

Effects of a School-Based Cognitive-Behavioral Intervention for ADHD Children¹

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Two variations of school-based cognitive-behavioral training (CBT) program were compared to each other and to a waiting-list control condition in the treatment of children with attention-deficit hyperactivity disorder (ADHD). The experimental interventions included a multicomponent condition that provided coordinated training programs for parents, teachers, and children and a teacher-only condition that offered training for classroom teachers only. Evaluation of outcome occurred at pre-intervention, post-intervention and at 6-week followup periods. Dependent measures included classroom behavior observations, teacher ratings of child behavior, child self-report, and teacher ratings of adjustment. The multicomponent CBT condition was significantly better than the other conditions at improving observed off-task/disruptive behavior at post-test. This improvement was maintained at followup, although treatment condition differences were no longer significant. There were no treatment condition differences on any other measures at post-intervention or followup. It was concluded that the intervention had minimal short-term effects on the ADHD children. The results are discussed within the context of several methodological limitations of the study which serve as proposals for continued research in this area.

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Cognitive-behavioral therapy (CBT) interventions have been increasingly applied to remediate self-control and behavior problems in children (Kendall & Braswell, 1985). The CBT focus on self-guidance and strategic problem-solving provides an ideal conceptual match to the core problems and functional deficits of attention-deficit hyperactivity disorder (ADHD). The results of CBT treatment studies with ADHD children, however, have been disappointing in that short-term gains have not endured and CBT has not produced additive or synergistic effects when combined with stimulant medication (Abikoff, 1987; Abikoff & Gittelman, 1985; Brown, Wynne, & Medenis, 1985; Brown, Borden, Wynne, Schleser, & Clingerman, 1986). The limited success of CBT with ADHD children has been attributed to the rather narrow scope of its delivery (Abikoff, 1985). Typically, the child has been the target of training, with parents or teachers involved only in a peripheral manner. When CBT is delivered to children with an active parent component, the outcome is better (Bloomquist, August & Garfinkel, 1991). Also problematic is the tendency for CBT interventions to focus training on one or two skills (e.g., alternative and consequential thinking) with application to a single adjustment domain (e.g., interpersonal problem-solving) (Shure & Spivack, 1982; Spivack & Shure, 1974).

The present CBT intervention includes multiple training components that target specific cognitive and behavioral factors descriptive of ADHD children, their parents/families, and their school environments. The child training component focuses on training in problem-solving and self-instructions, while parents and teachers are trained to prompt and reinforce children for using cognitive-behavioral strategies in the home and classroom.

This study was part of a pilot project designed to evaluate the feasibility of implementing a school-based, secondary prevention program for children with ADHD. The primary aim was to assess the short-term efficacy of a school-based multicomponent CBT program in reducing symptomatic behaviors and improving adjustment in children with ADHD. To evaluate the impact of mode of delivery, a dismantling strategy was employed to contrast the multicomponent CBT package with a teacher-only CBT variation. Both of these experimental groups were compared to a waiting-list control group. Intervention effects were assessed immediately upon completion of a 10-week experimental trial and following a 6-week no-intervention interval.

METHOD

Subjects

Subjects were drawn from three suburban elementary schools in the same independent school district. The three schools were located in close prox-

imity to each other and shared similar sociodemographic characteristics (e.g., 95% Caucasian students, a range of 7 to 10% students receiving free or reduced-cost lunches). An epidemiological screening method of diagnostic assessment, called multistage identification, was employed to make diagnoses of ADHD in this nonreferred, school-based population. Children with mental retardation, epilepsy, severe emotional disorder, or pervasive developmental disorder were excluded. The multistage procedure consisted of three sequential assessments, with each successive assessment designed to maximize the accuracy of identifying valid ADHD cases. A total of 1,490 students in grades 1–4 were initially screened (Stage 1) on the basis of teacher ratings on the inattentive factor of the Child Behavior Checklist—Teacher Rating Form (Achenbach & Edelbrock, 1986). Of these, 163 (10.8%) were identified as positive screens (T score ≥ 60). From this group, 115 (70%) returned signed consent forms agreeing to participate further in the study. The parent version of the Child Behavior Checklist (CBC-PRF; Achenbach & Edelbrock, 1987) was employed for Stage 2 assessment. Using a T score of 65 or greater as a clinical cutoff for parent screening resulted in a group of 70 children who were still identified as positive screens. Stage 3 of the identification procedure involved administration of a structured diagnostic interview to the child's parent, the Diagnostic Interview for Children and Adolescents—Revised (DICA-R; Reich, Welner, Taibleson, & Kram, 1990). Sixty-four of the remaining 70 children received a DICA-R diagnosis of ADHD. In summary, the multistage identification procedure yielded a 4.3% rate of ADHD in the total school population.

Six of the 64 diagnosed case were lost during the interval between identification and the start of the intervention trial, leaving a sample of 58 children. In all cases, this loss was due to change of residence outside of the school district. Six additional cases were used as pilot subjects at one of the schools during the practicum for therapist training and were withdrawn from the data analysis. The final sample included 52 children (36 boys, 16 girls). The sample represented a mild to moderately severe type of ADHD, with 18/52 (35%) subjects meeting DICA-R criteria for oppositional defiant disorder and no subject diagnosed with a conduct disorder.

Group Assignment

Because the multicomponent and teacher-only intervention groups required school-wide training of teachers, it was not possible to utilize random assignment of subjects or classrooms to the interventions. Instead, two of the three participating schools were selected at random to receive both the multicomponent and teacher-only interventions. Within these two schools, the ADHD subjects were randomly assigned to either the multicomponent

or teacher-only groups. The third school participated only in the waiting-list control condition.

Interventions

Multicomponent Cognitive-Behavioral Therapy Intervention. The intervention is based on Braswell and Bloomquist (1991) and Bloomquist and Braswell's (1989) cognitive-behavioral therapy program for ADHD children. The intervention includes coordinated child, parent, and teacher training components. These components, which are delivered simultaneously, are described below:

1. *Child component.* School psychologists at the two schools assigned to this intervention were trained to function as primary therapists. Undergraduate psychology students from a local university were trained as cotherapists. Each group consisted of 6-8 ADHD children. The child groups met for two 1-hour sessions each week over a 10-week period (total of 20 sessions). Children were initially trained to apply a step-by-step framework to guide problem-solving efforts. The step included (1) problem recognition, (2) generation of alternative solutions, (3) thinking of consequences for potential solutions, (4) anticipation of obstacles for the chosen solutions, and (5) execution of specific behaviors to solve problems. Once the children mastered the generic problem-solving scheme, they then learned to apply these steps to specific component areas (e.g., interpersonal problem-solving, anger/frustration management, poor effort management). A variety of behavioral principles were utilized to facilitate acquisition of these skills, including didactic discussion, modeling, role-play exercises, and administration of contingent reinforcement and response cost procedures in the groups. Therapists encouraged children to utilize their newly acquired skills to solve actual problems that arose during group sessions. Children were given homework assignments to practice skills learned in group, at home, and at school. Children were also requested to have their parents and teachers sign a form documenting their use of CBT strategies at home and at school. Homework assignments were reviewed during group sessions.
2. *Teacher component.* The teacher component consisted of one 2 hour inservice and six 45- to 60-min consultation sessions which took place over a 10-week period. One consultant (MLB) conducted all teacher training sessions. All teachers in the two schools receiving the active interventions were invited to attend. No distinction was made between the teacher component for the multicomponent CBT and the teacher-only interventions. Educative and cognitive restructur-

ing exercises were employed to help teachers modify potential dysfunctional cognitions they might have held toward ADHD children. Teachers were also trained to teach *all* children in their classrooms about problem-solving and to prompt and reinforce them for using the strategy to solve actual problems occurring in the classroom. Teachers were trained in behavioral child management methods, focusing on techniques for reinforcing appropriate behavior and consequenceing disruptive and inappropriate behavior in the classroom. Finally, teachers were encouraged to actively participate together with their students through “collaborative problem-solving” to solve problems that arose between themselves and the children. The consultant also asked teachers to complete child- and self-evaluation forms each week to monitor the progress and compliance of the children as well as to verify their own compliance.

3. *Parent component.* The parent component consisted of seven 90-min sessions. The sessions were conducted at one school site during the evening hours. One therapist (GJA) conducted all the sessions. Aims of the parent component included (1) to provide parents with a comprehensive educational program addressing ADHD, (2) to establish an atmosphere of trust and support among parents, and (3) to provide parents with an intensive training program that focused on cognitive-behavioral and behavioral principles identical to those addressed in the teacher training component.

Teacher-Only Intervention. This intervention involved the teacher training component described above, but without the child or parent training components. Teachers were instructed to teach, model, prompt, and reinforce *all* children in their classroom for using problem-solving skills. Following completion of the experimental phase of the intervention, both children and parents in this experimental group were given the opportunity to receive training.

Waiting-list control. Children, parents, and teachers in the waiting-list control condition did not receive any of the intervention components during the experimental phase of the intervention. These children were all from one school in which no school personnel had been exposed to the CBT program. Following completion of the experimental phase of the study, all children, parents, and teachers in the control group were given an opportunity to receive training.

Assessment Measures

1. *Structured behavioral observations.* This measure was designed to provide a direct sample of the child’s behavior at school. Observations were recorded during structured didactic teaching and other teacher-directed ac-

tivities involving academic assignments. During a training period, undergraduate observers were required to memorize the behavioral codes and demonstrate mastery through coding observations of criterion videotapes of children. Mastery was demonstrated by observers through the obtaining of acceptable agreement with one of the authors' (RO) coding of the criterion tapes. Acceptable agreement was set at 95% for both occurrence and nonoccurrence of each behavioral code. Training continued until acceptable agreement was demonstrated in excess of 95% when compared to criterion codes completed by the experimenters. Observers were blind to treatment assignment. To limit reactivity effects, the classroom teacher informed the students of the pending arrival of college students who were interested in observing how children behave in school. Each of the targeted children was observed in an unobtrusive manner during 10-min observation periods. Three observations were performed at each of the assessment periods (baseline, post, followup). Reliability for 10-second intervals was computed for occurrence of on-task (96%), off-task/passive (91%), and off-task/disruptive (94%) behavioral codes. The specific, nonexclusive behavior codes were (1) on-task (i.e., visual orientation to the worksheet/assigned task and/or task relevant discussion with teacher/student), (2) off-task/passive (i.e., all nontask-related activity), and (3) off-task/disruptive (i.e., audible or physically intrusive off-task behavior).

2. *Conners Teacher Rating Scale (CTRS; Goyette, Conners & Ulrich, 1978)*. This is a 39-item questionnaire rated on a 4-point continuum from *not at all* (scored 0) to *very much* (scored 3). The scale includes four factors: conduct problems, impulsivity, hyperactivity index, and inattention/passivity.

3. *Self-Control Rating Scale (SCRS; Kendall & Wilcox, 1979)*. This is a 33-item questionnaire that was specifically developed to assess self-control in elementary school children. Each of the items is rated on a 7-point scale, and all items are summed to yield a total score. The higher the score, the greater the child's lack of self-control.

4. *Child Report—Piers-Harris Self-Concept Scale (Piers, 1984)*. This is an 80-item questionnaire which requires yes/no responses from the child. There are six cluster scales including behavior, intellectual/school status, popularity, physical appearance, happiness/satisfaction, and total score.

5. *Teacher Report—Walker-McConnell Scale of Social Competence and School Adjustment (Walker & McConnell, 1988)*. This 43-item checklist is designed to sample behavior, social, and academic competence domains according to the following scales: teacher-preferred social behavior, peer-preferred social behavior, and school adjustment.

Intervention Integrity

Specific efforts were made to monitor and verify the experimental procedures to ensure the construct validity of the manipulation. A comprehensive intervention manual (Bloomquist & Braswell, 1989) that described the rationale, content, materials, and session-by-session procedures for the child, teacher, and parent training components was followed by the therapists on a session-by-session basis. All therapists for the child component (i.e., school psychologists and undergraduates) were required to participate in an intensive training program that included 12 hours of didactic instruction and practicum experience where therapists conducted the entire intervention on "practice" prior to conducting the intervention for the study. During the practicum, as well as during the experimental intervention, the therapists received 1 hour of group supervision between sessions from one supervisor (MLB). Therapists were required to complete forms documenting each child's progress. Some sessions were videotaped and reviewed with the supervisor. Attendance was recorded for child, teacher, and parent training sessions. Since child and teacher training was conducted at the schools during regular hours, attendance was nearly perfect. Parents of children assigned to the multicomponent CBT group were required to attend a minimum of 5–7 biweekly training sessions. Children whose parents did not meet this criteria were dropped from the analyses.

RESULTS

Fifty-two children were assigned to one of three intervention groups (multicomponent, $n = 20$; teacher-only, $n = 16$; waiting-list, $n = 16$). All of these children received the intervention, with 36 (70%) considered as valid data cases for assessment of intervention efficacy. Of the 16 subjects dropped from analysis, eight were currently taking psychostimulant medication (four in the multicomponent, one in the teacher-only, three in the waiting-list groups), three had pre-intervention scores that were no longer in the clinical range as rated by their new teachers during the intervention year of the study (all three were in the teacher-only group), and five were dropped from the multicomponent group because their parents failed to comply with parent training criteria. We elected to drop these subjects from analyses to prevent confounding variables from contaminating the results. The final intervention group sample size was as follows: multicomponent, $n = 11$; teacher-

Table II. Comparison of Intervention Groups on Subject Selection and Descriptive Characteristics

	Multicomponent		Teacher-only		Waiting-list control	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Age	8.41	1.18	9.00	1.22	8.81	1.18
IQ	99.54	10.50	102.45	6.68	100.15	12.29
Woodcock-Johnson						
Reading	100.00	10.58	90.27	9.40	95.39	12.96
Math	99.18	8.12	95.36	11.49	88.54	10.64 ^a
Language	95.64	12.50	92.46	11.14	96.08	15.69
Conners Hyper-Activity Index						
Teacher	1.82	0.51	1.57	0.54	1.75	0.47
Mother	1.79	0.46	1.66	0.59	1.64	0.46
Self-Control Rating Scale						
Teacher	165.00	19.74	153.58	24.66	169.08	17.96
Mother	170.46	23.24	160.88	22.11	167.79	13.69
Child Behavior Checklist—						
Teacher						
Inattention	64.83	4.65	66.08	10.76	64.15	7.40
Nervous/overactive	62.45	4.01	65.42	7.97	64.62	4.48
Aggressive	61.46	6.11	65.83	10.69	63.15	7.18
External	62.55	4.50	65.50	8.88	63.62	6.05
Mother						
Hyperactivity	69.72	4.22	65.17	6.31	67.42	7.13
Aggressive	65.46	9.83	66.08	7.14	68.33	8.87
Delinquent	61.54	6.95	63.50	6.42	67.92	7.33
External	66.36	6.36	64.75	9.00	67.42	8.47

^aGroups differ at $p < .05$.

only, $n = 12$; waiting-list, $n = 13$. Post-intervention data (behavioral observations, child self-report, teacher ratings) were obtained for all cases. A significant number of parents failed to return the parent rating questionnaires, however, and thus parent response data were not included in the analyses.

Preliminary Analyses

One-way analyses of variance (ANOVAs), comparing the three intervention groups on descriptive, subject identification, and pre-intervention dependent measures, were conducted. As noted in Table I, the groups were highly comparable on descriptive and subject identification measures such as age, IQ, academic achievement, hyperactivity and self-control behavior ratings, and dimensions of externalizing and internalizing behavior. There were no group differences observed on any of the pre-intervention dependent measures.

Pre- to Post-Intervention Effects

Means and standard deviations for the three groups at pre-intervention and post-intervention assessments are presented in Table II.

Separate 3 (Intervention Groups) \times 2 (Time) repeated-measures multivariate analysis of variance (MANOVAs) were performed first. Measures which assessed conceptually related constructs and/or reflected a common source (e.g., teacher ratings) were grouped into discrete sets, and for each set a MANOVA was conducted to control for experiment-wise error. Separate MANOVAs were performed on (1) the various coded behaviors of the classroom behavior observation measure, (2) teacher behavior rating scales (e.g., Self-Control Rating Scale, CTRS), (3) teacher adjustment ratings (e.g., Walker-McConnell), (4) anxiety and happiness subscales of the Piers-Harris, and (5) intellectual, popularity, and social status subscales of the Piers-Harris. Individual ANOVA's were utilized to analyze the composite total scores from the Piers-Harris and Walker-McConnell scales because these component scores showed items common in different MANOVA groupings.

The results of the MANOVAs are summarized in Table III. Only Group \times Time effects are reported to evaluate the effects of the different experimental groups across time. The only significant MANOVA was for classroom observations.

To examine specific sources of variance, repeated-measures ANOVAs were conducted on each classroom behavior-dependent measure. A significant Group \times Time effect for off-task/disruptive behavior ($F(2, 327) = 4.30, p < .02$), and nonsignificant effects for on-task ($F(2, 32) = .71, p = .50$), and off-task/passive ($F(2, 32) = .87, p = .43$) were found.

Paired *t* tests were then computed to assess pre- to post-intervention effects for the three groups on the behavior observation measures. Only the multicomponent group showed significant improvement on off-task/disruptive behavior ($t(9) = 2.42, p < .04$).

Pre- to Followup Intervention Effects

Means and standard deviations for the three groups at pre- and followup assessments are presented in Table II.

Separate 3 (Intervention Groups) \times 2 (Time) repeated-measures MANOVAs were performed to evaluate intervention effects on the same conceptual groupings of dependent measures. The results of the MANOVAs are summarized in Table III. There were no significant effects on these MANOVAs. As a result of the nonsignificant MANOVAs, no univariate analyses will be reported.

Table II. Means and Standard Deviations at Time of Testing for Dependent Measures as a Function of Group

Dependent measures	Group	Pre		Post		Followup	
		M	SD	M	SD	M	SD
Child self-report							
Piers-Harris Behavior	Multicomponent	48.00	10.46	47.78	6.02	49.67	10.77
	Teacher-only	46.83	6.81	47.58	7.94	50.00	13.13
Intellectual and school	Control	53.90	10.52	52.50	8.11	54.30	11.06
	Multicomponent	51.78	13.19	54.33	7.16	52.44	7.42
	Teacher-only	53.75	6.00	53.58	8.69	54.67	11.59
	Control	58.40	11.36	57.50	10.66	58.50	11.06
Anxiety	Multicomponent	49.33	7.56	51.44	8.56	46.00	11.43
	Teacher-only	49.82	6.26	50.64	8.33	52.83	14.15
Popularity	Control	55.67	12.08	56.00	8.06	56.60	11.32
	Multicomponent	45.67	6.04	47.44	7.72	47.33	9.81
	Teacher-only	48.58	10.84	43.83	7.93	47.92	13.44
Happiness and satisfaction	Control	50.10	12.06	50.10	13.02	52.60	11.80
	Multicomponent	51.78	10.05	53.22	6.26	56.11	10.25
	Teacher-only	51.45	8.23	53.45	9.75	50.58	15.29
Total	Control	56.22	10.62	54.44	10.74	54.20	12.74
	Multicomponent	53.11	10.61	56.89	7.72	53.44	10.35
	Teacher-only	51.58	5.59	54.00	8.60	54.42	16.27
	Control	60.00	13.64	58.50	10.95	60.60	13.58
Teacher rating scales							
Conners	Multicomponent	1.09	0.81	0.99	0.70	0.90	0.36
	Teacher-only	0.77	0.59	0.83	0.61	0.95	0.67
	Control	1.06	0.70	0.93	0.70	1.20	0.81
Conduct problems	Multicomponent	2.05	0.38	1.50	0.59	1.39	0.43
	Teacher-only	1.58	0.76	1.43	0.84	1.43	0.78
	Control	1.85	0.77	1.57	0.89	1.69	1.00
Inattention/passivity	Multicomponent						
	Teacher-only						
	Control						

Impulsivity	Multicomponent	1.68	0.53	1.23	0.55	1.42	0.39
	Teacher-only	1.88	0.48	1.55	0.65	1.79	0.62
	Control	2.05	0.45	1.61	0.55	1.82	0.58
Hyperactivity index	Multicomponent	1.79	0.53	1.41	0.58	1.37	0.27
	Teacher-only	1.57	0.54	1.43	0.66	1.58	0.52
	Control	1.75	0.47	1.38	0.61	1.66	0.71
Self-control rating scale	Multicomponent	163.50	20.13	138.00	35.38	144.40	13.03
	Teacher-only	153.58	24.66	141.67	29.44	149.50	29.91
	Control	169.08	17.96	161.00	20.22	159.17	23.19
Walker-McConnell Teacher-preferred	Multicomponent	7.50	3.14	7.60	3.06	7.40	1.84
	Teacher-only	7.33	2.19	8.08	2.15	7.42	2.19
	Control	6.00	2.27	6.54	1.94	5.38	2.33
Peer-preferred	Multicomponent	7.30	3.87	7.70	3.47	7.30	2.83
	Teacher-only	7.17	3.04	8.25	2.80	8.08	2.23
	Control	6.08	2.43	6.85	1.91	5.69	2.66
School adjustment	Multicomponent	6.20	3.12	7.10	2.69	6.50	1.90
	Teacher-only	5.33	1.15	6.33	1.92	6.08	2.02
	Control	4.38	1.33	5.46	2.26	5.54	1.71
Total	Multicomponent	83.50	17.52	86.50	15.90	83.50	11.49
	Teacher-only	82.08	9.11	87.00	11.54	85.25	9.64
	Control	76.08	10.28	80.54	9.49	75.85	9.75
Classroom observation							
Percent on-task	Multicomponent	54.17	0.04	54.17	0.06	52.17	0.14
	Teacher-only	48.47	0.08	53.33	0.08	53.88	0.09
	Control	49.87	0.08	51.92	0.11	50.00	0.11
Percent off-task passive	Multicomponent	21.00	0.05	17.67	0.06	17.67	0.09
	Teacher-opnly	26.80	0.06	19.03	0.05	16.25	0.06
	Control	23.33	0.07	20.90	0.12	15.38	0.10
Percent off-task/disruptive	Multicomponent	14.67	0.08	8.33	0.06	9.83	0.07
	Teacher only	9.30	0.03	13.05	0.08	7.92	0.04
	Control	10.65	0.06	10.65	0.08	10.52	0.10

Table III. Summary of Group \times Time Effects for Repeated Measures MANOVAs and ANOVAs from Pre to Post and Pre to Followup

Measures	Pre to Post			Pre to Followup		
	<i>F</i>	<i>df</i>	<i>p</i>	<i>F</i>	<i>df</i>	<i>p</i>
Self-report						
PHCSS ^a —Anxiety, happiness, and satisfaction	0.31	3,24	0.80	1.86	6,52	0.11
PHCSS ^a —Behavior, intellectual and school status, popularity	0.81	6,52	0.57	0.34	6,52	0.91
PHCSS ^a —Total ^b	0.72	2,28	0.72	0.11	2,28	0.90
Teacher ratings						
SCRS, ^a Conners conduct problems, Conners Hyperactivity Index, Conners impulsivity, Conners inattention/passivity	0.69	8,58	0.70	0.75	8,56	0.65
WMSSCSA ^a —Teacher-preferred social behavior, peer-preferred social behavior, school adjustment	0.14	6,60	0.98	0.67	6,60	0.68
WMSSCA ^a —Total ^b	0.10	2,32	0.90	0.38	2,32	0.69
Classroom behavior observations						
On-task, off-task/passive, off-task/disruptive	2.41	6,60	0.04	1.18	6,60	0.33

^aNote: PHCSS = Pier-Harris Children's Self-Concept Scale (Piers, 1984); SCRS = Self-Control Rating Scale; WMSSCSA = Walker-McConnell Scale of Social Competence and School Adjustment.

^bANOVAs were conducted for PHCSS and WMSSCA total scores.

We concluded the groups did not differ from each other from pre- to followup assessment on any measures, including the classroom behavior observations. Given the importance of documenting maintenance of treatment effects, however, it is still worthy to investigate if the significant pre- to post-test improvements favoring the multicomponent group on observations of off-task/disruptive behavior were still maintained at followup. Paired *t* tests were computed for each group to assess change from pre- to followup on the observed off-task/disruptive behavior measure. Only the multicomponent group exhibited a tendency toward maintained improvements on off-task/disruptive behavior ($t(9) = 2.10, p = .07$).

DISCUSSION

The results provide minimal support for the efficacy of a school-based, multicomponent CBT intervention for ADHD children. ADHD children receiving multicomponent CBT evidenced greater reduction in off-task/disruptive behavior than did ADHD children in the teacher-only CBT and waiting-list control groups. Unfortunately, significant effects were not ob-

tained on child self-report or teacher ratings of adjustment. There were no significant group differences on any measures at followup. The multicomponent CBT group, however, maintained its improvement on the off-task/disruptive variable. Given the broad scope of the intervention, and the amount of effort necessary to conduct it, this single finding does not bode well for this CBT program. There are less time-consuming and labor-intensive behavioral interventions which could achieve similar results. This study is similar to other studies finding limited support for CBT as a viable intervention for ADHD children (Abikoff, 1985; Hinshaw & Erhardt, 1991).

A major problem was the loss of subjects due to failure to satisfy entry criteria. Potentially significant intervention effects may have been masked due to the limited power in the statistical analyses resulting from small sample size. Indeed, if one examines the means on some dependent measures, it is apparent that certain effects may have been missed. For example, on the Self-Control Rating Scale, there appears to be more improvement favoring the multicomponent group over the other conditions. Perhaps with a larger sample size, these potentially important effects would have achieved statistical significance. Given the small sample size, our results should be viewed as preliminary and should be applied with caution.

The general aim of the present multicomponent CBT intervention was to reduce behavioral difficulties of ADHD children, while improving adjustment in social and academic domains. While the results documented positive change in observations of off-task/disruptive behavior for subjects who received the multicomponent intervention, this change did not extend to self-perceptions or teacher perceptions of behavior improvement or adjustment. Some studies (e.g., Bierman & Furman, 1984; Lochman & Curry, 1986) have shown that behavioral change does not necessarily affect another's perceptions concerning an individual. It could be suggested that if the child's behaviors continued to improve, then self-, parents', and teachers' perceptions could also change over time. It is also plausible that adjustment changes follow a slower course, as hypothesized above, in which newly acquired skills and behaviors require longer-term strengthening via prompting, feedback, and reinforcement before changes are strong enough to alter perceptions. Longer followup evaluations would be necessary to test out these hypotheses.

This study may have been too limited in placing its assessment focus only on the child. First, we did not evaluate the actual extent to which parents and teachers compiled and carried out the skills targeted in training at home and at school. Therefore, we are unsure if potential changes in parents or teachers were strong enough to really affect the child. Second, the impact of the parent and teacher components of the multicomponent intervention on parents and teachers themselves was not formally evaluated. Perhaps the intervention modified parent/teacher cognitions and beliefs about the children or themselves, their perceived self-efficacy in coping with or managing the chil-

dren, and/or observed parent/teacher interactions with the children. Changes in parents and teacher may ultimately be more important and have a more profound effect on the ADHD children than directly changing the children. Future CBT intervention research involving parent and teachers should document actual behavioral changes and evaluate treatment effects on them directly.

This research illustrates the numerous difficulties in school-based intervention studies. The merit of the study was in describing the model of intervention and providing some initial evaluation. We view the findings as preliminary in nature, and think that future research evaluating the effects of the multicomponent CBT intervention is indicated to address the issues raised. We also feel there is considerable value in continuing to deliver such interventions in the school for clinical purposes. We have numerous pieces of anecdotal information suggesting the program was received positively by children, parents, and teachers, even if research results do not show compelling effects. The school represents an ideal site for this type of intervention because it provides a place of ready access to large numbers of children and it already possesses abundant ecological resources in the form of mental health professionals (e.g., school psychologists, social workers, etc.) and teachers who can be readily trained to provide children with skills, knowledge, and services consistent with the goals of intervention and prevention.

REFERENCES

- Abikoff, H. (1987). An evaluation of cognitive behavior therapy for hyperactive children. In B. B. Lahey & A. E. Kazdin (Ed.), *Advances in clinical child psychology* (pp. 171-212). New York: Plenum Press.
- Abikoff, H., & Gittelman, R. (1985). Hyperactive children treated with stimulants: Is cognitive training a useful adjunct? *Archives of General Psychiatry*, *42*, 953-965.
- Achenbach, T. M., & Edelbrock, C. (1986). *Manual for the teachers version of the Child Behavior Profile*. Burlington, VT: University of Vermont, Department of Psychiatry.
- Achenbach, T. M., & Edelbrock, C. (1987). *Manual for the Child Behavior Checklist and Revised Child Behavior Profile*. Burlington, VT: University of Vermont, Department of Psychiatry.
- Bierman, K. L., & Furman, W. (1984). The effects of social skills training and peer involvement on the social adjustment of pre-adolescents. *Child Development*, *55*, 151-162.
- Bloomquist, M. L., August, G. J., & Garfinkel, B. G. (1991). *Cognitive-behavioral therapy for children with attention-deficits and hyperactivity: Effects of parent involvement and methylphenidate*. Manuscript submitted for publication.
- Bloomquist, M. L., & Braswell, L. (1989). *Multicomponent cognitive-behavior intervention for attention-deficit hyperactivity disorder children*. Unpublished treatment manual, University of Minnesota.
- Braswell, L., & Bloomquist, M. L. (1991). *Cognitive-behavioral therapy for ADHD children: Child, family and school interventions*. New York: Guilford Press.
- Brown, R. T., Borden, K. A., Wynne, M. E., Schleser, R., & Clingerman, S. R. (1986). Methylphenidate and cognitive therapy with ADD children: A methodological reconsideration. *Journal of Abnormal Child Psychology*, *14*, 481-497.

- Brown, R. T., Wynne, M. E., & Medenis, R. (1985). Methylphenidate and cognitive therapy: A comparison of treatment approaches with hyperactive boys. *Journal of Abnormal Child Psychology*, *13*, 69-87.
- Goyette, C. H., Conners, C. K., & Ulrich, R. F. (1978). Normative data on Revised Conners Parent and Teacher Rating Scales. *Journal of Abnormal Psychology*, *6*, 221-236.
- Hinshaw, S. P., & Erhardt, D. (1991). Attention-deficit hyperactivity disorder. In P. C. Kendall (Ed.), *Child and adolescent therapy: Cognitive-behavioral procedures* (pp. 98-128). New York: Guilford Press.
- Kendall, P. C., & Braswell, L. (1985). *Cognitive-behavioral treatment for impulsive children*. New York: Guilford Press.
- Kendall, P. C., & Wilcox, L. E. (1979). Self-control in children: Development of a rating scale. *Journal of Consulting and Clinical Psychology*, *47*, 1020-1029.
- Lochman, J. E., & Curry, J. F. (1986). Effects of social problem-solving training and self-instruction training with aggressive boys. *Journal of Clinical Child Psychology*, *15*, 159-164.
- Piers, E. V. (1984). *Piers-Harris Children's Self-Concept Scale—Revised manual*. Los Angeles, Western Psychological Services.
- Reich, W., Welner, Z., Taibleson, C., & Kram, L. (1990). *The Diagnostic Interview for Children and Adolescents—Revised—Parent*. Unpublished structured psychiatric interview. Washington University.
- Shure, M. B., & Spivack, G. (1982). Interpersonal problem-solving in young children: A cognitive approach to prevention. *American Journal of Community Psychology*, *10*, 341-356.
- Spivack, G., & Shure, M. B. (1974). *Social adjustment of young children*. San Francisco: Jossey-Bass.
- Walker, H. M., & McConnell, S. R. (1988). *Walker-McConnell Scale of Social Competence and School Adjustment*. Austin: Pro-Ed.