

# Does Maintenance Treatment Matter?

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**Abstract** This study examined the effects of a two-year maintenance treatment assessed at 1 and 2 years following Parent–child Interaction Therapy (PCIT). Sixty-one of 100 clinic-referred children (M age=4 years, 4 months) originally diagnosed with oppositional defiant disorder (ODD) completed the standard treatment and were then randomized to PCIT maintenance treatment (MT) or to an assessment-only follow-up condition (AO). Rating scale and observational measures from fathers, mothers, and children were collected before and after standard treatment and at one- and two-year follow-up assessments. Maintenance treatment involved monthly telephone contacts from the original therapist focused on relapse prevention based on principles of PCIT. At the two-year follow-up, MT families showed few changes from post-treatment, as expected. However, the expected decrements for AO control families were not seen. Few differences between MT and AO were found at either follow-up assessment, and there were no significant differences in the rates of change during follow-up. The maintenance of gains among AO families may have resulted from the continuous enhancement of standard treatment or from inadvertent reinforcement for maintenance provided by the assessments of change alone.

**Keywords** Maintenance treatment · Booster treatment · Continuous enhancement · Follow-up · Treatment of disruptive behavior disorders · Oppositional defiant disorder · Outcome studies · Fathers · Parent-child interaction therapy

## Introduction

The prevalence of disruptive behavior disorders (DBD) is estimated to be above 13 % among preschoolers (Lavigne et al. 2009). The DBDs, which include oppositional defiant disorder and conduct disorder, represent the most frequent reason for referral of children to mental health services (Loeber et al. 2000a). Early-onset DBDs are associated with significant impairments in social, emotional, and educational functioning and predict adjustment difficulties into adulthood (Frick and Nigg 2012). Early DBD diagnosis represents the most powerful risk factor for subsequent delinquent behavior, including interpersonal violence, substance abuse, and property destruction (Gau et al. 2007; Loeber et al. 2000b). Without effective treatment, these disorders show a high degree of persistence over time (Boggs et al. 2004; Campbell 2002).

Parenting practices and parent psychopathology both significantly influence the development of disruptive behaviors in young children (McMahon and Estes 1997). Parent–child interactions become increasingly coercive and play a fundamental role in the persistence of DBD throughout development (Olsen et al. 1990). Intervening early in the development of these destructive parent–child interaction patterns can reverse the trajectory of early DBD for some time, and not surprisingly, six of the seven evidence-based treatments for preschoolers with disruptive behavior are parent training interventions (Eyberg et al. 2008).

Parent-training interventions have shown positive effects that are maintained for at least 1 year following treatment on many measures of child and family functioning (Eyberg et al. 2008). In the longest follow-up study of parent–child interaction therapy (PCIT), 3 to 6 years after treatment intake,

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however, fully 25 % of parents again scored above normal limits on parent ratings of disruptive behavior and parenting distress (Hood and Eyberg 2003). Examining follow-up study data further, we noted that although children's behavioral gains were generally maintained at 1-year follow-up, they began to decline significantly within the second follow-up year after treatment (Boggs et al. 2004; Eyberg et al. 2001; Funderburk et al. 1998). Long-term treatment effectiveness may have been compromised by the persistent, recurrent nature of DBD and related parenting distress and dysfunction.

A few early studies examined the effectiveness of brief booster sessions after behavioral parent training for maintaining treatment gains and reported a return to post-treatment levels for the children who had relapsed during follow-up (Baer et al. 1984; McDonald and Budd 1983; Patterson 1974). More recently, a randomized controlled trial (RCT) of maintenance treatment for depressed adolescents was examined and found to accelerate recovery among adolescents who had remained depressed after standard treatment, but not to reduce the recurrence rates of depression (Clarke et al. 1999). For children with DBD, RCTs of booster or maintenance treatments have not previously been reported (but see Kolko et al. 2013).

Our study examined a maintenance treatment for young children with DBD. The design was based on the continuing care model of child treatment (Kazdin 1997) in which psychological disorders are considered chronic conditions requiring continued monitoring and treatment at a less intensive level to maintain the initial treatment gains. Families were randomly assigned to either maintenance treatment (MT) or an assessment-only control condition (AO) for 2 years after completion of standard treatment with Parent-child Interaction Therapy (PCIT). We did not expect changes to occur during the first follow-up year, similar to previous PCIT studies (Boggs et al. 2004; Eisenstadt et al. 1993; Eyberg et al. 2001; Schuhmann et al. 1998). We hypothesized that at the 2-year follow-up assessment, control families would show significantly greater declines in child and family functioning than families in PCIT maintenance treatment.

## Method

### Participants

Figure 1 shows the flow of participants from the start of standard treatment to the end of the 2-year follow-up period. Families were referred for treatment by pediatricians, child psychiatrists, child neurologists, teachers, and day care providers. One hundred families of 3- to 6-year-old children with oppositional defiant disorder (ODD) were enrolled in the study. Sixty-four families completed the standard treatment phase. Thirty-six families dropped out of standard treatment, and three additional families did not complete the post-treatment

assessment. Sixty-one families were randomly assigned to the MT ( $n=31$ ) or the AO ( $n=30$ ) follow-up condition.

For inclusion in this study, children had to meet Jensen et al. (1996) criteria for ODD, which required both categorical and dimensional indices of the disorder. The children met diagnostic criteria for ODD on the Diagnostic Interview Schedule for Children-IV-Parent (DISC-IV; Shaffer et al. 2000) and obtained clinically elevated ( $T>61$ ) scores on the Aggressive Behavior subscale of the Child Behavior Checklist (CBCL/2–3; Achenbach 1992; CBCL/4–18; Achenbach 1991). Children were excluded if parents described severe sensory or mental impairment (e.g., blindness, autism) during the clinical interview. Children also had to obtain a standard score of at least 70 on the Peabody Picture Vocabulary Test-III (PPVT-III; Dunn and Dunn 1997) to ensure adequate comprehension of parental verbalizations during treatment. Children taking psychotropic medications to help manage their behavior (29 %) had to maintain a consistent medication regimen and dosage schedule for at least 1 month before enrolling in the study, and caregivers were asked not to alter their child's medication or dosage during treatment. Parents of children not taking psychotropic medication were asked not to begin medication for their child during treatment.

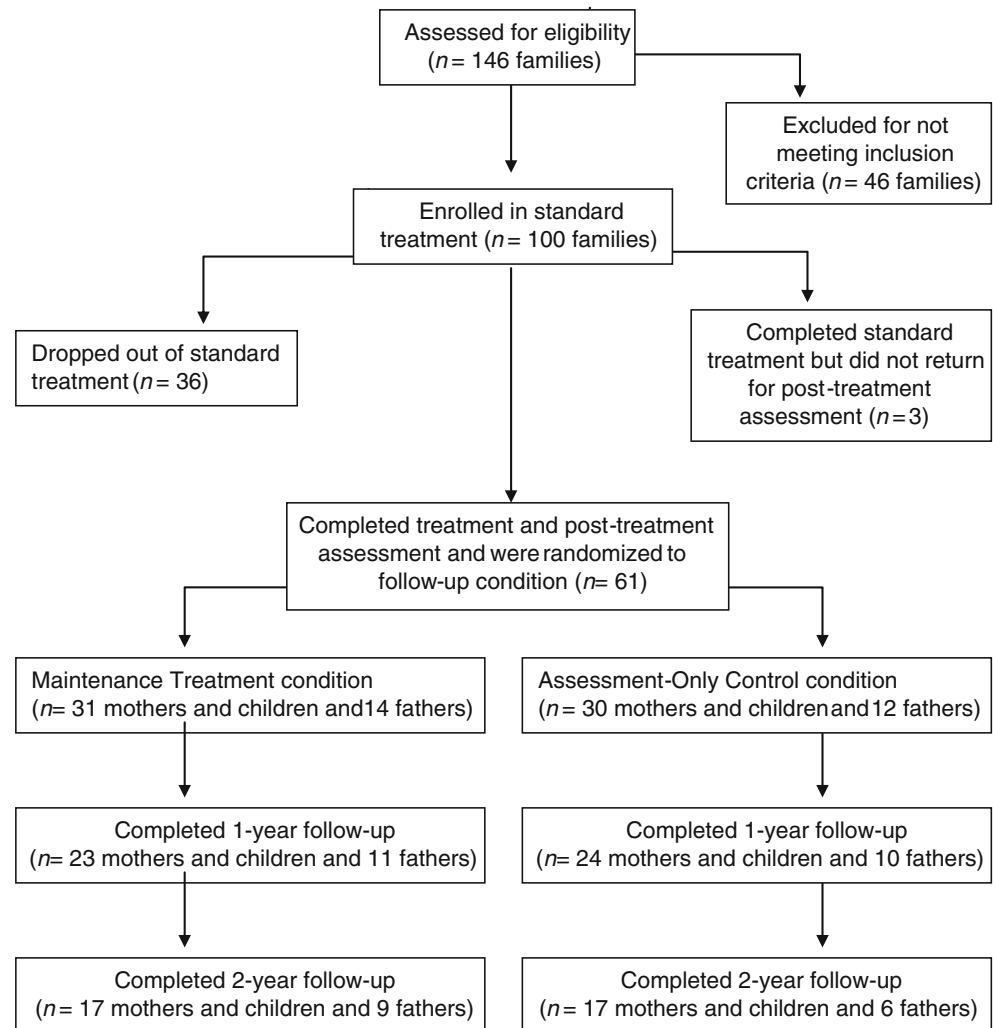
Children enrolled in this study were 31 % girls, with a mean age of 4 years, 4 months ( $SD=1$  year, 1 month). Racial/ethnic composition was 76 % Caucasian, 11 % Biracial, 8 % African American, 4 % Hispanic, and 1 % Asian. In addition to ODD, children in this study met DISC-IV criteria for attention-deficit/hyperactivity disorder (ADHD; 74 %), conduct disorder (46 %), separation anxiety disorder (26 %), and major depressive disorder (4 %).

Maternal caregivers were 92 % biological or adoptive mothers, 3 % stepmothers, 4 % grandmothers, and one foster mother. Their mean age was 33 years, 9 months ( $SD=9$  years, 6 months), and they were married (58 %), divorced (17 %), single (17 %), or separated (6 %); one mother was widowed. Mothers' racial/ethnic breakdown was 84 % Caucasian, 7 % African American, 5 % Biracial, and 4 % Hispanic.

Participating fathers were either married to or living with the maternal caregiver. Their mean age was 39 years, 9 months ( $SD=9$  years, 6 months). Fathers' racial/ethnic breakdown was 94 % Caucasian, 3 % African American, and 3 % Hispanic. With all five socioeconomic categories represented, families had a mean Hollingshead score of 38.44 ( $SD=13.98$ ), placing them, on average, in the lower middle SES range according to the Hollingshead (1975) Four-Factor Index of Social Status. No significant differences between the MT and AO condition were found on any family demographic variable (Table 1).

### Measures

*Services for Children and Adolescents-Parent Interview (SCA-PI; Jensen et al. 1997)* The SCA-PI is a structured

**Fig. 1** Flow of participants through the study

parent interview measuring health service utilization. It provides information on the type, number, duration, and intensity of physical and mental health services used by the child within the past 6 months or since the last time the measure was administered. Data from this interview were used to describe child psychotropic medication use (yes/no) at each major assessment.

*Child Behavior Checklist for 4 to 18 year Olds (CBCL/4–18; Achenbach 1991)* The CBCL/4–18 is designed to assess behavior problems in 4- to 18-year-old children during the previous 6 months. It consists of 118 behavior-problem items rated by the parent on a 3-point scale, with two broadband scales measuring internalizing and externalizing behaviors. Jensen et al. (1996) have recommended a cut score of  $T \geq 61$  for externalizing disorders as optimal for defining caseness. Parents of the 4- to 6-year-olds in our study completed this instrument, with Cronbach's alphas of 0.81 for the Internalizing Scale and 0.84 for the Externalizing Scale.

*Child Behavior Checklist for 2 to 3 year Olds (CBCL/2–3; Achenbach 1992)* The CBCL/2–3 is similar in format to the CBCL/4–18 and contains 99 items rated by the parent for frequency in the past 2 months on a 3-point scale. Fifty-nine items have counterparts on the CBCL/4–18, and 40 items are specifically designed for the younger age group. The parents of children 3 years of age completed this instrument; Cronbach's alpha was 0.78 for the Internalizing Scale and 0.90 for the Externalizing Scale. Standard scores from the two Achenbach instruments were combined and analyzed as a single outcome variable.

*Parenting Daily Hassles Intensity Scale (PDH; Crnic and Greenberg 1990)* The PDH is a 20-item self-report questionnaire measuring stressful events in parenting and parent–child interactions. The instrument contains two scales, measuring the frequency and intensity of each hassle. The Intensity Scale measures the impact on parents of minor daily stresses related to parenting. Greater mother-reported daily hassles have been related to greater trouble managing toddler behavior

**Table 1** Demographic characteristics of the sample

Characteristic	%	<i>M</i>	<i>SD</i>
Child age		4 years 4 months	1 years 1 months
Mother age		33 years 9 months	9 years 6 months
Father age		39 years 9 months	9 years 6 months
Family Hollingshead Index		38.44	13.98
Child sex %male	69 %		
Child ethnicity			
Caucasian	76 %		
African American	8 %		
Hispanic	4 %		
Asian	1 %		
Biracial	11 %		
Mother ethnicity			
Caucasian	84 %		
African American	7 %		
Hispanic	4 %		
Asian	0 %		
Biracial	5 %		
Father ethnicity			
Caucasian	94 %		
African American	3 %		

(Belsky et al. 1996). In this study, Cronbach's alpha for the Intensity Scale was 0.84.

*Beck Depression Inventory-II (BDI-II; Beck et al. 1996b)* The BDI-II is a 21-item self-report scale of adult depressive symptomatology. Severity of depression can be scored according to four levels: minimal (0–13), mild (14–19), moderate (20–28) and severe (29–63) (Beck et al. 1996a). One-week test-retest reliability (0.93) has been reported for the BDI-II. Cronbach's alpha in this study was 0.90.

*Cohesion Scale (CS; Moos and Moos 1986)* The Cohesion Scale is one of ten scales that constitute the Family Environment Scale. This 9-item true-false scale, which assesses the degree of commitment, help, and support family members provide one another, was used to evaluate family interaction patterns broadly. Moos and Moos (1986) reported 2-month test-retest reliability of 0.86 for this scale. In our study, Cronbach's alpha was 0.79.

*Dyadic Parent–child Interaction Coding System (DPICS; Eyberg et al. 2013)* The DPICS is a behavioral observation coding system that measures the quality of parent–child social interactions during three 5-min standard situations [(Child-Led Play (CLP), Parent-Led Play (PLP), and Clean-Up (CU)] that vary in the degree of parental control required. Many studies have established the reliability and construct validity of the DPICS system (Eyberg et al. 2013). Five

composite variables from the DPICS were used in this study (see Table 2). Mean Kappa reliability for individual parent categories was 0.78 and for child categories was 0.64.

## Procedure

During the first of two pre-treatment assessment visits, families were screened for inclusion, and informed consent was obtained. Families were informed that we were studying whether monthly monitoring and treatment as needed after the initial treatment would produce different long-term outcomes than assessment-only during the 2 years after initial treatment, and the randomization procedure was fully described. The pre-treatment assessment visits included a clinical interview, child diagnostic interview, and services utilization interview with the parents, cognitive screening measures, and the rating scale measures. At each visit, parent–child dyads were also video-recorded in the three DPICS standard situations, which were later coded using the individual DPICS categories. Families were seen for PCIT by two graduate student co-therapists during weekly 1-h sessions, which were video-recorded for later integrity checking. Treatment sessions were conducted according to procedures outlined in the PCIT treatment manual (Eyberg 1999a). Following completion of PCIT and the post-treatment assessment visits, families were randomly assigned to either the MT or AO condition.

## Parent–child Interaction Therapy

PCIT was the standard treatment used in this study. This treatment is based on Baumrind's (1967; 1991) developmental theory of parenting styles and her demonstration that the authoritative parenting style, in which parents provide a high level of warmth and support combined with clear communication of expectations and clear limits, leads to optimal adolescent outcomes. In PCIT, parents learn to apply specific skills that constitute authoritative parenting, following behavioral principles of learning. During treatment sessions, therapists also apply behavioral principles in coaching parents as they practice their new skills with their child. The treatment is not time-limited, but continues until the parents' skills reach a pre-set "mastery level" and their ratings of the child's behavior are well within normal limits.

## Maintenance Treatment

Based on Kazdin's (1997) model of continuing care, PCIT MT was designed to prevent relapse by monitoring parent and child treatment gains and intervening immediately at the first sign of new or recurrent problems. Sessions were conducted by the family's original therapist once per month, primarily by telephone, beginning the first month after the PCIT post-treatment assessment and continuing until the 2-year follow-

**Table 2** Composition of DPICS-IV composite categories used in this study

Category	Equation*
% Child Noncompliance (%NC) (coded only in PLP and CU)	$cNC \div [pDC+pIC - cNOC]$
% Parent Positive Following (%PF) (coded only in CLP)	$[pBD+pRF+pLP+pUP] \div pTV$
% Parent Negative Leading (%NL) (coded only in CLP)	$[pDC+pIC+pDQ+pIQ+pNTA] \div pTV$
% Parent Praise (%PR) (coded in all 3 situations)	$[pLP+pUP] \div pTV$
Total parent verbalizations (TV) (denominator for % categories)	$pNTA+pDC+pIC+pLP+pUP+pIQ+pDQ+pRF+pBD+pTA$
*Individual category abbreviations used in column 2 equations	
Negative Talk (NTA)	Reflection (RF)
Direct Command (DC)	Behavior Description (BD)
Indirect Command (IC)	Neutral Talk (TA)
Labeled Praise (LP)	No Opportunity for Compliance (NOC)
Unlabeled Praise (UP)	Compliance (CO)
Information Question (IQ)	Noncompliance (NC)
Descriptive Question (DQ)	

The subscript *c* indicates the child category. The subscript *p* indicates the parent category. *CLP* child-led play, *PLP* parent-led play, *CU* clean-up

up assessment. Therapists followed a maintenance treatment protocol (Eyberg 1999b) that involved monitoring the child’s behavior on the Eyberg Child Behavior Inventory Intensity Scale (Eyberg and Pincus 1999), the mother’s parenting stress on the Parenting Stress Index-Short Form (Abidin 1995), and parental follow-through with PCIT skills practice/use. Therapists then delivered one of three levels of intervention intensity based on information obtained during the call.

The Level 1 intensity intervention consisted of reinforcing the parents’ reported follow through and their child’s maintenance of gains, making brief suggestions if indicated, providing support by asking about and showing concern for the parents’ own well-being, and encouraging continued participation in the maintenance study. The Level 1 calls, including the monitoring, lasted between 5 and 15 min.

The Level 2 intensity was an extension of Level 1 and involved a longer telephone contact lasting 15 to 60 min. Level 2 was indicated when a problem area was identified during the initial monitoring. This intervention included empathic listening followed by a problem-solving approach to the identified issue and a plan for implementing a solution based on principles and skills learned in PCIT. When Level 2 interventions occurred, the therapist made a brief (<5 min) follow-up phone call to the family a week later. If the problem had lessened, the family was encouraged to continue the plan. If the plan had not been effective, a Level 3 intensity intervention was arranged.

Level 3 was implemented when (a) the monitoring call indicated a significant problem or family crisis, (b) a problem dealt

with during a Level 2 call had persisted, or (c) a parent called the therapist and requested an emergency clinic visit. Level 3 consisted of an in-clinic treatment session that included support and problem-solving, observation of parent–child interactions followed by coaching if indicated, and development of a plan for problem resolution based on the information obtained. Two families required a Level 3 intervention lasting 1 and 3 visits.

#### Follow-up Assessments

Families in both conditions were contacted by phone once every 3 months by a graduate student assessor unknown to the family and masked to the families’ follow-up condition (MT versus AO) to complete the ECBI (Eyberg and Pincus 1999) and the PSI-SF (Abidin 1995). Because these two measures were used as process measures to monitor child and parent progress throughout the study, alternative measures of child behavior and parenting stress were used as outcome measures of these constructs. At the 1- and 2-year follow-up points, families returned for full, two-visit clinic assessments that included the behavioral observation measures at each visit as well as the rating scales.

#### Treatment Integrity

Undergraduate research assistants used component checklists from each treatment session to code treatment integrity for a randomly selected 50 % of session videos for each family. For standard PCIT treatment, the percent agreement with session

checklists was 90 %. A randomly selected 50 % of the coded session videos were recoded by a second undergraduate research assistant to assess the reliability of the treatment integrity coding. Inter-coder percentage agreement reliability was 91 %. The same procedure was used to code audiotapes of the maintenance treatment calls during the 2 years following standard treatment. Percent agreement with the maintenance treatment protocol was 97 %, and percent agreement reliability between coders was 97 %.

## Results

### Preliminary Analyses

Examination of pre-treatment SCA-PI medication data indicated that among children who completed PCIT, 30 % subsequently assigned to MT (9 of 30 children with data available) and 32 % subsequently assigned to AO (9 of 28 children) were taking psychotropic medication before the standard treatment began. Pre-treatment differences between the MT and AO conditions were not statistically significant, chi square = 0.0311,  $df=1$ ,  $p<0.860$ . At the post-treatment assessment, 33 % of children subsequently assigned to MT (10 of 30 children with data available) and 21 % subsequently assigned to AO (6 of 28 children) were taking medication. The post-treatment difference between conditions was not significant, chi square = 1.03,  $df=1$ ,  $p<0.311$ . At the 1-year follow-up assessment, 47 % of MT children (9 of 19 children with available data) and 33 % of AO children (8 of 24 children) were taking medication. The difference between MT and AO children at 1 year follow-up was not significant, chi square = 0.874,  $df=1$ ,  $p<0.350$ . At 2-year follow-up, 58 % of MT children (11 of 19 with available data) and 38 % of AO children (6 of 16 children) were taking psychotropic medication. The difference between MT and AO children at the 2-year assessment was again not statistically significant, chi square = 1.45,  $df=1$ ,  $p<0.229$ .

Because a test of maintenance of treatment gains assumes that the initial treatment is effective, we first checked pre- to post-treatment outcomes for families that completed the standard treatment. A single degree of freedom contrast comparing the pre-treatment mean value with the post-treatment mean value was performed on each of the five rating scale and four behavioral observation measures for both the MT and AO conditions, separately. No corrections for family-wise error rates were imposed due to the small sample size and consequent low power, following the arguments of Anderson (2001). Adjusted mean scores were used for all analyses; unadjusted mean scores are reported in Table 3 for clarity.

Statistically significant improvements at post-treatment were reported on rating scale measures by mothers in the MT condition on the externalizing CBCL-E,  $t(59)=9.06$ ,

$p<0.001$ ,  $d=1.90$ ; the internalizing CBCL-I,  $t(59)=6.03$ ,  $p<0.001$ ,  $d=1.30$ ; the PDH,  $t(54)=5.41$ ,  $p<0.001$ ,  $d=0.85$ ; and the BDI-II,  $t(58)=3.91$ ,  $p<0.001$ ,  $d=0.84$ ; but not on the family cohesion CS scale,  $t(55)=1.96$ ,  $p<0.056$ ,  $d=0.22$ . For fathers in the MT condition, statistically significant improvements were reported on the CBCL-E,  $t(23)=2.43$ ,  $p<0.023$ ,  $d=0.82$ ; CBCL-I,  $t(23)=3.23$ ,  $p<0.004$ ,  $d=0.71$ ; and BDI-II,  $t(23)=3.72<0.001$ ,  $d=1.07$ , but not on the CS,  $t(21)=0.39$ ,  $p<0.701$ ,  $d=0.02$ . The PDH was not administered to fathers.

In the AO condition, pre- to post-treatment results for mothers were statistically significant for all rating scale measures. Mothers reported improvements on the CBCL-E,  $t(58)=9.70$ ,  $p<0.001$ ,  $d=2.11$ ; CBCL-I,  $t(59)=5.99$ ,  $p<0.001$ ,  $d=1.17$ ; CS,  $t(55)=2.02$ ,  $p<0.05$ ,  $d=0.33$ ; PDH,  $t(54)=4.26$ ,  $p<0.001$ ,  $d=1.11$ ; and BDI-II,  $t(58)=2.74$ ,  $p<0.008$ ,  $d=0.52$ . Fathers reported significant improvements on the CBCL-E,  $t(23)=4.37$ ,  $p<0.001$ ,  $d=1.74$ ; and CBCL-I,  $t(23)=4.24$ ,  $p<0.001$ ,  $d=1.48$ ; but scores on the BDI-II,  $t(23)=1.95$ ,  $p<0.064$ ,  $d=0.64$  and the CS,  $t(21)=1.45$ ,  $p<0.16$ ,  $d=0.63$ , were not statistically significant.

Behavioral observation measures of mothers' and fathers' behaviors during parent-child interactions showed statistically significant improvements from pre- to post-treatment in both groups on all measures. In the MT condition, mothers showed significant improvements in Percent Positive Following (%PF),  $t(59)=10.98$ ,  $p<0.001$ ,  $d=3.05$ ; Percent Negative Leading (%NL),  $t(59)=13.08$ ,  $p<0.001$ ,  $d=2.77$ ; and Percent Total Praise (%TP),  $t(59)=9.73$ ,  $p<0.001$ ,  $d=2.17$ . Father-child dyads in the MT condition showed similar outcomes: %PF,  $t(16)=3.20$ ,  $p<0.006$ ,  $d=2.34$ ; %NL,  $t(22)=6.16$ ,  $p<0.001$ ,  $d=2.59$ ; and %TP,  $t(22)=5.37$ ,  $p<0.001$ ,  $d=2.60$ . In the AO condition, mothers again showed significant improvements in %PF,  $t(59)=8.00$ ,  $p<0.001$ ,  $d=1.97$ ; %NL,  $t(59)=10.62$ ,  $p<0.001$ ,  $d=3.32$ ; and %TP,  $t(59)=8.31$ ,  $p<0.001$ ,  $d=2.18$ . Father-child dyads in the AO condition also showed significant improvements on all observational measures: %PF,  $t(16)=2.47$ ,  $p<0.025$ ,  $d=1.57$ ; %NL,  $t(22)=5.34$ ,  $p<0.001$ ,  $d=2.34$ ; and %TP,  $t(22)=4.82$ ,  $p<0.001$ ,  $d=1.55$ .

In these dyadic interactions, children in the MT condition showed statistically significant reductions from pre- to post-treatment in noncompliance to maternal commands,  $t(58)=4.86$ ,  $p<0.001$ ,  $d=1.01$ ; but not to their fathers' commands,  $t(22)=1.62$ ,  $p<0.120$ ,  $d=0.24$ . Children in the AO condition showed statistically significant reductions in noncompliance with both their mothers,  $t(58)=5.10$ ,  $p<0.001$ ,  $d=1.18$ ; and their fathers,  $t(22)=2.11$ ,  $p<0.047$ ,  $d=0.79$ .

### Differences Between MT and AO Conditions

**Overview** Examination of the differences between conditions at post-treatment was conducted to confirm that after the families completed PCIT, randomization resulted in no significant differences in outcomes between MT and AO.

**Table 3** Unadjusted means for outcome variables in the two treatment conditions

		Maintenance treatment			Assessment only		
		n	M	SD	n	M	SD
		<b>Mother-completed rating scale measures</b>					
CBCL-E	Pre	31	72.52	6.87	30	71.47	6.52
	Post	31	56.71	8.91	30	54.27	9.50
	1-year	23	56.78	11.61	21	52.14	7.06
	2-year	17	55.59	9.84	16	54.81	11.54
CBCL-I	Pre	31	61.84	9.30	30	62.07	9.39
	Post	31	48.26	11.32	30	48.37	13.58
	1-year	23	51.52	12.37	21	47.43	10.21
	2-year	17	51.88	11.56	16	53.13	9.26
CS	Pre	29	6.28	2.41	30	7.20	2.48
	Post	30	6.80	2.34	29	7.93	1.87
	1-year	23	6.48	2.31	23	8.13	1.33
	2-year	17	7.06	2.48	15	8.47	0.83
PDH	Pre	28	57.96	13.29	29	54.28	11.40
	Post	31	42.68	10.76	29	41.72	11.26
	1-year	22	43.09	11.14	23	41.04	11.44
	2-year	16	35.50	9.60	17	43.35	12.91
BDI-II	Pre	31	14.48	8.72	30	11.93	9.51
	Post	31	7.77	7.23	29	6.86	9.87
	1-year	23	8.91	7.94	24	7.38	7.05
	2-year	17	9.94	9.21	17	4.00	4.32
<b>Father-completed rating scale measures</b>							
CBCL-E	Pre	16	63.38	8.36	16	66.75	8.90
	Post	14	56.93	9.52	12	52.75	7.13
	1-year	11	55.18	12.93	9	52.89	5.88
	2-year	09	53.44	14.63	6	53.50	4.28
CBCL-I	Pre	16	59.06	9.79	16	58.75	10.39
	Post	14	51.14	12.51	12	46.25	5.96
	1-year	11	55.36	13.14	09	48.11	9.05
	2-year	09	54.56	14.54	06	52.67	5.16
CS	Pre	15	7.47	1.51	14	6.79	2.42
	Post	14	7.50	1.74	11	8.00	1.27
	1-year	11	7.36	2.38	10	8.50	0.71
	2-year	9	7.56	1.42	6	8.50	0.84
BDI-II	Pre	15	11.33	8.83	15	8.93	10.70
	Post	14	4.29	2.89	12	3.50	5.57
	1-year	11	5.18	3.34	10	1.20	1.93
	2-year	9	5.44	5.66	6	1.33	2.16

**Table 3** (continued)

		Maintenance treatment			Assessment only		
		n	M	SD	n	M	SD
		<b>Mother behavioral observation measures</b>					
DPICS %PF	Pre	31	4.74	4.06	30	7.98	5.89
	Post	31	38.51	15.13	30	32.97	16.97
	1-year	22	30.54	14.74	25	29.80	19.75
	2-year	18	29.87	12.54	16	24.58	15.59
DPICS %NL	Pre	31	51.40	15.92	30	44.08	10.50
	Post	31	13.56	10.92	30	12.85	8.19
	1-year	22	19.73	15.73	25	15.15	9.74
	2-year	18	15.14	11.64	16	17.40	9.86
DPICS %PR	Pre	31	3.66	3.07	30	3.98	2.82
	Post	31	19.89	10.11	30	18.07	8.68
	1-year	22	17.38	9.54	24	15.91	8.05
	2-year	18	19.17	9.04	15	13.67	5.99
<b>Father behavioral observation measures</b>							
DPICS %PF	Pre	14	4.29	3.04	14	9.13	7.49
	Post	14	28.07	14.07	12	26.30	13.57
	1-year	10	26.68	16.80	9	27.42	20.41
	2-year	8	25.71	17.03	5	19.37	14.36
DPICS %NL	Pre	14	52.99	8.79	14	44.73	13.39
	Post	14	23.49	13.47	12	17.07	10.03
	1-year	10	26.69	17.25	9	21.64	10.25
	2-year	8	27.83	12.50	5	27.33	13.43
DPICS %TP	Pre	14	3.21	2.73	14	3.61	3.93
	Post	14	14.67	5.60	12	15.44	10.02
	1-year	10	11.60	5.57	8	19.24	11.93
	2-year	8	11.86	5.47	4	13.35	8.26
<b>Child behavioral observation measures</b>							
DPICS %NC with mother	Pre	31	49.21	26.23	30	46.13	22.28
	Post	31	26.12	19.07	30	22.27	17.90
	1-year	22	25.28	20.79	24	19.71	15.26
	2-year	18	25.79	26.76	15	14.51	11.58
DPICS %NC with father	Pre	14	32.68	25.56	13	36.72	22.34
	Post	14	26.80	23.60	12	20.81	17.80
	1-year	10	27.58	26.87	8	13.93	12.72
	2-year	8	19.47	16.40	4	9.62	10.02

DPICS dyadic parent–child interaction coding system (see Table 2 for category names). CBCL-E child behavior checklist externalizing scale; CBCL-I child behavior checklist internalizing scale; CS cohesion scale; PDH parenting daily hassles intensity scale; BDI-II Beck depression inventory

Differences between groups at 1-year follow-up were not expected because previous follow-up studies had shown no decrement in treatment gains during the first year after treatment. Our primary hypothesis was that families in MT would show significantly greater maintenance of change than families in the AO control condition at the 2-year follow-up assessment. Specifically, we expected that families receiving maintenance treatment would continue to maintain their gains over the 2-year period, whereas the AO control families would show loss during the second follow-up year, as in previous studies, such that the MT families would demonstrate significantly greater maintenance at the 2-year assessment.

**Randomization Check** A single degree of freedom contrast was performed on all measures for mothers and fathers separately comparing MT and AO conditions at post-treatment, where the initial pre-treatment score was used as a covariate (Kirk 2012). For MT mothers at post-treatment, the adjusted means for the rating scale measures were 56.51, 48.31, 7.23, 42.56, and 7.24, for the CBCL-E, CBCL-I, CS, PDH, and BDI-II, respectively. Corresponding means for AO mothers were 54.48, 48.31, 7.68, 42.51, and 7.43. None of these differences was statistically significant. For the behavioral observation measures, the adjusted means for MT mothers at post-treatment were 38 %, 13 %, 19 % for %PF, %NL, %PR, respectively. Child %NC with mother was 26 % at post-treatment. The corresponding means for the AO mothers were 33 %, 13 %, and 17 %. Child %NC with mother in the AO condition was 23 %. None of these differences was statistically significant.

For MT fathers at post-treatment, the adjusted means for the rating scale measures were 57.46, 51.07, 7.44, and 3.82 for the CBCL-E, CBCL-I, CS, and BDI-II, respectively. The corresponding adjusted means for the AO fathers were 52.96, 46.64, 7.87, and 4.42. None of these differences was statistically significant. For the behavioral observation measures, the adjusted means for MT fathers at post-treatment were 28 %, 24 %, and 15 % for %PF, %NL, %PR, respectively. Child %NC with father was 26 % at post-treatment. The corresponding means for the AO fathers were 25 %, 17 %, and 15 %. Child %NC with father in the AO condition was 22 %. None of these differences was statistically significant.

**One-year Follow-up Differences** One year follow-up differences between the MT and AO conditions were evaluated using single degree of freedom contrasts for the mean outcome with the pre-treatment scores as a covariate. For MT mothers, the adjusted 1-year follow-up means for the rating scale measures were 56.69, 52.29, 6.91, 42.26, and 8.26 for the CBCL-E, CBCL-I, CS, PDH, and BDI-II, respectively. Corresponding means for AO mothers were 52.24, 46.59, 7.99, 42.48, and 8.01. These differences were significant only on the CS scale,

$t(41)=2.14$ ,  $p<0.038$ ,  $d=-0.67$ , which favored the AO mothers. On the behavioral observation measures, the adjusted means for MT mothers at 1-year follow-up were 31 %, 20 %, and 17 % for %PF, %NL, %PR, respectively. Child %NC with mother was 25 % at 1-year follow-up. The corresponding means for the AO mothers were 30 %, 15 %, and 16 %. Child %NC with mother in the AO condition was 19 %. None of these differences was statistically significant.

For MT fathers, the adjusted 1-year follow-up means for the rating scale measures were 55.40, 55.20, 7.30, and 4.67 for the CBCL-E, CBCL-I, CS, and BDI-II, respectively. The corresponding adjusted means for the AO fathers were 52.62, 48.31, 8.52, and 1.76. The differences between the MT and AO fathers were significant only for the BDI-II,  $t(18)=2.62$ ,  $p<0.017$ ,  $d=1.24$ . For the behavioral observation measures, the adjusted means for MT fathers at 1-year follow-up were 25 %, 29 %, and 11 % for %PF, %NL, and %PR, respectively. Child %NC with father was 27 % at the 1-year follow-up assessment. The corresponding means for the AO fathers were 25 %, 29 %, and 19 %. Child %NC with father in the AO condition was 15 %. None of the behavioral observation differences was statistically significant.

**Two-year Follow-up Differences** Two-year follow-up differences between the MT and AO conditions were evaluated using single degree of freedom contrasts for the mean outcome with the pre-treatment scores as a covariate. For MT mothers, the 2-year follow-up adjusted means for rating scale measures were 55.93, 52.78, 7.87, 40.41, and 8.71 for the CBCL-E, CBCL-I, CS, PDH, and BDI-II, respectively. Corresponding means for AO mothers were 54.45, 52.18, 8.07, 44.89, and 8.71. In contrast to our hypothesis, none of these differences was statistically significant. For the behavioral observation measures, the adjusted means for MT mothers at 2-year follow-up were 29 %, 15 %, and 19 % for %PF, %NL, and %PR, respectively. Child %NC with mother was 26 % at 2-year follow-up. The corresponding means for the AO mothers were 25 %, 18 %, and 14 %. Child %NC with mother in the AO condition was 15 %. In contrast to our hypotheses, none of these differences was statistically significant.

For MT fathers, the 2-year follow-up adjusted means for the rating scale measures were 53.44, 54.77, 7.52, and 5.20 for the CBCL-E, CBCL-I, CS, and BDI-II, respectively. The corresponding adjusted means for the AO fathers were 57.50, 52.34, 8.47, and 1.70. None of these differences was statistically significant. For the behavioral observation measures, the adjusted means for MT fathers at 2-year follow-up were 25 %, 31 %, and 11 % for %PF, %NL, and %PR, respectively. Child %NC with father was 19 %. The corresponding means for the AO fathers were 18 %, 27 %, and 13 %. Child %NC with father in the AO condition was 15 %. None of these differences was statistically significant.



### Maintenance of Change from Post-Treatment to the Two-year Follow-up

The final analysis concerned differences in the degree of change for the treatment completers in the MT versus AO conditions from the post-treatment to 2-year follow-up assessment. Degree of change was operationalized as the 2-year follow-up mean minus the post-treatment mean. For both mothers and fathers, across all measures, the only statistically significant difference between conditions was found for mothers on the depression scale. From post-treatment to the 2-year follow-up assessment, the degree of change was greater for mothers in the AO than MT condition,  $t(32)=2.55$ ,  $p<0.016$ ,  $d=0.91$ . The AO mothers showed significant improvement in their BDI-II scores during the 2-year follow-up period,  $t(32)=2.37$ ,  $p<0.024$ ,  $d=0.38$ , whereas mothers in the MT condition showed no significant change during this time (see Table 3).

### Discussion

This study examined the effects of a PCIT maintenance treatment program conducted for 2 years following treatment with parent–child interaction therapy. Sixty-one of 100 clinically referred families completed PCIT and were randomized to either the maintenance treatment or an assessment-only control condition. Assessments at pre and post standard PCIT treatment and at 1- and 2-year follow-ups included multiple informant measurement of child disruptive behavior, parenting skills, parent emotional distress, and family cohesion. Single group statistical analyses and effect size calculations of change suggested clinically meaningful improvements during standard treatment on all measures except the family cohesion scale. The nine-item Cohesion Scale from the Family Relationship Index (Moos and Moos 1986) assesses the degree of commitment, help, and support among family members. This scale has previously evidenced adequate discriminative validity with aggressive preschoolers (Fowler 1980) and had acceptable internal consistency in our sample. However, neither mothers' nor fathers' ratings of family cohesion showed the expected gains during standard PCIT, and therefore the follow-up scores could not be used as an indication of maintenance of gains.

We used analyses of covariance to examine the 1- and 2-year follow-up data on all measures, with pretreatment scores used as covariates, to examine differences between the MT and AO families that would suggest maintenance treatment effects, but found few significant differences at either follow-up point. Further, the *rates* of change from post-treatment to 2-year follow-up revealed only one statistically significant difference between conditions, on the maternal depression scale.

Mothers' depression scores in both conditions were improved after standard treatment, and showed no significant

group difference at post-treatment. During the follow-up period, however, the groups diverged. MT mothers showed slightly increasing depressive symptoms whereas AO mothers showed a further lessening of depressive symptoms during the second follow-up year (Table 3). Of note, at pre-treatment the AO mothers' scores were in the nonclinical range, whereas the MT mothers scored in the mildly depressed range. It is possible that pre-treatment symptomatology influenced the stability of treatment gains in this area of functioning. Mothers experiencing depressive symptoms in the clinical range at pre-treatment may require more targeted attention to these symptoms during the initial treatment period to consolidate initial gains.

The primary hypothesis of this study was that control families, receiving only quarterly assessments during the follow-up period, would begin to show decrements in treatment gains by the 2-year follow-up point, as found in previous PCIT studies, whereas families receiving ongoing maintenance treatment with their therapist would continue to maintain gains at the level achieved immediately after treatment. This hypothesis was not supported. Instead, we found that families in both MT and AO tended to maintain their post-treatment gains throughout follow-up.

It is possible that the continuous enhancement approach (Nock and Ferriter 2005) to PCIT, in which the standard treatment is improved over time based on information from the research literature, strengthened the durability of the treatment effects to the extent that a 2-year period of maintenance might now be an expected average for standard treatment. For example, before this study began, and based on earlier findings by Prinz and Miller (1994), we introduced into treatment sessions a brief (less than 5 min) discussion of personal parent concerns unrelated to the child, to communicate increased therapist support. A second change made to PCIT was setting a more stringent standard for the criterion measure used to indicate treatment completion. Observations from previous PCIT studies had shown that families' post-treatment scores across outcome measures fell on average at the same standard score level that was set for the criterion measure. By changing the level required on the criterion measure from 1 to  $\frac{1}{2}$  *SD* from the normative mean, we expected to find similarly improved scores on the outcome measures. This more stringent criterion for treatment completion lengthened treatment by approximately two sessions and perhaps provided greater consolidation of initial gains, contributing to the more durable maintenance evidenced at the 2-year point.

It is also possible that treatment maintenance in AO families at the 2-year follow-up was due to the follow-up assessments alone. Study assessors contacted all families quarterly to collect brief outcome ratings of change, which may inadvertently have provided an ongoing prompt to continue using the skills learned in treatment. These quarterly assessment calls might also have provided some degree of continued emotional support from the treatment team, even though

individual assessors were unknown to the families and these contacts lasted less than 10 min.

Change in children's medication status during the follow-up period did not appear to affect the long-term findings. Differences in medication use were not significant at any of the four assessment points, and AO children did not evidenced an increase in medication use over time.

This study has methodological strengths and limitations to consider in interpreting the findings. The study participants were children with multiple comorbid diagnoses and families experiencing multiple stressors, similar to families seen in community settings. However, the limited ethnic and racial diversity, although consistent with the population of families seen in our local health clinics (Harwood et al. 2009), nevertheless limits the generalizability of the findings.

The inclusion of fathers in this study provides new information about fathers' maintenance of parenting skills learned in treatment, as well as information on fathers' perceptions of child behavior over time. However, the maintenance treatment telephone contacts as well as the quarterly assessment calls involved only the mothers. Thus, the effect of these calls on fathers was indirect. Further, the number of fathers participating at the Year 2 follow-up assessment is not sufficient to draw conclusions. Their 2-year data suggest only that the few fathers who remained involved with the study tended to report lasting positive effects regardless of the condition to which the family had been assigned.

Attrition during this study was a significant limitation (see Fig. 1). An earlier analysis of attrition in this sample found that both SES and positive and negative maternal verbalizations during parent-child interactions predicted dropout from the initial treatment (Fernandez and Eyberg 2009). Dissatisfaction with the treatment approach (as opposed to approaches less demanding of parents) was the most frequent reason parents gave for dropping out. Maternal distress did not predict attrition from standard treatment. Among 38 mothers evidencing clinically elevated scores on both depression and parenting stress measures, 61 % completed standard treatment and of those, 65 % reported neither depression nor parenting stress at the post-treatment assessment (Fernandez and Eyberg 2009). The same study reported that although attrition rates were similar in the MT and AO conditions during follow-up, maternal distress predicted study dropout only for families in the AO condition.

A thorough analysis of attrition bias and its theoretical implications is beyond the scope of this paper given the multiple waves of data collection, the multiple outcome variables, and the multiple family types. Documentation of bias in and of itself is not theoretically informative unless the bias has implications for theoretical conclusions. Based on Fernandez and Eyberg (2009), we know that some attrition biases were present which are of interest in their own right and that suggest caution when interpreting the current results. Examination of predictors and moderators of attrition will continue to be important in the

search for ways to maintain treatment gains. In our examination of specific outcomes following a 2-year maintenance treatment, attrition severely limited the power of this study to identify small differences between follow-up conditions that may have existed.

This study is the first RCT to examine maintenance treatment effects following a standard parent-training intervention for preschool-age children with DBD. The results suggest that with this young population, the continuing care model of treatment may not apply. Young children have a shorter, less entrenched history of coercive parent-child interactions than older children, which may be more amenable to lasting change without further intervention. The answer to "Does maintenance treatment matter?" likely depends on multiple interacting factors including child age at initial treatment and the extent of remission achieved, as well as the content, timing, and dosage of the maintenance treatment itself. Although much more study of these factors is needed in treatment research, the continuous enhancement of standard treatments for children is essential as well. Elements that improve treatment adherence or criteria for treatment completion are promising enhancements requiring experimental examination across time. It may be that further enhancements of standard treatments will improve treatment maintenance to the extent that future treatments are infrequently needed.

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