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Combining Parent and Child Training for Young Children with ADHD

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The efficacy of the Incredible Years parent and child training programs is established in children diagnosed with oppositional defiant disorder but not among young children whose primary diagnosis is attention-deficit/hyperactivity disorder (ADHD). We conducted a randomized control trial evaluating the combined parent and child program interventions among 99 children diagnosed with ADHD (ages 4–6). Mother reported significant treatment effects for appropriate and harsh discipline, use of physical punishment, and monitoring, whereas fathers reported no significant parenting changes. Independent observations revealed treatment effects for mothers' praise and coaching, mothers' critical statements, and child total deviant behaviors. Both mothers and fathers reported treatment effects for children's externalizing, hyperactivity, inattentive and oppositional behaviors, and emotion regulation and social competence. There were also significant treatment effects for children's emotion vocabulary and problem-solving ability. At school teachers reported treatment effects for externalizing behaviors and peer observations indicated improvements in treated children's social competence.

Attention-deficit/hyperactivity disorder (ADHD) in young children mark significant risk for later oppositional defiant disorder (ODD), which in turn confers risk for early-onset conduct disorder (CD; see Beauchaine, Hinshaw, & Pang, in press; Campbell, Shaw, & Gilliom, 2000). Early-onset CD exacts enormous costs on society in terms of adolescent school dropout, delinquency, substance abuse and dependences, and interpersonal violence. Moreover, early-onset CD is among the most refractory of all psychiatric conditions, with interventions becoming increasingly less effective and more expensive if delayed until late childhood or adolescence (Offord & Bennet, 1994). These findings suggest that one effective means of preventing CD may be to target preschool children with ADHD before more serious conduct problems have escalated. Unfortunately, one limitation of the ADHD treatment-outcome literature is that comparatively little research has been conducted with samples of children younger than age 7.

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LIMITATIONS OF PSYCHOSTIMULANTS FOR YOUNG CHILDREN WITH ADHD

Although research indicates that methylphenidate and other psychostimulants are effective in reducing core ADHD symptoms such as inattention and distractibility among preschoolers (see, e.g., Connor, 2002), there is little evidence to suggest that these medications prevent the escalation of ADHD to ODD and CD in later

childhood or adolescence (Hinshaw, 1994; Pelham, Wheeler, & Chronis, 1998). In the 14-month follow-up of the MTA trial, the largest intervention effect on oppositional/aggressive behaviors in school-age children with ADHD (7 years and older) was observed when a behavioral intervention was paired with medication (MTA Cooperative Group, 1999a, 1999b). Issues of efficacy aside, many parents and service providers are reluctant to use psychostimulants when children are younger than 7 years of age due to concerns about possible adverse effects on developing anatomical structures (Henderson & Fischer, 1995), perceived overprescription (Jensen et al., 1999), lack of long-lasting effects on academic achievement (Swanson, McBurnett, Christian, & Wigal, 1995), and the observation that long-term behavioral improvements require adjunctive psychosocial interventions (Ialongo, Horn, Pascoe, & Greenberg, 1993). Furthermore, parents of most children who are prescribed stimulants fill the prescription for only 1 to 2 months (Sherman & Hertzig, 1991). Finally, psychostimulants are not effective for 20% to 30% of children with ADHD (Swanson et al., 1995).

PARENT TRAINING INTERVENTIONS FOR YOUNG CHILDREN WITH ADHD

In response to these concerns, it is critical that further development of psychosocial interventions for young children with ADHD be pursued. In part, this suggestion follows from the conjecture that interventions may be the most effective with young children, who have not yet experienced school failure, social rejection, and a long history of negative parenting responses to their disruptive behaviors (Johnston & Mash, 2001; Pelham et al., 1998; Rappaport, Ornoy, & Tenenbaum, 1998). Pisterman, McGrath, Firestone, and Goodman (1989) reported improvements in mother–child interaction quality and rates of child compliance among preschoolers with ADHD following parent training, effects that were maintained 3-months posttreatment and replicated in a follow-up study (Pisterman et al., 1992). Sonuga-Barke, Daley, Thompson, Laver-Bradbury, and Weeks (2001) reported similar findings that extended to ADHD behaviors and were maintained at 6-month follow-up. Of importance, concurrent improvements in child compliance suggest reduced oppositionality, a finding consistent with observed effects of behavioral interventions in older children. Thus, psychosocial interventions that include parent training hold promise in treating young children with ADHD, a conclusion supported by findings from the MTA trial indicating that negative and ineffective discipline strategies moderated treatment efficacy among grade school children (Hinshaw et al., 2000).

However, as very little research exists in this area, firm conclusions cannot be drawn at present about the efficacy of psychosocial interventions for children with ADHD who are younger than age 7. Given this, additional research examining the effects of ADHD treatment programs on 4- to 6-year-old children represents an important contribution to the literature. Moreover, intervention targeting preschoolers with comorbid ADHD and ODD has generally not been conducted. In a notable exception, Barkley et al. (2000) recruited 158 kindergarteners who exhibited high levels of ADHD, ODD, and CD behaviors and assigned them to parent training only, classroom day treatment only, a combined condition, or a control group. In general, treatment response was poor, although the classroom intervention produced improvements in classroom aggressive behavior, social skills, and self-control. Unfortunately, these effects did not persist at a 2-year follow up (Shelton et al., 2000) and did not generalize beyond the classroom. Moreover, the parent training intervention yielded no effects. These null effects are perplexing given the established efficacy of parent training in reducing ODD and CD behaviors among children in this age range (Brestan & Eyberg, 1998). However, attendance in the Barkley study was poor, as only 25% of parents attended more than 4 of 14 sessions. Given such poor parental attendance, what was referred to as a multimethod psychoeducational approach was in effect primarily a classroom intervention. Although classroom interventions are important, the broader literature on externalizing behaviors suggests that effective treatments must include parent training, as parents are the primary socializing agents of young children.

RESEARCH ON INTERVENTIONS FOR CHILDREN WITH ODD AND CD

A second limitation in the treatment literature addressing ADHD among young children is the failure to draw from the broader literature on externalizing disorders. Thus, most studies of ADHD have been informed minimally by research on ODD and CD (Beauchaine, Neuhaus, Brenner, & Gatzke-Kopp, 2008), despite evidence indicating that a large proportion of children with ADHD go on to develop ODD and CD (Biederman, Newcorn, & Sprich, 1991). For example, in contrast to the Barkley et al. (2000) study just outlined, most psychosocial interventions that have been tested with preschool children with ODD have focused on parent training exclusively. It is clear that poor parenting predicts (a) the development of ODD and conduct problems among impulsive children, and (b) poor treatment outcome (Patterson, DeGarmo, & Knutson, 2000). However, the broader literature on externalizing

disorders suggests that parent training is effective in reducing behavior problems at home yet by itself may not be sufficient to prevent negative child outcomes in other settings, including school and peer interactions. Indeed, interventions for externalizing conduct are maximally effective when they target multiple risk factors across multiple settings, thereby addressing all influences on children's social and emotional development (Backeland & Lundwall, 1975).

THE INCREDIBLE YEARS INTERVENTIONS

Parent Program

The efficacy of the Incredible Years (IY) parenting program has been evaluated in a series of randomized control group studies with more than 800 families of 3- to 7-year-olds with ODD and CD. Results indicate sustained improvements 1- to 2 years postintervention in positive and consistent parenting, coercive and violent discipline, parent–child interaction patterns, and child conduct problems at home (Webster-Stratton & Reid, 2010). It is important to note that approximately 30% of the sample of children recruited for ODD also had elevated levels of ADHD symptoms and the IY parent program was shown to be as effective for these comorbid children as it was for ODD-only children (Hartman, 2000). Furthermore, reducing negative discipline practices and increasing parenting efficacy, both of which predicted outcome in the MTA trial over and above effects of intervention (Hoza et al., 2000), are focal points of treatment. Efficacy of the IY parent program for children for reducing ODD symptoms has been replicated by independent investigators in mental health clinics in Europe (Drugli & Larsson, 2006; Scott, Spender, Doolan, Jacobs, & Aspland, 2001). However, the efficacy of the IY program has not been evaluated among children with a primary diagnosis of ADHD. Little is known about the impact of the IY parenting program for improving emotion regulation and social competence or decreasing inattentive and hyperactive symptoms, and ODD/CD outcomes have not been evaluated in children recruited for ADHD.

Child Program

Two randomized control group studies have evaluated the effectiveness of the IY Dinosaur School child training program. In these trials, children with ODD who received Dinosaur School training showed improved conflict management skills and cognitive problem-solving skills and less aggression at school than children in parent training only and control group conditions (Webster-Stratton & Hammond, 1997; Webster-Stratton, Reid, & Hammond, 2004). Comorbid ADHD did not affect these outcomes (Webster-Stratton, Reid, & Hammond, 2001b). Moreover, families who received combined parent and child training exhibited both cross-setting changes and greater maintenance of treatment effects at 1-year follow-up (Webster-Stratton et al., 2004). This research demonstrates the necessity of combining parent training with the child intervention.

By addressing multiple intervention targets that address family and school/peer risk factors, clinically significant improvement in ODD/CD behaviors are achieved for two thirds of participant children (Webster-Stratton & Hammond, 1997). Moreover, although children in the IY intervention studies were recruited for oppositional behaviors rather than ADHD, secondary data analyses indicate that both the parent and child programs are at least as effective for reducing ODD symptoms for the subset of children with high levels of ADHD symptoms (Hartman, Stage, & Webster-Stratton, 2003). However, in these prior studies, limited data were available regarding hyperactive and inattentive behaviors, and no formal ADHD diagnoses were made.

CURRENT STUDY

Based on these prior studies, we hypothesized that IY parent and child training for preschool children with ADHD would result in positive changes for children with ADHD with or without ODD. These two IY programs seem promising for this population given similar intervention targets for children with ODD (i.e., building academic and attention skills, emotional regulation and problem solving, social competence, etc.). The current study adds to our understanding of the effectiveness of the IY parent and child programs for children with a primary diagnosis of ADHD, and to its use for preventing and reducing the development of ODD in this population.

METHOD

Participants

In total, 99 young children (4–6 years of age) with ADHD (hyperactive or combined type) were assigned randomly to either (a) an IY treatment condition ($n = 49$) or (b) a waitlist control condition ($n = 50$). Descriptive statistics and demographics are presented in Table 1. No significant group differences were observed on any family or child demographic variables at study entry, when children were 4 to 6 years old. Approximately half of the children had ADHD and half had comorbid ADHD+ODD. Of the 99 families who completed baseline assessments, 3 dropped out of the waitlist condition and 2 dropped out of the intervention

TABLE 1
Demographic Characteristics and /Descriptive Statistics by Group

Variable	Group: Intervention[a]	Group: Waitlist[b]	Test-Statistic[c]	Effect Size Partial η^2
Child's Sex (% Male)	73%	78%	$\chi^2(1) = 0.28$	.05
Child's Age (Months)	64.1 (11.3)	64.4 (10.6)	$F(1, 95) = 0.02$	00
Child's Grade (%)			$\chi^2(1) = 1.44$	.12
Preschool	22 (45%)	25 (50%)		
Kindergarten	17 (35%)	12 (24%)		
1st Grade	10 (20%)	13 (26%)		
Child With Comorbid ODD	26 (53%)	22 (44%)	$\chi^2(1) = 0.37$	.09
Child Adopted	7 (14%)	11 (22%)	$\chi^2(1) = 0.31$	.11
Child's IQ	100.4 (14.4)	106.9 (32.0)	$F(1, 97) = 1.62$	.02
Language Delay	20 (40%)	18 (38%)	$\chi^2(1) = 0.24$	.03
Receiving Early Intervention	26 (52%)	21 (44%)	$\chi^2(1) = 1.21$	.07
Mothers Partnered	38 (77%)	40 (81%)	$\chi^2(1) = 0.08$	.08
Child's Ethnicity (% Minority)	14 (28%)	13 (26%)	$\chi^2(1) = 0.08$	.04
Mother Ever Imprisoned?	6 (13%)	5 (10%)	$\chi^2(1) = 0.01$	.07
Father Ever Imprisoned?	13 (26%)	12 (24%)	$\chi^2(1) = 0.08$	.08
Mother's Age (Years)	37.3 (6.0)	38.7 (6.9)	$F(1, 97) = 1.09$	.01
Father's Age (Years)	40.1 (8.5)	41.5 (8.2)	$F(1, 86) = 0.82$	.01
Hollingshead Score (SES)	32.3 (13.3)	31.6 (14.1)	$F(1, 94) = 0.25$	<.01
Mother Education (Years)	15.6 (2.3)	15.6 (2.1)	$F(1, 97) = 0.00$	.00
Father's Education (Years)	15.2 (2.2)	15.1 (2.5)	$F(1, 97) = 0.09$	<.01
No. of Children in Home	1.8 (0.7)	2.2 (1.0)	$F(1, 97) = 3.93$	.04
Parenting Disagreements Score	1.8 (0.5)	2.1 (0.7)	$F(1, 97) = 3.81$	.04

Notes: Continuous variables are expressed as *M* (*SD*). ODD = oppositional defiant disorder; SES = socioeconomic status.
[a] $n = 49$.
[b] $n = 50$.
[c] Degrees of freedom differ for some variables due to missing data.
$^{*}p \leq .01$. $^{**}p \leq .001$.

condition. In all cases, attempts were made to collect posttreatment data, even if the family had not completed treatment. Partial data were collected for 48 of the 49 intervention families and 48 of the 50 waitlist control families.

Procedures

All study procedures were approved by the University of Washington Institutional Review Board, and parental consent was obtained. Participants were recruited through teachers and school counselors at local preschools and elementary schools, pediatricians' offices, mental health professionals, and community parent publications. Parents were invited to call if their children had a diagnosis of ADHD or showed very high levels of hyperactive and/or inattentive behavior. An initial phone screen conducted by a research assistant explained the requirements of the study (e.g., random assignment to immediate treatment or waitlist condition, no medication, length of intervention, no autism diagnosis). Two hundred four parents inquired about the study. Among these, 156 felt their child might be eligible for the project and wanted to continue to the detailed phone screen.

These 156 families completed a structured telephone interview with a clinician, which included portions of the Child Symptom Inventory (CSI; Gadow & Sprafkin, 1997) and the Child Behavior Checklist (CBCL; Achenbach, 1991). The CSI yields dimensional scores and diagnostic cutoffs for most *Diagnostic and Statistical Manual of Mental Disorders* (4th ed., text rev. [*DSM–IV–TR*]; American Psychiatric Association, 2000) internalizing and externalizing disorders. Symptoms are rated on a 4-point scale ranging 0 (*never*), 1 (*sometimes*), 2 (*often*), and 3 (*very often*), with ratings of 2 or higher considered positive for each diagnostic criterion. Scales from the CSI included those assessing ADHD (both inattentive and hyperactive-impulsive) and ODD. In the most recent validation sample (Sprafkin, Gadow, Salisury, Schneider, & Loney, 2002), internal consistencies (Cronbach's alphas) were .91 for both the ADHD and ODD scales, and 4-month test–retest reliabilities were .72, and .65, respectively. In addition, the attention problems subscale of the CBCL was administered.

Among the 156 families who completed the phone screen, 103 had a child who met inclusion criteria (≥95th percentile on the CBCL Attention Problems scale *and* met *DSM–IV* criteria for hyperactive-impulsive or combined subtype of ADHD on the CSI

and were not taking medication to treat ADHD). These families were scheduled for an initial clinic visit at which parents were administered the Diagnostic Interview Schedule for Children, ADHD module. Ninety-nine of the 103 children who came to the clinic intake were eligible to continue in the study based on a diagnosis of hyperactive-impulsive or combined subtype ADHD on the Diagnostic Interview Schedule for Children.

All assessments were conducted on the same time line across treatment conditions. Pretests were conducted from September to October. The intervention ran from November to April, and postassessments were conducted in May and June. Assessments included initial interviews with both parents (when available), mother and father reports of parenting behaviors, and parent and teacher reports of child social competencies and inattentive, hyperactive, oppositional, and aggressive behaviors. In a second clinic visit, mother and child interactions were observed in the laboratory (budgetary constraints did not allow for a father–child observation). Children were observed by independent raters at school with peers.

Interventions

The IY parent training intervention consisted of 20 weekly, 2-hr sessions conducted with six families per group. The newest version of the basic IY preschool curriculum (revised 2008) was offered. This updated version of the program has new curriculum material focusing on academic, persistence, social and emotional coaching, establishing predictable household routines and schedules, emotion regulation strategies, and teaching children to problem solve. This version of the program includes new vignettes showing children with ADHD in order to enhance parental understanding of how to respond effectively to these children and understand their developmental levels and temperament. Additional sessions from the IY advance parent curriculum included problem solving between adults and with teachers regarding child behavior plans, and strategies to build family interpersonal support, reduce depression, and manage anger.

The IY Dinosaur training program was held at the same time as the parent program. Program topics included following group rules, identifying and articulating feelings, problem solving, anger management, friendship skills, and teamwork. Each 2-hr session consisted of three short circle times and three to four planned activities to reinforce concepts presented in circle time. Therapists used coaching methods during unstructured play times to encourage appropriate peer interactions and targeted social and emotional skills. See Webster-Stratton (2007) and Webster-Stratton and Reid (2008) for more detailed information regarding the use of these two interventions for children with ADHD.

Intervention Integrity

Fidelity was monitored and measured in the following ways: (a) Initial IY parent and child group sessions were conducted using standard manuals and protocols; (b) all child and parent groups were videotaped and reviewed by the program developer and the group leaders during weekly supervision; (c) protocol checklists were completed by the group leaders after each session, indicating which vignettes, activities, and practice exercises were used in each session; and (d) one of the parent group leaders and one of the child group leaders (both were master's level and were IY certified to lead groups) were consistent across all groups throughout the course of the study. Each group leader had a coleader who was also certified in the program (all were master's- or doctorate-level clinicians), and the program developer participated in a support/consultation role for each intervention. Reviews of session protocols and videos indicated that all groups showed all required vignettes, completed all practice activities, and completed all 20 session protocols.

Measures

Parent Reports of Parenting Behavior and Adjustment

Parenting practices inventory (conduct problems prevention research group [CPPRG], 1996). This questionnaire was revised from the Oregon Social Learning Center's discipline questionnaire for parents of older children and has been used in multiple treatment-outcome studies, where they have shown to be sensitive treatment effects (e.g., Webster-Stratton, Reid, & Hammond, 2001a). Five summary scores were included in this project: (a) appropriate discipline (e.g., brief timeout, ignoring, consequence; $\alpha = .81$), (b) praise and incentives ($\alpha = .68$), (c) monitoring ($\alpha = .55$), (d) harsh and inconsistent discipline (e.g., raise voice, threaten, say mean things; $\alpha = .80$), and (e) physical punishment (e.g., spank or hit child; $\alpha = .79$).

Parent Reports of Child Behavior

CBCL (Achenbach, 1991). The 1991 version of this questionnaire was used, which is validated for children ages 4 to 16. For purposes of this study, broadband externalizing and internalizing scores were extracted from the CBCL as measures of behavioral outcomes. In addition, the Attention Problem subscale was used in the phone screen to measure levels of hyperactivity and inattention. The CBCL has well-established norms.

Intraclass correlations for the validation sample were .98 for interparent agreement and .84 for test–retest reliability (Achenbach, 1991).

Conners' Parent Rating Scale–Revised (CPRS–R; Conners, Sitarenios, Parker, & Epstein, 1998). The CPRS–R is a 57-item instrument that assesses ADHD and comorbid psychopathology. Summary scores for hyperactivity, inattention/cognitive problems, and oppositional behaviors were used. For these scales, in the current sample, alpha coefficients range from .91 to .93. The CPRS differentiates between children with and without ADHD (CPRS–R; Conners et al., 1998).

Eyberg Child Behavior Inventory (ECBI; Robinson, Eyberg, & Ross, 1980). The ECBI is a 36-item inventory of conduct problem behaviors for children ages 2 to 16. Two summary scores measure the number of reported conduct problems and the intensity of these problems. In the current sample, alphas for these both scales are .95 for intensity and .94 for number of problems. The ECBI problem and intensity scores were correlated significantly with both the CBCL externalizing (.67 and .75, respectively) and internalizing (.48 and .41, respectively) scales (Robinson et al., 1980).

Social Competence Scale (CPPRG, 1999a, 1999b). The Social Competence Scale consists of 12 items that assess parental perceptions of children's positive social behaviors (e.g., resolves peer problems, understands others, shares, is helpful, and listens; $\alpha = .81$) and emotion regulation (e.g., accepts things, copes with failure, thinks before acting, can calm down, and controls temper; $\alpha = .80$). In the Fast Track sample (CPPRG, 1999a, 1999b) this measure distinguished between normative and control groups and showed adequate reliability alpha ranged from .89 to .94.

Teacher Reports of Child Behavior

Teacher Report Form (Achenbach, 1991). The TRF is a teacher-report version of the CBCL (Achenbach & Edelbrock, 1991; see earlier). For this study, both the internalizing and externalizing scores were of interest. Two versions of this scale were used: the Caregiver Teacher Report (Achenbach, 1997) for children 5 years and younger, and the TRF for children 6 and older. The psychometric properties of these scales are well-established. Tes–retest reliabilities for broadband scales of the CTR and the TRF range from .77 to .89. Both measures show adequate content validity as all items discriminate between demographically similar referred and nonreferred children (Achenbach, 1991, 1997).

Conners' Teacher Rating Scale–Revised (CTRS–R; Conners, 1998). The CTRS–R is a 38-item teacher-report instrument similar to the parent-report version. Three summary scores were used: hyperactivity/impulsivity, inattention/cognitive problems, and oppositional behaviors. Coefficient alphas for these scales in the current sample range from .89 to .93.

Independent Observations of Parent–Child Behaviors

All mothers and children were observed at pre- and posttreatment during (a) a 10-min laboratory unstructured free-play session, and (b) a 10-min parent-directed task in which mothers were asked to get their children to follow directions involving a challenging block-building task.

Dyadic Parent–Child Interactive Coding System–Revised (DPICS–R; Robinson & Eyberg, 1981; Webster-Stratton, 1988). The DPICS–R is a well-researched observational measure for evaluating the quality of interactions between parents and children, and scores from this system have been shown to be sensitive to the effects of treatment (e.g., Reid, Webster-Stratton, & Beauchaine, 2001; Webster-Stratton, Hollinsworth, & Kolpacoff, 1989). Also, the DPICS–R differentiated a referred sample of parents and children with conduct problems from a matched comparison group of parents with behaviorally normal children on parent and child variables (Webster-Stratton & Lindsay, 1999).

Three parent variables were used: praise, critical statements, and coaching (descriptive encouragement, reflective statements, and problem solving). The coaching variable was derived from several DPICS–R items and reflects the intervention focus on persistence, emotion, and social coaching methods. It includes descriptive statements and questions, reflective statements and questions, and descriptive comment or encouragement. Two child variables were used: child deviance (whining, crying, physical negativity, smart talk, yelling, destructiveness, and noncompliance) and child positives (verbal and nonverbal affect and physical warmth). Reliability was assessed by independent coding of 26% of sessions by two observers. Intraclass correlations were as follows: praise, .97; critical, .97; coaching, .95; child deviance, .70; and child positive, .96.

Independent Observations of Child Behavior in the Classroom

Each child was observed twice at pre- and postintervention (four observations total) for 30 min in the classroom in both structured (e.g., circle time, work time at desks) and unstructured (e.g., recess, lunch) settings.

Coder Observation of Child Adaptation–Revised (COCA–R). The COCA–R is an observational version of the Teacher Observation of Child Adaptation–R (Werthamer-Larsson, Kellam, & Oveson-McGregor, 1990). The teacher-report version of this scale distinguishes between normative and referred children (CPPRG, 1999a, 1999b). The coder version of this measure has been shown to be sensitive to intervention effects in our prior studies (e.g., Webster-Stratton, Reid, & Stoolmiller, 2008). To provide some validation data for this measure, correlations are provided between the COCA–R and the CTRS–R (Conners, 1998) in the current sample. Relevant subscales were moderately and significantly correlated (CTRS–R Oppositional Scale and the COCA–R Authority Acceptance scale, $r = .39$, $p < .01$; CTRS–R Inattentive Scale and the COCA–R Cognitive Concentration scale, $r = .26$, $p < .01$; CTRS–R Social Problems Scale and the COCA-R Social Contact scale, $r = .26$, $p < .05$).

Following each 30-min observation, coders respond to 26 items assessing three dimensions of behavioral adjustment to school: cognitive concentration (completes assignments, poor effort, eager to learn, works well alone) authority acceptance (steals, yells, lies, fights, teases, breaks rules), and social contact (initiates to peers, plays with others, positive social contact). High scores indicate more problematic behavior. Coders were blinded to study condition, and reliability checks were completed on 15% of observations. Intraclass correlations indicated high interrater reliability for each scale: cognitive concentration, .90; authority acceptance, .87; and social contact, .93.

Child Problem Solving and Feelings Assessment

Wally Problem Solving Test (Webster-Stratton, 1990b). The Wally Problem Solving Test measures children's social problem-solving skills by assessing their responses to hypothetical conflict situations. A summary score indicates the ratio of positive to negative strategies generated by the child. The Wally was derived from Spivak and Shure's (1985) Preschool Problem Solving Test and Rubin and Krasnor's (1986) Child Social Problem-Solving Test. Interrater reliabilities (intraclass correlations) were .93 for positive strategies and .71 for negative strategies. In our samples, 4- to 8-year-olds with conduct problems produce more aggressive and fewer prosocial strategies than controls (Webster-Stratton & Lindsay, 1999).

Wally Feelings Test (Webster-Stratton et al., 2008). The Wally Feelings test is a newly developed measure of children's emotion vocabulary. Children are shown eight pictures of other children in positive and negative situations and are asked how the characters in the pictures would feel. The sum of different feeling words identified by the child provides a total feeling vocabulary score. This assessment was sensitive to intervention effects in a sample of more than 1,700 children who were assigned randomly to the IY child program or their usual classroom curriculum (Webster-Stratton et al., 2008).

Parent Satisfaction with Program

Parent satisfaction questionnaires. Following completion of the program, parents completed a detailed end-of-program questionnaire asking about their feelings about the parent and child programs.

RESULTS

Intervention Dose and Parent Participation

In the intervention group, 49 mothers and 39 fathers provided baseline data. All 49 mothers began treatment, with 47 completing. Two mothers dropped from the group (one moved and one's husband was killed). Thirty-six fathers began and completed treatment (3 fathers chose not to participate). Both mother and father attendance was high (mother $M = 18.5$, $SD = 4.2$; father $M = 17.1$, $SD = 4.3$ out of 20 sessions). These means include mothers who began therapy and dropped but not the fathers who came to no sessions.

Tests of Treatment Effects

Informant Reports

All parent- and teacher-report data were analyzed using repeated measures analyses of variance (ANOVAs). Child outcomes served as dependent variables in 2 Condition (intervention, waitlist) × 2 Time (pre, post) models. Given the expectation that intervention children should improve more than waitlist children, treatment effects are carried in the Condition (intervention, waitlist) × Time (pre, post) interaction. Accordingly, we report Condition × Time interactions and group contrasts at posttreatment for all outcomes in Table 2.

As shown, significant Condition × Time interactions were observed on all eight of the mother-report measures of externalizing behavior, all $Fs \geq 3.76$, all $ps \leq .05$. Four of these measures (CBCL aggression, CPRS hyperactive, ECBI intensity, and ECBI problem) yielded significant between group differences posttreatment. Significant Condition × Time interactions were also observed on maternal reports of emotion regulation and social competence, both $Fs \geq 17.77$, both $ps \leq .05$. Posttreatment between group differences were significant for both measures. For father reports, Condition × Time interactions were found on six of eight measures of

TABLE 2
Condition × Time Interactions in Analyses of Variance Assessing Child Behavior

	Condition						
	Intervention		Waitlist				
Variable	Pre	Post	Pre	Post	df^a	Condition × Treatment Effect (F)	η_p^2
Mother Report Externalizing							
CBCL Externalizing	65.0 (7.2)	58.9 (8.6)	65.0 (9.0)	62.6 (9.9)	90	5.50*	.06
Broadband							
CBCL Aggression	66.4 (7.9)	60.2 (7.4)†	67.1 (11.2)	64.3 (10.3)†	90	4.17*	.04
CBCL Attention Problems	69.5 (8.9)	65.8 (7.0)	69.3 (10.8)	68.8 (9.6)	90	3.76*	.04
CPRS–R Oppositional	68.3 (11.3)	59.8 (10.6)	65.8 (12.6)	64.2 (13.2)	90	10.87***	.11
CPRS–R Inattentive	70.5 (12.6)	64.2 (12.5)	68.2 (13.4)	67.9 (12.1)	90	6.53**	.07
CPRS–R Hyperactive	74.3 (8.6)	65.5 (9.2)††	74.3 (8.9)	73.0 (11.3)††	90	13.37**	.13
ECBI Intensity	155.7 (3.0)	125.8 (3.9)‡	155.9 (3.0)	150.3 (3.8)‡	89	25.22***	.22
ECBI Problem	22.5 (0.9)	13.7 (1.0)‡	20.5 (0.9)	19.7 (1.0)‡	89	28.44***	.24
Mother-Report Internalizing							
CBCL Internalizing Broadband	56.9 (10.9)	51.9 (8.2)	58.3 (11.2)	55.6 (12.2)	90	2.12	.02
Mother-Report Emotion Regulation[c]	1.9 (0.5)	2.5 (0.6)‡	1.9 (0.4)	1.9 (0.5)‡	89	25.25***	.22
Mother-Report Social Competance[c]	2.7 (0.6)	2.9 (0.7)‡	2.6 (0.6)	2.7 (0.7)‡	89	17.77***	.17
Father-Report Externalizing							
CBCL Externalizing broadband	61.1 (9.9)	57.2 (8.8)	58.4 (11.0)	58.6 (10.3)	70	4.10*	.06
CBCL Aggression	62.0 (9.8)	58.8 (6.5)	60.4 (10.8)	60.3 (8.7)	70	2.99	.05
CBCL Attention Problems	65.5 (7.6)	64.8 (8.6)	64.1 (10.3)	65.8 (10.0)	70	2.33	.03
CPRS–R Oppositional	60.9 (11.7)	57.1 (9.2)	57.9 (12.4)	58.3 (11.3)	70	3.96*	.05
CPRS–R Inattentive	67.3 (13.7)	65.1 (12.7)	61.3 (13.2)	64.6 (12.4)	70	4.23*	.06
CPRS–R Hyperactive	67.1 (9.4)	63.4 (7.8)	66.3 (9.4)	67.3 (10.2)	70	4.67*	.06
ECBI Intensity	143.5 (5.2)	125.2 (4.4)	132.6 (4.7)	134.5 (4.0)	68	13.17***	.16
ECBI Problem	18.0 (1.3)	12.9 (1.4)	15.4 (1.2)	15.9 (1.3)	68	13.17***	.16
Father-Report Internalizing							
CBCL Internalizing Broadband	54.3 (10.1)	53.2 (10.0)	50.2 (9.6)	50.1 (10.2)	70	0.24	<.01
Father-Report Emotion Regulation[c]	2.1 (0.5)	2.5 (0.5)††	2.1 (0.5)	2.1 (0.4)††	68	21.09***	.24
Father-Report Social Competance[c]	2.7 (0.6)	3.1 (0.5)†	2.8 (0.6)	2.8 (0.5)†	68	9.52**	.12
Teacher-Report Externalizing							
TRF Externalizing Broadband	63.4 (10.6)	60.3 (10.4)	62.2 (10.2)	61.7 (9.2)	94	4.24*	.04
CTRS–R Oppositional	67.2 (15.5)	62.5 (12.6)	65.0 (15.7)	63.9 (15.0)	94	0.68	.01
CTRS–R Inattentive	61.9 (13.3)	59.7 (13.8)	59.0 (12.8)	57.5 (13.2)	94	0.13	<.01
CTRS–R Hyperactive	65.3 (12.2)	61.2 (10.9)	67.2 (11.0)	65.2 (10.0)	94	1.20	.01
Teacher-Report Internalizing							
TRF Internalizing Broadband	58.3 (10.8)	55.2 (9.3)	53.9 (9.4)	54.3 (9.0)	94	3.33	.03

Notes: All entries are expressed as M (SD) of T scores. CBCL = Child Behavior Checklist (Achenbach & Edelbrock, 1991); CPRS–R = Conners' Rating Scale–Revised (Conners, 1998; Conners, Sitarenios, Parker, & Epstein, 1998); ECBI = Eyberg Child Behavior Inventory (Robinson, Eyberg, & Ross, 1980).

[a]Denominator degrees of freedom vary slightly among tests due to missing data.

[b]Oppositional defiant disorder symptom count on Child Symptom Inventory (Gadow & Sprafkin, 1997).

[c]Social Competence Scale–Parent Report (Conduct Problems Prevention Research Group, 1999a, 1999b).

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$. †Significant posttest difference between the treatment group and controls, $p \leq .05$. ††Significant posttest difference between the treatment group and controls, $p \leq .01$. ‡Significant posttest difference between the treatment group and controls, $p \leq .001$.

child externalizing behavior, all Fs ≥ 17.77, all ps $\leq .05$. Significant Condition × Time interactions were also observed on paternal reports emotion regulation and social competence, both Fs ≥ 9.52, both ps $\leq .05$, and the posttreatment group contrasts were significant for both measures. For teachers, a Condition × Time interaction was found only for the CBCL externalizing broadband score. As with the father data, none of the posttreatment group contrasts were significant.

Lab and School Observations

Repeated measures ANOVAs were also used to analyze lab and school observations of both parent and child behavior. As shown in Table 3, Condition × Time Time interactions were found for mother praise, coaching, and critical/negative statements, all Fs ≥ 4.83, all ps $\leq .05$. Posttreatment group differences were significant for both praise and coaching. A significant Condition × Time interaction was also found for child

TABLE 3
Condition × Time Interactions in Analyses of Variance Assessing Lab and School Observations

Variable	Condition: Intervention Pre	Condition: Intervention Post	Condition: Waitlist Pre	Condition: Waitlist Post	df^a	Condition × Time Effect (F)	η_p^2
DPICS Lab Observations							
Free Play Parent Behavior							
Critical/Negative Statements	0.4 (0.7)	0.3 (0.9)	0.3 (0.8)	0.2 (0.3)	77	0.71	<.01
Praise	0.7 (0.5)	1.0 (0.9)††	0.7 (0.5)	0.5 (0.6)††	77	10.40***	.12
Coaching	3.8 (1.2)	4.6 (1.7)‡	4.0 (1.9)	3.3 (1.5)‡	77	13.52***	.15
Free Play Child Behavior							
Child Deviance	0.3 (0.5)	0.3 (0.7)	0.3 (1.0)	0.1 (0.2)	77	1.00	.01
Child Positives	0.6 (0.6)	0.5 (0.5)	0.6 (0.5)	0.5 (0.4)	77	1.08	<.01
Task parent Behavior							
Critical/Negative Statements	1.1 (1.2)	0.7 (1.2)	0.7 (0.7)	0.8 (1.0)	75	4.83*	.06
Praise	1.2 (0.9)	1.6 (0.9)††	1.1 (1.0)	1.1 (0.7)††	75	2.66	.03
Coaching	3.4 (1.4)	4.0 (1.5)†	3.3 (1.6)	3.3 (1.5)†	75	2.68	.04
Child Behaviors							
Child Deviance	1.1 (1.6)	0.7 (0.9)	0.7 (1.0)	0.7 (1.1)	75	4.54*	.06
Child Positives	0.3 (0.3)	0.4 (0.8)	0.2 (0.3)	0.2 (0.3)	75	1.00	.01
School Peer Observations							
COCA Cognitive Concentration	1.5 (0.1)	1.3 (0.1)	1.1 (0.1)	1.3 (0.1)	93	1.12	.02
COCA Authority Acceptance	0.3 (0.1)	0.3 (.01)	0.3 (.01)	0.2 (0.1)	93	0.11	<.01
COCA Social Contact	1.2 (0.1)	1.0 (0.1)	0.7 (0.1)	0.9 (0.1)	93	8.34**	.08

Notes: All entries expressed as *M* (*SD*). DPICS = Dyadic Parent–Child Interaction Coding System (Robinson & Eyberg, 1981); COCA = Coder Observations of Adaptation–Revised (Werthhamer-Larsson, Kellam, & Wheeler, 1991).

[a]Denominator degrees of freedom vary slightly among tests due to missing data.

[b]Oppositional defiant disorder symptom count on Child Symptom Inventory (Gadow & Sprafkin, 1997).

*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$. †Significant posttest difference between the treatment group and controls, $p \leq .05$. ††Significant posttest difference between the treatment group and controls, $p \leq .01$. ‡Significant posttest difference between the treatment group and controls, $p \leq .001$.

deviance. However, the group difference at posttest was not significant.

Parent Reports of Parenting Behavior

In repeated measures ANOVAs assessing parent reports of their own behavior, significant Condition × Time interactions were found on four of five mother-report variables, including appropriate discipline, harsh discipline, monitoring, and physical punishment, all Fs ≥ 8.44, all ps $\leq .01$. However, no significant group differences were found at posttest. No effects on father reports of their own behavior were found (see Table 4).

Child Problem Solving and Feeling Language

Significant Condition × Time interactions were found for children's feeling identification and problem-solving ability, both Fs ≥ 3.98, both ps $\leq .05$. Problem solving showed a significant group difference at posttest (see Table 5).

Parent Satisfaction

Each parent completed a 59-item satisfaction questionnaire upon completion of the intervention. Mean mother ratings on 48 of these 59 items were higher than 6 on a 7-point scale, indicating high satisfaction. Mean father ratings were above 6 on 38 of the 59 items. Examples of these items included overall program satisfaction, usefulness of home activities, group discussion, video vignettes, usefulness of home-school behavior plans and meetings, usefulness of program topics such as play, descriptive commenting, and coaching, praise, ignoring, timeout, and problem solving with adults and children. No items were rated lower than a mean of 4 by either mothers or fathers.

Additional Therapy

At the posttreatment interview, parents were asked if they had sought additional services for their child since intake. Five control families received additional therapeutic services (two children had social skills groups at school, one child was seen by an individual psychologist, and two families received some form of parent consultation). In the intervention condition, one child received a social skills group at school. In the control condition, seven children started medication compared with five in the intervention condition. There were no significant differences between conditions on these variables.

TABLE 4
Condition × Time Interactions in Analyses of Variance Assessing Parent Reports of Parenting Behavior

	Condition						
	Intervention		Waitlist				
Variable	Pre	Post	Pre	Post	df^a	Condition × Time Effect (F)	η_p
PPI							
Mothers							
Appropriate Discipline	4.7 (0.9)	5.0 (0.9)	4.6 (0.8)	4.6 (0.9)	86	7.47**	.08
Harsh Discipline	2.9 (0.7)	2.4 (0.5)	2.9 (0.8)	2.8 (0.7)	86	6.05**	.07
Monitoring	6.3 (0.4)	6.5 (0.4)	6.5 (0.5)	6.3 (0.6)	85	11.99***	.12
Physical Punishment	1.5 (0.7)	1.2 (0.3)	1.3 (0.4)	1.3 (0.4)	86	8.44**	.09
Praise and Incentives	4.4 (0.8)	5.0 (0.9)	4.3 (0.8)	4.6 (0.8)	85	3.11	.04
Fathers							
Appropriate Discipline	4.5 (0.8)	4.7 (0.7)	4.2 (0.8)	4.3 (0.8)	74	0.17	< .01
Harsh Discipline	2.7 (0.6)	2.6 (0.6)	2.8 (0.7)	2.8 (0.6)	74	1.12	.02
Monitoring	6.2 (0.6)	6.2 (0.7)	6.0 (0.7)	6.0 (0.7)	74	1.62	.02
Physical Punishment	1.5 (0.4)	1.4 (0.5)	1.4 (0.6)	1.4 (0.7)	74	0.01	< .01
Praise and Incentives	4.2 (0.8)	4.8 (0.8)	4.0 (0.7)	4.4 (0.9)	74	3.39	.04

Notes. All entries expressed as *M* (*SD*). PPI = Parenting Practices Inventory (Conduct Problems Prevention Research Group, 1996).
[a]Denominator degrees of freedom vary slightly among tests due to missing data.
[b]Oppositional defiant disorder symptom count on Child Symptom Inventory (Gadow & Sprafkin, 1997).
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

TABLE 5
Condition × Time Interactions in Analyses of Variance Assessing Child Testing

	Condition						
	Intervention		Waitlist				
Variable	Pre	Post	Pre	Post	df	Condition × Time Effect (F)	η_p
Wally Feelings							
Total Feelings	5.7 (0.5)	7.7 (0.5)	6.7 (0.5)	6.7 (0.5)	89	8.32**	.09
Wally Problem Solving							
Proportion Positive to Negative Solutions	0.6 (0.1)	0.8 (0.1)[†]	0.7 (0.1)	0.8 (0.1)[†]	89	3.98*	.04

Notes: Wally Feelings = Wally Feelings Test (Webster-Stratton, 1990a); Wally Problem Solving = Wally Game: A Problem-Solving Test (Webster-Stratton, 1990b).
*$p \leq .05$. **$p \leq .01$. [†]Significant posttest difference between the treatment group and controls, $p \leq .05$.

DISCUSSION

Understanding the effects of parent and child psychosocial and behavioral interventions for reducing inattentive, hyperactive, aggressive, and oppositional behaviors among preschoolers with ADHD is important because it has implications for preventing the further development of conduct disorders and academic difficulties. The goals of these two interventions are for parents and therapists to promote children's social competence and emotional regulation; increase their attention, persistence, ability to wait, and compliance with tasks and requests; and reduce their aggression and behavior problems. Overall, results from this study indicated promise for this intervention in terms of intervention effects on parent reports of children's ADHD symptoms, externalizing behaviors, and social competence. Independent observations confirmed effects for children's deviant behavior and social skills. Overall engagement in the intervention was high, and parents were very satisfied. Both mother reports and independent observations indicated intervention effects on mothers' parenting. Unfortunately no effects were found on fathers' parenting.

Changes Child Behavior and Adjustment

Mother reports of child behavior showed significant Condition × Time results for inattentive and hyperactive behavior, oppositional and aggressive behavior problems, and emotional regulation and social competence. Comparison of posttreatment means showed that children in the treatment group were significantly less

aggressive, hyperactive, and oppositional than children in the control group. Significant Condition × Time results in the independent observations of children interacting with their mothers during a parent-directed task confirmed the mother-report results. Father reports showed significant Condition × Time results for children's hyperactive, inattentive, and externalizing behavior, emotional regulation, and social competence. In summary, although mothers reported more child behavior change than fathers, both parents reported change in ADHD symptoms, externalizing behaviors, and children's social competence and emotion regulation.

Changes in Parenting Behavior and Adjustment

Immediate posttreatment results indicated significant condition by time results for mothers' appropriate discipline and monitoring, harsh discipline, and physical punishment. Independent observations of mother–child interactions confirmed these findings. During unstructured child-directed play, treated mothers used more praise and encouragement and engaged in more coaching than control mothers. During the parent-directed task, treated mothers were less critical. Fathers in the intervention condition did not report significant changes in their parenting compared to controls. The lack of significant effects in father reports of their parenting is puzzling given their high rates of treatment attendance, which were comparable to mothers' attendance. All prior Webster-Stratton treatment studies have shown significant changes in most father outcomes (e.g., Webster-Stratton & Hammond, 1997; Webster-Stratton et al., 2004). Unfortunately, independent laboratory observations were not obtained for father–child interactions to determine if (a) their perceptions of their parenting were accurate, or (b) their behaviors actually changed despite a lag in self-perceptions. One possible explanation for the null findings is that 40% of mothers in the intervention condition were stay-at-home mothers, whereas only 6% of fathers stayed at home full time with their children. Thus fathers had less time to practice their parenting skills compared with mothers. Another possible explanation is that therapists reported anecdotally that more fathers in this study, as opposed to previous studies, were disorganized, and this trait could be an indicator of adult ADHD. This may have made it harder for them to absorb and integrate the new parenting strategies into their interactions with their children. Unfortunately, this variable was not measured well enough to draw any conclusions.

Results in the children's classroom behaviors were less pronounced. Teacher reports indicated significant treatment results for children's externalizing but not inattentive or hyperactive behaviors, and our independent observations did not show any treatment effects for externalizing, inattentive, or hyperactive behaviors. One limitation of the current study is that, given budget constraints, the IY teacher classroom management program was not offered to the teachers of these children. In prior studies of IY interventions, teachers received between 4 and 6 days of classroom management training plus individual consultation. In those studies we found improvement in children's aggressive behaviors in the classroom (Webster-Stratton et al., 2001a, 2004). Further studies should include a classroom management intervention for teachers to ensure that parents and teachers are promoting the same behaviors across settings and using similar strategies and language. Indeed, prior research by Barkley et al. (2000) showed that the classroom intervention produced significant improvements in classroom aggressive behavior, social skills, and self-control. However, these effects did not generalize beyond the classroom, perhaps because in that case the parent intervention was minimal.

Nonetheless, despite the failure to reduce oppositional and aggressive behavior in the classroom, observations did reveal a significant Treatment × Time effect for social competence, and child testing indicated a significant treatment effect for children's social problem solving and feelings literacy. These findings suggest benefits of adding the child treatment Dinosaur program to the parent program in terms of social competence with peers. Prior studies have shown that when parents participate in the parent program without the addition of the child program, children's social and problem-solving skills with peers do not improve (Webster-Stratton & Hammond, 1997).

This study contributes to a growing body of literature showing the promise of intervening with children with ADHD during the preschool period. One strength of the study is the use of independent observations of mother–child interactions in the lab and child–peer interactions at school, in addition to parent- and teacher-report measures. Few studies have used observational methods to measure parent–child or peer interactions. Instead, most have relied on parent self-report behavior ratings to measure changes. Although parent reports provide important information about parents' perceptions of their children's behaviors, these ratings are supplied by those who received the intervention and thus may be biased in favor of reporting positive changes. The addition of teacher reports, independent observations with mothers and in the classroom with peers, as well as independent testing of social problem solving, strengthens the validity of the intervention effects reported. Further follow-up research is under way to assess whether the changes in children's social, emotional, and behavioral competencies are sustained in subsequent years, and whether they lead to enhanced

academic achievement and reduction of conduct problems.

Implications for Research, Policy, and Practice

In summary, the combined parent-training and child-training interventions showed that psycho-social interventions can help to reduce hyperactive, inattentive, and oppositional behaviors among young children with a primary diagnosis of ADHD. Future work will determine whether these improvements are maintained. Children between the ages of 4 and 6 are developing social and emotional skills at a pace exceeding any other stage in life. Their behavior is still flexible, and their thought processes and brain development are highly malleable and therefore receptive to socialization. Interventions for high-risk children in this age range are crucial because they can set either a firm or fragile foundation for later development, learning, and attitudes about school. Intervening early to remediate these difficulties may have lifelong benefits for enhancing children's later success. Research such as this, which provides empirical information about ways to change key risk variables, can provide the basis for early intervention plans for schools, which will benefit children at high risk for later school difficulties and conduct problems.

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