butter et al. 2003).

Behavioral Parent Training (BPT) has long been recognized as an evidence-based treatment for disruptive behavior disorders (Eyberg et al. 2008). Despite the high degree of comorbidity, and the recognition that involving caregivers in skills training is a critical and beneficial component of autism treatment (Burrell and Borrego 2012; Tonge et al. 2014), BPT research examining disruptive behaviors for children with ASD is sparse (Ginn et al. 2015). Although promising programs exist (Bearss et al. 2015; Whittingham et al. 2008), very few interventions are recognized by the American Psychological Association (APA) as efficacious or possibly efficacious (McLeod et al. 2015) with this population.

Parent–child interaction therapy (PCIT; McNeil and Hembree-Kigin 2010) is an empirically-supported, short-term parent training program designed for young children ages 2–7 with disruptive behavior problems. PCIT is derived from Hanf's (1969) two-stage treatment model, social

learning theory, and attachment theory. Similar to other behavior-based parent training programs founded on Hanf's model, PCIT consists of two phases, a relationship enhancement phase [child directed interaction (CDI)] and a discipline phase [parent directed interaction (PDI)]. The two phases of PCIT are conducted in weekly 1-h sessions and both contain didactic and experiential components. Each phase of treatment begins with a didactic, in which the therapist teaches, models, and role plays the skills with the parents alone. The subsequent sessions begin with a brief check-in with the parents, in which a therapist discusses the homework from the previous week and also reviews learned skills. After the check-in, the therapist codes the parent's use of skills utilizing the Dyadic Parent–Child Interaction Coding System (DPICS: Eyberg et al. 2005) for 5 min. Using the coding data as a guide, the therapist coaches the parent in real-time to help improve skills while the parent and child play together. During the coaching, the therapist helps the parents master the skills by providing support, reinforcement, and corrective feedback.

In the first phase of treatment (CDI), parents engage in playtime with their children by following their child's lead and utilizing core "do" skills (i.e., behavior descriptions, labeled praises, reflections, imitation). Therapists coach parents to increase the use of these positive skills and to reduce the use of the "avoid skills" (i.e., commands, questions, criticism, sarcasm) during the interactions to enhance the parent–child relationship. Importantly, parents engage in selective attention by responding to appropriate behaviors using the positive skills while ignoring inappropriate behaviors (e.g., whining). After families have mastered the skills in CDI (10 of each "do" skill, less than 3 combined "avoid" skills) families move to the second phase of treatment (PDI). Throughout PDI, families continue to utilize the skills learned in CDI, however the teaching and implementation of effective commands are incorporated to work on child compliance. A script is used to teach caregivers to deliver positive reinforcement in the form of labeled praise contingent on the child's compliance to their demand and a structured timeout sequence contingent on noncompliance. PCIT is data-driven, and therefore, is highly individualized for each family. Families only progress to PDI when parents have demonstrated mastery of the CDI skills. Families only complete treatment after mastering PDI skills.

PCIT has been shown to improve parent–child relationships, reduce problem behavior, and increase child compliance (Zisser and Eyberg 2010). In addition, reductions in child externalizing behaviors in the clinic, home, and school environments as assessed by teacher report, parent report, and behavioral observations (Eisenstadt et al. 1993) have been noted. Further, gains last for up to 6 years following treatment (Hood and Eyberg 2003).

Elements of PCIT are aligned with what Smith and Iadarola (2015) refer to in their comprehensive literature review of ASD treatments as "best practices that should be incorporated into any services offered to children with ASD" (p. 914). First, the importance of family involvement to ensure consistency across settings is emphasized. A major component of PCIT is the integration of caregivers in the intervention process. Research has shown that treatment for children with ASD may be more effective when direct family members are actively involved in comparison to solely interventionists (Burrell and Borrego 2012; Ingersoll and Dvortcsak 2006; Smith and Iadarola 2015). PCIT trains parents to assume leadership in shaping their child's behavior and therefore trains parents to a mastery level in each component of treatment. Like some autism-specific treatments (e.g., Greenspan and Wieder 2006), PCIT emphasizes one-on-one parent–child interaction maintaining focus on the child, following their lead and creating rewarding and enriching interactions between the child and caregiver. By increasing parental involvement, skills learned within a clinic are then generalized to other settings such as the home and public environments.

Smith and Iadarola (2015) identified increasing child engagement by utilizing positive reinforcement and introducing preferred interests, activities, and objects into the treatment setting as a best practice. One of the fundamental tenets of PCIT is to employ positive social reinforcement to increase prosocial behaviors. Also, similar to Pivotal Response Training (Koegel et al. 2003), PCIT emphasizes the importance of using familiar play objects in a comfortable environment by encouraging parents to use their skills at home on a consistent basis with preferred stimuli. This is done in an effort to promote generalization and encourage positive parent–child interaction.

PCIT not only stresses the importance of family involvement through enriched parent–child interactions with preferred activities, but also contains an intensive compliance-training component (i.e., command-consequence sequence in PDI). Child compliance is a pivotal skill needed for the milieu of ASD services (e.g., speech and occupational therapy) to be successful (Masse et al. 2007).

In sum, as research has shown, some shared core components of BPT programs such as PCIT and ASD-focused approaches result in large effects on outcomes with children with ASD. These include caregiver involvement, behavioral-based techniques grounded in learning principles, a focus on improving communication, teaching appropriate play and social skills (e.g., imitation, turn taking), and skill building in a natural setting (Agazzi et al. 2013; Horner et al. 2002; Masse et al. 2007; Rogers and Vismara 2008).

Although PCIT research has historically excluded children with ASD, a necessary shift has occurred as community-based PCIT-trained outpatient clinicians seek an affordable, short-term clinical solution for the growing number of children with ASD presenting for treatment of disruptive behavior. Although proven treatments for ASD exist (e.g., Lovaas' ABA approach; Rogers and Vismara 2008), they are oftentimes unavailable, too intensive (e.g., home-based wraparound) or costly for families, namely those who are low-resourced (Ginn et al. 2015). Preliminary findings examining PCIT with children on the autism spectrum demonstrated a decrease in externalizing behaviors, an increase in positive parenting skills, and improved child adaptability (Agazzi et al. 2013; Hatamzadeh et al. 2010; Lesack et al. 2014; Solomon et al. 2008). In a randomized controlled trial, Ginn et al. (2015) compared 30 mother–child dyads for children diagnosed with ASD (ages 3–7) on a number of parent- and child-outcomes after receiving eight sessions of CDI training. Families receiving the CDI training experienced reductions in child disruptive behaviors, and improvements in social awareness and maternal stress as it related to child behavior issues compared to families on a waitlist. It is worth noting that level of externalizing behavior and non-compliance rates was not targeted as inclusion criteria for the study. As such, only 63 % of the sample had significant behavioral challenges. Overall, Ginn et al. demonstrated a strong argument for utilizing PCIT for children with ASD and the possibility of expanding the treatment (i.e., including both phases) to target children meeting criteria for both disruptive behavior disorders and ASD.

The increase in the diagnostic rate for children with ASD (Centers for Disease Control 2012), the number of children with ASD presenting to clinics with behavioral difficulties, limited treatment alternatives, and promising preliminary research, have raised the question of whether PCIT is a viable therapy to increase compliance and reduce disruptive behaviors with the ASD child population. The primary aim of this study was to extend PCIT research (Ginn et al. 2015) by assessing a full PCIT protocol (i.e., both CDI and PDI) and determining whether PCIT is an effective treatment for families with children on the autism spectrum with co-occurring behavioral difficulties by employing a non-concurrent multiple baseline design across three subjects. It was hypothesized that, relative to baseline levels, data would show (a) an increase in child compliance rates, (b) a decrease in parent report of oppositional behavior, (c) an observable increase in positive parenting behaviors, and (d) a high level of treatment satisfaction. Secondary hypotheses included improvement in behaviors consistent with ASD, as measured by the Autism Behavior Checklist and Childhood Autism Rating Scale. We hypothesized that treatment effects would maintain at 3 month follow-up.

## Method

### Participants

Participants were recruited from community referrals (e.g., schools, clinicians) in a rural university town. Inclusion criteria for the study were as follows: (a) child was between the ages of 2 and 7, (b) participating caregiver was the primary caregiver and legal guardian of the child, (c) child was previously diagnosed with ASD by a comprehensive multidisciplinary assessment and was identified by a teacher or mental health professional as having significant compliance issues, and (d) child had receptive language skills greater than 24 months (as assessed by the Peabody Picture Vocabulary Test-III; Dunn and Dunn 1997). Referred families were excluded from participation if (a) there was a known history of psychosis or organic brain damage for the caregiver or child, (b) the caregiver-child dyad was non-English-speaking, (c) scores on the Childhood Autism Rating Scale were 29 or lower (CARS; Schopler et al. 1988), (d) scores on the Autism Behavior Checklist were 43 or lower (ABC; Krug et al. 1980), or (e) Compliance Test scores were equal to or above an average of 60 % across 3 consecutive baseline sessions. As participants met selection criteria, they were admitted into the study. A total of 5 families was recruited for the study. Three families completed treatment after two families were excluded: one for receptive language difficulties resulting in the inability to understand the Compliance Test directions and the other for an average Compliance Test score of 95 % following three baseline sessions. The following is a description of each child and family. Names and identifying information have been changed to protect client confidentiality. Table 1 presents an overview of the screening measures scores as well as a parent description of behavioral difficulties.

#### *Kenneth*

Kenneth was a 3-year-old Caucasian male who participated in the study with his 38-year-old father. Kenneth was referred to the study by a local clinic specializing in developmental disabilities. Kenneth reached his developmental milestones within normal limits up until 18 months of age, when he began to regress. At that time, he was diagnosed with autism at a nationally-recognized center for the assessment and treatment of pervasive developmental disorders. Since the diagnosis, Kenneth received speech,

**Table 1** Descriptive screening data for study participants

| | Kenneth | Adam | Christopher |
|---|---|---|---|
| Age | 3 | 4 | 4 |
| ECBI[a] | | | |
| Intensity | 131 | 181 | 178 |
| Problem | 10 | 27 | 26 |
| WPPSI full IQ | 120 | 107 | 58 |
| ABC | 91 | 85 | 112 |
| CARS | 33 | 41.5 | 44 |
| PPVT | 104 | 127 | 82 |
| Parent description | Aggressive, noncompliant, social difficulties | Noncompliant, frequent elopement | Noncompliant, aggressive, frequent and intense tantrums |

*ECBI* Eyberg Child Behavior Inventory, *WPPSI* Wechsler Preshool and Primary Scale of Intelligence, *ABC* Autistic Behavior Checklist, *CARS* Childhood Autism Rating Scale, *PPVT* Peabody Picture Vocabulary Test

[a] Score represents average across baseline sessions

occupational, and physical therapy which continued intermittently throughout the study. He lived at home with his biological parents.

At the time of intake, Kenneth's father reported several behavioral concerns including physical aggression toward parents and peers (e.g., hitting, kicking, biting), consistent noncompliance to requests at home and school, difficulty focusing for long periods of time, and a high level of activity throughout the day that was described as more frequent and intense than similar-aged children. During the baseline sessions, Kenneth was observed becoming physically aggressive with his father. This behavior was typically in the context of being asked to comply with a task demand (e.g., shouting "no" while kicking his father in the legs). There was concern that Kenneth would be expelled from daycare as a result of aggressive behavior toward other children. In addition, due to his frequent aggression, Kenneth demonstrated difficulties with establishing relationships and was experiencing peer rejection.

### *Adam*

Adam was a 4-year-old Caucasian male who participated in the study with his 39-year-old biological mother. Adam was referred by a specialized education program at a local elementary school. He was diagnosed with autism at 19 months at a university-based medical center and received speech therapy, occupational therapy, and physical therapy prior to study initiation. At intake, Adam no longer received services but had recently been placed in a specialized education classroom for children with developmental delays. Adam lived with his biological mother.

At intake, Adam was having behavioral difficulties at both home and school. He was often argumentative and defiant to requests from his mother and school staff, refusing to obey until threatened with punishment. He engaged in risky behaviors such as running away from adults in public places (e.g., playground, parking lots, stores). He was aggressive toward siblings and peers (e.g., observed throwing a large ball at classmate without provocation). It was reported that he was easily distracted and had difficulty sustaining attention for short periods of time, often interrupted, and constantly sought attention. Occasionally, he destroyed toys or objects. During baseline sessions, Adam displayed a frequent amount of off-task and noncompliant behavior (e.g., looking in the one-way mirror, running around room screaming, flipping light switch on/off, dumping all the toys out of their containers and throwing them, trying to elope from the room).

### *Christopher*

Christopher was a 4-year-old Caucasian male who participated in the study with his 25-year-old biological mother. Christopher was referred by a specialized educational program at a community school. He was diagnosed with autism at 18 months at a university-based medical center for developmental disabilities. At the time of study, he was receiving in-home occupational and physical therapy which continued throughout treatment. He exhibited significant expressive language delays, immediate echolalia, and several self-stimulatory behaviors (e.g., rocking, hand flapping). Christopher lived with his biological parents.

Behaviorally, Christopher's mother reported that he was defiant and often would not comply with demands at home, in school, and with interventionists. He often refused to eat food presented. In addition, he frequently cried and yelled and would become physically aggressive toward his

parents and other objects (e.g., the wall). During the baseline sessions, Christopher often wandered around the room and was generally non-compliant with his mother's requests. He was frequently off-task, engaging in other activities of his preference (e.g., playing with stuffed animals by himself).

## Procedures

The study was approved by a university's Institutional Review Board. A non-concurrent multiple staggered baseline design across subjects was used to measure child compliance as measured by the Compliance Test. Prior to the study, a minimum number of baseline sessions (i.e., either 3, 4, or 5 sessions) were randomly assigned to family #1 (Kenneth; 3 minimum baseline sessions), family #2 (Adam; 5 minimum baseline sessions), and family #3 (Christopher; 4 minimum baseline sessions, needed 6 to attain downward trend). Treatment commenced after the baseline criteria were met as defined as either a downward or stable overall trend. Post-treatment data were gathered at approximately 1 week following the graduation session. Follow-up data were collected at 12 weeks post-treatment for Kenneth and Christopher and at 10-weeks post-treatment for Adam.

## Treatment

Treatment followed the standard clinic-based PCIT protocol (Eyberg and Pincus 1999) with the exception that the sessions took place in the home setting. Due to the change in setting, some adaptations from the clinic-based protocol were necessary to properly implement the treatment. As Eyberg (2005) points out, "treatment adaptations refer to changes in the structure or content of established treatments. Adaptations are typically made when aspects of the standard treatment are not feasible or sufficient in the new population" (p. 200). For this study, instead of using a bug-in-the-ear device to coach parents from behind a one-way mirror, therapists coached parents in an in-room format. During coaching sessions, the therapist sat behind the caregiver and quietly provided feedback to the parent or presented parents with written coaching statements, namely during the PDI phase so as to keep the parent in charge of the discipline sequence-versus the child potentially complying to the therapist's overheard instructions to the parent. In addition, children were instructed to ignore the therapists while the therapists did not give attention to child advances. Preliminary research suggests that in-room coaching is an effective substitute to the traditional bug-in-the-ear method (Rayfield and Sobel 2000; Ware et al. 2008). With the exception of coding and coaching in the room, there were no other adaptations or modifications to the details of the manual. The core components (e.g., coding to mastery, active coaching, homework assignment, CDI phase preceding PDI phase) of PCIT were maintained. See Masse and McNeil (2008) for a more comprehensive review of clinical considerations around home-based PCIT while maintaining fidelity to the treatment protocol.

Two therapists provided the treatment to each of the families. The therapists included two clinical child psychology graduate students with former experience conducting PCIT. Therapists met on a weekly basis with a licensed clinical psychologist with extensive background administering and training PCIT. A co-therapist observed and independently completed integrity checklists for 57 % of all the therapy sessions. Treatment integrity scores were averaged across each client's sessions and ranged from 97 to 98.5 %.

The two phases of PCIT, child-directed interaction (CDI) and parent-directed interaction (PDI), were conducted in twice weekly 1-h sessions consisting of didactic and experiential components. Each phase of treatment began with a didactic, in which the therapist taught, modeled, and role played the skills with the parents alone. The subsequent sessions began with a brief check-in with the parents regarding the previous week's homework and learned skills. After the check-in, the therapist coached the parent to help improve their skills while the parent and child played together. During coaching, the therapist helped the parents master the skills by providing support, reinforcement, and corrective feedback. PCIT progressed per treatment parameters with CDI mastery required to move into PDI and graduation criteria prior to treatment completion (see Eyberg and Funderburk 2011 for complete treatment guidelines). Length of treatment ranged from 16 to 21 sessions which is slightly longer than the average length of treatment for studies examining PCIT for children with externalizing behavior disorders (Brinkmeyer and Eyberg 2003; Eisenstadt et al. 1993).

## Measures

### *Autism Behavior Checklist (ABC; Krug et al. 1980)*

The ABC is a 57-item assessment devised to measure behaviors indicative of ASD. The ABC is independently completed by a parent. Studies have shown a cutoff score of 44 demonstrates strong construct validity (Wadden et al. 1991). Krug et al. (1980) also demonstrated split-half reliabilities of .87 for the total score. The internal consistency of items has been shown to be strong (Sturmey et al. 1992). The ABC was completed by the parent at pre-treatment as a screening measure, post-treatment, and follow-up.

*The Compliance Test (Roberts and Powers 1988)*

The Compliance Test is designed to assess child compliance rate to parental demands. Brumfield and Roberts (1998) assert that the measure has consistently shown strong inter-rater reliability coefficients (97 % average across studies) and high internal consistency (Kuder Richardson 20 = .99).

In giving the assessment, a parent was coached to administer 10 two-step motor tasks (i.e., 20 instructions) to pick up particular toys and place them in specific containers. For example, the parent directed the child to "please pick up this red block" followed by "please put the red block into the school bus." The verbal directions were accompanied by a physical gesture (i.e., pointing to the specific object). The sequence of the directions as well as the particular toys and containers used in the assessment were standardized across administrations. Therapists gave the parent a series of index cards, one at a time, which contained a specific script for the command. In addition, the therapist cleared the play area after each command. The parent waited 5 s for compliance and then was coached to give another command regardless of child compliance. Compliance was coded if the child initiated a continuous motor movement within 5 s that terminated in grasping the object or complying with the command. Noncompliance was coded if the child failed to initiate within 5 s or if the child initiated, but discontinued after 5-s without grasping the object or completing the command. Compliance rate (%) was determined by the number of compliant responses divided by the number of instructions given (i.e. frequency of compliance/30).

The Compliance Test was modified to include an additional 10 instructions (i.e., 30 overall instructions) from the Compliance Probability Questionnaire-Academic Version (Ducharme and DiAdamo 2005) in an effort to prevent ceiling effects that may occur due to the potential ease of the play commands and to increase ecological validity.

The Compliance Test was used in determining baseline criteria and as the primary dependent variable in the study. The Compliance Test was administered at the outset of each baseline and treatment session. Behavior observations and coding were conducted in vivo with inter-rater reliability ranging from .94 to .96 and being attained for 57 % of the observations.

*Childhood Autism Rating Scale (CARS; Schopler et al. 1988)*

The CARS is a 15-item behavior rating scale based on direct behavior observation or interview. Observers rate child behavior on 14 general dimensions indicative of ASD (e.g., verbal communication, adaptation to change, etc.) plus an overall "impression of autism" dimension. Research has found a 1 year test–retest correlation of .88 (Eaves and Milner 1993). Additionally, the CARS has a criterion-related validity correlation of .84, indicating the assessment is stable over time and has high validity when compared to criterion ratings (Eaves and Milner 1993). The CARS was administered in an observation format at pre-treatment as a screening measure, post-treatment, and follow-up.

The CARS was administered by two graduate students and an undergraduate student. The observers underwent a training consisting of quizzes and videotape review. Observer scores were within six points (e.g., one and a half standard deviations; Perry et al. 2005) of each other at each assessment point of the study.

*Dyadic Parent–Child Interaction Coding System-III (DPICS-III; Eyberg et al. 2005)*

The Dyadic Parent–Child Interaction Coding System (DPICS) is a behavioral observation system designed to assess particular features of parent–child social interactions. The DPICS-III was the most up-to-date version of the coding system at the time of the research study. The psychometric properties of the DPICS has been studied extensively (see Eyberg et al. 2005 for an overview) and normative data are available (Eyberg et al. 1994). Reliability and validity studies of the DPICS during live coding situations have demonstrated adequate results (Bessmer and Eyberg 1993). Categories coded for this study included parenting "Do Skills" (labeled praises, behavioral descriptions, reflections) and "Don't Skills" (questions, commands, criticism, sarcasm). Child compliance to parental commands was also coded at pre-treatment, PDI sessions, post-treatment, and follow-up. Clean-up was coded at pre-treatment, post-treatment, and follow-up. Frequency counts of each of the "do" and "don't" skills were gathered in a 5-min observation period at the outset of each session. Mastery was reached when a parent attained 10 labeled praises, 10 behavioral descriptions, 10 reflections, and less than 3 "don't" skills combined during the 5-min coding period. All coding was conducted live.

Three doctoral level graduate students and one undergraduate student were trained to code parent–child observations using the DPICS-III. Training included a series of didactics, homework assignments, and evaluations. After the training, the raters coded live or videotaped interactions. Coders were considered reliable after attaining an agreement of .75 kappa for each of the dependent variables on three consecutive observations. Inter-rater agreement was attained for 55 % of the study observations. Kappas were calculated for each DPICS-III code used as a dependent variable and ranged from .73 to .98.

*Eyberg Child Behavior Inventory (ECBI; Eyberg and Pincus 1999; Eyberg and Ross 1978)*

The ECBI is a parent-report assessment that examines disruptive behaviors of children between the ages of 2 and 16. The measure is made up of 36 items that characterize specific problem behaviors for children with externalizing behavior disorders. Parents rate the frequency of behavior on a scale of 1 (*never*) to 7 (*always*), producing an Intensity Score. In addition, parents report whether the behavior is a problem (i.e., *yes* or *no*), yielding a Problem Score. The clinical cutoff scores are 131 for the Intensity Score and 15 for the Problem Score (Eyberg and Pincus 1999). Per PCIT treatment guidelines, criterion for treatment completion was an Intensity Score at or below 114. Several studies have shown the ECBI to be a reliable and valid measure in assessing problem behavior and also sensitive to behavior change at post-treatment (e.g., Boggs et al. 1990; Eyberg and Ross 1978). The ECBI was completed at pre-treatment, at each session, post-treatment, and follow-up.

*Peabody Picture Vocabulary Test—Third Edition (PPVT-III; Dunn and Dunn 1997)*

The PPVT-III is an interviewer-based vocabulary test assessing receptive language skills and the child's age equivalence. The PPVT-III has been used extensively in clinical and research settings and has shown strong psychometric properties. Dunn and Dunn (1997) showed high internal consistency (Cronbach's Alpha ranging from .92. to .98; split half reliability ranging from .86 to .97) and solid test–retest coefficients ranging from .91 to .94. The PPVT-III was administered at pre-treatment to screen for eligibility. A score of >24 months was required for study qualification.

*Therapy Attitude Inventory (TAI; Eyberg 1993)*

The TAI is a 10-question measure containing items on a 5-point Likert scale. Higher scores represent higher levels of caregiver satisfaction. Specific items ask parents to rate various components of the treatment including change in a child's problem behavior, confidence in implementing intervention components, and general impressions of the treatment. Studies have shown strong validity and reliability for the TAI (Eisenstadt et al. 1993; Eyberg and Matarazzo 1980). Specifically, the TAI demonstrated high internal consistency (Cronbach's alpha = .91) and test–retest reliability coefficient ($r = .85$; Brestan et al. 1999). The TAI was administered at post-treatment and follow-up.

*Wechsler Preschool and Primary Scale of Intelligence-Third Edition (WPPSI-III; Wechsler 2002)*

The WPPSI-III is an interview-based series of 12 individual subtests (e.g. block design, picture concepts, word reasoning, etc.) designed to assess the cognitive ability of young children ages 2 years, 6 months to 7 years, 3 months. The WPPSI-III provides a general index of verbal and performance ability as well as an overall index of intelligence. The WPPSI-III has been standardized and normed on large samples and contains adequate psychometric properties (see Wechsler 2002 for a more detailed description). The core subtests of the WPPSI-III was administered at pre-treatment for descriptive purposes.

## Results

The study hypothesized that child compliance rates would increase over the course of treatment, relative to baseline levels. As displayed in Fig. 1, the hypothesis was supported for 2 of 3 study participants. For Kenneth, compliance rate across baseline sessions was relatively low ranging from 17 to 30 % and a phase mean of 25.67 %. There was an increase across the CDI phase with a phase mean of 36 % and a noticeable upward shift in compliance during the PDI phase with rates ranging from 47 to 80 % and phase mean of 60.88 %. Compliance rate at post-treatment was 77 and 100 % at follow-up.

For Adam, low levels of compliance were demonstrated during the baseline phase with an average percentage of .75 % across 5 sessions. During the CDI phase of treatment, compliance percentage increased considerably to a phase mean of 56 %. During PDI, compliance percentages were variable throughout the phase ranging from 7 to 93 % with an overall phase mean of 51 %. Compliance rate at post-treatment was 60 % and decreased at follow-up to 37 %.

For Christopher, the phase mean for the baseline sessions was 33.83 %. Compliance rates through CDI remained generally consistent with baseline with a range between 33 and 40 % and a phase mean of 34.40 %. There was considerable variability in compliance during PDI with rates ranging from 3 to 43 % and a phase mean of 15.78 %. Compliance rate at post-treatment was 17 % with a considerable increase at follow-up to 70 %.

As shown in Fig. 2, child compliance rates during PDI sessions, as measured by the DPICS-III, increased at a rate similar to that seen in other PCIT studies. Aggregate compliance rates across PDI sessions showed a 34 % increase at post-treatment relative to baseline and a 40 %

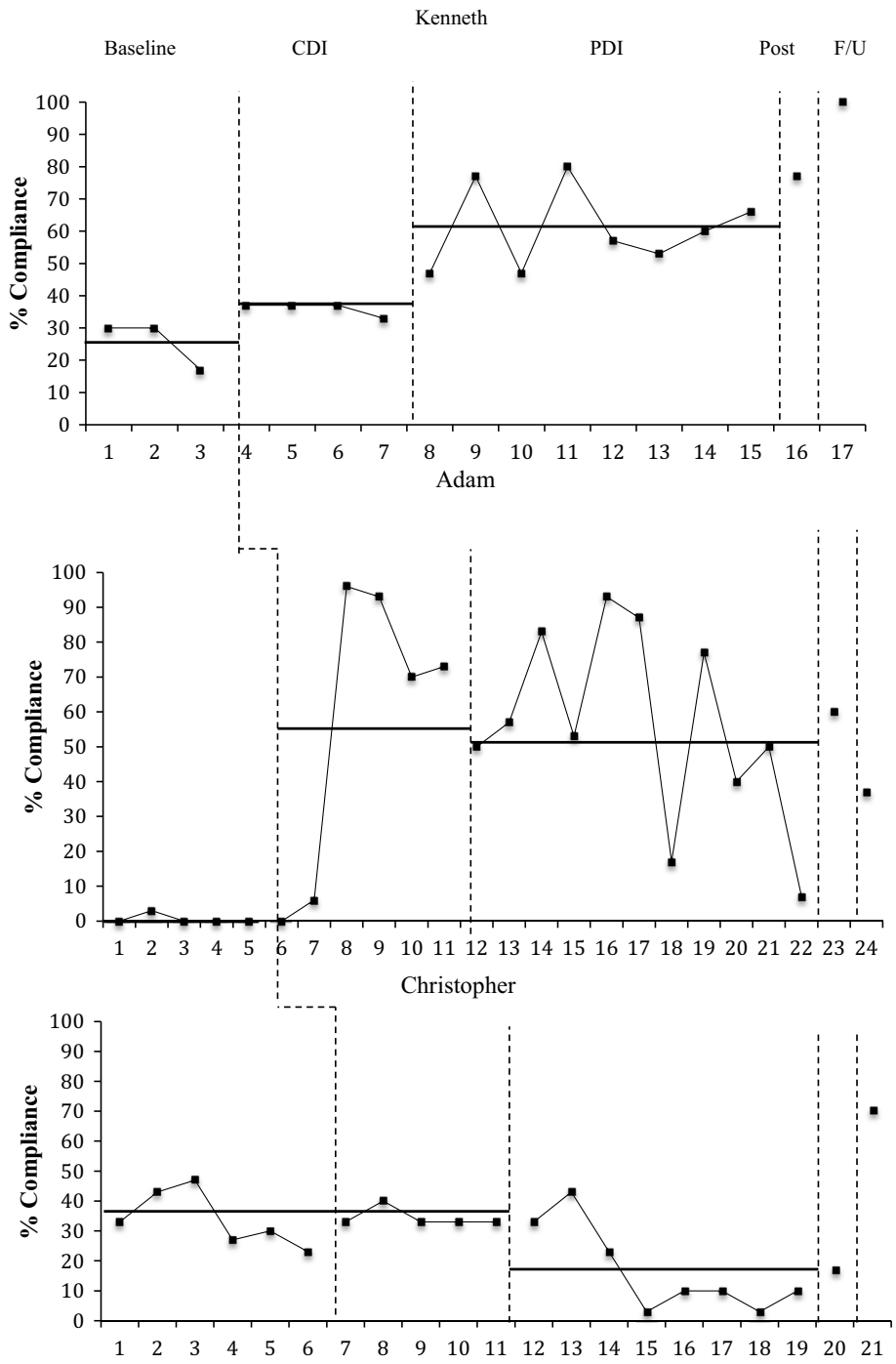


**Fig. 1** Compliance Test percentage exhibited by participants with *horizontal lines* indicating phase mean

increase at follow-up. Similarly, as shown in Fig. 3, average data from clean-up observations revealed a 56 % increase from baseline at post-treatment and a 70 % increase at follow-up.

ECBI intensity scores are displayed in Fig. 4 and demonstrated pre-treatment scores in the clinical range with post-treatment scores all below the clinical cutoff. Adam's and Christopher's intensity scores demonstrated a gradual decrease across treatment sessions. Kenneth's intensity score showed a gradual increase during CDI perhaps as a result of his caregiver better recognizing behavior problems. Christopher's intensity score increased at follow-up to clinically significant levels. It is important to note that new stressors developed for Christopher's

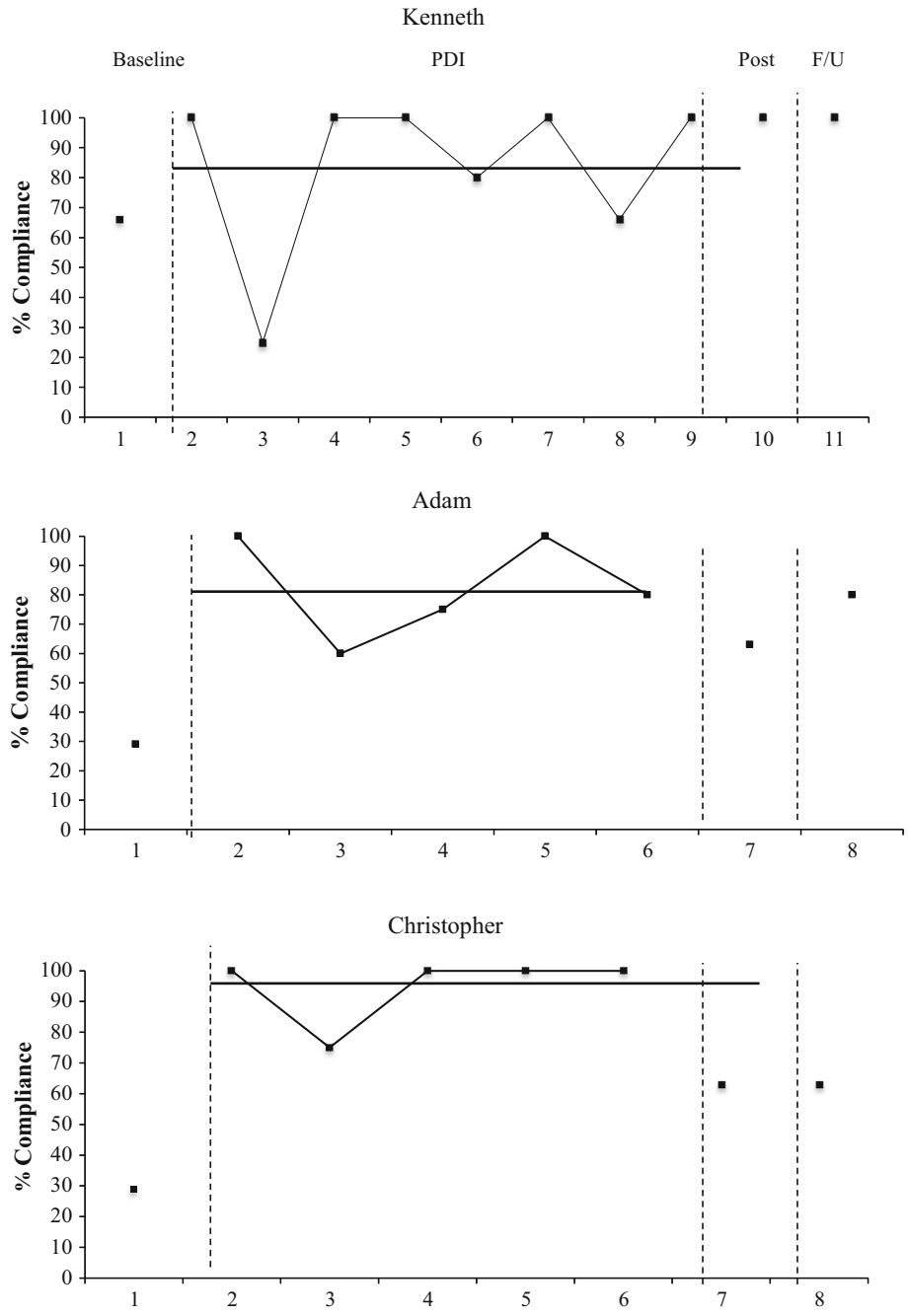


**Fig. 2** PDI compliance percentage exhibited by participants with *horizontal lines* indicating phase mean

family between post-treatment and follow-up as his mother became ill. As such, additional stressors may have potentially impacted the results.

ECBI problems scores demonstrated a gradual decline from pre-treatment to post-treatment across participants closely aligning with the intensity scores. For Kenneth, scores across baseline and CDI remained generally stable with an average of 11.71. Scores across PDI sessions gradually decreased across sessions with an average of 5.88. Problem scores dropped to 0 at post-treatment and follow-up. For Adam, scores were stable throughout baseline with a mean of 26.75, reduced in CDI with an average of 24.40 and decreased to 19.85 in PDI. Scores maintained below clinical cutoff at post-treatment (6) and follow-up (8). For Christopher, baseline scores were an average of 27.67. After CDI implementation, scores demonstrated a downward trend with an average of 19.6 and continued to decrease during PDI with an average score of 13.14. At post-treatment and follow-up, scores maintained at 6 and 11, respectively.

Figure 5 shows caregiver parenting behaviors. As hypothesized, positive parenting behavior increased across

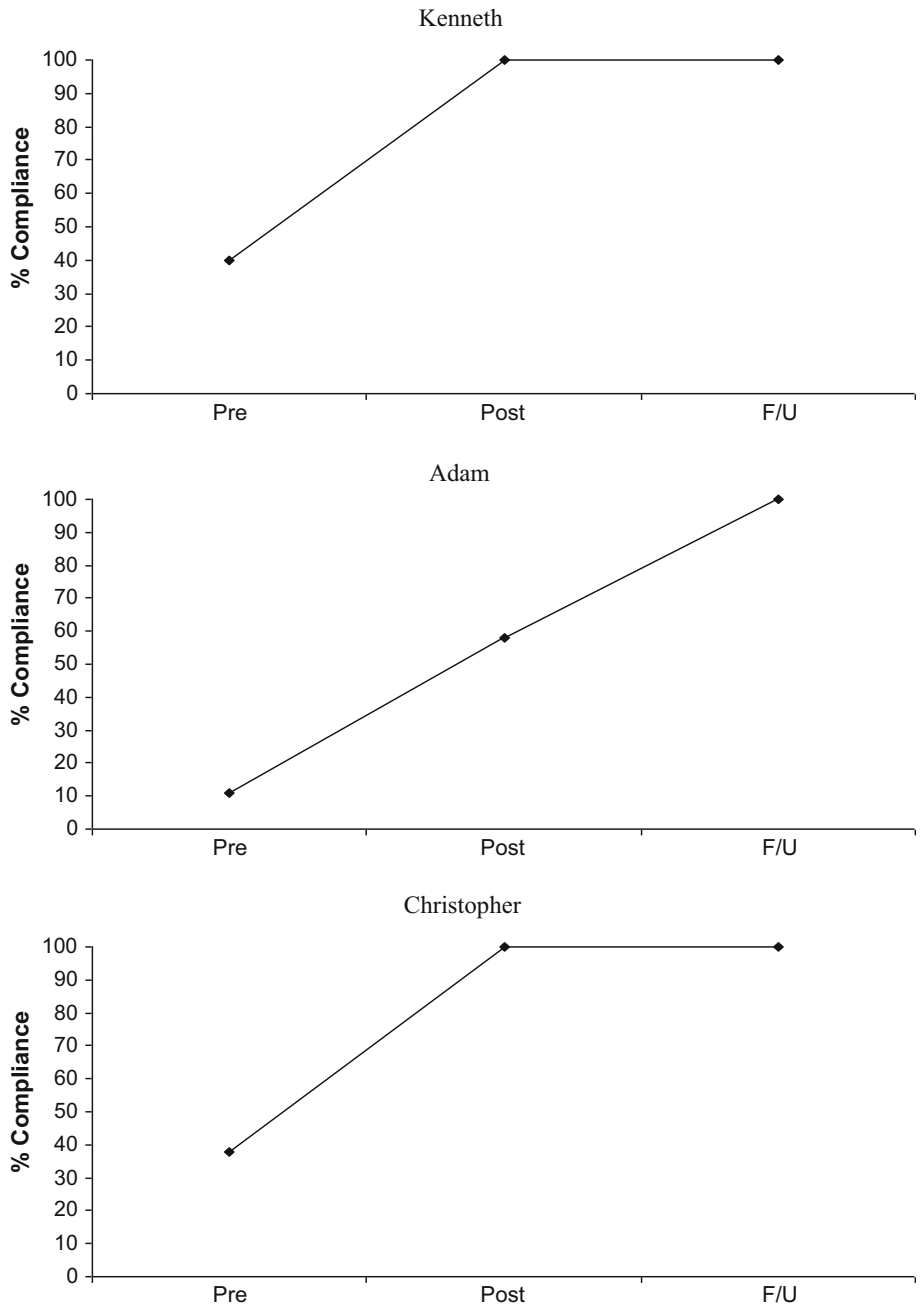


**Fig. 3** Clean-up task compliance percentage across participants

all three families. For each dyad, there were not any positive behaviors demonstrated at pre-treatment observation. At post-treatment, an average of 34.6 behaviors were observed with a high level of skill use. These numbers maintained at follow-up with 31.6 behaviors observed.

Consumer satisfaction was reported at high levels for all three families. Post-treatment TAI scores were an average of 44.6 while follow-up scores were an average of 43 out of 50.

Secondary analyses examined the impact of PCIT on autism-related behaviors. Each participant's scores on the ABC demonstrated a downward trend across treatment phases with all scores remaining above clinical cutoff (i.e., 44). Kenneth's pre-treatment CARS score of 33 was in the mild-moderate range whereas post-treatment score of 26 and follow-up score of 24.5 were both in the non-autistic range. Adam's pre-treatment CARS score was a 41.5 placing him in the severely autistic range. At post-treatment, the average score was a 31 indicating mild-moderate autistic behavior with a follow-up score of 32 which is also in the mild-moderate range. Christopher's CARS remained fairly even with each score falling in the mild-moderate autistic range. Specifically, Christopher's

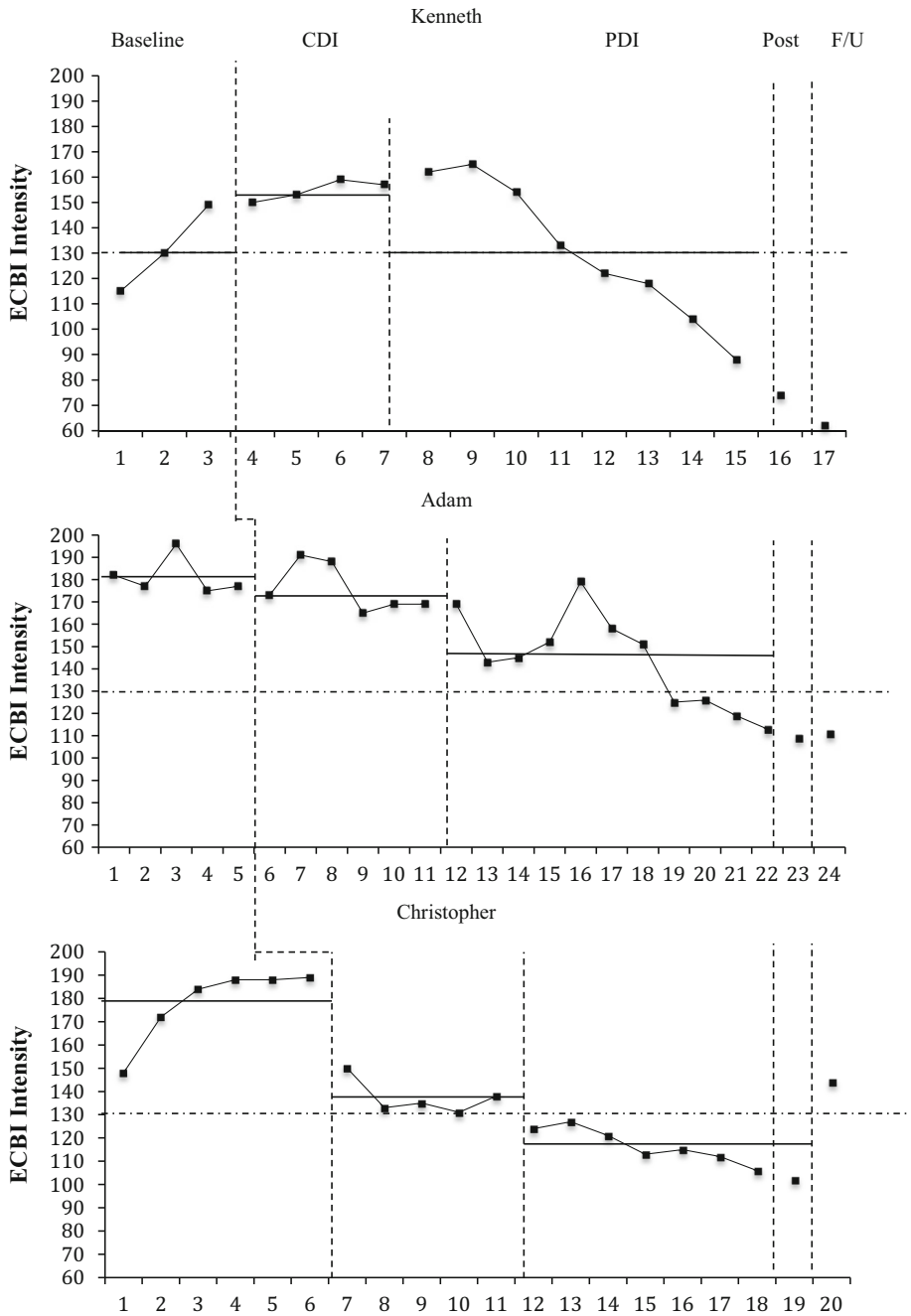


**Fig. 4** ECBI intensity scores reported by caregivers with *horizontal lines* indicating phase mean and *dashed horizontal line* indicting clinical cutoff

data demonstrated a pre-treatment score of 44, a post-treatment score of 42, and follow-up score of 38.

## Discussion

This study sought to replicate previous research examining the efficacy of PCIT with children on the autism spectrum with co-occurring behavioral difficulties (Ginn et al. 2015) while expanding the findings to determine outcomes from a full PCIT protocol (i.e., utilizing both CDI and PDI). The findings of the study serve as further evidence indicating efficacy of PCIT with this specialized population across a number of domains. Specifically, results showed improved compliance in 2 of 3 of the participants on a compliance task and a marked improvement across each participant on a natural compliance task. Also, a reduction in problem behaviors across all three participants as well as an increase in caregiver use of positive communication ("do") skills was

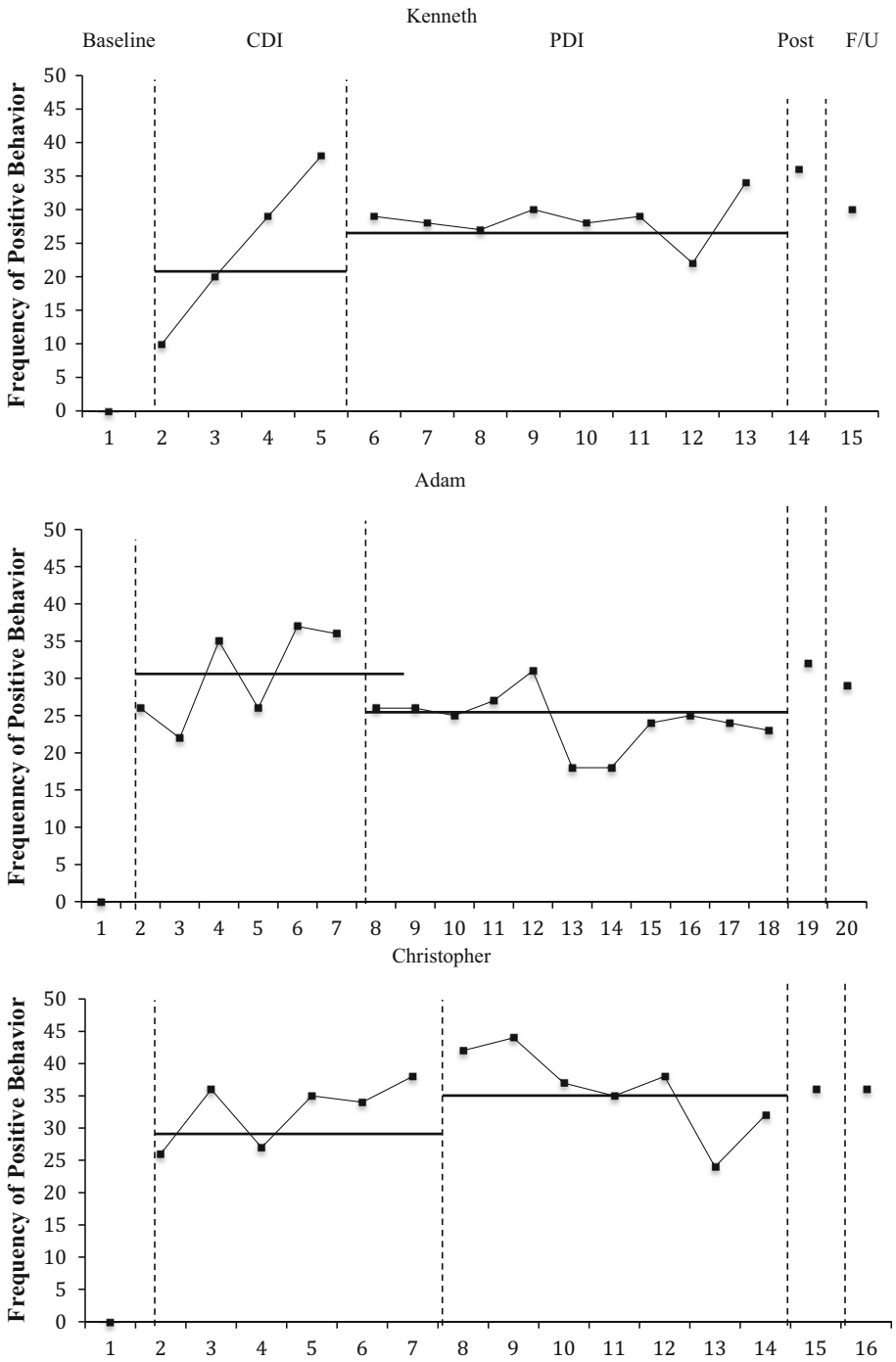


**Fig. 5** Positive parenting exhibited by caregivers with *horizontal lines* indicating phase mean

found. Relative to baseline levels, treatment gains maintained at 10–12 week follow-up across domains for each dyad. Satisfaction with the treatment was indicated by each caregiver, suggesting that PCIT was a well-received intervention for each family who participated in the study.

Study results demonstrated behavioral changes similar to those of children without ASD who received PCIT (Eisenstadt et al. 1993; McNeil et al. 1991; Schuhmann et al. 1998; Ware et al. 2008). The study findings supported previous research demonstrating that PCIT is efficacious in reducing behavior problems in children with developmental delays while still adhering to the core components of the treatment (e.g., Bagner and Eyberg 2007; Jamison 2008; Lesack et al. 2014; Solomon et al. 2008). Moreover, the study yielded similar outcomes to those found in the study by Ginn et al. (2015) utilizing CDI training for families of

children with ASD. Outcomes from the present study combined with Ginn et al. are promising given that some cases of ASD have typically been excluded from participation in PCIT despite the increase in referrals to PCIT clinics.

It was proposed that child compliance on the Compliance Test would increase from baseline, namely during the PDI phase of the intervention. For two children (Adam and Kenneth), the data supported the hypothesis showing a noticeable difference in mean compliance rates between baseline and PDI. In contrast, Christopher's compliance rate decreased between baseline and PDI. Moreover, a closer examination of Adam's and Christopher's data revealed substantial variability during the PDI phase, with each showing a downward trend in scores as therapy progressed. Interestingly, for both participants, performance on the compliance measure decreased following the session (PDI session #6 for Adam, PDI session #3 for Christopher) in which parents began to implement the PDI procedure at home (i.e., when a parent begins to implement the PDI independently differs for each family and is dependent upon parent–child progress). One explanation for this phenomenon may be described by the negative behavioral contrast effect which states there is a decrease in the rate of responding in one condition as a result of the increase of a contingency in another condition (Gross and Drabman 1981). In other words, as parents began to use PDI skills, there were contingencies for behavior (contingent praise, warning, timeout) as opposed to the Compliance Test which was void of response-based contingencies. For example, it is feasible that Adam's Compliance Test performance decreased after the introduction of PDI skills as neither compliance nor noncompliance on the assessment was met with a contingency. In contrast, during PDI, he was praised for compliance or given a warning/timeout for noncompliance.

Working in concert with the negative behavioral contrast effect is the notion of assessment fatigue due to repeated testing. As each Compliance Test administration is identical in terms of content, order, and parent behavior (neutral with no additional verbalizations beyond command), the test itself or some portion of it may have served as a discriminative stimulus for non-compliance after repeated trials. For instance, Adam, during the last several Compliance Test administrations, verbally expressed discontent with the test. Additionally, the participant (Christopher) with the longest baseline and most Compliance Test administrations prior to PDI demonstrated the most difficulty with the task. So, taken together, a diminishing amount of motivation to engage in the assessment may have further been accelerated when contingencies were introduced in other situations outside the Compliance Test setting.

At follow-up, two of the three participants displayed their highest Compliance Test scores. One possibility for this increase is that the 12 weeks between post-treatment and follow-up made the Compliance Test novel again, such that it no longer served as a conditioned stimulus for noncompliance as it did when it was given more consistently (i.e., ~twice/week for many weeks in a row).

This study also included measures of child compliance for behavioral observations during parent-directed play (PDI) and clean-up situations. Table 2 provides a comparison of the current study with other PCIT studies assessing compliance through PDI and clean-up observations. The table illustrates that the current study resulted in larger improvements in compliance rates than is typically demonstrated in PCIT research. PDI observations demonstrated a notable increase in compliance between baseline and the PDI phase for all children. Additionally, compliance percentage for the clean-up task increased across phases of treatment. This demonstrates improvement in compliance for all three children on these particular tasks.

In terms of caregiver behavior, each family showed a similar pattern of skill acquisition for positive parenting behaviors. Each caregiver did not exhibit positive parenting skills at baseline. As hypothesized, a notable increase across families was observed during CDI. During PDI, skills continued to improve for the caregivers of Christopher and Kenneth. These skills remained at mastery level at follow-up. Adam's mother demonstrated less use of CDI skills during PDI. This caregiver required more intensive coaching with CDI skills, particularly with labeled praise. These findings are consistent with an extensive body of literature showing that behavioral parent training programs are effective in changing parent–child communication for families of children with oppositional behavior (Herschell et al. 2002) and further expand the PCIT and ASD literature showing improvement with parent–child interaction with this population. Additional research is needed to understand the mechanisms of change given the different manner in which children with developmental delays relate to others.

Data supported the hypothesis that parents would report a reduction in behavior problems, as measured by the ECBI, at post-treatment and follow-up. Findings are similar to prior studies with this population demonstrating a reduction in parent-reported child problem behavior following behavioral parent training programs (Hudson et al. 2003; Huynen et al. 1996; Jamison 2008; Plant and Sanders 2007; Solomon et al. 2008) and provide further support of this treatment approach. At follow-up, Christopher showed a significant increase in reported oppositional behavior while the others' scores improved or maintained at non-significant levels. The elevated follow-up score may indicate a need for additional booster treatment sessions for

**Table 2** Comparison of child compliance rates to previous PCIT studies

| Study | Percent child compliance | | |
|---|---|---|---|
| | Pre-treatment M (SD) | Post-treatment M (SD) | Follow-up M (SD) |
| Current study | 35.5 (18.1) | 80.7 (21.3) | 90.5 (15.7) |
| Nixon et al. (2003) | 64 (24) | 81 (22) | 83 (21) |
| Schuhmann et al. (1998) | 25 | 46 | Not reported |
| Eisenstadt et al. (1993) | 41.0 (17.8) | 71.6 (16.1) | Not reported |
| McNeil et al. (1991) | 40.7 (18.2) | 70.4 (16.3) | Not conducted |

some children in this population, namely when multiple stressors are present (Eyberg et al. 2014).

With regard to behaviors consistent with ASD, results revealed a general modest reduction in overall autistic behaviors across assessment points for each participant. Although scores uniformly decreased, they generally remained above clinical significant levels for each participant. Although PCIT focuses on increasing compliance and enhancing parent–child communication, it may not target all core autistic behaviors. A closer examination of the Autism Behavior Checklist data demonstrated patterns that would be expected after implementation of PCIT. In particular, results showed an even decrease in scores for the Relating subscale. This construct is composed of behaviors related to connectedness (e.g., attending to social cues, eye contact, relationship-enhancement, imitation), it may be that improved communication impacted these behaviors. Behavioral observations of the CARS provided corroborating support of the parent-report measures showing a reduction of scores across participants. Overall, the findings demonstrating a positive impact on relationship and social-based variables are promising, namely given the potential deleterious effects associated with difficulties in these domains. Future research would be an essential next step in determining qualitative and quantitative extent of the change.

Overall, caregiver responses indicated a moderate to high level of satisfaction with the treatment. Consumer satisfaction was comparable with PCIT studies suggesting the parents were as satisfied with the treatment as parents of children without ASD (Bagner and Eyberg 2007; Eisenstadt et al. 1993; Schuhmann et al. 1998).

## Clinical Implications

Although PCIT has gathered some empirical evidence and reported clinical success with case studies of children on the autism spectrum, it is important to note that not all children with ASD may benefit from PCIT. For example, children with poor receptive language skills (<24 months) who do not understand simple instructions may not be appropriate for this treatment, namely the discipline phase. When the study was conducted, there was no formal definition for high functioning ASD (APA 2000). Some researchers have speculated that language and intelligence are critical elements to consider (Ghaziuddin and Mountain-Kimchi 2004; Klin et al. 1995). The newest edition of the American Psychological Association's *Diagnostic and Statistical Manual of Mental* Disorders, Fifth Edition (DSM-5; APA 2013), has included a classification system to categorize severity of symptoms. Future PCIT research could assess whether the treatment is effective with children on various points of the autism spectrum according to the new protocol (APA 2013).

Given that PCIT is based in large part on social reinforcers (e.g., labeled praise, reflection of speech, imitation) the approach may only be effective and appropriate for the portion of children with ASD who can easily be taught to consistently respond to social contingencies. As such, it's important to assess function of behavior when implementing PCIT with the ASD population. Prior studies examining the relation between social reinforcement and behavior of children with ASD have demonstrated that attention may be reinforcing though it may influence behavior differently. For example, Piazza et al. (1999) employed a concurrent schedule of reinforcement and demonstrated that reprimands were a stronger reinforcer for inappropriate behavior than praise was for appropriate behavior. However, it was also concluded that praise was reinforcing when it was the only option available.

Although manualized, PCIT offers flexibility that allows treatment to be tailored to the individual needs of the child and family, a critical element in working with the diverse needs and behavioral presentations of children on the autism spectrum. For instance, in order to increase language use, parents were taught to ignore inappropriate attempts to acquire objects (e.g., screaming, using parents' hand to attain object) and then praise the child for appropriate communication. Further, to increase behaviors such as eye contact or imitation, parents were coached to monitor and attend to (i.e., label praise) any occurrence of these behaviors.

Further extending the research base examining the effectiveness of traditional PCIT on children with

intellectual disabilities (Bagner and Eyberg 2007), Christopher (FSIQ = 58) demonstrated positive changes in behavior following treatment. Although he received the treatment with no adaptations, some tailoring was required to meet his developmental needs. For example, his mother was taught to use short sentences and allow Christopher some time to generate his own statements. Further, similar to the procedure described Bagner and Eyberg, his mother was taught to use repetition of concepts across the "do" skills (e.g., "you are holding a green block," "you put the green block on top," "I love your green block tower"). In PDI, Christopher's mother was taught to pair verbal commands with physical cues (e.g., pointing at the green block and her hand while saying "please hand me the green block"). To gain his attention, his mother would be coached to give "cueing" commands (e.g., "please turn your head and look at me"). Finally, his mother was coached to direct her child away from self-stimulatory behavior by giving an incompatible command (e.g., "please sit down next to me," "please draw me a circle"). In giving the command, the parent was able to reduce the self-stimulatory behaviors and simultaneously teach the child more prosocial activities.

It is important to note that each family received a slightly higher dose of PCIT sessions ($M = 18$, range 16–21) than is typically given for children without ASD. The difference in session numbers occurred in the PDI phase. It is possible that behavioral problems are more persistent for children with ASD or that parents may need more support during this phase. Interestingly, Bagner and Eyberg (2007) demonstrated that families needed, on average, 7 sessions of PDI to complete therapy. Further research is warranted with this population to examine the appropriate dose of treatment or potential barriers that may interfere with successful implementation of the intervention.

Although findings of the present study are encouraging, certain limitations must be considered when interpreting the results. First, the primary measure of the study (i.e., Compliance Test) was generally insensitive to treatment effects and a relatively unreliable measure of general child compliance. Next, a longer follow-up period with additional assessment points may have provided a more accurate depiction of long-term effects of the treatment. Although encouraging, further research should be conducted examining the long-term impact of behavior parent training on families with ASD children given the chronic nature of the disorder and possible challenges in behavior over time. Next, the raters in the study were not blinded to treatment phase. Finally, a limitation inherent in a nonconcurrent multiple baseline design is the threat of history effects influencing the dependent variable. By introducing treatment in a nonconcurrent fashion, there exists the possibility that outcomes were influenced by an extraneous event. Although feasible, it is worth noting that there was a large amount of overlap in that more than one participant was receiving therapy simultaneously reducing the threat of historical factors influencing study results.

## Future Directions

As this study is one of few empirically-based research projects investigating PCIT and autism, replication is an important next step. In addition, as some research has shown that solely CDI produces marked improvements in child behavior (Ginn et al. 2015), whereas other studies note the importance of some variation of a discipline component, namely for children with severe presentations (DuBard 2014; Lesack et al. 2014; Smith 2014), future studies should help to differentiate client characteristics that respond favorably or poorly to the components of PCIT.

One PCIT and ASD component that warrants further investigation is if the addition of a social skills training module to enhance social and communicative repertoires for ASD children would improve overall PCIT efficacy. Similar variations have been developed for other diagnoses, including separation anxiety disorder (Pincus et al. 2008). Throughout PCIT coaching, parents learn skills to prompt their child with ASD to answer questions, ask questions, use eye contact, imitate behaviors, and initiate/maintain conversations. The administration of a social skills training at the end of PCIT might allow the parent to effectively teach these skills considering the child has become more receptive to social interactions and more likely to comply when prompted. Further investigation should examine the usefulness of this additional component. As an example, the participants in this study increased their use of imitation in the absence of a specific module to teach this skill. Future studies should continue to examine the traditional model of PCIT making modifications only as dictated by further research (Eyberg 2005).

As behaviorally-based techniques have become more readily implemented with children on the autism spectrum with varying levels of intensity and success (Brookman-Frazee et al. 2010), it is critical that community providers are informed about and trained in proven, research-driven treatments to assure children and their families are realizing optimal outcomes (Brookman-Frazee et al. 2012). This study serves to expand the research base on the efficacy of PCIT and ASD. Results of the study provide preliminary, yet valuable, evidence suggesting that PCIT may be a viable intervention for managing disruptive behaviors in children with ASD. Future research directions should examine whether PCIT may serve as a primer treatment that enhances the parent–child relationship and increases child compliance, thereby setting the stage for greater

success in other domains of life (e.g., academic success, peer relationships) and in adjunct treatments (e.g. speech therapy, occupational therapy).

**Acknowledgments** Ashley Tempel Scudder, Paul Shawler.

**Compliance with Ethical Standards**

**Conflict of interest** The authors declare that they have no conflict of interest.

## References


Agazzi, H., Tan, R., & Tan, S. Y. (2013). A case study of parent–child interaction therapy for the treatment of autism spectrum disorder. *Clinical Case Studies, 12*(6), 428–442.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders*, 4th ed. Washington, DC: American Psychiatric Publishing.

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders*, 5th ed. Washington, DC: American Psychiatric Publishing.

Bagner, D. M., & Eyberg, S. M. (2007). parent–child interaction therapy for disruptive behavior in children with mental retardation: A randomized controlled trial. *Journal of Clinical Child and Adolescent Psychology, 36*, 418–429.

Bearss, K., Johnson, C., Smith, T., Lecavalier, L., Swiezy, N., Aman, M., & Scahill, L. (2015). Effect of parent training vs parent education on behavioral problems in children with autism spectrum disorder. *Journal of the American Medical Association, 313*, 1524–1533.

Bessmer, J., & Eyberg, S. (1993, November). *Dyadic parent–child Interaction coding system—II (DPICS-II): Initial reliability and validity of the clinical version*. Paper presented at the AABT preconference on social learning and the family, Atlanta, GA.

Boggs, S. R., Eyberg, S. M., & Reynolds, N. A. (1990). Concurrent validity of the Eyberg Child Behavior Inventory. *Journal of Clinical Child Psychology, 19*, 75–78.

Brestan, E. V., Jacobs, J. R., Rayfield, A. D., & Eyberg, S. M. (1999). A consumer satisfaction measure for parent–child treatments and its relation to measures of child behavior change. *Behavior Therapy, 30*, 17–30.

Brinkmeyer, M., & Eyberg, S. M. (2003). Parent–child interaction therapy for oppositional children. In A. E. Kazdin & J. R. Weiz (Eds.), *Evidence-based psychotherapies for children and adolescents* (pp. 204–223). New York: Guilford Press.

Brookman-Frazee, L. I., Drahota, A., & Stadnick, N. (2012). Training community mental health therapists to deliver a package of evidence-based practice strategies for school-age children with autism spectrum disorders: A pilot study. *Journal of Autism and Developmental Disorders, 42*(8), 1651–1661.

Brookman-Frazee, L. I., Taylor, R., & Garland, A. F. (2010). Characterizing community-based mental health services for children with autism spectrum disorders and disruptive behavior problems. *Journal of Autism and Developmental Disorders, 40*, 1188–1201.

Brumfield, B. D., & Roberts, M. W. (1998). A comparison of two measurements of child compliance with normal preschool children. *Journal of Clinical Child Psychology, 27*, 109–116.

Burrell, T. L., & Borrego, J. (2012). Parent's involvement in ASD treatment: What is their role? *Cognitive and Behavioral Practice, 19*, 423–432.

Butter, E. M., Wynn, J., & Mulick, J. A. (2003). Early intervention critical to autism treatment. *Pediatric Annals, 32*, 677–684.

Center for Disease Control. (2012). Prevalence of autism spectrum disorders: Autism and developmental disabilities monitoring network, 14 sites, United States, 2008. *MMWR Surveillance Summaries, 61*(3), 1–19.

DuBard, M. (2014). Alternatives to the holding chair: Commentary on Lesack. *Clinical Practice in Pediatric Psychology, 2*, 86–87.

Ducharme, J. M., & DiAdamo, C. (2005). An errorless approach to management of child noncompliance in a special education setting. *School Psychology Review, 34*, 107–115.

Dunn, L. M., & Dunn, L. M. (1997). *Peabody picture vocabulary test* (3rd ed.). Circle Pines, MN: American Guidance Service.

Eaves, R. C., & Milner, B. (1993). The criterion-related validity of the Childhood Autism Rating Scale and the Autism Behavior Checklist. *Journal of Abnormal Child Psychology, 21*(5), 481–491.

Eisenstadt, T. H., Eyberg, S. M., McNeil, C. B., Newcomb, K., & Funderburk, B. (1993). Parent–child interaction therapy with behavior problem children: Relative effectiveness of two stages and overall treatment outcome. *Journal of Clinical Child Psychology, 22*, 42–51.

Eyberg, S. M. (1993). Consumer satisfaction measures for assessing parent training programs. In L. VandeCreek, S. Knapp, & T. L. Jackson (Eds.), *Innovations in clinical practice: A source book* (Vol. 12). Sarasota, FL: Professional Resource Press.

Eyberg, S. M. (2005). Tailoring and adapting parent–child interaction therapy for new populations. *Education and Treatment of Children, 28*, 197–201.

Eyberg, S. M., Bessmer, J., Newcomb, K., Edwards, D., & Robinson, E. (1994). Dyadic parent–child interaction coding system-II: A manual. *Social and Behavioral Sciences Documents* (Ms. No. 2897).

Eyberg, S., Boggs, S., & Jaccard, J. (2014). Does maintenance treatment matter? *Journal of Abnormal Child Psychology, 42*(3), 355–366.

Eyberg, S. M., & Funderburk, B. (2011). *Parent–child interaction therapy protocol*. Gainesville: PCIT International.

Eyberg, S. M., & Matarazzo, R. G. (1980). Training parents as therapists: A comparison between individual parent child interactions training and parent group didactic training. *Journal of Clinical Psychology, 36*, 492–499.

Eyberg, S. M., Nelson, M. M., & Boggs, S. R. (2008). Evidence-based psychosocial treatment for children and adolescents with disruptive behavior. *Journal of Clinical Child and Adolescent Psychology, 37*(215), 237.

Eyberg, S. M., Nelson, M. M., Duke, M., & Boggs, S. R. (2005). *Manual for the dyadic parent–child interaction coding system* (3rd ed.). Gainesville: University of Florida.

Eyberg, S. M., & Pincus, D. (1999). *Eyberg Child Behavior Inventory Sutter Student Behavior Inventory—Revised professional manual*. Lutz, FL: Psychological Assessment Resources.

Eyberg, S. M., & Ross, A. W. (1978). Assessment of child behavior problems: The validation of a new inventory. *Journal of Clinical Child Psychology, 7*, 113–116.

Ghaziuddin, G., & Mountain-Kimchi, K. (2004). Defining the intellectual profile of Asperger syndrome: Comparison with high-functioning autism. *Journal of Autism and Developmental Disorders, 34*, 279–284.

Ginn, N. C., Clionsky, L. N., Eyberg, S. M., Warner-Metzger, C., & Abner, J. P. (2015). Child-directed interaction training for young children with autism spectrum disorders: Parent and child outcomes. *Journal of Clinical Child & Adolescent Psychology, 18*, 1–9.

Greenspan, S. I., & Wieder, S. (2006). *Engaging autism: Using the Floortime approach to help children relate, communicate, and think*. Cambridge, MA: DaCapo Press.

Gross, A. M., & Drabman, R. S. (1981). Behavioral contrast and behavior therapy. *Behavior Therapy, 12*, 231–246.

Hanf, C. (1969). *A two-stage program for modifying maternal controlling during mother–child (M–C) interaction.* Paper presented at the meeting of the Western Psychological Association, Vancouver, British Columbia, Canada.

Hatamzadeh, A., Pouretemad, H., & Hassanabadi, H. (2010). The effectiveness of parent–child interaction therapy for children with high functioning autism. *Procedia Social and Behavioral Sciences, 5*, 994–997.

Herschell, A. D., Calzada, E. J., Eyberg, S. M., & McNeil, C. B. (2002). Parent–child interaction therapy: New directions in research. *Cognitive and Behavioral Practice, 9*, 6–16.

Hood, K. K., & Eyberg, S. M. (2003). Outcomes of parent–child interaction therapy: Mothers' reports of maintenance three to six years after treatment. *Journal of Clinical Child and Adolescent Psychology, 32*, 419–429.

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

Hudson, A. M., Matthews, J. M., Gavidia-Payne, S. T., Cameron, C. A., Mildon, R. L., Radler, G. A., & Nankervis, K. L. (2003). Evaluation of an intervention system for parents of children with intellectual disability and challenging behavior. *Journal of Intellectual Disability Research, 47*, 238–249.

Huynen, K. B., Lutzker, J. R., Bigelow, K. M., Touchette, P. E., & Campbell, R. V. (1996). Planned activities training for mothers of children with developmental delays. *Behavior Modification, 20*, 406–427.

Ingersoll, B., & Dvortcsak, A. (2006). Including parent training in the early childhood special education curriculum for children with autism spectrum disorders. *Journal of Positive Behavior Interventions, 8*(2), 79–87.

Jamison, R. T. (2008). The effects of parent–child interaction therapy on problem behaviors in three children with autistic disorder. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 68(7-B), p. 4828.

Kaat, A. J., & Lecavalier, L. (2013). Disruptive behavior disorders in children and adolescents with autism spectrum disorders: A review of the prevalence, presentation, and treatment. *Research in Autism Spectrum Disorders, 7*, 1579–1594.

Klin, A., Volkmar, F. R., Sparrow, S. S., Cichetti, D. V., & Rourke, B. P. (1995). Validity and neuropsychological characterization of Asperger syndrome. *Journal of Child Psychology and Psychiatry, 36*, 1127–1140.

Koegel, R. L., Koegel, L. K., & Brookman, L. I. (2003). Empirically supported pivotal response interventions for children with autism. In A. E. Kazdin & J. R. Weisz (Eds.), *Evidence-based psychotherapies for children and adolescents* (pp. 341–357). New York: Guilford Press.

Krug, D. A., Arick, J. R., & Almond, P. J. (1980). *Autism Behavior Checklist*. Austin, TX: Pro-Ed.

Lesack, R., Bearss, K., Celano, M., & Sharp, W. G. (2014). Parent–child interaction therapy and autism spectrum disorder: Adaptations with a child with severe developmental delays. *Clinical Practice in Pediatric Psychology, 2*(1), 68–82.

Masse, J., & McNeil, C. B. (2008). In-home parent–child interaction therapy: Clinical considerations. *Child and Family Behavior Therapy, 30*(2), 99–126.

Masse, J., McNeil, C. B., Wagner, S. M., & Chorney, D. B. (2007). Parent–child interaction therapy and high functioning autism: A conceptual overview. *Journal of Early and Intensive Behavior Intervention, 4*(4), 714–735.

McLeod, B., Wood, J. J., & Klebanoff, S. (2015). Advances in evidence-based intervention and assessment practices for youth with an autism spectrum disorder. *Behavior Therapy, 46*, 1–6.

McNeil, C. B., Eyberg, S., Eisenstadt, T. H., Newcomb, K., & Funderburk, B. (1991). Parent–child interaction therapy with behavior problem children: Generalization of treatment effects to the school setting. *Journal of Clinical Child Psychology, 20*, 140–151.

McNeil, C. B., & Hembree-Kigin, T. L. (2010). *Parent–child interaction therapy*. New York, NY: Springer.

Nixon, R. D. V., Sweeny, L., Erickson, D. B., & Touyz, S. W. (2003). Parent–child interaction therapy: A comparison of standard and abbreviated treatments for oppositional defiant preschoolers. *Journal of Consulting and Clinical Psychology, 71*, 251–260.

Perry, A., Condillac, R. A., Freeman, N. L., Dunn-Geier, J., & Belair, J. (2005). Multi-site study of the Childhood Autism Rating Scale (CARS) in five clinical groups of young children. *Journal of Autism and Developmental Disorders, 35*, 625–634.

Piazza, C. C., Bowman, L. G., Contrucci, S. A., Delia, M. D., Adelinis, J. D., & Goh, H. (1999). An evaluation of the properties of attention as reinforcement for destructive and appropriate behavior. *Journal of Applied Behavior Analysis, 32*, 437–449.

Pincus, D. B., Santucci, L. C., Ehrenreich, J., & Eyberg, S. M. (2008). The implementation of modified parent–child interaction therapy for youth with separation anxiety disorder. *Cognitive and Behavioral Practice, 15*, 118–125.

Plant, K. M., & Sanders, M. R. (2007). Reducing problem behavior during care-giving in families of preschool-aged children with developmental disabilities. *Research in Developmental Disabilities, 28*, 362–385.

Rayfield, A., & Sobel, A. (2000). *Effectiveness of "in-room" coaching of parent–child interaction therapy.* Paper presented at the first annual parent–child interaction therapy conference, Sacramento, CA.

Roberts, M. W., & Powers, S. W. (1988). The compliance test. *Behavioral Assessment, 10*, 375–398.

Rogers, S. J., & Vismara, L. A. (2008). Evidence-based comprehensive treatments for early autism. *Journal of Clinical Child & Adolescent Psychology, 37*(1), 8–38.

Schopler, E., Reichler, R. J., & Renner, B. R. (1988). *Child Autism Rating Scale*. Los Angeles, CA: Western Psychological Services.

Schuhmann, E. M., Foote, R. C., Eyberg, S. M., Boggs, S. R., & Algina, J. (1998). Efficacy of parent–child interaction therapy: Interim report of a randomized trial with short-term maintenance. *Journal of Clinical Child Psychology, 27*, 34–45.

Smith, T. (2014). Safe utilization of a holding chair in short-term parent training to reduce high-risk behaviors: Commentary on Lesack. *Clinical Practice in Pediatric Psychology, 2*, 83–85.

Smith, T., & Iadarola, S. (2015). Evidence base update for autism spectrum disorder. *Journal of Clinical Child & Adolescent Psychology, 44*, 897–922.

Solomon, M., Ono, M., Timmer, S., & Goodlin-Jones, B. (2008). The effectiveness of parent–child interaction therapy for families of children on the autism spectrum. *Journal of Autism and Developmental Disorders, 38*, 1767–1776.

Sturmey, P., Matson, J. L., & Sevin, J. A. (1992). Analysis of the internal consistency of three autism scales. *Journal of Autism and Developmental Disorders, 22*, 321–328.

Tonge, B. J., Bull, K., Breteron, A., & Wilson, R. (2014). A review of evidence-based early intervention for behavioural problems in children with autism spectrum disorder: The core components of effective programs, child-focused interventions and comprehensive treatment models. *Current Opinion in Psychiatry, 27*, 158–165.

Wadden, N. P. K., Bryson, S. E., & Rodger, R. S. (1991). A closer look at the autism behavior checklist: Discriminant validity and factor structure. *Journal of Autism and Developmental Disorders, 21*, 529–541.

Ware, L. M., McNeil, C. B., Masse, J. J., & Stevens, S. B. (2008). Efficacy of in-home parent–child interaction therapy. *Child and Family Behavior Therapy, 30*(2), 127–135.

Wechsler, D. (2002). *Wechsler preschool and primary scale of intelligence* (3rd ed.). San Antonio, TX: The Psychological Corporation.

Whittingham, K., Sofronoff, K., Sheffield, J., & Sanders, M. R. (2008). Stepping Stones Triple P: An RCT of a parenting program with parents of a child diagnosed with an autism spectrum disorder. *Journal of Abnormal Child Psychology, 37*, 469–480.

Zisser, A., & Eyberg, S. M. (2010). Parent-child interaction therapy and the treatment of disruptive behavior disorders. In J. Weisz & A. Kazdin (Eds.), *Evidence-based psychotherapies for children and adolescents* (pp. 179–193). New York, NY: Guilford Press.