

Mindfulness Training for Parents and Their Children With ADHD Increases the Children's Compliance

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Abstract Children with ADHD are often non-compliant with parental instructions. Various methods have been used to reduce problem behaviors in these children, with medication and manipulation of behavioral contingencies being the most prevalent. An objection often raised by parents is that these management strategies require them to impose external control on the children which not only results in the children not learning self-control strategies, but also does not enhance positive interactions between them and their parents. Studies have shown that providing mindfulness training to parents, without a focus on reducing problem behaviors, can enhance positive interactions with their children and increase their satisfaction with parenting. We were interested to see what effects giving mindfulness training to two mothers, and subsequently to their children, would have on compliance by the children. Using a multiple baseline across mothers and children design, we found that giving a mother mindfulness training enhanced compliance by her child. When the children were subsequently

given similar training, compliance increased even more markedly, and was maintained during follow-up. The mothers reported associated increases in satisfaction with the interactions with their children and happiness with parenting. We suspect that the mindfulness training produces personal transformations, both in parents and children, rather than teaching strategies for changing behavior.

Keywords Children with ADHD · Parental non-compliance · Mindfulness · Interactional context

Introduction

Attention-deficit/hyperactivity disorder (ADHD) is a highly heritable neurobehavioral disorder that affects between 8 and 12% of children worldwide (Polanczyk et al. 2007). The prevalence of ADHD in the United States varies between 2 and 16%, depending on the sample size, diagnostic criteria used, informants, impairment status, age and gender of the children, and clinical versus community samples (Biederman and Faraone 2005; Froehlich et al. 2007). Although children with ADHD are typically characterized by inattention, hyperactivity and impulsivity, many display behavior problems such as non-compliance and aggression. It is likely that the children displaying these behaviors also have comorbid psychiatric disorders (e.g., oppositional disorder, mood, anxiety) and learning disorders (dyslexia, executive function deficits) (Pliszka et al. 1999).

Pharmacotherapy is the standard treatment for ADHD, with the stimulants (i.e., methylphenidate, amphetamine) being the first choice of drugs. Research evidence suggests

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that the average effect size for stimulants (0.9 for immediate release and 0.95 for long acting) is much higher than for non-stimulants (0.62) (Faraone 2003). However, recent studies suggest that the non-stimulant, atomoxetine, may be moderately effective (Newcorn et al. 2008). The 14 month multimodal treatment study of children with ADHD (MTA) showed that the combination of intensive medication management and multi-component behavior therapy was superior to behavior therapy alone and routine community care (The MTA Cooperative Group 1999). However, the superiority of the combined treatment disappeared at the 3 year follow-up (Jensen et al. 2007). A recent meta-analysis of behavioral treatments for ADHD reported an average effect size of 0.83 for between-group studies and 0.70 for pre-post studies, suggesting strong evidence for the effectiveness of behavioral treatments (Fabiano et al. 2008).

In both of these approaches, pharmacotherapy and behavior therapy, treatment is provided to the children by external agents, a physician or parents trained in behavior management. Although effective, there are inherent limitations to both approaches. With pharmacotherapy, there are well documented problems with unintended side effects, as well as the finding that between 10 and 20% of children with ADHD are non-responsive to medication (Greenhill et al. 1999). With behavior management, there are a number of implementation issues including the fact that many parents fail to apply the prescribed contingencies consistently, often not instigating them at all in the absence of crises. Further, neither of these approaches includes self-management techniques, so children do not have the opportunity to learn self-control strategies that may assist them in controlling their behavior.

The weight of current evidence suggests that parent training programs based on behavioral or cognitive behavioral principles are reasonably effective in producing behavioral changes both in children with ADHD and in their parents and family members (Anastopoulos and Farley 2003; Barkley 2000; Pelham et al. 1998; van den Hoofdakker et al. 2007). With the current zeitgeist being on using positive methods, of possible concern is that extant parent training studies typically include some form of aversive or punishment contingencies (for an exception, see Ducharme et al. 2000). For example, in the MTA study of children with ADHD, the parent training program included time-out and response cost procedures (Wells et al. 2000a, b). While effective in the short term, these procedures typically do not teach the children socially acceptable replacement behaviors and their use by parents may, in fact, initiate coercive parent-child interactions with some children, especially those with oppositional defiant disorder. Thus, there is a need for parent training studies that do not include punishment contingencies as part of the training. An example of

this type of parent training would include recent studies based on mindfulness-based methods (e.g., Altmaier and Maloney 2007; Singh et al. 2006b, 2007).

There is a very small literature on the use of cognitive-behavioral interventions with children diagnosed with ADHD that focus on self-management skills such as self-reinforcement, problem-solving, self-instructions, communication, cognitive restructuring, and self-redirection. A meta-analysis of these studies showed that treatment outcomes varied markedly, with effect sizes ranging from 0.08 to 2.08 on cognitive outcome measures (Toplak et al. 2008). Further, if a behavioral treatment component was not included, there was minimal change in behavioral outcomes. In addition to these approaches, there has been some reported success in using yoga, meditation and mindfulness-based strategies with children and adolescents diagnosed with ADHD (Harrison et al. 2004; Grosswald et al. 2008; Zylowska et al. 2008).

In the present study, we were interested in exploring the effects of providing mindfulness-based training initially to mothers of children with ADHD, then subsequently to their children. Typically, in parent training studies, the training is provided only to the parents, but in the present study we planned on providing similar training sequentially to parents and their children. Instead of focusing on behaviors associated with ADHD per se (e.g., attention, hyperactivity, impulsivity, executive functioning), we focused on the children's compliance to their mother's requests. Compliance with parental requests is a pivotal behavior in the developmental trajectory of a child. For example, research in developmental psychopathology indicates a negative correlation between child compliance to parental requests and later maladaptive behavior (Loeber and Hay 1994). Our specific focus was on whether customized mindfulness-based training, without teaching specific parenting skills to the mothers or specific self-management skills to the children, would result in transformational changes in both the mothers and their children, as measured by the children's compliance to their mother's requests.

Method

Participants

Two mothers and their sons with ADHD participated. Judy was 34 at the beginning of the study and had attended a 12-session behavioral parent training course to learn how to communicate better with her son, Chris. Chris was 12 years old, diagnosed with ADHD, and was on methylphenidate. His ADHD was reasonably well controlled at school in terms of attention and impulsivity. Denise was 36 years old at the beginning of the study, and had worked with her

family physician and school psychologist to help her son, Will, cope with ADHD. Will was 10 years old, diagnosed with ADHD, and was on methylphenidate and clonidine. His behavior was not well controlled at school, where he was placed on a behavior management program by the school psychologist. Both mothers chose to participate in the study because of the low compliance of their child to parental requests and the fear that this may lead to more serious oppositional behavior as their child grew older.

Definitions and Recording Procedures

A request was defined as a clear instruction by the mother for her child to perform an action in a timely manner, as jointly determined by the child and his mother. The actual time to comply was dependent on the nature of the request. Compliance was defined as the child responding appropriately and promptly to the mother's requests, without concomitantly engaging in maladaptive behavior, either verbal or physical. Each mother collected data on her requests and her child's compliance for 4 h a day: an hour before school, an hour after school, an hour leading up to and including dinner, and an hour after dinner. Using an **event recording procedure**, each mother recorded on a Palm PDA each time that she made a request and whether her child complied with the request. The mother and child jointly determined a time by which a request could be completed and compliance was recorded only if her child responded appropriately and within the agreed time.

The mothers also completed **two single-item rating scales**, once at the end of each experimental phase: *satisfaction with self in interactions with my child (SSIMC)* and *subjective units of happiness with my child (SUHMC)*. The SSIMC was rated on a 0–5 scale (0 = totally unsatisfied; 5 = totally satisfied) and the SUHMC was rated on a 0–100 scale (0 = totally unsatisfied; 100 = totally satisfied).

Informal Interviews

During the last week of the follow-up phase, both mothers and children were individually interviewed about their experiences and perceived outcomes of mindfulness training. Among other topics discussed, the following were pertinent to the present study: (a) meditation practice; (b) use of mindfulness in daily life; and (c) the relationship between mother and child.

Inter-Rater Agreement

The mothers were the primary data collectors. During the study, the mindfulness trainer collected data on six occasions, for an hour each time. An agreement was defined as both the mother and the trainer recording an instance of a

child's compliance with the mother's request within the time limit agreed upon by the mother and child. Percent inter-rater agreement was calculated by dividing the total number of agreements by the total number of observations made by the mother and multiplying by 100. The mean inter-rater agreement for the mothers' requests was 94% (mean = 91–100%) and the mean for the children's compliance was 92% (mean = 87–100%).

Experimental Design

We used a **multiple baseline across participants design** (Barlow et al. 2009).

Baseline

No training in mindfulness was provided to either the mothers or their children during baseline. Data on each mother's requests and her child's compliance were collected for 4 weeks for Mother–Child 1 (Judy–Chris) and for 7 weeks for Mother–Child 2 (Denise–Will).

Parent Mindfulness Training

Following the final baseline session, an experienced mindfulness trainer met with each mother–child dyad and explained the study parameters, the nature of the proposed training, data collection, and the philosophy of mindfulness. They were told that the trainer would provide the mother with a 12-session training program, followed by a similar 12-session training program for the child. The training program and the topics covered in each session are presented in Table 1. The training program was adapted from our earlier studies (i.e., Singh et al. 2006b, 2007). Formal training in mindfulness was terminated following the 12th session of mindfulness training. Each mother was encouraged to practice mindful behavior with her family during and following the mindful training phase.

Child Mindfulness Training

The 12-session mindfulness training for each child followed the general outlines of the training provided to the mothers. However, the content was customized and presented at the cognitive level of each child, with simple examples that were meaningful to each of them. The training was interactive, with the trainer presenting the principles, the children asking questions and then the trainer customizing the actual meditation practices for each child. The practices were based on the trainer's own experience as well as from children's books. For example, basic meditation practices were adapted from Fontana and Slack's (1997) book on teaching meditation to children and

Table 1 Outline of mindfulness training program

Sessions	Outline of training
Session 1	<p>The basics</p> <p>Discussion of basic philosophical differences between mindfulness training and other parent training models</p> <p>Other parent trainings are typically focused on techniques parents can use to control or manage their child's behavior</p> <p>Mindfulness training focuses on how the parent can change her behavior so that it positively impacts her child's behavior</p> <p>Holistic and interactional perspectives</p> <p>Conceptualization of mindfulness in everyday life</p>
Session 2	<p>Mindfulness in everyday life</p> <p>Being open to new information</p> <p>Being able to see old information in new ways</p> <p>Having an awareness of multiple perspectives</p> <p>Avoiding premature cognitive commitment</p> <p>Understanding mindfulness and mindlessness</p> <p>Appreciating the positive aspects of mindlessness</p>
Session 3	<p>Basic meditation exercise</p> <p>Mindfulness is an having the experience without thoughts</p> <p>Meditation on mindful breathing</p> <p>Conscious returning of attention to the breath when the mind wanders away</p>
Session 4–7	<p>Meditation exercises</p> <p>Being in the present moment</p> <p>Loving kindness</p> <p>A beginner's mind</p> <p>Letting go</p>
Sessions 8–11	<p>On being mindful</p> <p>Personal practice</p> <p>Active observation of oneself, other, and the "problem"</p> <p>Accepting life is as it is</p> <p>Knowing and experiencing "I am not my thoughts"</p> <p>Being compassionate</p> <p>Listening with calm attention</p> <p>Seeing through other's eyes</p> <p>Engaging in loving kindness</p> <p>Being in the present moment</p> <p>When in trouble, breathe!</p>
Session 12	<p>Putting it all together</p> <p>Applications of mindfulness in family life, especially in parent–child interactions</p> <p>Overcoming history of mindless parenting practices and freeing the spirit within</p> <p>Being in the present moment with your child</p> <p>Being loving, kind, compassionate and interacting with wisdom</p>

Hanh's (2002) illustrated book for children was used to teach them about living in the present moment.

Follow-up

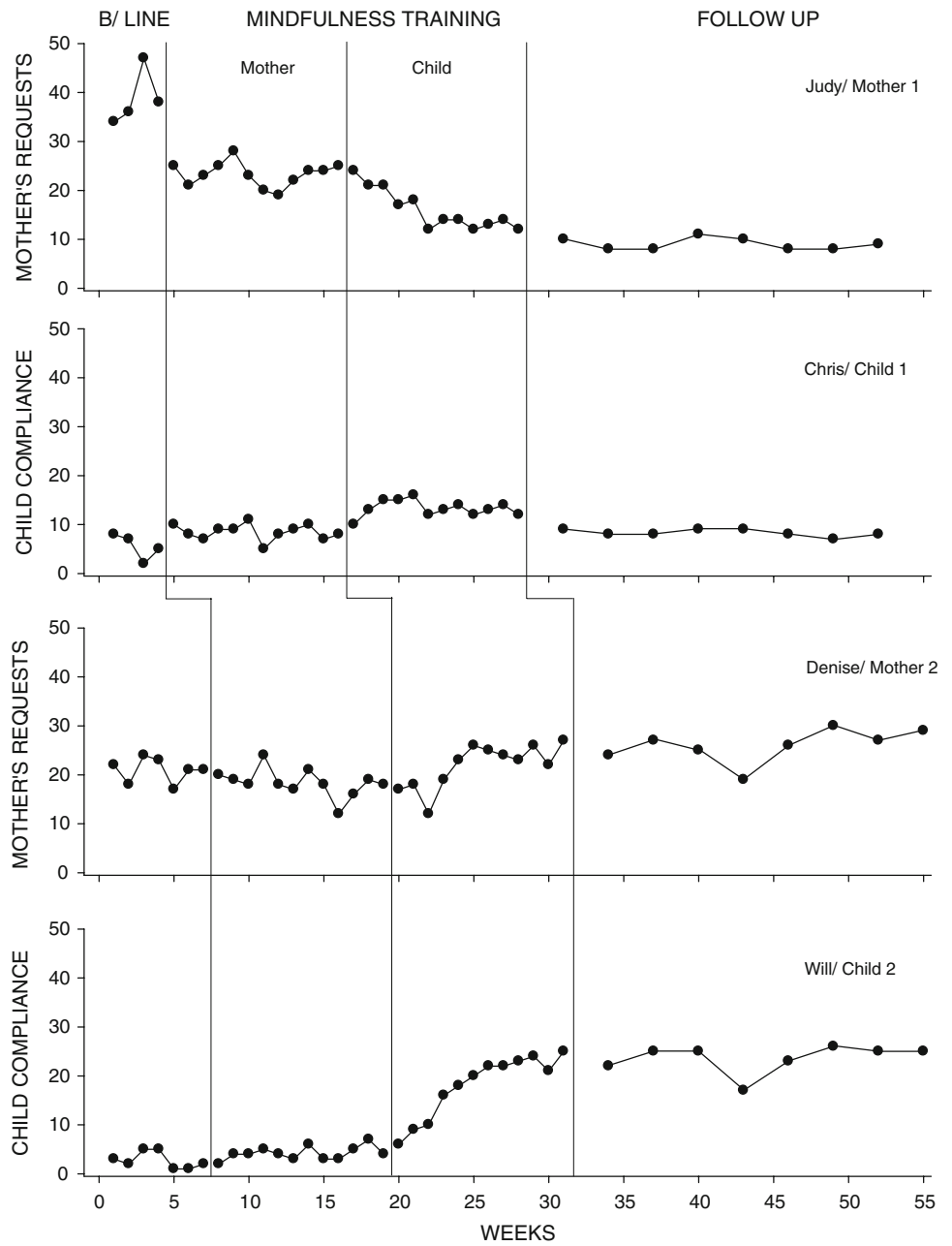
During this phase, the mother–child dyads were given no further training in mindfulness, but they were encouraged to use the methods they had learned in their daily

interactions. The mothers continued to collect data, but only for 1 week in every three, for a total of 24 weeks.

Results

Figure 1 presents the number of times per week each mother made requests and the number of times her child

Fig. 1 Weekly number of requests by each mother and compliance by her child during baseline, mother’s mindfulness training, her child’s mindfulness training and mindfulness practice



complied with her requests during baseline, mindfulness training for mother and child, and follow-up. Figure 2 presents the percentage of times per week each child complied with the mother’s requests during baseline, mindfulness training for mother and child, and follow-up.

Table 2 presents, for each experimental phase, the mean number of each mother’s requests and her child’s compliance, and the percentage of requests that resulted in compliance. For both children, compliance with their mother’s requests, independent of the number of these requests, increased across the phases. The mean percentage of Chris’ compliance with his mother’s requests increased by 155.1% from baseline to parent training, by 128.8%

from parent training to child training, and by 10.8% from child training to follow-up. The mean percentage of Will’s compliance with his mother’s requests increased by 74.6% from baseline to parent training, by 262.7% from parent training to child training, and by 10.2% from child training to follow-up.

For both children, the mean numbers of compliant responses changed across the different phases, although somewhat differently for the two children. Chris’ compliance increased by 53.0% from baseline to parent training and by 57.4% from parent training to child training, and then decreased by 37.7% from child training to follow-up. Will’s compliance increased by 53.5% from baseline to

Fig. 2 Weekly percentage compliance by each child to his mother’s requests during baseline, mother’s mindfulness training, her child’s mindfulness training and mindfulness practice

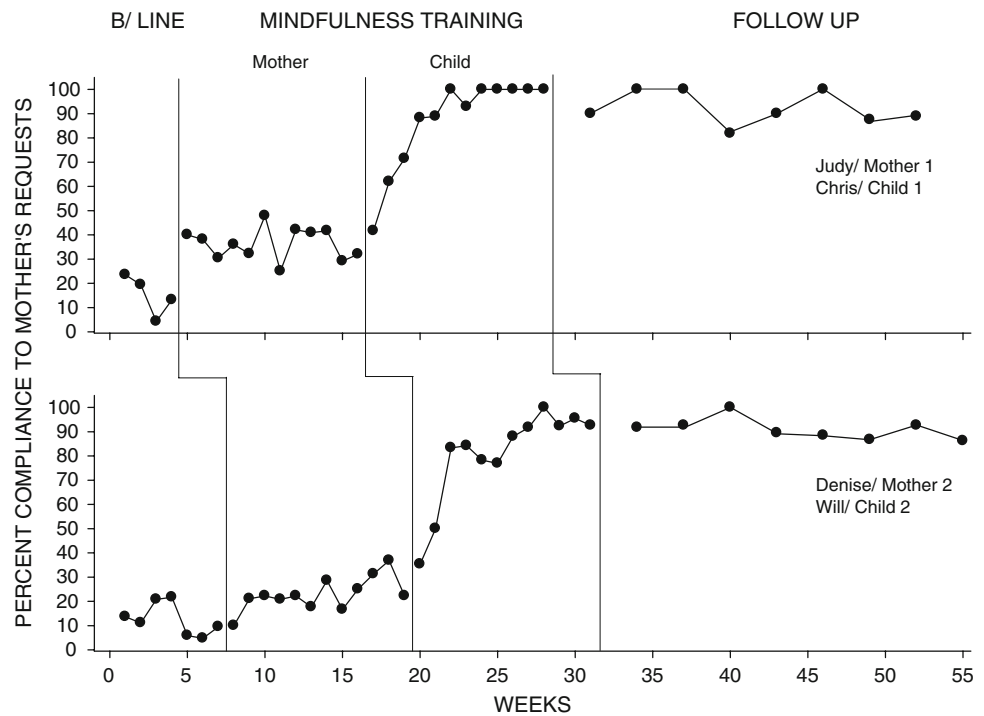


Table 2 Mean number of requests by mothers and compliance by their child and mean percent of compliance to request

	Mother-child 1			Mother-child 2		
	Mother’s requests	Child’s compliance	Percent compliance to requests	Mother’s requests	Child compliance	Percent compliance to requests
Baseline	38.75	5.50	14.2	20.86	2.71	13.0
Mother mindfulness training	23.25	8.42	36.2	18.33	4.17	22.7
Child mindfulness training	16.00	13.25	82.8	21.83	18.00	82.4
Follow-up	9.00	7.25	91.7	25.88	23.50	90.8

parent training, by 322.0% from parent training to child training, and by 30.6% from child training to follow-up. The mean number of each mother’s requests also changed successively across the experimental phases, with some differences between mothers. Judy’s requests successively decreased across phases, by 40.0% from baseline to parent training, by 31.2% from parent training to child training, and by 43.8% from child training to follow-up. Denise’s requests decreased by 12.1% from baseline to parent training, and then increased by 19.1% from parent training to child training, and by 18.5% from child training to follow-up.

The mothers’ satisfaction with their interactions and their subjective units of happiness with their child both increased across successive experimental phases (see Table 3). On each measure, there was an increase with the mothers’ mindfulness training, but the increase following mindfulness training of their child was much more marked. Although high levels were reached during the children’s

mindfulness training, they either stayed at the same level or increased during follow-up.

Both children were on medication that targeted symptoms of their ADHD. While the study was not focused on their medication, Chris’ family physician began tapering his medication beginning in the 7th week of the child’s mindfulness training and discontinued it 3 weeks later. Will’s family physician began tapering his medication from the 13th week of the child’s mindfulness training and discontinued it 6 weeks later. No adverse changes were evident due to the discontinuation of medication in either child.

In informal interviews, both mothers reported that they found the meditation practice to be initially physically and mentally difficult, and foreign to their way of life. Both reported that they would have given up the practice within the first few sessions if they had not personally requested this training. They noted that they felt obliged to at least complete the training before making a decision to quit.

Table 3 Ratings of mothers' satisfaction

	Satisfaction with self in interactions with my child (5-point scale)		Satisfaction units of happiness with my child (100-point scale)	
	Mother 1	Mother 2	Mother 1	Mother 2
Baseline	0	1	22	15
Parent mindfulness training	1	2	30	25
Child mindfulness training	3	4	80	85
Follow-up	4	4	90	95

Both reported that as training and practice proceeded, they began enjoying the calmness and lightness of being that it produced, and that they began to actually look forward to more training and practice. The mothers mentioned that the mindfulness training was especially helpful in teaching them to really listen to their children, without premature judgments. Furthermore, both reported that positive comments about their calmness, made by their spouses and children, were very rewarding to them and helped them to maintain their practice. The children reported that they found the meditation to be fun because they “liked the way it was taught.” They reported that they liked the trainer emphasizing that they could “play with their thoughts, manipulate them, and to make them go away altogether.” They reported that while they initially thought it was more like a game, they were “hooked when they could remain calm and attentive in school.” Most of all, they reported that they liked the way their mothers became calmer and stopped yelling at them. Finally, they reported that they were “thrilled not to have to take medicines at school.”

Discussion

Training mothers in mindfulness increased their child's compliance but, in the short-term, probably not enough to make a substantial difference in the mother–child relationship. When compared to baseline, there were clear increases in the children's compliance levels during their mother's training in mindfulness, but these were followed by even larger increases after the children received the planned training in mindfulness. Training the children in mindfulness positively enhanced mother–child interactions, probably to an extent that both mother and child gradually became rooted in natural communities of reinforcement and their transactions moved from being somewhat negative to a positive pathway (Sameroff 1995). Total compliance with the mothers' requests was neither expected nor achieved because a certain amount of non-compliance is considered developmentally normal. Consistent and enduring compliance at a high level, however, was evident during follow-up, suggesting strong response maintenance.

There were collateral changes associated with mindfulness training. Both mothers' ratings of satisfaction in their interactions with their child increased following training in mindfulness, and this showed an even greater increase following mindfulness training of their child, and some further increase during follow-up. The ratings by both mothers of subjective units of happiness with their child also increased following mindfulness training, again with a greater increase following mindfulness training of their child, and some further increase during follow-up. These ratings were probably because the nature of mother–child interactions, as evidenced by their child's rates of compliance, changed substantially when the child received training in mindfulness. However, it must be remembered that these data were derived from single-item ratings scales whose psychometric properties have not been established.

Furthermore, both children's family physicians tapered and discontinued their medication during the mindfulness training phase. Both mothers reported that their child's family physician took this initiative because of the improved behavior in their child. While we may wish to attribute this to the family physician's independent assessment of each child's behavior, we suspect that it may well have been due to the mother's reports of their child's behavior at home. Whether some of the improvement in impulsivity, inattention and hyperactivity noted by the mothers was due to mindfulness training remains to be investigated.

Informal interviews with the mothers and children were salutary. Clearly, these mothers found the meditation practice to be foreign to their lifestyle, and may well have given up if they had simply volunteered for the training instead of seeking it out. The dropout rate in parent training programs is high, such as the almost 60% reported by Ducharme et al. (2000), and the mothers' comments show an inclination consistent with this. Their comments about mindfulness resulting in calmness and in experiencing lightness of being accords well with participants in other mindfulness studies (e.g., Singh et al. 2006a, 2009) as well as in the literature from wisdom traditions (e.g., Ajahn Chah 2002; Kornfield 2008; McLeod 2001). The children's views were also very interesting. Although they would be at the lower end of the age range considered appropriate for

participation in cognitive behavior therapy (Davies 2004), their self-report indicated they were able to participate fully in the mindfulness training. In this form of training, the children were able to change their relationship to their thoughts rather than being required to correct faulty cognitions as with cognitive behavior therapy (Singh et al. 2008). As in cognitive behavior therapy, and as noted by the children, the outcome can be only partially attributed to the posture and skill of the therapist (Kendall et al. 1995), with the weight of the changes coming from the training itself.

The report by the mothers that mindfulness training enabled them to “really listen” to their children resonates with the reports of meditators. At an experiential level, most of us really do not listen to others in conversation. We appear to listen to others because we make eye contact with them when they are speaking, but more often than not, we are listening only partially and busy thinking about other things, such as things that we need to do or, more likely, of an answer or a retort even before the person has finished speaking. While the other person is speaking, we are engaged in an internal dialog that sometimes leads us to interrupt the speaker, miss the import of what is being said, or ask mindless questions. Mindful training results in true listening when we stop our internal conversations and simply hear what the other person is saying to us. Both mothers suggested that their enhanced listening enabled them to stop making premature judgments about their children. This is akin to premature cognitive commitment to an action in the presence of only partial data.

This was an exploratory study of the effects of customized mindfulness training for mothers and their children with ADHD. We did not set out to investigate the mechanisms for change because that would have been premature. We have speculated in related studies why mindfulness may produce the changes that it does. We have noted that participants of mindfulness training gradually begin to exhibit loving kindness, patience, non-judgmental acceptance, calmness, and similar behaviors with meditation practice (Singh et al. 2006a, b, 2007). For example, we have noticed that the calmness resulting from sustained personal meditation practice is manifest in the parents in many ways, most commonly in the non-escalation of potentially negative interactions with their children, thus producing peace and calmness in both themselves and their children. Similarly, with loving kindness, parents and children gradually develop unconditional love for each other, and this provides the underpinnings of their social interactions, regardless of the actual content of the interactions, and increases empathy in both parent and child.

The customized mindfulness training used in our current and previous studies include, at varying depths, three of the four components of training the mind (Singh et al. 2008).

These components include a personal meditation practice based on concentration and/or contemplative meditation exercises, behavioral practices (e.g., loving kindness, compassion, and generosity), cognitive strategies (e.g., reflection on the transitory nature of events and the emptiness of self), and empathic strategies (e.g., the alternate giving of happiness and taking of suffering [*tonglen* practice]). Our training focuses on a personal meditation practice, some behavioral practices, and rudimentary cognitive strategies. However, we must clearly emphasize that, in this context, the word *mind* in *training the mind* does not pertain to the Western concept of the center of intellect and cognition. Rather, it pertains to the Eastern, especially Buddhist, concept of *experience*. As noted so succinctly by McLeod (2001), the “mind is everything we experience” (p. 58). The basis of our mindfulness training is that it produces personal transformation in what is experienced, rather than teaching procedures or techniques. This transformation cannot be fully specified in conceptual terms and for it to reliably occur, the training needs to be conducted by an experienced meditator (c.f., Segal et al. 2002; Singh et al. 2008). The training, however, does follow defined procedures and at least some of its effects can be measured objectively, as shown by the compliance data, or more subjectively, as shown by the mothers’ ratings and the comments made by both mothers and children.

This study has several limitations including the issue of experimental control. A multiple baseline design provides evidence of control when the behavior change closely follows the introduction of training or treatment. Although only two baselines are needed to demonstrate the effects of training or treatment, the consensus of opinion is that a minimum of three is required to show experimental control (Barlow et al. 2009). In this study, we used only two baselines, although the baselines were replicated across mothers and children. Thus, future studies must demonstrate experimental control with the use of a stronger experimental design. The study reported inter-rater agreement data based on only six sessions, but future studies should increase the number of sessions to about 20% of all sessions across mother–child dyads. The effects of the mindfulness training were measured only on a behavioral metric and not on any of the core symptoms of ADHD that the children exhibited, such as inattention, impulsivity, and hyperactivity. Observational or rating scale data on these variables could have contributed to our understanding of the broader impact of the mindfulness training.

It could be argued that the baseline in this study was confounded with an intervention. That is, during baseline and in the following experimental conditions, the mother and child explicitly agreed on time parameters for the child’s response to each request made by the mother. Of course, because this condition was not typical of their prior

interactions, it could be viewed as an intervention that produced some or all of the changes in compliance rates in the baseline and the experimental conditions that followed. While this is a distinct possibility in terms of the experimental design used in this study, the data suggest that this condition did not substantially impact the children's behavior. For example, as evident in Fig. 2, baseline compliance was either variable but stable or showed a slight decline, and compliance increased when mindfulness training was introduced for the mothers, and particularly so when the children were provided the training.

Notwithstanding these limitations, our study suggests that mindfulness training for mothers of children with ADHD improves mother–child interactions as measured by the child's rate of compliance to the mother's requests. Further, compliance increases greatly when the mother's training is followed by similar training for the child. The effects of training mother and child together, or individually but concurrently, remain to be investigated. If the findings in our study can be replicated, then we believe mindfulness training will provide a positive approach to parent training, without resorting to any form of punishment contingencies.

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