

A Randomized Trial of Mindfulness-Based Cognitive Therapy for Children: Promoting Mindful Attention to Enhance Social-Emotional Resiliency in Children

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Abstract Mindfulness-based cognitive therapy for children (MBCT-C) is a manualized group psychotherapy for children ages 9–13 years old, which was developed specifically to increase social-emotional resiliency through the enhancement of mindful attention. Program development is described along with results of the initial randomized controlled trial. We tested the hypotheses that children randomized to participate in MBCT-C would show greater reductions in (a) attention problems, (b) anxiety symptoms, and (c) behavior problems than wait-listed age and gender-matched controls. Participants were boys and girls aged 9–13 ($N = 25$), mostly from low-income, inner-city households. Twenty-one of 25 children were ethnic minorities. A randomized cross-lagged design provided a wait-listed control group, a second trial of MBCT-C, and a 3-month follow-up of children who completed the first trial. Measures included the Child Behavior Checklist, State-Trait Anxiety Inventory for Children, and Multidimensional Anxiety Scale for Children. Participants who completed the program showed fewer attention problems than wait-listed controls and those improvements were maintained at three months following the intervention [$F(1, 1, 18) = 5.965$, $p = .025$, Cohen's $d = .42$]. A strong relationship was

found between attention problems and behavior problems ($r = .678$, $p < .01$). Reductions in attention problems accounted for 46% of the variance of changes in behavior problems, although attention changes proved to be a non-significant mediator of behavior problems ($p = .053$). Significant reductions in anxiety symptoms and behavior problems were found for those children who reported clinically elevated levels of anxiety at pretest ($n = 6$). Results show that MBCT-C is a promising intervention for attention and behavior problems, and may reduce childhood anxiety symptoms.

Keywords Mindfulness · MBCT · Children · Emotion regulation · Attention · Anxiety

Introduction

For some children, daily school activities present many potential stressors. Some anxiety is certainly a helpful and expectable response to stress, but too much anxiety interferes with a child's ability to study and make appropriate academic progress. Anxiety is commonly associated with attentional biases (Ehrenreich and Gross 2002), cognitive distortions and emotional lability (Mineka and Gilboa 1998), and physiological hyperarousal (Joiner et al. 1999). It seems likely that the chronic, pervasive, and intrusive worries associated with anxiety interfere with academic achievement by impairing attention and disrupting cognitive information processing. Attention has been consistently associated with academic achievement outcomes (Duncan et al. 2007). Analyzing longitudinal data, Duncan and his colleagues found that the strongest predictors of later achievement were school entry-level math, reading, and attention skills. Academic problems contribute to

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negative self-judgment and increased anxiety (Gordon 1977; Mineka and Gilboa 1998). Anxiety further disrupts attention and escalates academic problems. The reciprocal interactions between anxiety, impaired attention, and academic difficulties seem to maintain or exacerbate the child's initial problems. Mindfulness-based interventions aim to enhance attention and reduce chronic harsh self-judgments, thereby suggesting an approach that promises to break this vicious cycle.

Evidence-based psychotherapies (EBTs) can be moderately effective in treating a wide range of childhood mental health issues, and particularly anxiety problems (see review by Silverman et al. 2008), but may be limited in their strength and durability. Mean treatment effect sizes are approximately .30, which suggests only modest effectiveness (Weisz et al. 2006), and these effects may not be lasting. A 20-year follow-up of 104 children treated for at least six months at an inpatient psychotherapy clinic found that these former child patients continued to show persistent psychiatric symptoms and “a considerably restricted quality of life” (Fleischhaker et al. 2008).

The popularity of mindfulness-based psychotherapies is growing even as researchers struggle to define exactly what mindfulness is and how to measure it. Kabat-Zinn (1994) described mindfulness as “paying attention in a particular way: on purpose, in the present moment, and nonjudgmentally” (p. 4). Bishop et al. (2004) proposed that mindfulness is “a process of regulating attention in order to bring a quality of nonelaborative awareness to current experience and a quality of relating to one's experience within an orientation of curiosity, experiential openness, and acceptance” (p. 234). Mindfulness is generally believed to be a learned skill that enhances self-management of attention (Baer 2003; Bishop et al. 2004; Boals 1978; Borkovec 2002; Kabat-Zinn 1994; Kumar 2002; Segal et al. 2002). Largely, mindfulness-based therapies seek to develop mindful attention using a variety of meditative techniques, many of which have been adapted from Buddhist spiritual practices.

Little research has directly examined the effects of mindfulness practices on attention. Jha et al. (2007) used the Attention Network Test (Fan et al. 2002) to examine three attentional subsystems: alerting, orienting, and conflict monitoring. Participants in a Mindfulness-Based Stress Reduction program (MBSR; Kabat-Zinn 1990, 1994) demonstrated significantly improved orienting, while participants undergoing an intensive mindfulness retreat showed improvements in receptive attentional skills and enhanced performance on the alerting component. Jha and her colleagues suggested that mindfulness might differentially enhance specific components of attention. Zylowska et al. (2008) explored the relationship between mindfulness and attention-related behavior problems. After 24 adults

and 8 adolescents with ADHD completed an 8-week MBSR program, improvements were found in self-reported ADHD symptoms, performance tests of attention and cognitive inhibition, and in mood and anxiety symptoms. Other controlled studies with adults (Semple 1999; Valentine and Sweet 1999) and children (Rani and Rao 1996) practicing various forms of meditation have also reported significant enhancements of attention capabilities. The evidence, however, is not consistent. A randomized controlled trial of MBSR with healthy adults found no relationships between mindfulness and measures of sustained attention, switching, elaborative processing, or non-directed attention (Anderson et al. 2007). Apart from these few studies, there is little evidence to substantiate a direct relationship between mindfulness practices and attention enhancement. Definitions and measurements of attention were different across these studies, as were the mindfulness techniques and levels of participant training and experience. Albeit limited, evidence for a relationship between mindfulness and attention does appear promising and justifies further investigation.

Mindfulness-based therapies are generally effective in reducing anxiety, stress, and depressive symptoms in adults (Baer 2003), however, researchers are just beginning to explore the feasibility, acceptability, and effectiveness of this approach for children. A few clinical reports (Fontana and Slack 1997; Goodman 2005; Greco and Hayes 2008) and small-scale studies (Goldin et al. 2006; Greco 2006; Zylowska et al. 2008) suggest that meditation techniques may be useful in treating anxiety symptoms in children and adolescents. Linden (1973) conducted a controlled trial to evaluate the effects that meditation training might have on selected aspects of the cognitive and affective functioning of 3rd grade children ($N = 26$). No improvements in reading skills were found. However, after 18 weeks of meditation practice, participants reported significantly lower test anxiety than matched controls. Linden suggested that meditation practice might improve concentration and volitionally alter feeling states by shifting attention. Semple (2005) conducted a 6-week pilot study to examine the feasibility and acceptability of teaching mindfulness to children. They concluded that mindfulness-based techniques could be taught to children as young as 7 years old. Initial evaluations of MBCT-C suggest that mindfulness can be taught to children and shows promise in alleviating attention problems and anxiety symptoms (Lee et al. 2008).

Hayes and Feldman (2004) suggest that emotions can be regulated either by avoidance or by over-engagement. Avoidance of current experiences can involve selective biasing of information, distraction, cognitive distortions, or affective disengagement. Over-engagement can involve rumination, chronic worry, obsessions, strong cravings, or compulsive behaviors. Both of these emotion-regulation

strategies require one to shift attention from present events toward past or future events. Past-oriented thinking is characteristic of depressive affect (e.g., guilt, remorse, self-blame, and shame), while future-oriented thinking is associated with anxious affect (e.g., obsessive worries, anticipatory failures, and catastrophic outcomes). Anxious children tend to selectively allocate information processing resources toward threat stimuli, often missing or ignoring other, more relevant information (Taghavi et al. 1999). Neurologically, the anterior cingulate cortex seems to be part of an attention regulation circuit that serves to regulate both cognitive and emotional information processing. Neuroimaging studies have found connections between attention and emotion regulation (Bush et al. 2000) and mindfulness and emotion regulation (Davidson et al. 2003).

Many children with anxiety disorders show poor emotion regulation skills. Hannesdottir and Ollendick (2007) suggested that cognitive-behavioral treatments may not work well for a large minority of children because their emotion regulation deficits are not adequately addressed. In the context of mindfulness-based cognitive therapy (MBCT; Segal et al. 2002), *decentering* has been hypothesized to be the core mechanism of change that produces greater affective stability. Decentering is the ability to observe internal and external experiences without distortion from affective, cognitive, or physiological reactivities. MBCT proposes that thoughts, emotions, and body sensations are simply phenomena to *observe* rather than to *judge* (including observing the experience of judging) and as events to be *described* rather than *changed*. By experiencing intrapsychic processes independent of external events, mindful awareness allows an individual to more easily decenter from previously conditioned anxiety schemata (Safran and Segal 1990). Individuals with anxiety disorders tend to have strong thoughts and feelings of impending threat, danger, or catastrophe that promote hypervigilance and avoidant behaviors. The practice of mindful attention is simply to continue observing whatever is present. With practice, thoughts, emotions, and body sensations may come to be perceived as transient, continually shifting intrapsychic events. Essentially, mindfulness can be regarded as a form of intrapsychic exposure with response prevention. The process of decentering supports affective equanimity and produces a shift in the mental representations that define an individual's relationship to their own anxious thoughts, feelings, and body sensations (Teasdale 1999; Teasdale et al. 1995). Research needs to continue on childhood interventions targeted to improve sustained affective resiliency and coping skills. Mindfulness-based interventions offer a promising avenue for exploration.

Anxiety disrupts attention and interferes with affective self-regulation. A developmentally appropriate adaptation

of an adult mindfulness-based intervention may enhance self-management of attention, thereby reducing the affective dysregulation associated with childhood anxiety. The first two authors (RJS and JL) adapted concepts and applied techniques from Buddhism, integrated them with cognitive therapy techniques, and developed an age-appropriate, manualized group psychotherapeutic intervention for children: mindfulness-based cognitive therapy for children (MBCT-C). MBCT-C is a developmentally appropriate, 12-week group intervention. It teaches mindfulness techniques with the aim of enhancing self-management of attention, promoting decentering, increasing emotional self-regulation, and developing social-emotional resiliency. Evaluation of the feasibility and acceptability of MBCT-C is reported elsewhere (Lee et al. 2008). Results of the first randomized controlled trial of MBCT-C are reported here.

We initially put forth three hypotheses: as compared to age and gender-matched controls, children completing the MBCT-C program would show fewer (a) attention problems, (b) anxiety symptoms, and (c) behavior problems. We further hypothesized that improvements in these three domains would be maintained at three months following treatment. Based on initial findings, a supplemental hypothesis was generated and tested. This hypothesis was that changes in attention would mediate behavioral changes.

Methods

Participants

English speaking children, ages 9 to 13, enrolled in a university clinic-based remedial reading tutoring program were referred by the clinic's educational psychologist as having significant reading difficulties. Most displayed some indicators of associated stress or anxiety. Thirty-nine children were invited to participate. There were no other initial screening or clinical inclusion or exclusion criteria. Thus, the sample consisted of a representative group of inner-city children struggling with academic problems. Twenty-nine children (74%) enrolled in the study. Scheduling conflicts prevented two children from participating, one child was withdrawn due to parental concerns related to religious issues, and one child was excluded due to the age criterion. Twenty-five children (15 girls and 10 boys) began the program and completed all three assessments. Program completion was defined as attending at least eight of the twelve scheduled training sessions.

Parents of four participants spoke little or no English. Native Spanish language translators assisted these parents in completing the English version of the Child Behavior Checklist. Demographics by sex, age, race, and class grade are shown in Table 1. The study was conducted in

Table 1 Participant demographics by sex, age, race, and class grade

| | Boys | Girls |
|------------------|-------|-------|
| Age | | |
| 9–10 | 4 (3) | 9 (8) |
| 11–13 | 6 (5) | 6 (4) |
| Race | | |
| African American | 2 (2) | 4 (3) |
| Caucasian | 2 (1) | 2 (1) |
| Latino | 6 (5) | 9 (8) |
| Grade | | |
| 3 | 0 (0) | 2 (1) |
| 4 | 4 (3) | 4 (4) |
| 5 | 2 (2) | 6 (6) |
| 6 | 2 (2) | 3 (1) |
| 7 | 2 (1) | 0 (0) |

Intention to treat sample, $N = 25$, (completion sample, $n = 20$)

accordance with ethical guidelines of the American Psychological Association and the Columbia University Institutional Review Board. Parents signed informed consent forms (English or Spanish) and child participants signed assent forms. Participants and their parents received modest financial compensation for completing assessments and travel reimbursement.

Design

A power analysis was conducted to determine the number of participants needed to reasonably detect significant mean group differences. A meta-analysis of mindfulness studies with adults (Baer 2003) provided a nominal estimate of mean effect size of $d = .59$ ($SD = .41$). The sample size to detect a significant group difference at $\alpha = .05$ and a power of 80% was calculated to be nine participants per group.

Participants were first matched by age and gender, and then randomly assigned to one of four independent groups. The randomization was concealed from participants and staff before recruitment. Groups A and C consisted of children who were 9 or 10 years old. Groups B and D consisted of children who were 11–13 years old. There were six or seven children in each of the four groups. Phase I of the study was a pretest (Time 1) posttest (Time 2) randomized trial of a two-group design. Groups A and B were defined as the WINTER group, which consisted of 13 children who participated in the 12-week MBCT-C program during the winter school semester. Groups C and D were initially defined as wait-listed CONTROLS during the winter school semester, and then redefined as the SPRING group. The SPRING group therefore consisted of the 12 children who were randomized as wait-listed controls

during Phase I. Phase II completed the “cross-lag” element of the design. Children in the SPRING group participated in MBCT-C and then were evaluated for treatment effects (Time 3). At Time 3, WINTER group participants were assessed for maintenance of any treatment effects reported at the end of Phase I (Time 2). Each 12-week program consisted of one, 90-min, small group, mindfulness training session per week, supplemented with brief daily home practice exercises.

This design offered an opportunity to analyze the resulting data in two ways. First, as a randomized controlled trial (RCT), data from the WINTER treatment group (A and B; $n = 13$) were evaluated against data from the wait-listed CONTROLS (C and D; $n = 12$). Second, to explore the study as an open trial, data from all four groups ($N = 25$) were combined.

Measures

Trained graduate research assistants, who were blind to the group assignment of the participants, administered and scored the assessments. Test administration and scoring were conducted in accordance with the test developers’ manuals. Spanish speaking research assistants were available as needed to translate English language assessment materials for participants’ parents. All child participants spoke and read adequate English.

Child Behavior Checklist: Parent Report Form (CBCL; Achenbach 1991) is designed to obtain multi-axial data on emotional and behavioral problems, and social and academic competencies, in children. Three separate CBCL forms can be independently rated by parents, teachers, or direct observers. Parents provided the only source information used in this study. The CBCL consists of 113 problem-behavior items and provides sub-scores for eight Specific Problem Scales, an Internalizing Problems Scale, an Externalizing Problems Scale, and a Total Problems Scale. The Attention Problems scale, Internalizing Problems Scale, and the Total Problems Scale were outcome variables of interest for the present study. The Internalizing Problems Scale is composed of three separate subscales (withdrawn, anxious/depressed, somatic complaints). Raw scores for each scale are converted to T -scores ($M = 50$, $SD = 10$), based on a national standardization sample of 2,368 children ages 4–18. The CBCL is a well-standardized behavioral inventory with good reliability and validity (Achenbach 1991).

Multidimensional Anxiety Scale for Children (MASC; March 1997; March and Parker 1999) is a 39-item self-report inventory for children aged 8–19. MASC items ask about anxiety-related thoughts, feelings, and actions, which are rated on a 4-point scale. Four separate factor scores are provided: Physical Symptoms, Social Anxiety, Harm

Avoidance, and Separation Anxiety. The MASC also contains an inconsistency index, which provides a measure of score validity. Based on a normative sample of 2,698 children and adolescents, the internal consistency of the MASC Total Anxiety Scale is very good (alpha coefficients between .87 and .89). The MASC is useful to differentiate children with anxiety disorders from those without an anxiety disorder (71% correct classification rate; kappa .42) (March 1997).

State-Trait Anxiety Inventory for Children (STAIC; Spielberger et al. 1973) is a 40-item self-report questionnaire developed to assess state and trait anxiety in children in grades four through six. Forty short self-statements are rated on 3-point scale. Twenty items each measure state anxiety (SA) and trait anxiety (TA). The SA scale rates intensity (e.g., very upset, upset, and not upset). The TA scale rates frequency (hardly-ever, sometimes, and often). The STAIC has established reliability and validity for elementary-school aged children (Platzek 1970). Internal consistency for SA is .82 for boys and .87 for girls. Internal consistency for TA is .78 for boys and .81 for girls (Walker and Kaufman 1984). Test–retest reliability of SA over an 8-week interval is .31 for boys and .47 for girls and for TA is .65 for boys and .71 for girls (Spielberger et al. 1973).

Treatment: Mindfulness-Based Cognitive Therapy for Children

Mindfulness-based cognitive therapy for children (MBCT-C) is a group intervention adapted by two authors (RJS and JL) from the adult MBCT program (Segal et al. 2002). MBCT is a group intervention developed to reduce depressive relapse in adults with recurrent major depressive episodes. Both the adult and child programs combine mindfulness-based theory and practices with cognitively oriented interventions to help patients achieve affective self-regulation through the development of mindful attention. Unlike cognitive therapy, no effort is made to restructure or change existing thoughts and emotions. However, MBCT-C differs from the adult MBCT program in three important domains.

First, we made three structural modifications: (a) MBCT is an 8-week program consisting of weekly 2-h sessions, while MBCT-C is a 12-week program consisting of weekly 90-min sessions; (b) the 20 to 40-min seated breath and body meditations in MBCT were replaced with more frequent exercises practiced in 3 to 10-min blocks in MBCT-C; and (c) each MBCT group typically consists of up to 12 adult patients with one therapist, while MBCT-C groups consist of up to eight child patients with one or two therapists. The rationale for these changes is: (a) children typically have less developed memory and attentional capacities than do adults (Posner and Petersen 1990;

Siegler 1991) and therefore may benefit from shorter sessions; (b) children also generally find it more challenging than adults to stay engaged in a single activity for long periods, so we considered the shorter, more repetitious practices to be more developmentally appropriate than the longer duration adult practices; and (c) children often require more individual attention than adults.

Second, we modified and enriched the types of mindfulness exercises employed: (a) MBCT uses three primary forms of traditional mindfulness training practices (a breath meditation, the body scan, and yoga postures), while MBCT-C uses a variety of simple sensory exercises to heighten non-judgmental awareness of perceptual experiences (visual, auditory, tactile, olfactory, gustatory, and kinesthetic sensations) and intrapsychic events (thoughts, emotions); (b) the group interactions in MBCT are largely verbal exchanges, while the group interactions in MBCT-C include games, activities, and movement; and (c) MBCT-C mindfulness exercises are more varied than MBCT over the course of a session, alternating between focused sensory activities, short breath meditations, mindful body scan and movements, visualization practices, and drawing or writing exercises. These modifications to traditional mindfulness practices were implemented for several reasons: (a) Adult psychotherapies depend largely on the patient's ability to apply abstract thinking and logical analysis. Children use more concrete operational modes of thinking (Piaget 1962) and the cognitive-elaborative component of childhood anxiety may be less prominent. For example, children frequently report more specific fears (e.g., failing a math test) and somatic symptoms of anxiety than do adults, who report more generalized fears (i.e., feeling overwhelmed); (b) because latency age children have limited verbal fluency, abstract reasoning, and conceptualization skills, they may better engage in psychotherapy when games, activities, and stories are integrated into treatment protocols (Gaines 1997; Stark et al. 1994); and (c) educational programs using a variety of multisensory approaches have been shown to improve student achievement in elementary school settings (Moustafa 1999; Thornton 1983; Wislock 1993). Experiential mindfulness exercises used in MBCT-C are intended to enhance mindfulness by repeatedly focusing attention on internal and external events in specific sensory modes (sight, sound, touch, taste, smell, and kinesthetics). In addition, mindful movement exercises address children's needs for physical activity.

Third, MBCT does not require the involvement of family members, while in MBCT-C parents of the young participants were invited to engage with the program in a number of ways: (a) Parents were invited to attend two therapist-conducted mindfulness sessions; (b) an *Introduction to Mindfulness* was held before the children's 12-week program began; (c) co-therapists led parents

through several mindfulness exercises (e.g., breath meditation, eating a raisin); (d) parents were invited to ask questions during the initial session and to talk with the co-therapists throughout the program; (e) the therapists encouraged parents to participate in the home practice exercises with their children and to model mindful intentions, speech, and behaviors at home; (f) a *Review and Dialogue* session for parents was held at the conclusion of the program; (g) parents had opportunities to share their experiences of MBCT-C and to discuss ways in which they might continue to cultivate and support their child's mindfulness practices at home; and (h) each child received materials to take home at the end of each session, including written session summaries, home practice instructions, and a log to record the daily home practices. Reviewing the session materials offered parents a systematic understanding of each session and allowed them to better participate in the mindfulness exercises with their child. The rationale for these changes is that children are firmly integrated into their family environment, so family involvement in treatment can enhance outcomes (Kaslow and Racusin 1994). Detailed clinical descriptions of the specific session aims and interventions are published elsewhere (Semple and Lee 2008; Semple et al. 2006).

Results

Preliminary Analyses

The effectiveness of randomization of participants to groups was confirmed by subjecting pretest assessment scores for the MBCT-C participants (Groups A and B) and the wait-listed control participants (Groups C and D) to independent measures *t*-tests. No significant group differences in the completion sample ($n = 20$) were found at pretest. All subsequent analyses were conducted on the intention-to-treat data ($N = 25$) and on the completion data ($n = 20$).

Because of the cross-lagged design employed, relationships across assessment Time 1 (pretest), Time 2 (posttest), and Time 3 (follow-up) were not expected to be linear for any dependent variable. Therefore, hypotheses were tested using a quadratic, repeated-measures ANOVA for each of four dependent measures of interest (CBCL attention subscale; STAI-C state anxiety scale; MASC total anxiety score; and CBCL total score). Each analysis used GROUP as the between-subjects variable (two levels: MBCT-C, Controls) and TIME as the within-subjects variable (three levels: Time 1, Time 2, Time 3). An alpha of .05 was used for all tests.

To explore changes over time, secondary analyses were conducted in which data were pooled for all participants to simulate an open trial design. Time 1 data from Groups A and B was combined with Time 2 data from Groups C and

D to create a pooled PRETEST group. Time 2 data from Groups A and B was combined with Time 3 data from Groups C and D to create a pooled POSTTEST group. Wilcoxon signed ranked tests for related samples were conducted for each dependent measure of interest.

Participation

Response and attendance rates exceeded expectations. Figure 1 is a CONSORT diagram (Boutron et al. 2008) that shows the flow of participants through the study. Parents were enthusiastic about having their children participate in MBCT-C and 29 of 39 (74%) enrolled their children in the study, a substantially higher percentage than is typical for enrollments in clinical trials. Program completion was defined as attending at least eight of the twelve sessions. Twenty children (80%) completed the program. Seventeen children attended ten or more sessions, six attended 11 sessions, and eight attended all 12 sessions. Mean number of sessions attended by the 20 program completers was 10.9 (SD = 1.3) with an overall attendance rate of 90.4%. All sessions were videotaped. The tapes were reviewed by the authors as part of the program feasibility and acceptability evaluation (Lee et al. 2008).

First Hypothesis: MBCT-C for Reduction of Attention Problems

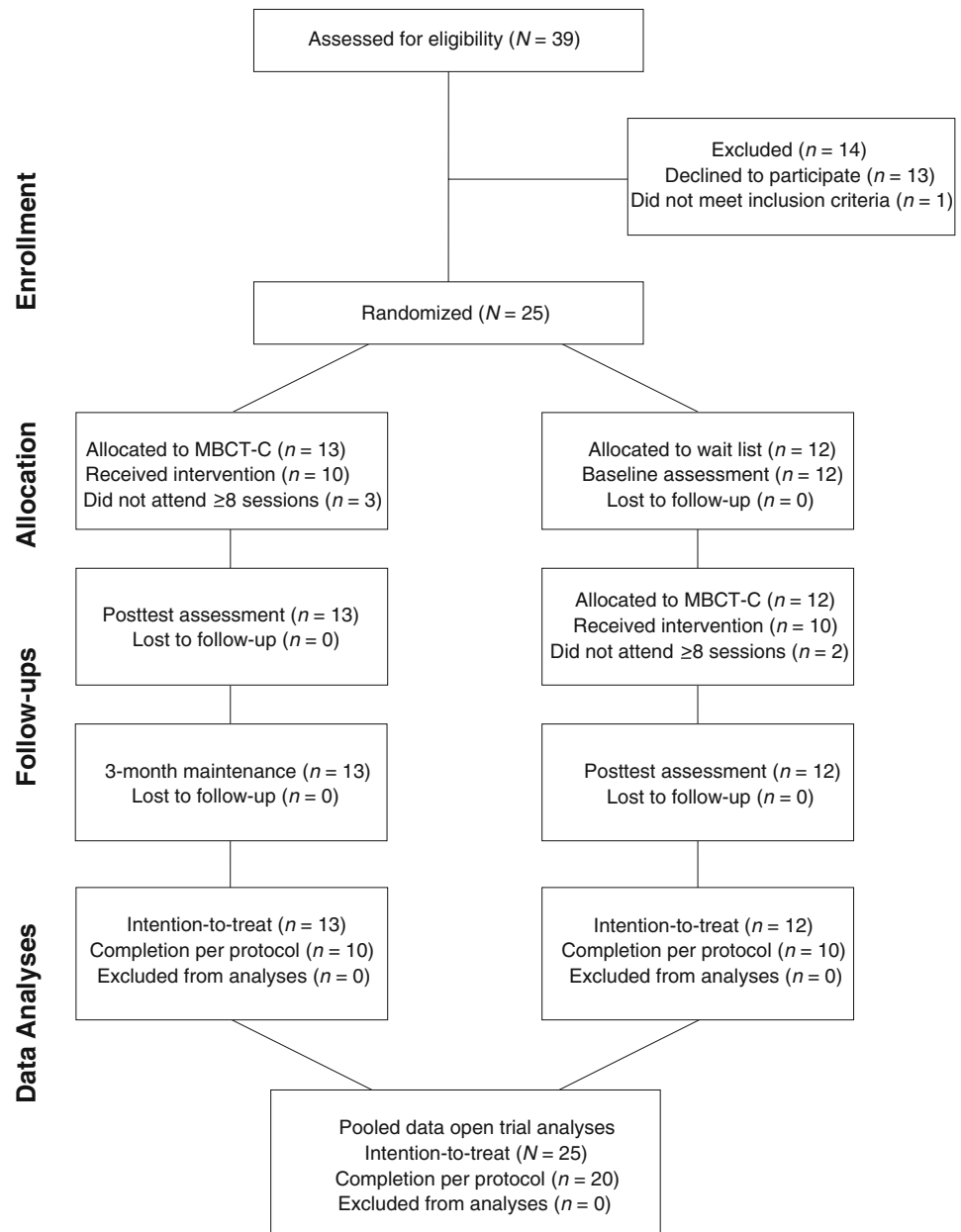
Although the TIME \times GROUP interaction between T1 and T2 by itself was not significant [$F(1, 18) = 2.023, p = .172$], the time-lagged crossover interaction was significant [$F(1, 1, 18) = 5.965, p = .025$]. ANOVA Table 2 and Fig. 2 show these results. The magnitude of treatment effect was calculated using Cohen's *d*, which indicated a small to medium treatment effect size of $d = .42$. An intention-to-treat analysis ($N = 25$) of the time-lagged crossover interaction showed comparable outcomes, $F(1, 1, 23) = 5.34, p = .03$, Cohen's $d = .46$.

We further examined changes in attention problems by pooling the data to simulate an open trial and conducting two-tailed Wilcoxon signed rank tests for related measures on the pooled pretest and posttest data. Significant reductions of attention problems over time were found with analyses of the intention-to-treat sample [$Z(N = 25), 2.493, p = .013$] and the completion sample [$Z(n = 20), 3.179, p = .001$].

Clinical Effectiveness of MBCT-C for Reduction of Attention Problems

Five children were reported to have clinically elevated (T -score ≥ 70) attention problems at pretest, two of whom carried an existing diagnosis of Attention-Deficit

Fig. 1 CONSORT flow diagram. *Note* MBCT-C = mindfulness-based cognitive therapy for children



Hyperactivity Disorder (ADHD). At the third assessment, just one of the children (a child with an existing diagnosis of ADHD) still showed clinical elevations on the attention problems scale. Significant reductions were found in attention problems [$t(4) = 3.884, p = .018$] and CBCL total behavior problem scores [$t(4) = 3.819, p = .019$] for this subgroup.

Second Hypothesis: MBCT-C for Reduction of Anxiety Symptoms

Some reductions in anxiety symptoms were shown, but no significant group differences were found via self-report

from the STAIC or the MASC. However, a combined one-group, intention-to-treat analysis using a one-tailed paired samples t -test between pretest and follow-up did show significant reductions in mean STAIC State Anxiety over the course of the study [$t(24) = 2.46, p = .02$, Cohen's $d = .38$]. We further examined changes in negative affect by pooling the data to simulate an open trial and conducting two-tailed Wilcoxon signed rank tests for related measures on the pooled pretest and posttest data. The CBCL internalizing problems scale showed significant reductions in the completion [$Z(N = 20) = 2.136, p = .033$] and intention-to-treat [$Z(N = 25) = 2.047, p = .041$] analyses.

Table 2 Quadratic ANOVA for CBCL attention problems following the MBCT-C intervention ($n = 20$)

| Source | <i>df</i> | MS | <i>F</i> | η^2 | <i>p</i> |
|---------------------|-----------|---------|----------|----------|----------|
| Between subjects | | | | | |
| Group | 1 | 8.817 | .026 | .001 | .873 |
| Error | 18 | 337.617 | | | |
| Within subjects | | | | | |
| Time | 1 | .133 | .010 | .001 | .922 |
| Time \times group | 1 | 80.033 | 5.965* | .249 | .025 |
| Error | 18 | 13.417 | | | |

CBCL Child Behavior Checklist, MBCT-C mindfulness-based cognitive therapy for children

* $p < .05$

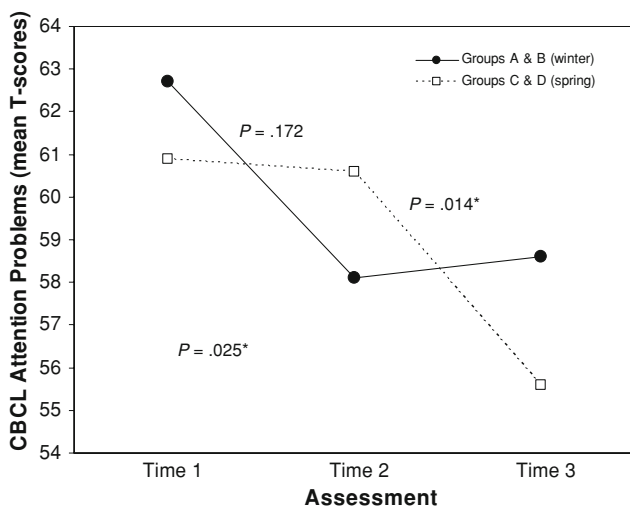


Fig. 2 Group means of Child Behavior Checklist (CBCL) attention problems for WINTER and SPRING intervention groups at pretest, posttest, and 3-month follow-up. Note * $p < .05$. Mean Child Behavior Checklist (CBCL) attention problems are reported as standardized *T*-scores ($M = 50$, $SD = 10$). WINTER intervention groups (A and B) showed reductions in attention problems that were maintained at the 3-month follow-up. SPRING interventions groups (C and D) showed little change during the waitlist period, and then showed similar reductions in attention problems as those shown by the WINTER intervention groups. Mean reductions in attention problems of approximately .5 SD were found following both the WINTER and SPRING interventions

Clinical Effectiveness of MBCT-C for Anxiety Symptoms

Although it was not possible to attribute self-reported reductions in the overall mean group anxiety to MBCT-C training, clinically relevant reductions in anxiety were found in a sub-group of children who initially reported experiencing greater levels of anxiety. Of the 20 children who completed the program, six reported clinically elevated anxiety (T -score ≥ 70) on the STAIC, the MASC, or the CBCL anxiety/depression subscale at pretest. At the

post-test assessment, only three children reported clinically elevated levels of anxiety. We also found significant improvements in CBCL total behavior problem scores in this sub-group of anxious children [$t(5) = 2.657$, $p = .045$].

Third Hypothesis: MBCT-C for Management of Behavior Problems

The CBCL total score was used as a general measure of behavior problems. During the course of the program, behavior problems declined; however, no significant group differences were found at posttest or at follow-up. The magnitude of treatment effect was calculated as Cohen’s $d = .27$, which suggested a small treatment effect. To further explore changes in behavior problems, two-tailed Wilcoxon signed rank tests for related measures were conducted on the pooled pretest and posttest data. Significant reductions in behavior problems over time were found with a completion analysis [$Z(n = 20)$, 2.459, $p = .014$]. The intention-to-treat analysis of behavior problems approached significance [$Z(N = 25)$, 1.763, $p = .08$].

A one-group, paired samples *t*-test of the pooled pretest and follow-up data found significant reductions in behavior problems over the course of the study with a medium effect size [$t(24) = 4.35$, $p < .001$ (two-tailed), Cohen’s $d = .44$].

Clinical Effectiveness of MBCT-C for Behavior Problems

For the most part, mean behavior problems reported on the CBCL were only slightly elevated at pretest ($\approx .4$ SD). Only three children were reported to have clinically significant behavior problems at the start of the program (T -scores ≥ 70). By the end of the program, no child was reported to have significant clinically behavior problems.

Post Hoc Hypothesis: Changes in Attention Problems as a Mediator of Behavior Problems

Pearson product-moment correlations between the four dependent measures were calculated to examine relationships between variables. A significant relationship was found between changes in CBCL attention problems and changes in CBCL behavior problems ($r = .678$, $p < .01$). Reductions in attention problems accounted for 46% of the variance in the reduction of behavior problems.

Based on these findings, a post hoc hypothesis was generated and tested. This hypothesis was that changes in attention would mediate behavioral changes. A model of this hypothesized mediation is shown in Fig. 3. To test the hypothesis, CBCL total score was defined as a measure of

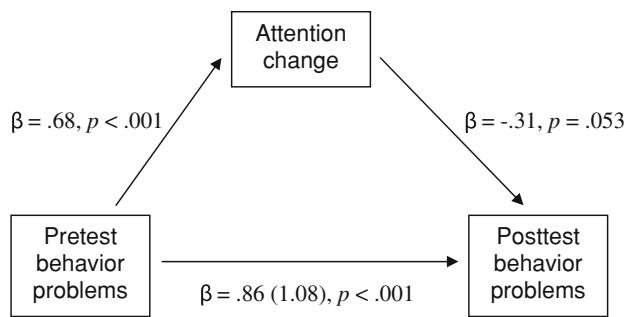


Fig. 3 Mediating effects of changes in attention problems on behavior problems. *Note* β value for the effect of pretest behavior problems on attention change is from a simple linear regression analysis with pretest behavior problems as the independent variable and attention change as the dependent variable. β values for the effect of attention change on posttest behavior problems and the effect of pretest behavior problems on posttest behavior problems are from a multiple regression analysis with attention change and pretest behavior problems as predictors of posttest behavior problems

behavior problems. The pretest CBCL total score was used as the independent variable ($n = 20$), the posttest CBCL total score was used as the dependent variable, and attention change (pretest minus posttest) was used as the mediator variable. The procedures of Baron and Kenny (1986) were followed.

The first step in the test of mediation was to confirm that the independent variable (pretest behavior problems) was predictive of the dependent variable (posttest behavior problems) via a simple linear regression analysis. The result of this analysis was statistically significant ($\beta = .86$, $p < .001$), indicating that pretest behavior problems were predictive of posttest behavior problems.

The second step was to ensure that the independent variable (pretest behavior problems) was predictive of the mediator variable (attention change). Again, a simple linear regression analysis was conducted. The result showed that pretest behavior problems were predictive of attention change ($\beta = .68$, $p < .001$).

The third step was to determine if the effect of the independent variable (pretest problem behaviors), as demonstrated in the first step, was reduced when the effect of the mediator variable (attention change) was included in the regression model. The results of this multiple regression analysis indicated that the effect of the mediator variable (attention change) was not statistically significant in this model ($\beta = -.31$, $p = .053$), while the effect of the independent variable (pretest behavior problems) on the dependent variable (posttest behavior problems) was still statistically significant ($\beta = 1.08$, $p < .001$) and not reduced when compared to the model without attention changes as a predictor. Therefore, the mediational hypothesis was not supported: attention changes did not mediate changes in the behavior problems in this study. It

should be noted that the β value of 1.08 is unusual in that it is greater than one, but can be explained by the high level of correlation among the three variables included in this model.

Age and Gender Differences

No significant relationships were found between the age of the children and any dependent variable. Independent samples t -tests of each dependent variable found no significant differences between girls and boys except on the pretest somatic complaints scale of the CBCL. Boys initially reported more somatic complaints than girls did [$t(24) = 2.637$, $p = .033$]. This difference disappeared by the end of the study.

Children who Failed to Complete the Program

Five children completed all three assessment batteries, but attended fewer than eight sessions. Independent samples t -tests were conducted on each pretest measure to identify any group differences between those who completed the program and those who did not. Significant pretest differences were found on two sub-scales. Children who dropped out reported higher separation anxiety on the MASC [$t(24) = .576$, $p = .025$] and less aggressive behavior on the CBCL [$t(24) = -1.405$, $p = .048$] than the 20 children who completed the program. These results are of clinical interest to better understand how MBCT-C might be made more acceptable to children who might find it difficult to participate in any form of group psychotherapy.

Discussion

Mindfulness-based cognitive therapy for children (MBCT-C) was developed as an intervention for children with attention and anxiety problems. MBCT-C is a 12-session, manualized group psychotherapy that aims to enhance self-management of attention, improve affective regulation by promoting decentering from thoughts and emotions, and increase social-emotional resiliency in elementary school aged children. This study reports that MBCT-C is effective in reducing attention-related problems and shows promise in managing anxiety symptoms and behavior problems in children with clinically elevated levels of anxiety.

After participating in 12 weeks of MBCT-C, clinic-referred children displayed significantly fewer attention problems than were reported at the beginning of the program. These improvements were maintained at the three-month follow-up. Results showed that MBCT-C might have some attention and behavioral benefits for children with Attention Deficit Hyperactivity Disorder. However,

since only five children began the study with clinically elevated attention problems, this impression needs to be further evaluated with larger groups of children diagnosed with ADHD. A variety of attention problems is characteristic of the entire spectrum of anxiety disorders. Thus, an approach that remediates attention deficits and enhances self-management of attention, such as MBCT-C, may offer therapeutic benefits for the other types of attention-related problems.

Significant reductions in anxiety symptoms were reported at the end of the program but comparable improvements were found across groups. Therefore, we were not able to attribute reductions in anxiety to the effects of the intervention. One obvious rationale is that the majority of children in the study were not evidencing clinically elevated levels of anxiety at the beginning of the study. Participants were referred from a clinic that specialized in reading remediation and were not pre-screened for anxiety disorders. However, it is notable that significant reductions in anxiety symptoms were found for the six children in the program who initially reported clinically elevated anxiety.

Mean behavior problems across all participants were only slightly elevated at pretest ($SD \approx .4$). Although behavior problem scores did change in the predicted direction, no significant differences between groups were found. However, post hoc analyses of data for all groups pooled to simulate an open trial did show significant reductions in behavior problems over the course of the study. Only three participants showed clinically significant behavior problems at the start of the program. By the end of the program, no child was reported to have clinically significant behavior problems. This finding has promising implications for the treatment of childhood behavior problems, but needs to be replicated with a larger clinical sample.

Reductions in behavior problems were significantly associated with reductions in attention problems. Changes in attention problems accounted for 46% of the variability in behavior problems. However, a subsequent mediation analysis showed that attention was suggestive, but not conclusive of having a mediating effect on behavior problems ($p = .053$). It seems likely that statistical significance may have been achieved with a larger sample size.

The MBCT-C model offers additional promise for the treatment of attention deficit hyperactivity disorder (ADHD). The hyperactivity and impulsivity often seen in ADHD children, is generally treated with medications or behavioral management techniques. Analyses of data from the Multimodal Treatment Study of Children With Attention Deficit Hyperactivity Disorder (Hoza et al. 2005) found that, regardless of treatment modality, ADHD

children remain significantly impaired in their peer relationships. The authors suggest that improvements in peer relationships are a more stringent measure of treatment success than improvements in adult-perceived functioning. They conclude, “It is not that social skills training, behavior therapy, and the other peer interventions we employed are not worthwhile—but rather, they are clearly not sufficient” (p. 83). MBCT-C includes specific elements that logically could contribute to improved peer relationships: its group format, present-moment focus, emphasis on acting with awareness, and practice making conscious choices.

One limitation of this study is the potential for one or two members of a group to influence treatment effects for other members. Within a psychotherapy group, any participant may have either a positive or a negative effect on the other members of the group. This influence violates the independence of observations assumption of parametric statistical techniques. Baldwin et al. (2005) suggested that a *Variance Inflation Factor* be added to the power analysis and subsequent analysis of results to take account of this intragroup correlation (IGC). However, Williams et al. (2008) examined this issue by reanalyzing the data for the original trials of MBCT using multilevel modeling that corrected for IGC. The results were not significantly different from the original, uncorrected analyses. Williams and his colleagues concluded that the concerns of Baldwin, Murray, and Shadish were likely overstated. Therefore, this concern probably had very little effect on the results of the present study.

As a preliminary randomized controlled trial, we applied less conservative analyses to the data. For example, no corrections for multiple analyses were made, thus increasing the possibility of Type I errors. Furthermore, participants in this study were a representative group of inner-city children sharing a common stress of struggling with academic difficulties. Most would not meet diagnostic criteria for an anxiety disorder or attention deficit disorder. The restricted variability within this mostly non-clinical sample probably limited the power to detect group differences.

Conclusion

Existing research suggests a relationship between attention and mindfulness. Attention-related problems are pervasive across the spectrum of anxiety disorders. Anxiety can impair attention and promote emotionally reactive behaviors that interfere with the development of good study skills, so it seems reasonable that increased mindfulness would be associated with less anxiety and fewer academic problems.

While substantial evidence supports the effectiveness of mindfulness approaches as a treatment for adult mood and anxiety disorders, ours is one of the few mindfulness-based studies to focus on elementary school-aged children. We found preliminary support for the effectiveness of MBCT-C in treating attention problems, anxiety symptoms, and behavioral problems. When conducting psychotherapy trials, having a manualized intervention and monitoring adherence to the treatment protocol greatly strengthens the scientist's argument for effectiveness. Preparation of a clinical training manual that describes the 12-session MBCT-C program in detail is underway. Future directions include piloting MBCT-C with older and younger children, and conducting randomized clinical trials with children diagnosed with DSM-IV attention and anxiety disorders.

The girls and boys who participated in MBCT-C eagerly brought creativity and playfulness to their explorations of mindfulness, which are not as readily apparent in adult MBCT or MBSR programs. For example, we suspect that few adults ever try to see how many meditation cushions they can (mindfully, of course) balance on top their heads. Nearly all the participants and their parents reported that the program was useful and beneficial to them at school, at home, or in both environments. The structured 12-week MBCT-C program was feasible to implement and enthusiastically accepted by a traditionally hard-to-reach group of inner-city minority children. The findings of this study show promise for the effectiveness of this approach and support the authors' call for more research into mindfulness-based interventions for children. We particularly encourage future clinical trials of MBCT-C with children who have diagnosed anxiety disorders or attention deficit disorders.

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