

The Effectiveness of Parent–Child Interaction Therapy with Depressive Mothers: The Changing Relationship as the Agent of Individual Change

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Abstract This study uses a multi-method approach to investigate the effectiveness of Parent–Child Interaction Therapy (PCIT) in reducing children’s behavior problems when parents report clinical levels of depressive symptoms. Participants were 132 children, 2–7 years of age, and their biological mothers, who either reported low ($N = 78$) or clinical levels of depressive symptoms ($N = 54$). Results showed that depressive mothers were likely to report more severe child behavior problems than non-depressive mothers at the pre-treatment assessment, but that depressive mothers reported greater reductions in child behavior problems than non-depressive mothers from pre- to post-treatment. The two groups showed similar levels of observed interaction quality at the pre-treatment assessment (i.e., parent and child emotional availability and parent verbalization patterns) and similar improvements in interaction quality from pre- to post-treatment. The implications of the findings for clinical practice were discussed.

Keywords Maternal depression · Parent–Child Interaction Therapy · Treatment outcomes

Introduction

Although recent research found that depressed mothers have a slight negative bias when reporting on their children’s behavioral problems [1], a considerable body of literature states that children of depressed mothers are reported to have more behavior problems

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[1–4] and a higher risk of later psychopathology [2, 5] than children of non-depressed mothers. They are reported as being more oppositional and defiant, less cooperative, and more aggressive than children of non-depressed mothers [2, 6, 7]. In interactions with their children, depressed mothers have shown more negative affect, hostile, and coercive behavior than non-depressed mothers [8], were more disengaged [9], spoke with negative or flat affect [5], and were insensitive to their children's cues [10]. Maternal depression has been found to increase risks of child physical abuse and neglect [11, 12] and psychological aggression [13]. Decay in the quality of mothers' parenting is considered to be one mechanism by which their depression affects their children's mental health and socio-emotional development [8]. Whether improving the quality of mothers' parenting might also serve to disrupt this depressive family cycle is unclear.

When young children are referred for mental health services because their disruptive behavior problems make them difficult to manage, relationship-based interventions targeting parenting and the parent–child relationship are considered to be beneficial because of the pre-eminence of social-emotional development in this age group [14, 15]. Parent–Child Interaction Therapy (PCIT) is a relationship-based, parenting-oriented treatment that has been found to be effective in reducing children's disruptive behaviors [16], maintaining treatment gains for up to 6 years [17]. Recently, research has shown PCIT's effectiveness in reducing children's disruptive behavior and parental stress in high risk dyads, such as maltreating mother–child dyads [18] and dyads exposed to interparental violence [19], who are also likely to report high levels of depressive symptoms [11]. However, given the potential barriers caused by mothers' mental health in improving the parent–child relationship, it is important to understand how maternal depression affects the process of treatment in PCIT and whether or not it is a barrier to treatment effectiveness. The purpose of this study is to examine the effects of maternal depression on engagement in PCIT and the different ways it might influence treatment outcomes.

Maternal Depression and Treatment Outcomes

While there is research that speaks to whether mothers' depression is a barrier to treatment participation and effectiveness, the findings are somewhat mixed. Mothers' depression has been noted as a barrier to engagement in mental health services for their children [20, 21], but there is some speculation about whether it is mothers' mental health or related contextual stressors that impede participation in treatment. A qualitative study of mental health service providers' perceptions of the barriers to providing in-home services to young mothers cited mothers' mental health as a barrier, reporting that mothers with mental health problems were more difficult to engage and inconsistent in attendance than those with no mental health problems [21]. In a study of barriers to participation in a parenting-oriented intervention to reduce child behavior problems in 169, 2–14 year-old oppositional and defiant children, Kazdin and Wassell [20] found that parent psychopathology predicted whether they subsequently perceived barriers treatment, such as a lack of relevance or demandingness. The perception of such treatment barriers predicted participation in treatment [22]. The research of Kazdin and his colleagues [20, 23] suggests that in addition to depressive symptomology, there may be a strong cognitive component to decisions about whether or not to drop out of treatment. These cognitive dimensions, in addition to reduced exposure to therapeutic intervention have been found to reduce the benefits families receive from treatment [24].

In addition to predicting treatment attrition, depressive symptoms such as fatigue and poor concentration could interfere with the acquisition of parenting skills [or adherence to

treatment protocols, diminishing its effectiveness [25]. A meta-analysis of predictors of the efficacy of parent training for reducing externalizing behavior problems in young children, using 11 studies conducted between 1980 and 2004, showed that maternal depression diminished the effectiveness of the intervention [25]. However, a recent study of mediators and moderators of outcomes in a study of the effectiveness of a parenting intervention for reducing conduct problems in young children found that while depressive symptoms and ratings of numbers of behavior problems were strongly related in the control group post-treatment, there was little observable relationship between numbers of endorsed depressive symptoms and numbers of problem behaviors [26]. Average scores on this measure were below the clinical cut-off for all mothers in the intervention group. These findings suggest that the intervention was successful in reducing numbers of child behavior problems for all mothers and that its efficacy was not impeded by mothers' depressive symptoms. Results of another study investigating the efficacy of an attachment-oriented treatment for young children with depressed mothers supported the notion that a parenting-oriented treatment for reducing children's behavior problems could be effectively provided when mothers were depressed [27]. Findings showed clinically significant pre- to post-treatment improvements in observed attachment security of children with depressed mothers receiving the intervention [27]. Finally, results of a study using data from six clinical trials examining the most effective strategy for treating young children with conduct problems suggested that depressed mothers fared better when the treatment protocol addressed parent and child factors, and only when behavioral observations, rather than parent reports of behaviors were used as assessments [28]. While research suggests that mothers' depression does not prevent a treatment from being effective, there are variations in findings that may be connected with biases in depressed mothers' reporting.

Chronically depressive mothers' reports of their children's behavior have been reported as negatively biased [2], but it is unclear how this bias is influenced by participation in treatment and on our ability to estimate its effectiveness. Gardner and colleagues' study of the mediators and moderators of the effectiveness of a treatment for reducing children's disruptive behaviors found that depressed mothers who participated in a parenting intervention reported significantly lower scores than non-depressed mothers [26]. They speculated that mothers' depressive symptoms were relieved as a result of participating in treatment; hence there was more change in parents' reports of the numbers of their children's behavior problems. However, it is not clear whether the changes depressed mothers reported were perceived changes in their children's behavior resulting from reductions in the mothers' depressive symptoms or whether they were "real". In evaluating the effectiveness of PCIT, it is important to know whether reported changes in the children's behavior are result of the reporters' diminishing negative bias or real changes in children's functioning.

We hypothesize that there are several ways in which mothers' depressive symptoms could affect PCIT outcomes. First, because research has shown that depressive mothers were more difficult to engage and retain these mothers in treatment [23], we hypothesize that mothers reporting clinical levels of depressive symptoms will be more likely to terminate at every phase of treatment. Second, if depressive symptoms interfere with the acquisition of parenting skills, the effectiveness of treatment, or adherence to treatment protocols [25] depressive mother-child dyads should need more time to complete treatment and should show less change from pre- to post-treatment than non-depressive dyads. Last, research findings have shown that depressed mothers' reports of their children's behavior are somewhat negatively biased [2] but it is unclear how this bias is influenced by participation in treatment. To determine whether reported improvements in child behavior

problems from pre- to post-treatment are “real” or a function of biased perceptions, we will compare mothers’ ratings with observations of children’s behavior. We expect that depressive mothers will report that their children’s behavior is worse than non-depressive mothers, but that there will be little observed difference in the behavior of the two groups of children before treatment begins. If depressive mothers accurately report significant improvements in their children’s behavior, we should observe a comparable improvement in observed behaviors. We will also examine changes in mothers’ depressive symptoms from pre- to post-treatment. While examining mediators and moderators of PCIT’s effectiveness is outside the scope of this paper, knowing whether or not depressive symptoms improve over the course of PCIT will help us understand whether reduced depressive symptoms are likely to be related to reduced child behavior problems.

Method

Study Participants

Analyses were conducted in two stages. The first stage of analyses, investigating differences in treatment participation, used as a sample all biological mother–child dyads referred to PCIT between February 1997 and December 2009 for treatment of children’s externalizing behavior problems ($N = 236$) in which the child was at least 2 and less than 8 years of age and mothers had either self-reported few depressive symptoms on a standardized measure of psychological symptoms (at least one standard deviation below the clinical cutoff) or in the clinical range. Additionally, mothers needed to have completed all pre-treatment measures of child behavior problems. The children averaged 4.47 years of age ($SD = 1.32$); 60% were male. The sample participants were diverse in race and ethnicity. Approximately half of mothers and children were White/Non-Hispanic (46% of children and 50% of mothers), 26% of the children and 20% of mothers were African American, and 24% of children and 20% of their mothers were Latino; 4% of the children and 10% of mothers were of other races and ethnicities. Mothers ranged from 17 to 45 years of age ($M = 27.8$ years, $SD = 5.88$). The sample was considered high-risk because of the children’s history of maltreatment: 75% of the sample was referred to treatment by child welfare social workers; and 48% were court-mandated to treatment. Approximately 42% of the children had a suspected or documented history of physical abuse, 57% had a suspected or documented history of neglect, and 55% had a history of exposure to interparental violence. Many of the mothers (60%) had a history of alcohol or drug abuse; 49% of the children had suspected or documented prenatal exposure to alcohol or drugs.

The second stage of analysis, investigating differences in treatment effectiveness, used a subset of those dyads included in the first stage of analyses who had completed standardized and observational assessments at a minimum of two assessment points (e.g., pre- and mid- or post-treatment; $N = 132$): 78 dyads were in the low depressive symptom group, 54 dyads were in the high symptom group. Approximately 77% of the 132 dyads completed a full course of PCIT.

The treatment setting was a university hospital-based outpatient clinic primarily serving children with a history of maltreatment. Children were assessed to determine the presence of a child mental health diagnosis and the appropriateness of PCIT. All met County-defined criteria for medical necessity. The University of California, Davis IRB approved the consent form and the description of the study, and all participants gave informed consent to participate in research.

Procedures

Parents of children referred to Parent–Child Interaction Therapy were given a battery of standardized measures and a short demographic questionnaire after they came to the clinic for the first time. Parents were asked to complete the assessments before beginning treatment, after the first phase of treatment (CDI), and immediately post-treatment. Additionally, therapists conducted a videotaped 15-min semi-structured observational assessment of the quality of caregiver and child interactions. The parent and child played together at a table in a room equipped with a two-way mirror, and were concurrently videotaped. The parent wore a “bug-in-the-ear” device, so that they could hear the therapist from the other side of the 2-way mirror.

Dyads were considered to have completed treatment after the parents mastered the skills taught in both the CDI and PDI portions of PCIT and children responded to their parents’ efforts to manage their behavior. For example, if a child had a tantrum and the parent without coaching could not help the child to recover sufficiently to resume play, the dyad was not graduated. The average number of treatment sessions (including assessments) to treatment completion was 17.9 (SD = 6.4).

Parent–Child Interaction Therapy (PCIT)

PCIT is a 14- to 20-week, manualized intervention founded on social learning and attachment theories. PCIT is designed for children between 2 and 7 years of age with externalizing behavior problems [29]. The underlying model of change is similar to that of other parent-training programs, asserting that by providing parents with behavior modification skills, they become the agent of change in reducing their children’s behavior problems, which in turn promotes more positive parenting. PCIT incorporates both parent and child in the treatment sessions and uses live, individualized therapist coaching for an idiographic approach to changing the dysfunctional parent–child relationship.

PCIT is conducted in two phases. The first phase focuses on enhancing the parent–child relationship (Child-Directed Interaction; CDI), and the second on improving child compliance (Parent-Directed Interaction; PDI). Both phases of treatment begin with an hour of didactic training, followed by sessions in which the therapist coaches the parent during play with the child. From an observation room behind a two-way mirror, via a ‘bug-in-the-ear’ receiver that the parent wears, the therapist provides feedback on the parent’s use of the skills. Parents are taught and practice specific skills of communication and behavior management with their children. In addition to practicing these skills during clinic sessions, parents are asked to practice with their children at home for 5 min every day.

In CDI (typically 7–10 sessions), parents are coached to follow their children’s lead in play by describing their activities, reflecting their appropriate verbalizations, and praising their positive behavior. By the end of CDI, parents generally have shifted from rarely noticing their children’s positive behavior to more consistently attending to or praising appropriate behavior. Caregivers are considered to have mastered the skills taught in CDI by demonstrating in a 5 min assessment that they can give behavior descriptions (e.g., “You are building a tall tower.”), reflections (i.e., repeating back or paraphrasing the child’s words), and praises (e.g., “Thank you for playing so gently with these toys.”), with few instances of asking a question and/or giving a command, and without criticism. They then move to the second phase of treatment. It should be noted that this clinic uses “Rules for Special Playtime” and several other non-coercive strategies to manage children’s

difficult behavior during CDI. This adaptation is used by many clinics that primarily treat high-risk, child welfare populations, but diverges from the traditional form of PCIT.

In PDI (typically 7–10 sessions) therapists train parents to give only clear, direct and essential commands, maximizing chances for compliance. These parents traditionally learn a specific method of using time-out for dealing with noncompliance and may also be taught “hands-off” strategies (e.g., removal of privileges) if indicated. These methods are designed to provide caregivers tools for managing their children’s behavior while helping them to avoid using physical power and to focus instead on using positive incentives and promoting children’s emotional regulation. Mastery of behavior management skills is achieved when therapists observe that caregivers are able to use the strategies without being coached, and when parents report that these strategies are effective. By the end of PDI, the process of giving commands and obtaining compliance are predictable and safe for parents and children.

There have been numerous studies demonstrating the efficacy of PCIT for reducing child behavior problems [16, 30]. Positive effects have been maintained for up to six years post-treatment [17].

Observational Coding

For coding in Emotional Availability (EA), it was standard practice for two coders to code each tape and to agree on 85% of codes. All non-matching codes were resolved by discussion between the coders. When needed, a third coder would evaluate and code the mother–child interaction. For coding parent verbalization types using the Dyadic Parent–Child Interaction Coding System (DPICS), it was standard practice for coders to code the observation twice through to ensure reliability.

Measures of Child and Parent Behavior

Standardized Assessments: Child Behavior Checklist (CBCL)

The CBCL [31–34] is a standardized instrument that lists approximately 100 child behavior problems. Parents or regular caregivers are asked to report on the frequency of problem behaviors in their children on a 3-point scale (0 = never to 2 = often). Separate norms are provided for boys and girls. We combine older and newer versions of two forms of the CBCL: one form is designed for young children [32, 33] and one for middle childhood and teen years [31, 34]. Therapists transitioned from the old to the new versions of the CBCL in 2003, and were careful to administer the same version at both assessment points, so that a dyad’s pre- to post-treatment change would be measured by the same version. We used the CBCL’s two broadband scales (Internalizing and Externalizing Behaviors), and the total problem score as measures of children’s symptom severity. We assume that although these scales are composed of slightly different items in the forms for younger and older children, that the meaning of internalizing, externalizing, and total problem behaviors is consistent across forms. The old and new versions of the broadband scales of the CBCL are highly correlated [31, 34] and we do not differentiate scores from the two versions.

Eyberg Child Behavior Inventory (ECBI)

The ECBI [35] is a 36-item scale that measures behavior problems exhibited by children aged 2–16 years as reported by the caregiver. In contrast to the CBCL, the ECBI lists

behaviors more commonly associated with disruptive behavior disorders (e.g., dawdling, arguing or fighting with siblings, sassiness). Caregivers indicate the frequency of these behaviors along a 7-point scale (1 = never to 7 = all the time) and whether they perceive the behavior as a problem (1 = Yes, 0 = No). Resulting scales reflect the Intensity and Number of Behavior Problems. The reliability and validity of the ECBI is well established [35]. Test–retest reliability estimates across a three-week period yielded coefficients of $r = .86$ and $r = .88$ for the scales [35].

Observational Assessments: Emotional Availability Scales (EAS, 3rd Ed.)

The EAS, 3rd Ed. [36] is an observational coding system for assessing the global qualities of the caregiver-child relationship. It consists of four parent scales and two child scales, measuring parents' sensitivity, hostility, intrusiveness and control, supportive presence and children's responsiveness and involvement of their parents in their play. Scores on the EAS have shown significant correlations with earlier assessments of infant attachment style [37].

Coders were doctoral level researchers, undergraduate, and graduate students in psychology or human development who received didactic training in Emotional Availability coding and procedures. Coders achieved mastery when 85% of their codes matched each of 5 criterion tapes coded by the first, second, and third authors. A random selection of 16 assessments was separately coded by a former student of Dr. Biringen's to check this project's reliability with other trained EA coders. Intercooder reliability was calculated using the intraclass correlation coefficients and were as follows: Parental sensitivity, $r = .90$; Non-hostility, $r = .94$; Non-intrusiveness, $r = .82$; Structuring, $r = .71$; Child responsiveness, $r = .77$; Involvement, $r = .84$, indicating adequate reliability. It was standard practice for two coders to code each tape and to agree on 85% of codes. All non-matching codes were resolved by discussion between the coders. When needed, a third coder would evaluate and code the mother-child interaction. No tape was considered "coded" until at least two sets of codes matched on 85% of codes. For reliability purposes, approximately 25% ($N = 62$) of the videotapes were randomly selected for recoding after all the tapes had been coded. This procedure also checked for observer drift. Intraclass correlation coefficients ranged from a low of .87 (Intrusiveness) to a high of .92 (Parent Sensitivity), suggesting good reliability.

Scores for each scale were averaged across the three play situations (child-directed play, parent-directed play, and clean up), and converted to percentage scores to obtain comparable metrics. The four parent scales were averaged together to form a summary measure for parents' EA; and the two child scales were averaged to form a summary score for children's EA.

Dyadic Parent-Child Interaction Coding System (DPICS)

We used the Dyadic Parent-Child Coding System-II (DPICS-II) to code parents' verbalizations. DPICS-II is a microanalytic coding system, designed by Eyberg and her colleagues [38] to categorize every verbalization in a parent-child interaction. The coding categories have particular relevance to the assessment of progress in PCIT. DPICS-II has a total of 52 different codes for verbalizations, vocalizations, and behaviors. In this study, we focus on encouraged verbalization categories commonly used by PCIT therapists in weekly assessments (behavioral descriptions, reflective statements, praise) and discouraged verbalizations (questions, commands, and critical statements). Behavioral descriptions give

specific information about the child's current or immediately completed behavior. In reflective statements, a parent repeats the child's verbalization that immediately preceded it. Praise is defined as any positive evaluation of children's attributes, products, or behaviors. Discouraged verbalizations are comprised of commands (parental directions to the child to perform a behavior), questions (verbal inquiries that do not have any implicit demand for behavior), and critical statements (negative evaluations of children's attributes, products, or behaviors). To test for reliability and coder drift, approximately 25% of tapes were recoded and intraclass correlations were computed for encouraged parent verbalizations ($r = .83$) and discouraged parent verbalizations ($r = .81$). These coefficients suggest that codes for these parent verbalization categories are reliable.

Measure of Mothers' Depressive Symptoms

Symptom Checklist 90-R (SCL-90-R) and Brief Symptom Inventory (BSI)

The SCL-90-R and the BSI are two self-report symptom inventories designed by Derogatis [39, 40] to assess current presence of adult psychological symptom patterns. The SCL-90-R contains 90 items and the BSI, a short form of the SCL-90-R, has 52-items. Each measure lists brief descriptions of psychological symptoms that are rated on a 5-point scale (0 = no discomfort to 4 = extreme discomfort). Both the BSI and the SCL-90-R have nine symptom subscales: somatization, obsessive-compulsive, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, psychoticism. We began using the BSI instead of the SCL-90-R in 2002 to reduce the amount of paperwork for parents. Derogatis [40] reported that the measures of the BSI and SCL-90-R were all highly correlated (all above $r = .90$). We do not distinguish between mothers whose depressive symptoms are measured by T scores from the BSI versus the SCL-90-R. The test-retest reliability coefficient for this indicator, measured in a sample of $N = 60$ across a two-week period, was $r = .90$ [39].

Defining Depressive and Non-Depressive Groups

In this study, we use the Depression scales of the BSI and SCL-90R to categorize mothers into one of two groups: those high in depressive symptoms (T score = 60 or more) and those in the normal range (T score = 50 or less). By omitting the group with borderline levels of depressive symptoms, we maximize our ability to identify distinguishing characteristics of depressive mothers' treatment gains in PCIT.

Measures of Family Risk Factors

Information about children's history of abuse, neglect, and exposure to domestic violence was obtained by review of the child's clinic file. The file contained therapists' reports, social workers' reports, court records, and therapists' clinical assessments, which contained information about the child's trauma history. When there was an unsubstantiated possibility that a child might have been abused, we labeled the case as having "suspected maltreatment." A child might have "suspected maltreatment" if an allegation of abuse or neglect was mentioned on a referral or other communication with a child welfare social worker or a caregiver. Children were classified as either having a suspected or documented history of maltreatment, or having no history of maltreatment. For purposes of this study,

children with suspected and documented histories of maltreatment were both classified as having a history of maltreatment.

Power of Analyses

We used an alpha of .05 in all analyses. With an average sample size of 50–60 in our analyses of treatment effects was sufficient to detect medium-large effect sizes with a power of .80. In addition to the observed power of treatment effects, we present η^2 (eta-squared) for analyses of variance and ϕ (phi), statistics that indicate the proportion of variance accounted for by membership in the designated groups (i.e., the between-subjects factor). Eta-squared is roughly the square of f , the statistic measuring effect size in analyses of variance. According to Cohen [41], a small effect size for an analysis of variance is $f = .10$ ($\eta^2 = .01$), a medium effect size is $f = .25$ ($\eta^2 = .06$), and a large effect size is $f = .40$ ($\eta^2 = .16$). In a 2×2 cross-tabulation, phi is equal to the effect size indicator, w in which a small effect size is $w = .10$, medium effect size is $w = .30$, and large effect size is $w = .50$ [41].

In order to increase our ability to generalize the meaning of our findings and maximize the power of statistical analyses, we used the group of dyads completing at least the first phase of treatment ($N = 132$) and included a dummy variable indicating whether or not the dyad had completed the full course of treatment in analyses of treatment effectiveness. In addition to including cases that only completed the first phase of treatment, we also included cases that were missing post-treatment assessments but had mid-treatment assessment. Using the “Last Observation Carried Forward” (LOFC) technique for imputing missing data consisting of more than one time point, we substituted mid-treatment assessments for post-treatment assessments when cases were missing the post-treatment assessment, covarying whether post-treatment assessments were missing.

Results

Demographic Differences

Table 1 describes the demographic and family risk of the groups with depressive and non-depressive mothers. Results of chi-square and analysis of variance analyses show few group differences. Mothers did not differ in age, ethnicity, educational attainment, or marital status. Children did not differ in age, gender, ethnicity, or risk history.

Differences in Treatment Effectiveness

Early Treatment Termination

In order to test whether depressive mother–child dyads were more likely to terminate PCIT before fully completing a course of treatment, we performed a binary logistic regression. Results of this analysis showed that depressive mothers were 44% more likely to terminate treatment before completing both phases of treatment (Odds ratio = .56, $p = .03$). To determine whether depressive symptoms increased the likelihood of dropout proportionally over the course of treatment, we performed a Cox regression, using the categories “never started treatment,” “some CDI coaching,” “completed CDI,” “completed treatment” to

Table 1 Descriptive differences between dyads with mothers endorsing clinical levels and normal levels of depressive symptoms

	Non-depressive (<i>N</i> = 131)	Depressive (<i>N</i> = 105)	Effects
Sex of child (% male)	60.3%	59.0%	
Age of child (in years)	4.35 (1.3)	4.60 (1.3)	
Child ethnicity:			
% Caucasian	45.0	47.6	
% African American	24.4	27.6	
% Latino/a	25.2	22.9	
% Other	5.3	1.9	
% Child: physical abuse history	43.5	39.0	
% Child: neglect history	57.3	57.1	
% Interparental violence history	53.5	56.9	
% Child: prenatal exposure to AOD	47.3	51.0	
% Child ever in foster care	68.7	58.1	
% Mother—single marital status	65.6	74.3	
% Mother—high school grad or less	72.5	82.9	
Mothers' ethnicity:			
% Caucasian	49.6	52.4	
% African American	19.1	21.0	
% Latino/a	22.1	16.2	
% Other	9.2	10.5	
Age of mother (in years)	28.0 (5.6)	27.6 (6.3)	
Mother—mental health diagnosis	24.6	36.2	

represent a meaningful indicator of time in treatment by phase completed. The results of this analysis revealed a non-significant predictive effect of mothers' depressive status on the speed of dropout (Odds ratio = 1.27, $p = .177$). The combination of these findings suggests that although the overall magnitude of depressive mother-child dyads leaving treatment before completion was greater than that of the non-depressive group, this effect was cumulative, so that at an earlier point in treatment, the two groups' attrition rate would not have significantly differed. An examination of the marginal distributions showed that while 36% of depressive and 50% of non-depressive mother-child dyads completed both phases of treatment, a significant difference between groups ($\chi^2(1, N = 236) = 4.76$, $p = .029$, $\phi = .14$), 55% of depressive and 63% of non-depressive dyads completed the first phase of treatment and had at least two assessment points. This difference between groups was not significant ($\chi^2(1, N = 236) = 1.31$, $p = .253$, $\phi = -.07$).

Treatment Outcomes

In order to determine whether mothers' depressive symptoms interfered with treatment outcomes in PCIT, we performed 2×2 repeated measures multivariate analyses of covariance to test the likelihood that the parent verbalizations for dyads in the depressive

Table 2 Mean levels of parent and child EA scale scores pre- and post-treatment by level of mothers' depressive symptoms

Depressive symptom level	Non-depressive		Depressive		Effects
	(Mean)	(SD)	(Mean)	(SD)	
Encouraged parent verbalizations	<i>(N</i> = 70)		<i>(N</i> = 45)		<i>A</i> **
Pre-treatment	6.09	(5.5)	4.71	(5.5)	
Post treatment	21.71	(10.9)	21.69	(13.1)	
Discouraged parent verbalizations					<i>A</i> ***
Pre-treatment	41.79	(15.3)	39.09	(12.3)	
Post treatment	13.96	(8.92)	12.56	(9.5)	

A Assessment point (pre-treatment vs. mid- or post-treatment), *OP* Observed power

** $p < .01$ ($OP > .80$); *** $p < .001$ ($OP = 1.0$)

group would differ significantly from those of non-depressive dyads. The repeated measure was the assessment point (*A*: pre- vs. mid/post-treatment), and the between-subjects factor was depressive group (*Dep*: clinical levels of symptoms vs. normal range). Two covariates were included in each analysis: a dummy variable indicating whether or not the participant had terminated treatment early and one indicating whether or not the participant was missing data on the post treatment assessment.

We examined first whether mothers depressive symptoms interfered with parents' skill acquisition by analyzing group differences in pre- to post-treatment change in encouraged and discouraged parents' verbalizations during the first 5 min of the 15-min observational assessment (child-directed play). Encouraged verbalizations include behavioral descriptions, reflective statements, and praise; discouraged verbalizations include commands, questions, and critical statements. Results (see Table 2) showed no indication that depressive symptoms interfered with PCIT's effectiveness. We observed significant pre- to post-treatment changes in parent verbalizations (*A*: $F(2, 104) = 8.74, p < .001, \eta^2 = .14$, (Observed power) $OP = .97$), with no further variation by depressive group ($A \times Dep$: $F(2, 104) = .23, p = .80$), and no significant main effect for depressive group (*Dep*: $F(2, 104) = .72, p = .49$). An examination of the mean frequencies of verbalizations showed increases in encouraged verbalizations and decreases in discouraged verbalizations for both depressive and non-depressive mothers.

Child Behavior Problems

In order to determine if mothers' depressive symptoms interfered with predicted reductions in child behavior problems, we tested the likelihood that the pre- to post-treatment change in child behavior problems for dyads in the depressive group would differ significantly from those of non-depressive dyads. Table 3 shows the mean levels of child behavior problems pre- and post-treatment for children with depressive and non-depressive mothers, together with significant univariate effects for individual scales. Results of analyses showed no indication that mothers' depressive symptoms interfered with the effectiveness of PCIT in reducing behavior problems. Although results showed that depressive mothers reported significantly more behavior problems on the ECBI than non-depressive mothers (Overall $F(2, 122) = 8.69, p < .001, \eta^2 = .13, OP = .97$), significant treatment effects were observed for both groups (overall $F(2, 122) = 3.78, p = .03, \eta^2 = .06, OP = .68$). We observed a significant treatment by depressive group interaction, suggesting that the

Table 3 Mean *T* scores for parent-reported child behavior problems, pre- and post-treatment by level of mothers' depressive symptoms

Depressive symptom level:	Non-depressive		Depressive		Effects
	(Mean)	(SD)	(Mean)	(SD)	
ECBI—intensity of problems	(<i>N</i> = 75)		(<i>N</i> = 52)		A**, A × Dep*, Dep***
Pre-treatment	52.9	(11.6)	62.2	(10.0)	
Post treatment	45.5	(10.6)	51.1	(10.9)	
ECBI—number of problems					A*, A × Dep***, Dep***
Pre-treatment	55.4	(10.9)	64.2	(9.4)	
Post treatment	46.8	(10.8)	49.7	(9.9)	
CBCL—internalizing	(<i>N</i> = 74)		(<i>N</i> = 51)		A**, A × Dep+, Dep***
Pre-treatment	49.7	(10.1)	59.6	(9.6)	
Post treatment	42.0	(10.1)	48.8	(12.0)	
CBCL—externalizing					A**, A × Dep+, Dep***
Pre-treatment	54.3	(12.0)	65.5	(8.8)	
Post treatment	45.6	(12.1)	53.4	(11.7)	
CBCL—total					A**, A × Dep*, Dep***
Pre-treatment	52.0	(10.8)	63.3	(8.9)	
Post treatment	44.0	(11.7)	51.5	(12.3)	

A = Assessment point, Dep = Level of depressive symptoms (low, high), A × Dep = Assessment point by Depressive symptom group, OP = Observed power

+ $p < .10$ (OP < .50); * $p < .05$ (OP < .80); ** $p < .01$ (OP > .80); *** $p < .001$ (OP = 1.0)

strength of these treatment gains varied by group (overall $F(2, 122) = 6.94$, $p = .001$, $\eta^2 = .10$, OP = .92). However, an examination of the mean scores suggested that mothers in the depressive group reported more improvement from pre- to post-treatment in their children's behavior than mothers of children in the non-depressive group.

Results of analyses of the three CBCL broadband scales (see Table 3) also showed no sign of depressive symptoms interfering with treatment effectiveness. We observed significant improvements in behavior from pre- to post-treatment for both groups (overall $F(3, 117) = 3.83$, $p = .01$, $\eta^2 = .09$, OP = .81), significant differences between depressive and non-depressive dyads (overall $F(3, 117) = 11.12$, $p < .001$, $\eta^2 = .22$, OP = 1.0), but no significant variation in pre- to post-treatment differences by mothers' level of depressive symptoms (overall $F(3, 117) = 1.71$, $p = .17$).

Behavioral Change

In order to test whether the behavioral change reported by depressive mothers was reflected in the dyad's behavior, we tested the likelihood that pre- to post-treatment change in children's emotional availability to their parents in the depressive group would differ significantly from those of non-depressive dyads, performing 2×2 repeated-measures multivariate analyses of covariance. Results suggested that changes in child behavior were indeed "real." As shown in Table 4, children of depressive and non-depressive mothers both improved from pre- to their second assessment, particularly if it was conducted after the second phase of treatment (A: $F(2, 110) = 5.44$, $p = .02$, $\eta^2 = .05$, OP = .64; A × MD: $F(1, 110) = 7.93$, $p = .006$, $\eta^2 = .07$, OP = .80). There was no indication that

Table 4 Mean levels of child EA scale scores pre- and post-treatment by level of mothers' depressive symptoms

Depressive symptom level:	Non-depressive		Depressive		Effects
	(Mean)	(SD)	(Mean)	(SD)	
Child EA (% of total points)	<i>N</i> = 67		<i>N</i> = 45		<i>A</i> *, <i>A</i> × <i>MD</i> **
Pre-treatment	57.7	(12.4)	57.5	(12.0)	
Post treatment	66.1	(12.9)	64.1	(17.8)	

A = treatment, *MD* = Missing data at post-assessment

* $p < .05$ (*OP* < .80); ** $p < .01$ (*OP* > .80)

children of depressive mothers improved more or less than children of non-depressive mothers ($A \times \text{Dep}$: $F(1, 110) = .03$, $p = .85$), nor were overall group differences observed (Dep : $F(1, 110) = .03$, $p = .86$).

While these findings showing improvements in parent reports and observations of children's behavior suggest that depressive mother–child dyads' behaviors change at least as much as non-depressive mother–child dyads over the course of treatment, we cannot know with certainty because assessment points may not have been comparable in analyses of the different assessments. Hence, we performed a follow-up analysis to try to determine whether depressive mothers showed bias in their estimates of their children's behavior pre- and or post-treatment and whether the reported improvements were “real” improvements. We conducted a mixed-model, repeated-measures multivariate analysis of covariance, with assessment point and assessment type (*Atype*: Parent assessment-ECBI intensity scale vs. Observation- child EA) as repeated measures, depressive group as the between-subjects measure, and mid versus post-treatment data indicators as covariates. Scores for both scales were on the same metric (1–100). Results confirmed only that the behavior of children of depressive mothers was more negative than that of non-depressed mothers, but improved more from the pre-treatment to the final assessment. We did not detect any group differences in the contrast between parent ratings and observed assessments of children's behaviors ($Atype \times \text{Dep}$: $F(1, 107) = 1.41$, $p = .24$; $A \times Atype \times \text{Dep}$: $F(1, 107) = 1.39$, $p = .24$). We observed a significant assessment point by depressive group interaction ($A \times \text{Dep}$: $F(1, 107) = 3.93$, $p = .05$, $\eta^2 = .04$, *OP* = .50) and main effects for assessment point (*A*: $F(1, 107) = 97.99$, $p < .001$, $\eta^2 = .44$, *OP* = 1.0), depressive group (Dep : $F(1, 107) = 6.46$, $p = .01$, $\eta^2 = .06$, *OP* = .71).

Dosage Effects

To determine whether depressive symptoms interfered with treatment gains differently in the relationship enhancement phase of PCIT, when dyads had less exposure to PCIT coaching, we re-ran the analyses of change in child behavior problems from the pre- to post-treatment assessment using as an independent variable (instead of a covariate), the indicator of whether the “last observation” was collected after the first (i.e., mid) or second phase (i.e., post) of PCIT (*MD*) and including a depressive group by mid/post assessment point interaction term in the model ($A \times \text{MD}$). Results of analyses showed no indication that depressive dyads showed any differences in the trajectory of pre- to mid-treatment change in behavior problems compared to pre- to post-treatment change. We observed significantly greater improvements in parent-rated child behavior problems from pre- to post-treatment compared to pre- to mid-treatment on the ECBI ($A \times \text{MD}$: $F(1,$

121) = 4.40, $p = .014$, $\eta^2 = .07$, $OP = .75$); and, significantly greater improvement in observed behaviors from pre- to post-treatment compared to pre- to mid-treatment in children's emotional availability ($A \times MD$: $F(1, 110) = 7.93$, $p = .006$, $\eta^2 = .07$, $OP = .80$). However, none of these differences varied further by mothers' depressive symptom status, suggesting that receiving a full course of PCIT was more effective than only the relationship enhancement phase for both groups.

Change in Depressive Symptom Endorsement

At pre-treatment, all mothers in the depressive symptom group had a T score of 60 or better on a standardized measure of depressive symptoms. At post-treatment, 20.7% of mothers in this group endorsed symptoms in the clinical range. In contrast, all mothers in the non-depressive group endorsed scores one standard deviation below the clinical cut-off for depressive symptoms pre-treatment (i.e., T score < 50) and 3.8% ($N = 2$) of these mothers endorsed symptom levels above the clinical cut-off post-treatment. This represents a significant pre- to post-treatment reduction in depressive symptoms for the depressive group (Depressive group Mean T scores: Pre = 66.3 (5.2); Post = 51.2 (10.6); Non-depressive group Mean T scores: Pre = 43.2 (4.3); Post = 43.6 (6.7); $A \times Dep$: $F(1, 85) = 54.16$, $p < .001$, $\eta^2 = .39$, $OP = 1.0$). However, because parents' psychological symptoms were only measured pre- and post-treatment, these changes only represent endorsements by mothers completing the full course of treatment: 82% of the non-depressive group and 70% of the depressive group.

Discussion

The purpose of this study was to determine whether mothers' depressive symptoms interfered with the effectiveness of a relationship-based treatment for children that focused on changing parent behavior (i.e., PCIT). Taken together, results of analyses presented here suggest that mothers' symptoms impede their ability to complete treatment, but do not impede skill acquisition or positive change associated with participation in PCIT.

We found that mothers in the depressive group were less likely to complete a full course of PCIT than mothers in the non-depressive group, but did not significantly differ in their rate of attrition. Hence, we correctly surmised that the two groups would be equally likely to complete the first phase of treatment. In order to avoid biasing our estimates of the effects of depressive symptoms on treatment effectiveness by selecting only those depressive mothers who were able to complete treatment, we included in our analyses dyads who completed only the first phase of treatment as well as those who completed a full course of PCIT.

When mothers in the depressive group and non-depressive groups began PCIT, they were observed to use similarly low levels of praise, reflection, and descriptions (encouraged) and similarly high levels of commands, questions, and critical statements (discouraged). At post-treatment, we observed significantly higher encouraged verbalizations and lower discouraged verbalizations for both groups of mothers. Furthermore, the observed change was proportionally similar for both groups of mothers.

On initial assessments, depressive mothers reported more severe child behavior problems than non-depressive mothers, consistent with many studies of children of depressed mothers [2, 6, 7]. Analyses showed that depressive mothers reported greater improvements from pre- to post-treatment on ECBI and CBCL scales than non-depressive mothers. This

pattern of results has been noted in other studies [26]. However, the configuration of findings left some doubt about whether depressive mothers' were able to perceive the observed changes, or whether negative biases impeded their perception of treatment gains. The fact that depressive mothers in this study reported greater improvements than non-depressive mothers suggests that the endorsement of depressive symptoms pre-treatment did not prevent them from perceiving treatment gains. However, the thought that depressive mothers' perceptions of their children's behavior were not accurate made it difficult to assume that PCIT was in fact an effective treatment for depressed mothers. We verified these findings by examining changes in observed child behavior.

Analyses of observed child behavior showed no detectible differences between children of depressive and non-depressive mothers at pre- or post-treatment, but confirmed that both groups' behaviors had improved significantly over the course of PCIT. Follow-up analyses designed to detect biases and change in bias between parents' assessments and observed child behaviors from pre- to post-treatment, found group differences in the overall change from pre- to post-treatment, but no group difference in the comparison of parent ratings with observational assessments. While children of depressive mothers showed more severe behaviors, their improvement was greater. Like Gardner et al. [26], we observed significant reductions in mothers' depressive symptoms from pre- to post-treatment. We did not detect statistically any bias in depressive mothers' reports that has been documented in other research [2], but we cannot dismiss the notion that mothers' depressive symptoms and children's behavior problems are connected. Results showed significant improvements in depressive mothers' perceptions of their children's behaviors as well as improvements in the observed quality of their interactions.

To see whether depressive and non-depressive dyads differed in the amount of PCIT needed to observe treatment gains, we examined differences between changes in reported and observed behaviors after participating in the first phase of treatment (CDI) versus changes after participating in the full course of treatment (CDI and PDI). Results of analyses showed significant decreases in children's behavior problems as measured by the ECBI and observed child emotional availability, but even greater decreases for those completing both CDI and PDI. However, these dosage effects did not vary further by depressive group. These results suggest that depressive and non-depressive parents and children made significant gains when they completed both phases of treatment and that their response to each phase of treatment was similar. Also, considering the high proportion of depressive dyads that terminate treatment early, the therapist's ability to encourage the parent to return week after week may play a critical role in achieving critical and significant treatment gains for these families.

While the reductions in caregiver-reported child behavior problems and mother's self-reported psychological symptoms in depressive mother-child dyads are persuasive evidence of the effectiveness of PCIT, including observational measures of parent's and children's behavior helps ensure that we witnessed more than just a change in caregivers' perceptions without a corresponding improvement in children's mental health. A change in parents' perceptions of their children could have resulted from their expectations for improvement as a result of being in therapy or an extension of a desire to present themselves in a favorable light. However, documentation of mothers' and children's increased emotional availability and mothers' use of the verbalizations taught in PCIT give us some confidence that PCIT is indeed effective in reducing children's behavior problems, as parents report.

Last, it is important to note the possible effects of the sample composition on the results of these analyses. The primary reason for these children's referral was their behavior problems. They were not referred to PCIT because of their mothers' mental health

problems. A large percentage of the depressive mothers had no report of any previous mental health problems. Furthermore, all of these mothers had been receiving Child Welfare services. In the same way that Green et al. [42] found that participants of a Family Treatment Drug Court (FTDC) benefited over a similar group of parents who did not participate in FTDC, the involvement of Child Welfare and the Juvenile Court may influence the parents' perceived need for change and connect them with needed services more quickly. In sum, our population of mother–child dyads may be very different from those recruited in an agency treating adults; and their involvement with Child Welfare services may influence their involvement in mental health treatment.

Limitations of this Study and Implications for Future Research

This study has some limitations. First, because we did not randomly assign mother–child dyads to treatment, we do not know whether children's behaviors would have improved in any treatment (or no treatment). However, as the children in this study were treated in a non-laboratory, outpatient setting by therapists who carried full-time clinical caseloads and we used as a control group a clinic-referred population of children whose mothers reported few depressive symptoms, we believe that the results presented here provide a strong first step in establishing the effectiveness of PCIT in a population depressive mother–child dyads.

Second, we did not have detailed information about mothers' mental health. We had no information about the severity or duration of their mental health problems or any co-occurring disorders, services they might be receiving for depression, nor did we have information about their use of psychiatric medication. Future research would benefit from systematic assessment of mothers' mental health history and treatment.

Summary

This study uses a multi-method approach to investigate the effectiveness of Parent–Child Interaction Therapy (PCIT) in reducing children's behavior problems when parents report clinical levels of depressive symptoms. Participants were 132 children, 2–7 years of age, and their biological mothers, who either reported low ($N = 78$) or clinical levels of depressive symptoms ($N = 54$). Results showed that depressive mothers were likely to report more severe child behavior problems than non-depressive mothers at the pre-treatment assessment, but that depressive dyads showed greater improvements in child behavior problems than non-depressive mothers from pre- to post-treatment. The results of this study show evidence for the effectiveness of PCIT as an intervention for children with disruptive behavior problems even when mothers report high levels of depressive symptoms, which could have impeded treatment. Results also suggest that though mothers with high levels of depressive symptoms are significantly more likely to terminate treatment early, some gains can be observed in the first phase of treatment. The greatest challenge to therapists may be that of engaging them in the treatment process long enough to observe these gains. We recognize that PCIT likely will not address all of the needs of these families and additional services may be required. However, PCIT appears to be a promising treatment for this population.

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