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Social Skills and Problem-solving Training for Children with Early-onset Conduct Problems: Who Benefits?

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Families of 99 children with early-onset conduct problems, aged 4–8 years, were randomly assigned to a child training treatment group (CT) utilizing the Incredible Years Dinosaur Social Skills and Problem Solving Curriculum or a waiting-list control group (CON). Post-treatment CT children had significantly fewer externalizing problems at home, less aggression at school, more prosocial behavior with peers, and more positive conflict management strategies than CON children. Significantly more CT than CON children showed clinically significantly improvements on reports and independent observations of aggressive and noncompliant behavior. The differential treatment response was evaluated according to child comorbidity with attention deficit hyperactivity disorder (ADHD), parenting discipline practices, and family risk factors. The only risk factor related to failure to make improvements in child conduct problems after treatment was negative parenting (i.e., maternal critical statements and physical force). The long-term follow-up 1·year later indicated that most of the significant post-treatment changes were maintained.

Keywords: ADD/ADHD, aggression, behavior problems, behavior therapy, conduct disorder, social skills training.

Abbreviations: ADHD: attention deficit hyperactivity disorder; BAAQ: Brief Anger-Aggression Questionnaire; BDI: Beck Depression Inventory; CBCL: Child Behavior Checklist; CD: conduct disorder; CON: waiting-list control group; CT: child training treatment group; DAS: Dyadic Adjustment Scale; DDI: Parent Daily Discipline Interview; DPICS-R: Dyadic Parent–Child Interaction Coding System-Revised; ECBI: Eyberg Child Behavior Inventory; (N) LES: (Negative) Life Experiences Servey; ODD: oppositional defiant disorder; PBQ: Preschool Behavior Questionnaire; SOS: independent observations in the clinic; TASB: Teacher Assessment of Social Behavior; WALLY: Wally Child Social Problem-Solving Detective Game.

Early-onset conduct problems in childhood are a major risk factor for the development of delinquency, violence, and drug abuse in later years (Patterson, DeGarmo, & Knutson, 2000). Parent training programs have been the single most successful treatment approach for reducing oppositional defiant disorder (ODD) and conduct disorder (CD) in young children (Brestan & Eyberg, 1998). (Hereafter in this study ODD/CD will be referred to as conduct problems because although young children are most often diagnosed as ODD, children in our study also exhibited the aggressive and antisocial features listed in the criteria for the diagnoses of CD, but were not old enough to exhibit the criminal behaviors.) A variety of parenting programs have resulted in clinically significant and sustained improvements for at least two thirds of young children treated (e.g., for review, see Brestan & Eyberg, 1998; Taylor & Biglan, 1998). These experimental studies provide evidence supporting the social learning theories that highlight the crucial role parenting style and discipline effectiveness play in determining children's social competence (Patterson et al., 2000).

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Despite the clear efficacy of parent training, this approach does have some shortcomings. First, although parent training results in predictable improvements in child behavior at home, it does not necessarily result in improvements at school (Taylor & Biglan, 1998). In our own studies we have reported that approximately one third of children with conduct problems whose parents received parent training continued to have peer relationship problems and academic and social difficulties at school 2–3 years later (Webster-Stratton, 1990a). Second, some parents of children with conduct problems cannot, or will not, participate in parent training either because of work conflicts, life stress, personal psychopathology, or lack of motivation. Third, some parents have difficulty implementing or maintaining the strategies taught in parent training due to their own interpersonal and family issues (Webster-Stratton, 1990b).

These limitations of parent training have led to a second treatment approach; that is, directly training children in social skills, problem solving, and anger management (e.g., Bierman, 1989; Kazdin, Esveldt, French, & Unis, 1987; Lochman & Dunn, 1993; Shure, 1994). The theory underlying this approach is the body of research indicating that children with conduct problems show cognitive and behavioral deficits with peers (Coie & Dodge, 1998; Dodge & Price, 1994). In our own work, we have found that referred children showed more negative

attributions, less ability to problem solve, and fewer social skills during play interactions with friends than a matched comparison group of typically developing children (Webster-Stratton & Lindsay, 1999). However, evaluation of social skills and cognitive interventions for young children with conduct problems, thus far, has been less convincing than parent and family intervention studies (Asher, Parkhurst, Hymel, & Williams, 1990; Kendall & Braswell, 1985; Rubin & Krasnor, 1986). Several promising classroom-wide interpersonal social skills training programs have shown small, short-term reductions in conduct problems, but long-term results are less clear (Beelmann, Pfingste, & Losel, 1994; Greenberg, Kusche, Cook, & Quamma, 1995; Grossman et al., 1997; Schneider, 1992). Controlled-trial evaluations with children with conduct problems have demonstrated that treatment focusing on social skills, problem solving, and anger management strategies effectively reduces conduct problems (Kazdin, Siegel, & Bass, 1992; Webster-Stratton & Hammond, 1997) and promotes positive peer interactions (Webster-Stratton & Hammond, 1997), particularly if used as an adjunct to parent training. However, the generalization to other settings and sustainability of child training is unclear. Further efforts are needed to develop and evaluate comprehensive, developmentally appropriate child training treatment programs to foster generalization of skills across settings.

It is also important to understand the characteristics of children and families who benefit from child training treatment programs. No studies that we are aware of have evaluated the differential treatment response of child training programs according to either biological risk factors (i.e., comorbidity with Attention Deficit Hyperactivity Disorder—ADHD), family risk factors (e.g., maternal depression, marital discord, negative life stress, poverty), or parenting risk factors (e.g., harsh discipline). Can children with one or more of these three risk factors benefit from a child training intervention that addresses poor social skills and emotional regulation difficulties? Can child training improve high-risk children's social and emotional competence, behavior, and peer relationships enough that it buffers them from other risk factors such as harsh parenting? It is important to understand which children benefit from child training interventions so that resources available for such programs can be allocated to the best effect.

In light of these questions, we proposed to examine the effects of our cognitive-behavioral, social skills, problem solving, and anger management child training curriculum (Incredible Years: Dinosaur Curriculum) in terms of its long-term effectiveness and ability to generalize across settings. Additionally we examined the role of three domains of risk factors (child ADHD, parenting discipline style, and family stress) in determining treatment effectiveness. We hypothesized that parenting and family risk factors would have a significant impact on treatment response. For example, we believed that children whose parents exhibited high levels of critical and harsh parenting would benefit less from the child program than children whose parents used positive, consistent discipline. This hypothesis was based on the substantial research suggesting a causal mechanism between coercive parenting practices and antisocial behavior (Patterson, Reid, & Dishion, 1992). Likewise, we hypothesized that children who came from more stressed homes (e.g., low income, marital distress, maternal depression) would benefit less than children from less stressed families because of studies that have shown the impact of stress in disrupting parenting skills (Webster-Stratton, 1990b).

Finally, we hypothesized that child biological risk factors, in this case ADHD, could potentially affect children's response to the child-training program. We were particularly interested in ADHD because of recent epidemiological and clinical studies suggesting that as many as 50% of children described as disruptive and aggressive (ODD/CD) are also comorbid for ADHD (Barkley, Guevremont, Anastopoulos, DuPaul, & Shelton, 1993; Lahey & Loeber, 1997). Results of studies utilizing child training cognitive-behavioral treatment (e.g., problem solving and self-instruction) with children diagnosed with ADHD have suggested that this treatment by itself results in few clinically significant improvements unless offered in combination with medication and/or with social skills and anger management training (Pelham & Gnagy, 1999). Since children in our study were younger than children in these other studies, and since our child intervention addresses social skills, anger management, *and* social skills, we were uncertain what role ADHD would play in differentiating treatment outcome. Our ultimate aim in this study is to evaluate the long-term outcomes for children with conduct problems who have participated in the Dinosaur Child Training Curriculum and to determine, based on a child's individual and family profile, which children benefit from such a treatment approach.

Methods

This report combines results from families randomly assigned to Child Training (CT) and Control (CON) conditions in University of Washington Parenting Clinic projects from 1991 to the present. Subsets of the data presented here comparing CT to alternate treatments (parent and teacher training) have been reported in other papers (Webster-Stratton & Hammond, 1997; Webster-Stratton & Reid, 1999). In the current paper, combining children from these two previous reports provides us with sufficient power to examine factors that predict outcome among those children who received CT.

Procedures

Enrollment and assessment procedures for all families were identical. Families were randomly assigned to child training (CT) or a wait-list control (CON). Assessments of the interventions included parent and teacher reports, independent home observations of children's interactions with parents, assessments of children's social and problem-solving skills, and parent satisfaction.

Subjects

Child characteristics. Criteria for study entry were: (a) the child was between 4 and 8 years old; (b) the child had no debilitating physical impairment, intellectual deficit, or history of psychosis, and was not receiving any form of psychological treatment at the time of referral; (c) the primary referral problem was child misconduct (e.g., noncompliance, aggression, oppositional behaviors) for at least 6 months; (d) parents reported a clinically significant number of child behavior problems (more than 2 *SDS* above the mean) on the Eyberg Child Behavior Inventory (ECBI) (Robinson, Eyberg, & Ross, 1980); and (e) the child met DSM-IV criteria for both ODD and/or CD. A telephone screen identified children in the clinical range on the ECBI. These families were eligible for a 2–3-hour structured intake interview that was developed by our staff; diagnosis was made according to DSM-IV criteria for ODD and/or CD. Children who met the DSM-IV criteria for

Table 1
Demographic Measures by Condition

Demographic measures	Child training			Control		
	M or %	*SD*	*N*	*M* or %	*SD*	*N*
Child's age (months)	72.49	11.94	51	69.13	16.35	48
Child's gender (% boys)	82.3%		51	79.2%		48
Child's ethnicity (% Caucasian)	88.2%		51	85.42		48
Social class category[a]	2.67	1.18	51	2.40	0.96	48
Social position score[b]	30.61	15.52	51	27.65	12.92	48
Family income[c]	6.43	2.09	51	6.48	1.80	48
Mother's marital status (% partnered)	74.5%		51	87.3%		48
Number years married	9.53	4.29	51	10.25	6.12	48
Number of children in home	2.16	0.90	51	1.98	0.79	48
Mother's age (years)	35.86	6.65	51	36.27	6.21	48
Mother's education[d]	2.59	1.06	51	2.52	1.03	48
Mother's ethnicity (% Caucasian)	94.1%		51	91.7%		48
Father's age (years)	38.83	8.48	47	38.11	6.47	45
Father's education[d]	2.46	1.35	48	2.40	1.26	47
Fathers ethnicity (% Caucasian)	93.5%		46	89.1%		46

[a] Hollingshead & Redlich (1958).
[b] Higher scores denote lower social position.
[c] 1: < $5000; 2: $5–8000; 3: $9–14,000; 4: $15–20,000; 5: $21–28,000; 6: $29–39,000; 7: $40–69,000; 8: $70–99,000; 9: $100,000+.
[d] 1: graduate school; 2: 4 years of college; 3: partial college; 4: high school graduate; 5: partial high school.

both ADHD and ODD were included in the sample because of the high comorbidity of these disorders. Three highly trained therapists conducted the intake interviews and all were videotaped for review. Random and regular review of approximately 15% of interviews indicated high reliability of the intake interview protocols.

All children needed to receive the ODD or CD diagnosis in order to to be eligible for the study. This was based on the parent ECBI scores as well as the interviews with therapists utilizing DSM-IV criteria. The diagnoses of ADHD were made later after a separate review of all the materials including intake interviews and parent and teacher reports on standardized measures. To receive the ADHD classification children scored above 66 (borderline to clinical range) on the Child Behavior Checklist (CBCL) Attention Problem Subscale (Achenbach & Edelbrock, 1991) *and* teachers reported above 5 for hyperactivity on the 4 items of the Teacher Behar Hyperactivity Subscale (range 0–8) (Behar, 1977) for behavior at school. At baseline assessment, 17.4% (16/92) were classified as ADHD (16.7% of CT group and 18.2% of CON group), and there was no significant difference between groups.

See Table 1 for demographic variables by treatment condition.

Attendance. Of the 51 children assigned to CT, all but 1 child attended 13 or more of the 20–24 sessions. The mean number of sessions attended by CT children was 18.03 (SD = 3.19).

Child Training Treatment

Child training (CT). The content of the "Dinosaur School" curriculum addressed interpersonal difficulties typically encountered by young children (ages 4–8) who have conduct problems: lack of social and conflict resolution skills, loneliness and negative attributions, inability to empathize or to understand another perspective, limited use of feeling language, and poor problem solving at school.

Our child training intervention is based on a coping model wherein children are encouraged to discuss and model the use of positive social skills in different situations, to apply them to hypothetical situations, and to practice those skills. Videotape modeling is used as one teaching tool: during each session children view 10–12 brief videotaped vignettes of children coping with stressful situations in a variety of ways. Children discussed the vignettes and collaborated to practice a varied repertoire of acceptable solutions and coping skills for situations they frequently encounter. The experience of collaboratively finding new solutions to typical conflicts and discussing feelings that have arisen for them (e.g., being kicked out of school) also contributes to strong bonds—for these children, sometimes their first friendships.

The methodology of the intervention was also made developmentally appropriate. Because young children are vulnerable to distraction and possess few organizing skills, our child training incorporates specific strategies to strengthen motivation, hold attention, and reinforce key concepts and newly acquired skills. Child-size puppets are used in every session. These puppets participate as group members and enlist the children's assistance in solving problems and role-playing solutions. Cue cards, coloring books, cartoons, books, tokens, stickers, and prizes are also used to enhance learning. Homework assignments to practice key concepts are sent home and are signed off by parents when completed. To enhance generalization, weekly sessions included: (a) group activities (e.g., art projects, games) practising the new concepts, (b) videotape modeling and role-plays to provide opportunities to re-enact conflictual situations using new skills, and (c) stories depicting children solving social problems and stating their feelings. In addition, weekly letters were sent to teachers and parents explaining the key concepts and the rationale for the targeted skill (e.g., sharing, teamwork, friendly talk, listening, compliance to requests, feeling talk, problem solving, etc.); teachers and parents were asked to reinforce the targeted social skills whenever they noticed the child using them in the home or school. Teachers and parents were provided with weekly good behavior charts and the children received bonus rewards for bringing these charts to the training session each week.

The children assigned to CT condition were divided into groups of five or six and came to the clinic weekly for 18–22 sessions with two therapists (lasting approximately 6 months). The number of sessions varied slightly because of the needs of different groups with children of differing ages, learning abilities, and missed sessions. A more complete description of the videotape training programs and leader manuals are available (Webster-Stratton, 1991).

Control group (CON). The families assigned to the control condition received no treatment and had no contact with a therapist. After waiting 8–9 months, control children were reassessed and families were then offered intervention.

Treatment Integrity

To assure the integrity of treatment, therapists co-led their first group with a supervisor, followed a treatment manual, and kept detailed notes of each session, documenting group process. All therapists completed weekly protocol checklists specifying all content, vignettes, role plays, and activities to be completed. All child groups were videotaped for feedback, and therapists received weekly supervision throughout the study. Treatment integrity was very high due to the close monitoring, standardized materials (i.e., videotapes), and comprehensive training manuals.

Therapists

Seven clinicians and a supervisor served as therapists for the child groups. The primary leader had a masters or doctoral degree in a mental health related field and had considerable experience (5–20 years) with behavior-problem children and/or counseling. The co-leaders had bachelor's degrees in psychology or education.

Assessment

Families were assessed prior to treatment, 2 months after treatment, and approximately 1 year later. Measures included parent reports of child behavior, independent home observations of parent and child interactions, and teacher reports of child behavior at school.

Each child was observed in the home for 30 minutes interacting with each parent in the home on two occasions during a 1-week period. If there was a participating parent who lived in a different home, the observation was carried out in both homes. During these observations, family members were asked to "do what you would normally do" (though talking to the observers, watching television, and talking on the telephone were prohibited).

These home observations were made by eight trained observers who were blind to the treatment conditions. Observers were required to achieve 80% reliability with practice tapes prior to coding. To maintain accuracy, observers had weekly training sessions to code videotaped interactions and discuss their coding. Reliability checks were conducted on at least 20% of the home observations.

Measures

Measures were chosen with the goal of defining two major child outcome constructs (i.e., child conduct problems and cognitive-social problem solving) and three risk constructs (i.e., family stress, negative parenting style, and hyperactivity/ADHD) by multiple measures as reported by multiple agents (teachers, parents, independent observers). Each scale within a construct taps different aspects of target phenomenon and is subject to different errors of measurement. A construct score is likely to provide better measurement and tends to be more reliable (despite lower internal consistency) than a single measure or single indicator that goes into the score. For example, somewhat dissimilar items are combined to represent multiple facets of a construct (i.e., overt and covert child negative behaviors or observations and report methods), which lowers the reliability coefficient. The approach used to develop construct measures followed a strategy implemented by Dishion, Patterson, Stoolmiller, and Skinner (1991). Scales for each construct were selected from established measures based on our theory of what behaviors the intervention addressed. Each scale was then tested for internal consistency and items with an item-total correlation of less than .30 were discarded. Principal components analysis was then used to evaluate the scales that were expected to measure the same construct. A single-factor solution was used to ascertain the composition of the scales and their respective construct. Scales with factor loadings of less than .40 were eliminated. A composite score for each construct was computed by first converting the component scales into z scores and then averaging them (Dishion et al., 1991).

Child Conduct Problems Outcome Construct

The child conduct problem construct was composed of three measures, described below. It includes the externalizing variable from the CBCL, a teacher report of aggression with peers from the Teacher Assessment of Social Behavior (TASB), and total deviance and noncompliance from the home observations according to the Dyadic Parent–Child Interaction Coding System-Revised (DPICS-R). Factor loadings ranged from .65 to .77 for these variables.

CBCL. This widely used parent report measure (Achenbach & Edelbrock, 1991) has been shown to have good reliability and validity. In this study the externalizing score was used to reflect children's aggressive behaviors.

TASB. This teacher report measure (Cassidy & Asher, 1992) asks teachers to compare the target child with all classmates on four behavioral dimensions: prosocial, aggressive shy/withdrawn, and aggressive/disruptive. Cronbach's alphas ranged from .62–.91. Significant correlations have been found between the TASB and peer sociometric measures. Particularly good agreement occurred between teachers and peers with regard to the aggressive dimension, used in the child conduct problems construct. The score indicates the difference between the target child and peers (i.e., target score minus peers average) on the aggression variables.

DPICS-R. The DPICS-R (Robinson & Eyberg, 1981) is a widely researched home observational measure developed specifically for recording behaviors of conduct-problem children and their parents. The DPICS-R, which consists of 29 behavior categories, was used to code the parent–child interactions. For this study we were interested in one child summary variable: Total Child Deviance (sum of frequency of whine + yell + cry + physical negative + smart talk + aggression and noncompliance to parental requests). Mean overall inter-rater agreement was 79% (range = 71–89%), and the product-moment correlation calculated between observers ranged from .80 to .95 for the child behaviors.

Child Cognitive Social Skills Outcome

Wally Child Social Problem-Solving Detective Game (WALLY). The WALLY game (Webster-Stratton, 1990c) derives from Spivak and Shure's (1985) Preschool Problem-Solving Test and Rubin and Krasnor's (1986) Child Social Problem-Solving Test. It is designed to assess both qualitative and quantitative dimensions of problem solving. The child is presented with 12 brightly colored illustrations of hypothetical problem situations involving "object acquisition" (i.e., how to obtain a desired object) and "friendship" (i.e., how to make friends with an unfamiliar person). The child is asked to think of many solutions for how the character in the situation could solve the problem. Two summary scores are derived for the set of pictures: the number and variety of positive solutions proposed. There are 16 prosocial solution categories with satisfactory internal consistency, alpha = .55, and 17 negative solution categories with satisfactory internal consistency, alpha = .54. The validity of WALLY has been established by showing that conduct-problem children use more aggressive strategies and, in the face of failure, are less flexible in thinking of alternative prosocial strategies. Inter-rater reliability for coding responses has been reported at 88%. Construct validity of the WALLY was established by showing satisfactory correlations between the WALLY total prosocial score and Rubin total positive strategies (r = .60), and between the WALLY negative score and Rubin negative strategies (r = .50).

Hyperactivity Risk Construct

This construct consists of these measures: teacher report of hyperactivity variable on the Preschool Behavior Questionnaire (PBQ), parent report of attention problems on the CBCL, and

independent observations of hyperactivity while being tested. Principle component analyses with a single-factor solution showed factor loadings ranged from .68–.77.

PBQ. The PBQ (Behar, 1977) includes 30 items, each rated by teachers on a 0–2 point scale. The Hyperactivity subscale was used in this study as a teacher report measure of child hyperactivity. Test–retest reliability has ranged from .60 to .99.

CBCL. This parent report measure (Achenbach & Edelbrock, 1991) was described above. For this variable we utilized the inattentive subscale.

Independent observations in the clinic (SOS). After the children were assessed on the WALLY test in the clinic, the testers completed two Likert-scale questions, giving their impression of the child's overall hyperactivity/impulsivity and attention span while being tested. These two items were summed to represent the child's hyperactivity level. The correlations between the two items was .76, $p < .001$ and Cronbach's alpha was .90. Correlations between SOS and hyperactivity and teacher reports of hyperactivity were .30, $p < .05$.

Negative Parenting Predictor Risk Factor Construct

A negative parenting style construct consisted of a mother report of physically violent discipline variable (physical force), and independent home observations of total critical parenting interactions with children (DPICS-R). The factor loadings for both of the two variables was .79.

Parent Daily Discipline Interview (DDI). The DDI (Webster-Stratton, 1991) consists of a list of 19 negative and 19 prosocial behaviors commonly exhibited by children. At baseline, parents select those behaviors that they perceive as problems. These individually tailored checklists are used as the basis for phone calls conducted twice a week for 2 weeks at baseline, immediately post intervention, and at the follow-up assessment. During phone calls, the checklist is read to the mothers, who are asked to report on the occurrence or nonoccurrence of the "target" behaviors for the previous 24 hours. If the behavior occurred, then the parents are asked how they handled the problem. The discipline responses are then coded into six categories: physical force, critical verbal force, limit setting, teaching, empathy, and guilt induction. Previous studies have reported inter-rater reliability ranging from .56 to .97, test–retest reliability of .75, and acceptable internal consistency (.59–.96). For this study, we were interested in the physical force discipline style, which includes items such as hitting, spanking, and slapping, because of the relationship between violent discipline and children's aggression (Straus & Gelles, 1986). The DDI has been shown to correlate with direct observations of mother behaviors with their children during home observations (Webster-Stratton & Spitzer, 1991).

DPICS-R. As described above for coding children's interactions with parents, DPICS-R (Robinson & Eyberg, 1981) includes separate summary variables for parenting. For this study, we were interested in the Total Critical Statements variable because it has been shown in our prior studies to differentiate a referred sample of parents and children with conduct problems from a matched comparison group of parents with behaviorally normal children and to discriminate abusive from nonabusive parents (Webster-Stratton & Lindsay, 1999). Moreover, this variable was shown in a recent path analysis to provide a strong and direct link to children's negative peer relationships (Webster-Stratton & Hammond, 1998). The intraclass correlation coefficient for the critical statement behavior variable was .73.

Family Stress Predictor Risk Factor Construct

The family risk construct included variables from five measures: mother report of marital distress on the Dyadic Adjustment Scale (DAS, score lower than 97), social class (semiskilled/unskilled level), moderate depression symptoms on the Beck Depression Inventory (BDI; score greater than 13), high negative life stressors on the Life Stress Inventory (greater than 5), and high mother reports of anger on the Brief Anger-Aggression Questionnaire (BAAQ) (greater than 9). If the mother was single and there was no partner, the score consisted of the remaining four variables. The factor loadings for the variables ranged from .47 to .77. The social class factor loading was lower (.37) because it was a 5-point scale.

DAS. The DAS (Spanier, 1989) a widely used self-report measure of marital adjustment completed by each spouse separately. It has good reliability, Cronbach's alpha .93–.96, discriminates married from divorced adults, and significantly correlates with other marital scales.

Socioeconomic (SES). Family social class was determined by Hollingshead and Redlich's (1958) Two-Factor Index, based on occupation and education. The index yielded a wide range of social class for the sample: Class 5 ($N = 14$), Class 4 ($N = 17$), Class 3 ($N = 32$), Class 2 ($N = 23$), and Class 1 ($N = 14$).

BDI. The widely used BDI (Beck, 1972) continues to be regarded as the best self-report measure of general depression symptoms available. Split-half reliability achieved a Spearman-Brown reliability coefficient of .93.

Life Experiences Survey (LES). The LES (Sarason, Johnson, & Siegel, 1978) is a 44-item measure that asks about the occurrence of positive and negative life experiences over the previous year. It has been found to have adequate test–retest reliability (over 6 weeks ranges from .56 to .88). The Negative Life Experience score (NLES) was used in this study because it was shown to be more reliable, and the authors reported it to be a better measure of life stress.

BAAQ. The BAAQ (Maiuro, Vitaliano, & Cohn, 1987) is a brief measure developed for assessment of anger levels. It has respectable internal consistency (alpha .82), test–retest reliability ($r = .84$), construct validity and criterion validity (.89). In our sample Cronbach's alpha was .91. The total score was used to determine mothers' level of anger.

Parent Satisfaction

Social validity measure. Our consumer satisfaction questionnaire consisted of 21 items with a 7-point Likert scale response format. Three subscales measured parents' perceptions of improvements in child behavior, format of treatment (e.g., ease of home assignments, notes to teachers), and usefulness of treatment. The internal consistency of the subscales ranged from .71 to .90.

Short-term Results

Treatment effects were evaluated by changes in the child conduct problem construct and cognitive social problem solving. Treatment effects were examined using a two-group ANOVA with repeated measures on the time factor (pre, post). When the condition by time ANOVA was significant, we examined the changes from pre to post for each group to determine the nature of the interaction. These were planned comparisons with a priori hypotheses (i.e., CT children would show less aggression and more prosocial behaviors than CON children).

The analysis of variance (*t*-tests) and chi-square analysis for dichotomous variables revealed no baseline significant differences between treatment and control groups on demographic variables (i.e., marital status, education, income social class, or child's sex and age) or the construct scores.

Child Conduct Problems Construct

ANOVA indicated condition by time interactions for the conduct problem construct, $F(1,97) = 16.01$, $p < .001$. Pre-post comparisons of treatment and control groups revealed significant reductions in conduct problems in the treatment group, $t(50) = 3.10$, $p < .01$,

while there were significant increases in conduct problems in the control group, $t(47) = -2.58, p < .05$.

Analyses of the individual measures comprising the construct indicated significant improvements in the treated children's teachers' reports of aggression at school as well as observations of child behaviors at home with their parents. Interestingly parent reports of behavior problems improved for both the intervention and control groups.

Child Cognitive Social Skills

ANOVA revealed significant condition by time interactions in children's responses to hypothetical conflict situations on the Wally Social Problem-Solving measure for number of positive strategies, $F(1, 97) = 6.09, p < .01$, and for variety of positive strategies, $F(1, 97) = 11.74$, $p < .001$. Comparisons revealed that treatment children gave a greater number and variety of prosocial solutions to the hypothetical conflict situations from pre to post-test. There was no pre-post change in these variables for the control children (see Table 2).

Consumer Satisfaction

In terms of overall perceptions of behavior, 87.8% of mothers and 94.1% of fathers reported improvements in children's behaviors as a result of the training program. On ratings of ease of the intervention format (e.g., homework activities), 64.7% of mothers and 82.3% of the fathers found it "somewhat to very easy." On ratings of the child program's perceived usefulness, 88.3% of mothers and 88.4% of the fathers found it "somewhat to very useful."

Clinical Impact of Treatment

These comparisons between treatment and control groups suggest that the intervention produced significant improvements in child behavior. Yet a major concern is the extent to which the treatment produced clinically important changes (Schmaling & Jacobson, 1987). We used several conservative criteria to assess the clinical significance of the findings. On the conduct problem construct, we required that one or more of the three variables (parent or teacher reports or observations of aggression) improved according to the following criteria. Parental reports on the CBCL had to be less than 64 (if > 63 pretest), because this score has been identified by Achenbach and Edelbrock (1991) as the cutoff point between normal and clinic samples (90th percentile). For teacher reports on the TASB, a measure that does not provide norms or cutoff points, we required a 30% reduction in aggressive behavior with peers (if < .23 pretest). Next, independent observations on the DPICS-R child deviance and noncompliance at home at post-treatment had to be reduced by 30% from baseline (for those above 3/minute at pretest). We based these percentage reductions on previous studies with conduct-problem children, which reported 30% reductions as indicators of treatment success (Webster-Stratton & Hammond, 1997). Both behavioral and parent and teacher report criteria were chosen in order to avoid reliance on a single informant or criterion measure and to provide validity to the findings.

Results indicated that 80.4% of the treated children improved on one or more of the criteria for child conduct problems while 47.8% of the control children improved, $\chi^2(1, N = 92) = 10.63$, $p < 001$. When looking at the individual components of the construct, 87.5% showed reductions on DPICS-R child deviance and non-compliance behaviors versus 50% of control children, χ^2 (1, N = 92) = 8.07, $p < 001$; and teachers reported 63.9% of the treated children reduced their aggression with peers at school versus 29.6% of teachers of control children $\chi^2(1, N = 92) = 7.24$, $p < 001$. On the parent report on the CBCL, there was a similar trend but it did not reach significance (30.8% vs. 15.8%).

In addition to looking at clinically significant improvements in conduct problems, we also determined if there was a change in the classification of children who were comorbid for ADHD. For the CT group, 62.5% (5/8) of children classified as ADHD at baseline were classified as non-ADHD at post-assessment. All 40 non-ADHD children at baseline were still non-ADHD at post. For the control children 62.5% (5/8) of children classified as ADHD at baseline were classified as non-ADHD at post and 2.8% (1/36) non-ADHD at baseline became ADHD at post. The McNemar test for change in proportions showed there was a trend for improvement in the ADHD classification from baseline to post for the CT group (p = .06) and nonsignificant for the Control group (p = .22).

In addition to looking at change in classification of ADHD status, we also assessed change in ODD status using the ECBI intensity score. The cutoff was set at 142, which is the 90th percentile (M = 142) according to the normative samples (M = 96.6, SD = 35). In the CT group, 69.7% of the children were below the cutoff at post-assessment vs. 28.6% of the CON group, $\chi^2(1, N = 68) = 9.91$, $p < 002$.

Predictors of Treatment Outcome

The family stress, negative parenting, and hyperactivity risk factor constructs were examined as predictors of the child conduct problem construct at immediate post-treatment. For these analyses, each subject was given a pretest "risk score" on each of the three predictor constructs. This was a dichotomized variable coded as "0" if none of the component risk factors in the construct was present and coded as "1" if one or more of the component risk factors were present. The child conduct problem construct at post was dichotomized as no improvement versus improvement on one or more of the three measures in this construct. Chi-square analyses showed that neither family stress risk nor hyperactivity risk predicted improvement in child conduct problems at post. Moreover, when we looked at ADHD classification as a risk factor it did not predict outcome.

However, negative parenting was a significant predictor of improvement in child conduct problems at post; 100% of the children whose mothers had no parenting risk factors at pre showed improvement in one or more of the child conduct problems components at post, whereas only 72.7% of the cases where mothers had one or more of the parenting risk factors at pre showed improvement in the child's conduct problems at post, $\chi^2(1, N = 46) = 4.41$, $p < 05$.

One-year Follow-up

At 1-year follow-up, we no longer had an untreated control group, as these children were offered treatment after their 8–9-month waiting period. For children in the

Table 2
Immediate Effects of Intervention on Child Conduct Problem Construct and Cognitive Problem Solving

	Control group (max $N = 48$)				Intervention group (max $N = 49$)				ANOVA	Pre-post t-tests	
	Pre		Post		Pre		Post		F for		
	M	SD	M	SD	M	SD	M	SD	condition	Control	Intervention
Child conduct problems construct[a]	−0.06	0.72	0.15	0.70	0.06	0.66	−0.17	0.64	16.01***	−2.58*	3.10**
Parent externalizing score (CBCL)	69.04	7.88	66.67	7.76	68.90	8.32	63.69	8.67	4.33*	3.01**	4.73***
Teacher report of aggression (TASB)	0.89	1.33	0.91	1.45	1.37	1.20	0.64	1.03	12.19***	−0.10	4.97***
Child deviance, noncomply, no opp. (DPICS-R)	14.63	13.50	16.47	19.60	16.88	20.43	11.13	12.61	4.40*	−0.24	2.83**
WALLY Test											
Variety of positive strategies	7.10	2.25	7.46	2.56	7.04	2.41	9.06	2.48	11.74***	−1.09	−5.57***
Number of positive strategies	12.60	5.27	13.88	5.71	13.50	6.71	18.15	7.75	6.09*	−1.40	−2.92**

[a] Estimates are z-scores.
* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 3
Child Conduct Problems Construct and Cognitive Problem Solving for Child Training Group Across Time

	Pre		Post		Follow-up (FU)			Paired t-tests		
	M	SD	M	SD	M	SD	ANOVA by time	Pre vs. post	Pre vs. FU	Post vs. FU
Child conduct problems construct	0.11	0.64	−0.51	0.67	−0.70	0.79	$F(2,45) = 41.98$***	7.67***	7.94***	1.89†
WALLY Test[a]										
Variety of positive strategies	6.89	2.59	8.89	2.63	9.35	3.00	$F(2,35) = 14.01$***	−4.43***	−4.59***	−0.85
Number of positive strategies	13.32	7.37	17.08	7.37	17.92	8.40	$F(2,35) = 8.60$**	−3.33**	−3.42**	−0.56

For these analyses, z scores were re-computed using the M and SD at pre for the construct score at all three times.
[a] $N = 37$ subjects who received the WALLY test at all three times.
† $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

treatment condition, 44 out of 46 (95%) were reassessed 1 year after the treatment. Analyses consisted of the following planned comparisons: (a) pre-treatment versus 1-year follow-up, and (b) immediate post-treatment versus 1-year follow-up. We preformed paired *t*-tests to describe changes over these times.

There were no significant changes as measured by report or observation from post-treatment to 1-year follow-up, indicating that the improvements noted immediately post-treatment were maintained over time. All pre-test to follow-up comparisons were significant (see Table 3 for follow-up data.)

At follow-up, 70.5% of children showed clinically significant improvement (one or more of the criteria in the construct). This was not significantly different from the percentage who showed clinically significant improvement at post-test. Additionally, 80% of the children classified as ADHD at baseline became non-ADHD at follow-up; 3.8% of non-ADHD children at baseline became ADHD; and 20% who were originally classified as ADHD remained ADHD at follow-up. None of the family stress, negative parenting, or hyperactivity risk factors predicted outcome at follow-up, although there was a trend for family stress risk factors to show fewer clinically significant improvements (90.6% of children with no family stress risk factors showed clinically significant improvements at 1- year follow-up versus 63% of the children who had one or more risk factors, χ^2 [1, $N = 44$] = 2.95, $p = 09$). On the ECBI intensity score, 73.3% were below the 90th percentile at follow-up.

When the parents whose children received the Dinosaur Child Treatment were asked at follow-up about what further treatment they had obtained since completing the program, 14.6% said they had obtained further "outside child therapy," 31.0% said they wanted more child therapy, and 11.9% wanted medication. Of the total group, 35.7% were on medication, reportedly for ADHD. Medication status at post-treatment did not predict follow-up outcome.

Discussion

Results indicated that the Dinosaur Child Social Skills and Problem Solving training program was successful in producing statistically and clinically significant improvements in child conduct problems (i.e., aggressive behaviors) and in children's cognitive social problem-solving strategies at post-treatment. Parent and teacher reports and independent observations indicated that these changes were produced both at home and in the classroom, suggesting that the program resulted in behavior change that generalized across settings. The follow-up assessments indicated that most of the clinically significant improvements were sustained over time. However, at 1-year follow-up we no longer had an untreated control group.

These findings suggest that child training is a potentially useful treatment alternative for children with conduct problems. The effect size for the child conduct construct score is moderate ($d = .46$). This is a less potent effect on child conduct problems than our previous reports of parent training treatment, which showed higher effect sizes on the mother CBCL variable ($d = 1.44$). Parent training alone, however, produced lower effects on the Wally measure ($d = .24$) than child training ($d = .64$). The analyses of the risk factors that predicted children's treatment success revealed some interesting results. First, neither the hyperactivity construct risk factor, nor the ADHD classification, had any bearing on children's ability to benefit from the treatment program. In other words, treatment response was not differentially affected by the presence or absence of hyperactivity. This has important implications given the recent literature that has suggested that cognitive-behavioral treatments do not provide clinically important changes in behavior of children with ADHD (Pelham & Gnagy, 1999). One possible reason for these discrepant findings may be the difference in the age of children treated. Children in the MTA study (MTA Cooperative Group, in press) were 8 years of age and older whereas children in our study were 4 to 8 years old. Perhaps treating children in the "preoperational stage" of thinking before negative thinking, behavioral interactions, and reputations have become stabilized yields better response to behavioral treatments. It is also noteworthy that 80% of the children who met the ADHD classification at baseline no longer met this classification at follow-up.

Likewise, the family stress risk factor did not differentially impact child outcome at post-treatment, although it showed a trend at 1-year follow-up. The fact that low socioeconomic status, depression, or marital discord did not affect treatment response suggests that providing child treatment can be beneficial even in highly stressed families. Often therapists feel hopeless in providing help to children if they feel parents are not motivated to attend therapy or are too depressed or consumed with marital difficulties to participate. These data suggest that stressful family situations do not preclude a child's ability to learn new social and problem solving strategies, and that reductions in conduct problems for children from stressed families are possible without direct parent intervention.

These findings must be considered in light of our third risk factor, negative parenting, which had significant implications for treatment success. Fewer children who had parents with one of the negative parenting risk factors (critical behaviors or physical punishment) showed clinically significant improvements compared with children whose parents did not have a negative parenting risk factor. This finding has implications for who should be offered such programs. It would seem that the child social skills program may suffice for children whose parents have competent parenting skills even if a family is experiencing other family stressors (e.g., poverty, marital distress). For children whose parents exhibit harsh and coercive parenting styles, however, it may be necessary to offer a parenting intervention in addition to a child intervention. Moreover, the fact that one third of the parents of treated children wanted further child therapy and one third of children were on medication at follow-up suggests the need for continuing treatment for a portion of these children. These numbers are roughly equivalent to our previous research, which indicates that one third of children continue to have problems after their parents received parent training. It is noteworthy that in a prior study we showed that in 95% of families who received both the child training program and the parent program, children showed clinically significant improvements at 1-year follow-up. This was significantly higher than the families who received only parent training or only child training (Webster-Stratton & Hammond, 1997). These findings echo the review by Pellham and Gnagy (1999), which suggests that combining child

training with parent or teacher training will be more efficacious.

These findings also lend support to Patterson's theory that the co-occurrence of ADHD and conduct problems, which share some similar long-term negative outcomes, signals the presence of a shared underlying mechanism, that is, parental discipline practices (Patterson et al., 2000). Children with conduct problems whose parents have positive skills seem to benefit from the added child training, even if they also show ADHD symptoms, whereas those who still have negative and punitive interactions modeled at home will be less likely to succeed with the child training alone.

We are encouraged that our results show sustained effects over time and generalizability across settings. It would seem that child social skills and problem-solving training should be considered as an effective treatment option for young children with conduct problems, as long as parents are using positive, noncoercive discipline at home.

Two limitations of this study are worthy of discussion. The first concerns the lack of an untreated control group at 1-year follow-up. We felt it was unethical to withhold treatment indefinitely from families who came to our clinic seeking treatment for their child's diagnosed problems (ODD/CD). Consequently, after 9 months, control families were offered a child or parent intervention. This lack of control group at follow-up makes it difficult to determine what would have happened to these high-risk children in the absence of treatment. However, longitudinal epidemiological data regarding aggressive children would suggest that without treatment, a substantial percentage (30–40%) will continue on to become antisocial, substance abusers, and violent (Snyder, 2001). Certainly one can see from our data at the 9-month assessment of the untreated control group that the control children were significantly worse on the conduct problem construct whereas the treated children improved.

A second concern is related to this treatment method of delivering a social skills and problem-solving curriculum to a small group of children with ODD/CD. Children who were diagnosed with ODD/CD were referred to our program by teachers, other professional, or were self-referred. Our services are housed in a mental health clinic and child groups are held during after-school hours or early evening. Many of these children made their first good friends in these groups. However, when they completed treatment at our clinic, they returned to their separate classrooms and schools, where their negative reputations with teachers and peers preceded them. Thus, their peer group were not coached with the skills to use when responding to these children's impulsive or aggressive behavior. Moreover, even though therapists sent teachers letters outlining the Dinosaur goals and phoned them to explain how they could reinforce the Dinosaur Social Skills Curriculum, teachers were not offered any comprehensive training or individual consultation. It would seem far more practical and efficacious for a curriculum such as this one to be offered by classroom teachers to all children in the classroom. With this approach, not only does the aggressive child receive daily help in responding appropriately to his peers but at the same time his classmates are taught to be more understanding and patient and less rejecting. If such emotional literacy programs are part of a regular classroom curriculum, all the children (typically developing as well as aggressive, withdrawn, and depressed or anxious children) would be helped to be more socially and emotionally competent. Such programs offer far greater potential as a cost-effective way of reducing conduct problems, strengthening friendships, supporting individual differences, preventing later development of school dropout, substance abuse, and violence.

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