Efficacy of In-Home Parent-Child Interaction Therapy

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ABSTRACT. In recent years, there has been much discussion of the efficacy of mental health interventions for children as well as the transportation of empirically-supported treatments (ESTs) to field settings. A logical initial step in this line of research is to examine whether the efficacy of ESTs can be demonstrated in community settings such as in the home environment. The purpose of the study was to examine the efficacy of an in-home Parent-Child Interaction Therapy (PCIT) program using a single-subject, A/B design across five subjects with staggered baselines. Decreases in caregiver use of negative behavior and caregiver-reported child behavior problems were observed for the three families that completed treatment. In addition, completers demonstrated increases in child compliance, caregiver use of positive

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99
behavior, and contingent praise. Data regarding caregivers' reported parenting stress and caregiver proportion of direct commands were less convincing. All three dyads completing treatment reported satisfaction with the intervention. Clinical implications regarding the possible benefits of PCIT for improving the effectiveness of home visiting programs are discussed as well as directions for future research.

**KEYWORDS.** Home-based interventions, parent-child interaction therapy

In recent years, there has been much discussion of the development and evaluation of empirically supported treatments (ESTs) for children as well as the transportability (e.g., Schoenwald & Hoagwood, 2001) and dissemination (e.g., Herschell, McNeil, & McNeil, 2004) of these interventions. Before the argument for widespread dissemination of these interventions can be made, however, transportability must be considered. A logical first step in such a line of research would be to examine whether the efficacy of ESTs can be demonstrated in community settings such as in the home. The current study evaluated one particular EST, Parent-Child Interaction Therapy (PCIT; Hembree-Kigin & McNeil, 1995) to determine the efficacy of this approach for improving parenting skills and reducing child disruptive behavior when conducted entirely in the home environment.

**PARENT-CHILD INTERACTION THERAPY (PCIT)**

PCIT is a two-stage Hanf-based (Hanf, 1969) intervention including a relationship enhancement phase (Child Directed Interaction [CDI]) and a discipline phase (Parent Directed Interaction [PDI]). Throughout PCIT, skills are taught by coaching caregivers in vivo as they are interacting with their child in a play situation. During CDI, caregivers are taught to manage child behavior through use of selective attention. During PDI, the target behavior is child compliance and caregivers are taught to use a consistent, predictable discipline program utilizing a time-out procedure, still within the context of a play situation.

Each phase of treatment is preceded by a didactic session during which the therapist uses lecture, modeling, role-playing, and handouts
to explain the skills to the caregiver. During subsequent sessions, the caregiver is coached directly in their use of the skills while interacting with their child. A minimum of 30 minutes of each session is devoted to coaching. In clinic-based PCIT, coaching sessions take place with the caregiver and child in the therapy room while the therapist observes from behind a one-way mirror. As the caregiver and child are engaged in play, the therapist coaches the caregiver by use of a bug-in-the-ear device. In this way the caregiver is provided with direct feedback on their behavior during the session. Throughout treatment, caregivers are assigned homework to practice at home the skills they have learned in the clinic.

Treatment progress is determined by the caregiver’s rate of skill acquisition and caregiver behavior is coded using the Dyadic Parent-Child Interaction Coding System-II (DPICS-II; Eyberg, Bessmer, Newcomb, Edwards, & Robinson, 1994). Caregivers must demonstrate “mastery” of the CDI skills prior to moving on to PDI. CDI mastery criteria is defined as the caregiver’s use of the following skills during a 5-minute CDI observation: (a) 10 labeled praises, 10 reflections, and 10 behavioral descriptions; (b) no more than 3 questions, commands, or criticisms; and (c) ignoring of non-harmful, inappropriate behaviors. Similarly, treatment is not complete until the caregiver obtains mastery of the PDI skills and the child’s behavior is within normal limits. To meet PDI mastery criteria, during the 5-minute DPICS-II PDI observation the caregiver must give at least 4 commands, of which 75% must be effective (e.g., stated directly) and the caregiver must demonstrate at least 75% correct follow-through after effective commands.

Outcome research evaluating the clinic-based model of PCIT has demonstrated statistically and clinically significant changes in child behavior in the home and school settings based on caregiver and teacher ratings, as well as direct observation (Eisenstadt, Eyberg, McNeil, Newcomb, & Funderburk, 1993; McNeil, Eyberg, Eisenstadt, Newcomb, & Funderburk, 1991; Schuhmann, Foote, Eyberg, Boggs, & Algina, 1998). Outcome research also has demonstrated change in caregiver behavior including increases in positive verbalizations (e.g., reflection) and decreases in critical and sarcastic statements (Eisenstadt et al., 1993; Schuhmann et al., 1998). Maintenance of the effects of PCIT has been demonstrated in both short-term and long-term studies (Boggs et al., 2004; Eisenstadt et al.; Eyberg, Funderburk, Hembree-Kigin, McNeil, Querido, & Hood,
2001; Funderburk et al., 1998; Hood & Eyberg, 2003; Nixon, Sweeney, Erickson, & Touyz, 2003). Recent research by Chaffin and colleagues demonstrated the effectiveness of PCIT in reducing child physical abuse recidivism (Chaffin et al., 2004).

Although the PCIT outcome literature is extensive, these studies have almost exclusively been conducted in university clinic settings using a one-way mirror and bug-in-the-ear device for coaching. The purpose of the present study was to evaluate the efficacy of PCIT when used in the home without coaching equipment.

METHOD

Participants

Children included in the study were between the ages of two and seven and met criteria for significant behavior problems as evidenced by a Child Behavior Checklist (Achenbach & Edelbrock, 1981; Achenbach & Rescorla, 2000, 2001) Aggression subscale score at the 95th percentile or higher and presence of symptoms consistent with a diagnosis of a disruptive behavior disorder as measured by caregiver report on the Diagnostic and Statistical Manual—Fourth Edition (DSM-IV; American Psychiatric Association, 1994) Structured Interview for Disruptive Behavior Disorders (McNeil et al., 1991). Participants were given incentives for their involvement in the study (i.e., $100 for pretreatment assessment, $75 for obtaining mastery criteria during the first phase of treatment, $75 for posttreatment assessment, and $50 for follow-up assessment). Two participants terminated treatment prematurely, while the remaining three participants completed the entire course of treatment. The children and families are described below using pseudonyms to protect their confidentiality.

Alex. Alex is a five year old Caucasian male who participated in the study with his biological mother and was recruited for participation from a local Head Start preschool. At intake, Alex’s mother reported that Alex had difficulty listening, was very active, and was often physically aggressive with his sister and peers at Head Start. Alex’s mother was diagnosed with generalized anxiety disorder and depression and Alex’s sister was receiving mental health services for
anxiety symptoms. The family was experiencing a variety of stressors during the study including living in the grandparents’ home and maternal unemployment.

Noah. Noah is a five year old Caucasian male who lived at home with his parents, two older sisters, and older brother. Noah was in Head Start when the study began and presenting problems included not listening, destructive behavior, and sibling conflict. During the course of the study, Noah’s family was experiencing a number of stressors. Most significant was the fact that Noah’s mother exhibited depressive symptoms and endorsed suicidal ideation with a history of suicide attempts. During the study, Noah’s mother was receiving intensive individual counseling and was prescribed anti-depressants. She stated that her greatest source of stress was her children’s behavior problems.

Tami. Tami is a seven year old Caucasian female who lived at home with her adoptive parents and younger brother. Tami’s mother sought PCIT services after hearing about the program at a local workshop. Tami was in the second grade during the study. Tami’s mother reported that Tami often exhibited aggressive behaviors (e.g., kicking, hitting) that would frequently escalate in intensity until caregivers gave in to her demands. Tami’s mother often did not complete her therapeutic homework assignments and occasionally seemed disorganized and overwhelmed. In the initial phase of treatment, Tami’s mother spoke with the therapists about her anxiety regarding certain aspects of the PCIT program (i.e., being observed and coached). There was significant marital discord in the family, which ultimately resulted in the divorce of Tami’s adoptive parents.

Rachel. Rachel is a four year old Caucasian female who lived at home with her biological parents and her older brother. Rachel was referred for the study by a local community mental health agency. Rachel’s mother reported that her daughter’s behavior was a great source of stress for the family. Rachel’s father had been diagnosed with a mood disorder. Rachel’s mother reported significant distress with regard to her relationship with Rachel’s father. Specifically, she reported feeling that her husband was not supportive and indicated that they often disagreed in their parenting styles. Rachel missed a number of
consecutive treatment appointments due to headaches, fever, and stomach pains. Rachel's mother ultimately terminated therapy prematurely due to feeling overwhelmed with life stressors (e.g., the dissolution of her marriage) and felt that she could not devote the time necessary to participate in treatment.

David. David is a multi-racial two year old male who lived at home with his biological mother. David's family was referred through an Early Head Start program. During intake, David's mother reported that David was noncompliant and destructive. David's mother was experiencing stress related to her inability to locate or maintain employment. During the first week of treatment, David's mother attained employment but stated that her new schedule was a cause of distress to her. David and his caregiver were inconsistent in their attendance (i.e., two "no-shows," one cancellation, chronically late). David's mother was terminated from the study after multiple attempts to contact her were met with no response.

**Experimental Design**

A single-subject A/B design across subjects with staggered baselines was used to assess caregiver behavior, child compliance, and child behavior problems. Dyads began treatment after meeting baseline criteria. Baseline data for CDI were obtained by assessing caregiver positive behaviors (i.e., labeled praise, reflection, behavioral description). A minimum of three consecutive data points were collected during baseline with data demonstrating no notable upward trend before treatment began. One week after the initial dyad began treatment, the next dyad who met baseline criteria began treatment. Each subsequent week, another dyad began treatment.

Two criteria were used to determine when to change from CDI to PDI conditions. First, participants' caregivers had to meet mastery of the CDI skills as described above. As different target behaviors were hypothesized to change during the PDI intervention, the second criterion for changing to PDI was the establishment of PDI baseline data based on caregiver behavior (i.e., proportion of direct commands during the DPICS-II PDI observation). These data had to be consistent for three consecutive sessions, with no notable upward trend. The first baseline data point for PDI was obtained during a 5-minute pretreatment DPICS-II PDI observation. Subsequent
baseline data points were collected throughout the CDI phase of treatment using a 5-minute DPICS-II PDI observation. Treatment was terminated once the family met criteria for PDI as described above. Follow-up data were collected for each dyad one month after the post-treatment session.

**Dependent variables.** The first two dependent variables (i.e., caregiver positive behavior, caregiver negative behavior) were related to the goals of the CDI phase of treatment and were coded during the 5-minute DPICS-II CDI observations. Caregiver positive behavior included the total number of labeled praises, reflections, and behavioral descriptions. Caregiver negative behavior was calculated by totaling the frequencies of questions, criticisms, and commands. Three dependent variables related to PDI goals were measured during the 5-minute DPICS-II PDI observations: proportion of direct commands, contingent praise, and child compliance. Proportion of direct commands was calculated by dividing the frequency of direct commands by the total of direct commands plus indirect commands. Contingent praise was assessed using a frequency count. Child compliance was calculated by dividing the number of commands complied with by the total number of commands. See Table 1 for DPICS-II definitions. Other dependent variables included scores on the Eyberg Child Behavior Inventory, Parenting Stress Index Short Form, Therapy Attitude Inventory, and the DSM-IV Structured Interview for Disruptive Behavior Disorders.

**Measures**

*Child Behavior Checklist (CBCL; Achenbach & Edelbrock, 1981; Achenbach & Rescorla, 2000, 2001).* The CBCL is a standardized parent report measure used to assess general child psychopathology. The Preschool (ages 1 1/2–5) and School Age (ages 6–18) forms were used in the current study. Psychometric properties of the CBCL have been demonstrated in numerous studies (e.g., see Achenbach & Rescorla, 2000, 2001 for reviews). Only the Aggression subscale was used in the current study for screening purposes as the behavioral items are consistent with disruptive behavior disorders that are targeted in PCIT.

*Dyadic Parent-Child Interaction Coding System-II (DPICS-II; Eyberg et al., 1994).* The DPICS-II was developed to code caregiver
### TABLE 1. Definitions of DPICS-II Codes

<table>
<thead>
<tr>
<th>Code</th>
<th>Definition</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Labeled Praise</td>
<td>Labeled praise provides a positive evaluation of a specific behavior, activity, or product of the child</td>
<td>Parent: “Thank you for sitting so nicely in your chair.”</td>
</tr>
<tr>
<td>Reflection</td>
<td>A declarative phrase or statement that has the same meaning as an immediately preceding child verbalization. The reflection may paraphrase or elaborate upon the child's verbalization but may not change the meaning of the child's statement or interpret unstated ideas</td>
<td>Child: “The cow wants to go to sleep.”</td>
</tr>
<tr>
<td>Behavioral Description</td>
<td>Descriptive statements in which the subject of the sentence is the child and the verb describes the child's ongoing or immediately completed (&lt; 5 seconds) verbal or nonverbal observable behavior</td>
<td>Parent: “You are drawing a big, colorful house.”</td>
</tr>
<tr>
<td>Question</td>
<td>A descriptive or reflective comment or acknowledgement expressed in question form</td>
<td>Parent: “What would you like to play with now?”</td>
</tr>
<tr>
<td>Criticism</td>
<td>A verbal expression of disapproval for the child or the child's attributes, products, or choices</td>
<td>Child: (Drawing a dog).</td>
</tr>
<tr>
<td>Direct Command</td>
<td>Declarative statements that contain an order or direction for a vocal or motoric behavior to be performed and indicate that the child is to perform this behavior</td>
<td>Parent: “That's not how you draw a dog.”</td>
</tr>
<tr>
<td>Indirect Command</td>
<td>Suggestion for a vocal or motoric behavior to be performed that is implied or stated in question form</td>
<td>Parent: “Please hand me the blue block.”</td>
</tr>
<tr>
<td>Contingent Praise</td>
<td>A labeled praise that expresses a positive evaluation of the behavior or the product of the behavior begun or completed by the child in compliance to an immediately preceding command.</td>
<td>Child: (Complies with parent command).</td>
</tr>
<tr>
<td>Child Compliance</td>
<td>Coded when the child obeys or begins to obey the command within the 5-second interval.</td>
<td>Parent: “Please draw a red circle.”</td>
</tr>
</tbody>
</table>

*Note. DPICS-II = Dyadic Parent-Child Interaction Coding System-II.*
and child behaviors during their interactions. Normative data for the DPICS-II are available (Eyberg et al.). Reliability and validity of the DPICS-II during live coding situations has yielded adequate results (Bessmer, 1993; Bessmer & Eyberg, 1993). More specifically, the DPICS-II manual (Eyberg et al.) lists live coding agreement scores averaging 64% (range = 25% to 93%) for the twelve codes included in the current study.

The DPICS-II was used to code caregiver and child behavior during two 5-minute structured observations at pretreatment, posttreatment, prior to each session, and at follow-up. During these interactions, the extent of parental control required varies (Hembree-Kigin & McNeil, 1995). The first structured observation was the DPICS-II CDI observation during which the caregiver was instructed to let the child lead the play and simply follow the child's lead. The second structured observation was the DPICS-II PDI observation in which the caregiver informed the child that the caregiver chooses (and leads) the activity. All observations were coded live during session.

*Diagnostic and Statistical Manual-IV (DSM-IV) Structured Interview for Disruptive Behavior Disorders (McNeil et al., 1991).* The DSM-IV Structured Interview was created to assess the severity and duration of child disruptive behaviors based on diagnostic criteria for oppositional defiant disorder, conduct disorder, and attention deficit/hyperactivity disorder. The measure utilizes DSM-IV criteria. Reliability and validity of this measure have been demonstrated in various PCIT outcome studies (Eyberg et al., 2001; McNeil et al.; Schuhmann et al., 1998).

*Eyberg Child Behavior Inventory (ECBI; Eyberg & Pincus, 1999; Eyberg & Ross, 1978).* The ECBI is a caregiver report form used to assess disruptive behavior problems of children between the ages of 2 and 16. Caregivers indicate the frequency of these behaviors, yielding an Intensity Score. Caregivers also indicate whether the behavior is problematic for them, generating a Problem Score. The clinical cutoff scores are 131 for the Intensity Score and 15 for the Problem Score (Eyberg & Pincus). There have been a number of studies demonstrating the reliability of the ECBI as well as its validity and sensitivity to change following treatment (e.g., Boggs, Eyberg, & Reynolds, 1990; Eyberg & Ross). In addition, research
demonstrates the sensitivity of the ECBI to weekly change in the intensity of child behavior problems (Perez, Bell, Adams, Garzarella, & Eyberg, 2002).

*Parenting Stress Index—Short Form (PSI-SF; Abidin, 1995).* The PSI-SF is a 36-item parent self-report derived from the 120-item full scale PSI. The PSI-SF was designed to assess stress within the parent-child relationship. For the purposes of the current study, only the Parental Distress, Difficult Child, and Parent-Child Dysfunctional Interaction subscales were analyzed. A number of studies have demonstrated adequate reliability and validity for the PSI-SF (see Abidin for review).

*Therapy Attitude Inventory (TAI; Eyberg, 1974).* The TAI is a consumer satisfaction measure for PCIT. The TAI is a 10-question measure containing items on a 5-point Likert scale, which vary depending on the specific item, but with a higher score indicating higher satisfaction. Items explore caregivers’ perceptions of techniques learned, quality of the parent-child relationship, changes in the severity of behavior problems, and overall impressions of PCIT. Psychometric evaluations of the TAI have demonstrated adequate reliability (Brestan, Jacobs, Rayfield, & Eyberg, 1999; Eisenstadt et al., 1993) and validity (Brestan et al.; Eisenstadt et al.; Eyberg & Matarazzo, 1980).

**PROCEDURES**

*Assessment procedures.* Pretreatment assessment began by obtaining written informed consent to participate in the study. The pretreatment assessment procedures were conducted in the following order: (1) caregiver completion of two self-report questionnaires (i.e., ECBI, PSI-SF), (2) completion of a thorough clinical interview (including Demographics Form), and (3) coding of the two 5-minute DPIICS-II observations (i.e., CDI, PDI).

Throughout treatment, the ECBI and two behavior observations (i.e., CDI, PDI) were collected prior to each session. Posttreatment assessment was conducted on the session following the family’s completion of treatment and was administered in the same order as pretreatment. At follow-up, the posttreatment assessment was replicated.
Treatment procedures. Therapists were two graduate students with previous experience in PCIT who were supervised by a licensed clinical psychologist with extensive PCIT experience. Therapists met with families in their home for twice-weekly 1-hour treatment sessions. One therapist served as the primary clinician for the family and both therapists were present at 42.80% of sessions overall. There were two reasons for conducting in-home PCIT in pairs. First, for the initial sessions, two therapists were sent to the home to address any potential safety concerns. Second, the other therapist conducted reliability coding for the study.

Treatment followed standard practice of clinic-based PCIT with the exception that all sessions were conducted in the home. Modifications from the clinic-based protocol were necessary in order to implement this treatment in the home setting. For example, as the bug-in-the-ear technology was unavailable in the home, in-home therapists relied on “in-room” coaching. During coaching sessions in the home, the therapist sat behind the caregiver and provided feedback discretely. Preliminary research suggests that coaching in the room is an effective alternative to the bug-in-the-ear technology (Rayfield & Sobel, 2000). During the first appointment, therapists explained to participants that distractions should be kept at a minimum during treatment sessions. Participants were asked to sign a home visitation policy indicating their agreement to minimize distractions during sessions by refraining from having visitors, accepting telephone calls, or having the television on during treatment sessions.

PDI observations were suspended during the two PDI didactic sessions while caregivers were instructed on the discipline procedure. In addition, observations were suspended during the first two PDI coaching sessions until the caregiver could demonstrate competence in the discipline procedure. Caregivers had to demonstrate competence either directly during a coaching session or within a role-play situation if the child did not have a timeout during one of the first two PDI coaching sessions. Thus, data were not collected for those variables examined during the PDI observations (i.e., proportion of direct commands, contingent praise, and child compliance) until the third PDI coaching session. The purpose of not conducting observations during those sessions was to ensure that the caregiver would not implement the discipline procedure incorrectly in the absence of adequate coaching.
Therapists were required to use self-monitoring using integrity checklists during each session. Treatment integrity scores were averaged for each participant and ranged from 99.50% to 100%. Treatment integrity dropped to 86% during one of Tami’s sessions, as the therapists were unable to conduct coding during that session.

Interobserver agreement. All DPICS-II observations were coded live. Agreement was evaluated for 42.80% of the observations with agreement being assessed comparably across all phases of treatment (i.e., baseline, CDI, PDI, follow-up). Kappas were averaged across participants for each of the nine DPICS-II codes and ranged from .87 (Question) to 1.0 (Contingent Praise). Kappas for coder agreement at each observation were high and were generally above .60. Kappa dropped below .60 on three different codes (LP, Q, IC) on three non-consecutive observations for the same participant (Tami).

RESULTS

Main Findings

Caregiver behavior. The three families who completed treatment (i.e., Alex, Noah, Tami) demonstrated similar rates of skill acquisition for caregiver positive behavior (i.e., labeled praise, behavior description, reflection) as displayed in Figure 1. At baseline, caregivers demonstrated very little of this behavior with Alex’s caregiver averaging 1.25, Noah’s caregiver with an average of 2.60, and Tami’s caregiver with an average of 1.17 during baseline. As hypothesized, upon commencement of CDI, all caregivers demonstrated a gradual increase in use of these skills across this phase. Mean levels of positive behavior during CDI were 29.00 for Alex’s caregiver, 20.14 for Noah’s caregiver, and 25 for Tami’s caregiver. Once families transitioned to PDI, their skills maintained at near mastery level. These results maintained at follow-up assessment for all three families. Data for participants who terminated treatment prematurely are displayed in Figure 2. Rachel’s caregiver demonstrated a similar pattern of caregiver positive behavior skill acquisition prior to withdrawing from treatment. In contrast, while David’s caregiver demonstrated an increase in caregiver positive behavior after beginning CDI, the overall level of caregiver positive behavior maintained at the same level across
the first three sessions of CDI, but did not increase in the same way as the other participants.

The families completing treatment exhibited varying levels of caregiver negative behavior during baseline with Tami's caregiver exhibiting the highest level of caregiver negative behavior ($M = 38.50$). All families demonstrated the same response upon implementation
FIGURE 2. Caregiver Positive Behavior Exhibited by Caregivers Who Terminated Treatment Prematurely with Horizontal Lines Indicating Means for Each Phase

of CDI; frequency of caregiver negative behavior decreased and appeared more stable, which was consistent with the proposed hypothesis. During PDI, these scores remained low. The same pattern was observed for Rachel and David's caregivers although the decline in David's caregiver's use of negative behavior appeared to decrease more slowly when compared to the other families.

Consistent with the proposed hypothesis, the proportion of direct commands increased during PDI. Data on proportion of direct commands for Alex, Noah, Tami, and Rachel were highly variable across baseline and CDI ranging from 0% to 100%. There was an overall increase in the proportion of direct commands for Alex, Noah, and Tami during PDI, although data remained variable for Noah and Tami. Mean levels of direct commands during PDI for Alex, Noah, and Tami were 100%, 70.60%, and 66.27%, respectively. Rachel's
data followed a similar trend although data were only collected for one PDI session. David’s data were not examined for this variable as he terminated treatment prior to PDI.

All families demonstrated the same pattern of skill acquisition for contingent praise. Levels of contingent praise were low and almost nonexistent during baseline and CDI. During PDI, contingent praise increased for Alex, Noah, and Tami. These results are consistent with the clinical expectation that contingent praise would increase during PDI. While it appears as though Noah’s caregiver exhibited lower levels of contingent praise across PDI, it is important to note that his caregiver utilized contingent praise for all but two times Noah complied. Therefore, a better measure of contingent praise might have been a percentage with number of contingent praises divided by number of times the child complied (or number of caregiver opportunities).

Child compliance. For the three families that completed treatment, compliance rates varied during baseline and CDI, but made notable increases during the PDI phase of treatment (see Figure 3 for completers and Figure 4 for noncompleters). From baseline to PDI, compliance increased by more than 80% for Alex, 34% for Noah, and 59% for Tami. In addition, child compliance rates maintained at one-month follow up for all three families. Rachel’s compliance data were variable during baseline and CDI. It is unclear whether her compliance would have increased during PDI, although her compliance rate was 80% during her last and only session of PDI. David showed slight improvement from baseline to CDI although his data were limited and variable.

Caregiver report of child behavior. All participants presented with significant levels of child behavior problems as indicated by caregiver report. Consistent with the proposed hypothesis, caregiver report of child behavior problems decreased across both CDI and PDI phases of treatment to within normal limits (see Figure 5 for completers and Figure 6 for noncompleters). ECBI Intensity scores for Alex and Noah were relatively consistent throughout baseline. Alex’s ECBI Intensity scores gradually decreased across CDI and PDI. This pattern is consistent with previous research using the ECBI to monitor treatment progress during PCIT (Perez et al., 2002). Noah’s data remained relatively stable through CDI and decreased throughout
FIGURE 3. Child Compliance Rates Exhibited by Children Who Completed Treatment with Horizontal lines Indicating Means for Each Phase

PDI. Rachel’s data demonstrated a similar pattern, although after a stable baseline, data decreased slightly throughout CDI, but then remained stable at the same level throughout PDI. Tami’s data showed a more unique pattern in which the scores were variable during baseline and began to decline in CDI, but then increased
throughout the end of CDI and beginning of PDI. Her scores then decreased throughout the rest of PDI. One hypothesis for this pattern was the amount of caregiver contact with the child. Therapists from the study explained that Tami participated in a day camp during the study and that the decline in ECBI scores appeared to coincide with the amount of daily contact the caregiver had with Tami. When day camp was over, the ECBI scores increased before making a decline to within normal limits. ECBI Intensity scores maintained at follow up for the three completers. Finally, David’s limited data showed stable ECBI scores at the level of clinical significance throughout baseline and CDI.
FIGURE 5. ECBI Intensity Scores Reported by Caregivers Who Completed Treatment with Horizontal Lines Indicating Means for Each Phase and Dashed Horizontal Line Indicating the Cutoff for Clinical Significance

Patterns for the ECBI Problem scores were slightly different. For Alex and Noah, the pattern was roughly the same as the ECBI Intensity scores. Scores were variable during baseline and then began to gradually decrease during CDI. Both Alex and Noah demonstrated a slight increase after PDI was implemented. This phenomenon has been noted anecdotally among PCIT clinicians. It is
FIGURE 6. ECBI Intensity Scores Reported Caregivers Who Terminated Treatment Prematurely with Horizontal Lines Indicating Means for Each Phase and Dashed Horizontal Line Indicating the Cutoff for Clinical Significance

hypothesized that after the discipline procedure is implemented, children attempt to "test the limits." Once the children experience this procedure consistently, their problem behavior decreases. For Tami, there was a downward trend during baseline followed by an increase in ECBI Problem scores across CDI. Scores then gradually decreased across PDI. Follow-up ECBI Problem scores for the three completers were equal to or less than their lowest score obtained during treatment. In contrast, no notable change was detected in ECBI Problem scores for Rachel across baseline, CDI, and PDI. One possible explanation for this lack of change is the level of participation in the program. Specifically, therapists noted that Rachel’s caregiver was experiencing a significant amount of distress at this time and
reported to therapists that she was inconsistent in her completion of therapeutic homework due to these additional stressors. This overall level of distress is reflected in her PSI-SF scores in which the Parent Domain was significantly elevated (99th percentile). It has been suggested that one explanation for a profile in which there are high Problem scores and low Intensity scores on the ECBI is a low level of parental tolerance perhaps caused by distress (Eyberg & Pincus, 1999). Finally, David’s data followed the same pattern as his ECBI Intensity data remaining stable across baseline and CDI although well above the cutoff for clinical significance.

At pretreatment, all of the participants met criteria for a disruptive behavior disorder based on their caregiver’s responses to the DSM-IV Structured Interview for Disruptive Behavior Disorders with all participants meeting criteria for oppositional defiant disorder. Tami no longer met criteria for ODD at posttreatment or follow-up. Alex and Noah met criteria for an additional disorder at pretreatment: Alex met criteria for ADHD – Combined Type and Noah met criteria for ADHD – Impulsive Type. Alex met criteria for ADHD – Impulsive Type at posttreatment assessment and again at the follow-up assessment while Noah no longer met criteria for any disruptive behavior disorder at posttreatment or follow-up assessment.

Parenting stress. Results suggested that all caregivers reported significant levels of distress on at least one domain (e.g., Difficult Child) at pretreatment. It is possible that parenting distress may have impacted progress in treatment. Of the treatment completers, Noah needed the greatest number of CDI coaching sessions (i.e., 7) to reach CDI mastery with Alex and Tami needing five and four sessions, respectively. In addition, Noah’s caregiver was the only one to report a significant amount of distress on the Parent Domain of the PSI-SF, which assesses stressors independent of the child’s behaviors including depression and self-confidence in the parenting role. One theory is that these additional stressors may have impacted Noah’s caregiver’s ability to learn the skills effectively. This is supported to some degree by the fact that the only other participant (i.e., Rachel) to report such an elevated level of distress on the Parent Domain withdrew from treatment prematurely. This suggests that caregivers participating in PCIT who are experiencing additional stressors beyond those presented by parenting a difficult child or difficulties within the parent-child relationship may benefit from further assessment.
Consumer satisfaction. Overall, caregiver responses suggested a high degree of satisfaction with in-home PCIT with two of the caregivers giving the highest possible ratings at posttreatment assessment and follow-up assessment on the TAI. Consumer satisfaction measures were not obtained from Rachel and David's caregivers, so it is unclear whether their termination may have been influenced by dissatisfaction with the intervention. Finally, the TAI was designed to assess consumer satisfaction for the clinic-based PCIT program and no items addressed the home-based nature of the current intervention.

DISCUSSION

Home visitation has been implemented to address a variety of social problems from health concerns to prevention of child abuse and neglect (e.g., Gomby, Culross, & Behrman, 1999). Unfortunately, in a review of randomized trials of home visiting, very few (8 out of 20) describe delivered services (Duggan et al., 2000) making it difficult to determine what aspect of the intervention is effective. Home-based intervention is a promising treatment modality; however, with the notable exception of David Olds' (e.g., Olds et al., 1998) home-based program, the evidence supporting the use of home-based interventions is quite limited (e.g., Sweet & Applebaum, 2004). Results from the present study suggest that PCIT can be implemented successfully in the home setting without a one-way mirror or bug-in-the-ear device. Given the lack of empirical support for home-based interventions, the results from the present study become even more relevant. These results provide preliminary evidence that quality, empirically-supported interventions can be applied in the home setting.

Comparison to Previous Studies

To assist in the interpretation of these findings, a comparison to data from previous PCIT outcome studies is provided. Table 2 displays means and standard deviations for ECBI Intensity pretreatment, posttreatment, and follow-up scores and child compliance rates from the present study as well as for four PCIT outcome studies. The mean pre-treatment ECBI Intensity score from the present study (157.67 [SD = 34.82]) was lower than all means from previous PCIT outcome studies, which ranged from 166.59 (SD = 18.93; Nixon
TABLE 2. Comparison of ECBI Intensity Scores and Child Compliance Rates to Previous Studies

<table>
<thead>
<tr>
<th>Study</th>
<th>ECBI Intensity Scores</th>
<th>Percent Child Compliance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre M (SD)</td>
<td>Post M (SD)</td>
</tr>
<tr>
<td>Ware et al., 2006</td>
<td>157.67 (34.62)</td>
<td>89.33 (12.90)</td>
</tr>
<tr>
<td>Nixon et al., 2003</td>
<td>168.59 (18.93)</td>
<td>125.24 (21.67)</td>
</tr>
<tr>
<td>Schuhmann et al., 1998</td>
<td>172.9 (28.60)</td>
<td>131.6 (40.60)</td>
</tr>
<tr>
<td>Eisenstadt et al., 1993</td>
<td>169.3 (25.90)</td>
<td>112.0 (20.10)</td>
</tr>
<tr>
<td>McNeil et al., 1991</td>
<td>180.7 (28.20)</td>
<td>105.9 (29.20)</td>
</tr>
</tbody>
</table>

Note. ECBI = Eyberg Child Behavior Inventory; PCIT = Parent-Child Interaction Therapy.

et al., 2003) to 180.70 (SD = 28.20; McNeil et al., 1991) suggesting that children participating in the present study were exhibiting lower levels of disruptive behavior than those children included in other PCIT outcome studies. Similarly, the mean ECBI Intensity posttreatment scores for the three families who completed treatment in the present study were lower than the comparison means at 89.33 (SD = 12.90). Means from the other outcomes studies ranged from 105.9 (SD = 29.20; McNeil et al.) to 131.60 (SD = 40.60; Schuhmann et al., 1998). The mean ECBI Intensity score at a one month follow-up assessment for the present study was 71.67 (SD = 8.14). Follow-up assessment data were only available from two of the outcome studies. ECBI Intensity scores were 117.47 (SD = 31.69) at Nixon et al.’s six month follow up and 126.30 (SD = 42.10) at Schuhmann et al.’s four month follow-up. This is an interesting finding in that the ECBI Intensity scores for the present study continued to decrease at follow-up in comparison to the scores from the Nixon et al. and Schuhmann et al. studies in which the scores increased at follow-up.

Child compliance rates for the present study were compared to previous studies that included child compliance data (Eisenstadt et al., 1993; McNeil et al., 1991; Nixon et al., 2003; Schuhmann et al., 1998). Pretreatment compliance rates from the present study (21.79% [SD = 25.61]) were similar to the rates obtained in the
Schuhmann et al. study (i.e., 23%) but lower than those obtained in the other three outcome studies. All of the outcome studies including the present study achieved increases in child compliance at posttreatment. Posttreatment compliance rates for the present study were 100% for all three families. Posttreatment compliance rates in the other outcome studies were lower and ranged from 47 (Schumann et al.) to 81% (Nixon et al.). Compliance rates maintained at follow-up in the present study at 97.92% (SD = .03). Nixon et al. was the only other study to report follow-up compliance rates. Maintenance of treatment gains was observed at follow-up, with a rate of 83% (SD = 21). Although the present study was a single-subject examination of PCIT in the home setting, the data obtained on child compliance and ECBI Intensity scores is comparable to previous PCIT outcome studies.

**Clinical Considerations**

Clinicians providing treatment during this study were able to provide a wealth of information regarding the clinical challenges presented by in-home PCIT. All of the challenges reported by the clinicians could be generally categorized as related to having less environmental control in comparison to clinic-based PCIT. When conducting PCIT in the clinic, the clinician has great control over the environment as the clinic therapy room is typically bare except for a table for special playtime, two chairs for the caregiver and child to sit in, and a limited number of toys to use during the session. In contrast, when providing treatment in the home, there are many other physical distractions to contend with during session (e.g., other family members). While clinicians reported that the in-room coaching was initially awkward for families, they felt that providing treatment in the home setting helped facilitate rapport building with the families. These strengths and challenges should be explored in future research as they could impact providers and client treatment acceptability.

**Attrition.** While there were no proposed hypotheses related to attrition, we had hoped that providing treatment in the home would reduce the likelihood of premature termination. As reported earlier, there was a 40% attrition rate in the present study with two out of five families terminating prematurely. Although based on a very small sample, this rate is consistent with research on attrition in child
psychotherapy outcome studies estimating that approximately half of families terminate from treatment prematurely (Baekeland & Lundwall, 1975; Pekarik & Stephenson, 1988). While consistent with previous research, these results were surprising given that families were offered $300 in incentives for their participation. An attempt was made to collect exit interviews from the two families who withdrew from treatment in order to ascertain possible reasons for termination. Several attempts were made to contact David’s caregiver, but were met with no response. As indicated previously, Rachel’s caregiver reported feeling as though the intervention was too overwhelming for her given the additional stressors she was experiencing at the time (e.g., marital discord). Further research is needed to examine attrition and attendance for in-home PCIT in comparison to clinic-based PCIT. Should randomized controlled trials be conducted on the efficacy of in-home PCIT, it is recommended that these studies carefully examine patterns of attendance and attrition.

Limitations. Most of the limitations of the present study can be subsumed under concerns with generalization. First, this study was conducted with a number of sources of support. Clinicians conducted sessions in pairs 42.80% of the time. This is important to note because PCIT can be a very challenging therapy to implement as it is so directive due to the demands of live coaching and coding. Clinicians also had the support of an advanced undergraduate student who engaged in a number of tasks, including keeping siblings occupied during the session. Second, the clinicians who participated in this study were graduate students in a doctoral program for clinical psychology and received intensive supervision throughout the study. Third, the participants in this study were not clinic-referred. While participants met inclusion criteria for the study based on presence of child behavior problems, their average ECBI Intensity scores were lower than those reported in clinic-based PCIT outcome studies, suggesting that these children may not have exhibited behavior problems comparable to a clinic-referred population. Finally, this study was conducted in a small, university town. Should in-home PCIT be conducted in more urban settings, it is likely that clinicians would encounter unique barriers to treatment (e.g., concerns for safety of the therapist when working in areas with high crime, poverty).
Directions for future research. The promising results of this study open the door for many future research studies. As the present study examined the efficacy of in-home PCIT using an experimental, single-subject design, a logical next step would be to confirm these results using a randomized design to directly compare in-home and clinic-based PCIT (e.g., client outcomes, cost analyses, generalization of skills, attrition rates, and child abuse recidivism). One possible research design would be to compare three groups: clinic-based PCIT, in-home PCIT, and standard of care. Treatment dose including amount of time spent coaching as well as cumulative amount of therapist-client contact would have to be measured and controlled in any such comparisons. In addition, research examining whether these same results could be achieved by community mental health agency providers (who likely would not have access to the degree of support provided in the present study) will be critical in establishing in-home PCIT as an effective intervention for use in "real world" settings.

CONCLUSION

This study provided an initial evaluation of the efficacy of in-home PCIT. These promising results provide preliminary evidence supporting the use of in-home PCIT to affect change in caregiver behavior, caregiver report of child behavior, and child compliance similar to effects observed in the clinic setting. By demonstrating the efficacy of an evidence-based treatment in the home setting, this study adds to the growing literature aimed at improving the quality of home-based interventions.

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