

# A Pilot Randomized Trial Evaluating a School-Based Mindfulness Intervention for Ethnic Minority Youth

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**Abstract** This study examined the feasibility and efficacy of a 12-week mindfulness intervention in a wait-list controlled trial of 19 Latino-American and Asian-American middle school students with elevated mood symptoms. ANCOVA analyses indicated that immediate treatment was associated with significant reductions in parent-reported externalizing problems at post-treatment and marginally significant reductions in youth-reported internalizing problems. The pooled pre-to-post treatment analyses revealed that mindfulness led to a reduction in parent-reported externalizing problems, youth-reported internalizing problems, and youth-reported use of expressive suppression. Overall, this pilot study offers feasibility and efficacy data for mindfulness-based program as a potential treatment for behavior problems for ethnic minority youth with elevated mood symptoms. Implications of the findings, as well as considerations in engaging low-income ethnic minority families are discussed.

**Keywords** Mindfulness · Culture · School-based intervention · Ethnic minority · Adolescent depression

## Introduction

One in five youth in the USA will have experienced at least one episode of depression by the age of 18 (Weisz et al. 2004). Furthermore, ethnic minority youth are at greater risk of unmet mental health needs compared to their non-Hispanic White (NHW) counterparts, with ethnic minority youth having less overall access to care, longer delays to treatment, poorer quality of care, and more premature termination (Snowden and Yamada 2005). Practical barriers (e.g., insurance coverage) and cultural barriers (e.g., beliefs about care) have been shown to disproportionately affect service use among ethnic minorities (Gudiño et al. 2008). School-based mental health services have been identified as an effective means to reduce observed racial disparities in mental health service utilization and promote overall student wellness. Studies suggest that ethnic minority youth are more likely to seek and receive school-based interventions compared to clinic-based treatment (e.g., Jaycox et al. 2010). Although youths across racial/ethnic groups are more likely to receive care through schools than specialty mental health sectors (Farmer et al. 2003), smaller racial/ethnic disparities exist in schools relative to clinics.

The Gateway to Success program was established in 2005 to extend school-based mental health to the traditionally underserved communities in the Alhambra Unified School District (AUSD). AUSD is an urban public school district in the greater Los Angeles area that serves a high proportion of ethnic minority (41.6 % Latino, 51.7 % Asian) and low-income families, with 70–81 % of students across campuses receiving free or reduced cost lunch. Gateway collaborates with universities to deliver services to students who are insured, underinsured, or non-insured. In 2011–2012, over 1600 students received school-based mental health services because of this innovative program. Data shows that the

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Gateway program has been effective in increasing linkage of youth with mental health needs to services (Bear et al. 2014).

Despite the extended reach of school-based mental health services, success in addressing barriers to care remains elusive and disparities in services can still be observed (Bear et al. 2014; Guo et al. 2014). The observed disparities may in part be due to how behavior problems are manifested. Evidence suggests that disruptive behaviors are more often recognized by adult gatekeepers (e.g., teachers and counselors) and more often referred to mental health services as these behaviors negatively impact classroom management (Neary and Eyberg 2002). However, Asian-American and Latino-American students tend to demonstrate high levels of internalizing problems (Chang et al. 1995, Martinez et al. 2012) which are less disruptive in classrooms; hence, youth who struggle with depression may not be as readily identified by adult gatekeepers (Guo et al. 2014).

Recent research has supported the efficacy of mindfulness-based programs in school settings in promoting wellbeing in adolescents (Semple et al. 2010; Huppert and Johnson 2010; Broderick and Metz 2009). Mindfulness is a form of attention training using meditation techniques, in which one learns to pay attention, in the present moment and non-judgmentally (Kabat-Zinn 1994). Three types of meditation have broadly been identified in the literature (e.g., Walsh and Shapiro 2006, Kristeller 2007): concentrative meditation (focusing attention on a particular object), receptive meditation (attention purposefully kept open such that one rests on whatever enters awareness), and guided meditation (focusing attention on content that carries significance and is intended to engage a particular aspect of self). Mindfulness-based programs often start with the practice of resting one's attention on a relatively neutral anchor (e.g., one's breath). The key process is to observe the breath, without reacting or imposing judgment on it (concentrative meditation). This may have grounding or stress-reduction effects in which, over repeated practice, the mind is trained to be less reactive and more regulated. The process is then expanded such that an individual practices becoming more aware of bodily, emotional, and cognitive experiences and consequently learns to purposefully disengage from the usual chatter of the conscious mind (receptive meditation). The program then ends with loving-kindness meditation, which involves directing one's emotions toward warm feelings in an open-hearted way to the self and then others in the world (directed meditation).

Overall, the development of stable attention and non-judgmental awareness helps to promote emotion regulation and sustained attentional control. As such, mindfulness has been touted as an intervention that helps promote social-emotional health and improve concentration, and for students,

promote better academic performance. Most trials have been conducted with adults, but a growing number of studies on school-age children have yielded promising findings (see Burke 2010 for a review) in improving attention difficulties (Semple et al. 2010), cognitive control (e.g., Schonert-Reichl et al. 2011), anxiety/depressive symptoms (e.g., Biegel et al. 2009), grades (Beauchemin et al. 2008), and conduct problems in youth (Singh et al. 2007).

Despite initial evidence supporting the efficacy of mindfulness for children and adolescents, some studies lack a control group (e.g., Black and Fernando 2014) or randomization (e.g., Huppert and Johnson 2010). This study is one of the few studies that utilizes a randomized controlled trial design, which is often considered the "gold standard" for evaluating the effectiveness of an intervention. Furthermore, few studies have examined the external validity of mindfulness interventions with ethnic minority and immigrant youth, an omission that calls into question generalizability across cultural groups (Lau 2006). The view of self and one's self-concept holds implications for emotion, emotion processing, and motivation of behavior (Kitayama et al. 2000). Heritage cultural orientations held by Latino and Asian-American students and their families may shape an interdependent construal of the self that has implications for coping and emotion regulation practices that may be relevant in predicting their engagement and response to mindfulness intervention (e.g., Soto et al. 2011). Gross and colleagues (Gross 2001; Gross and John 2003) identified cognitive reappraisal as the ability to think about a stressful event in such a way as to change its associated emotions, and expressive suppression as the active reduction of emotionally expressive behavior when emotionally aroused. Among European-American samples, reappraisal in general has been associated with positive outcomes (e.g., better social support, greater positive affect) whereas suppression has been associated with negative outcomes (depression, lower self-esteem and life satisfaction) (John and Gross 2004). However, recent studies have highlighted cultural differences in the use of emotion regulation strategies and their effects on wellbeing (Larsen and Prizmic 2004). For example, scholars have suggested that expressive suppression may be a socialized form of emotion regulation in cultures that are more interdependent given cultural norms surrounding the value of suppressing displays of strong emotion to promote social harmony (Butler et al. 2007).

Thus, the central aim of this study was to evaluate the efficacy of a mindfulness-based program (Learning to BREATHE; Broderick 2013) in reducing internalizing and externalizing behavior problems and enhancing emotion regulation among ethnic minority youth in a

wait-list controlled trial. Given that this is a pilot study, the second aim was to evaluate treatment acceptability among ethnic minority youth and feasibility of partnering with the local school district in engaging low-income ethnic minority families in delivering school-based depression prevention groups.

## Method

### Participants

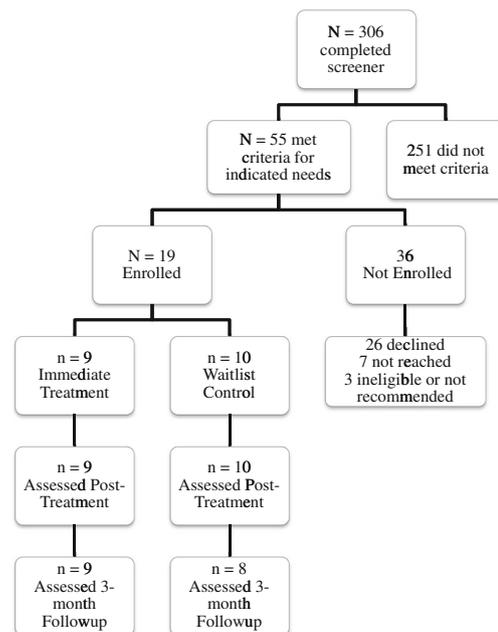
Participants were recruited from two K-8 elementary schools in an urban public school district in the greater Los Angeles area that serves a high proportion of ethnic minority and low-income immigrant families. The study sample included 19 students (8 boys and 11 girls) in the seventh and eighth grades between the ages of 12 and 14 years old ( $M = 12.7$  years,  $SD = .81$ ). Their parents (36.8 % mother) also completed questionnaires on child functioning. In the sample, 10 students (52.6 %) self-identified as Latino and 9 (47.4 %) as Asian-American. Fifteen (78.9 %) students were born in the USA while the remaining four foreign-born students have lived in the USA between 4 and 13 years. Parents were on average 40.36 years of age ( $SD = 7.88$  years). Families received \$10 for completing the questionnaires at each time point.

### Procedure

#### Depression Symptom Screening and Recruitment

Youth were recruited from two K-8 elementary schools in the greater Los Angeles area. The two schools have a total population of 391 seventh and eighth grade students. Figure 1 shows participant flow from recruitment to 3-month post-intervention. At the beginning of the school year, 306 students (78 %) obtained parental consent, provided assent, and were administered the screening survey. Given recent evidence suggesting that problem type (internalizing versus externalizing behaviors) may explain ethnic disparities in referral practices, a screening measure specific for adolescent depression was chosen to identify youth with indicated needs (PHQ-9; Kroenke and Spitzer 2002). A cut-off score was determined to identify students who score in the top 20 % on the PHQ-9 within each school. Screening results revealed that 55 students (18.0 %) met the criteria for mild to moderate depression (cut-off scores were set at five and eight for the two schools) and were invited to participate in mindfulness groups at the school.

From the screened sample, 36 students (65 %) were eligible but were not enrolled (declined, could not be reached, or



**Fig. 1** Participant flow from screening to 3-month follow-up intervention

inappropriate for a group due to behavioral problems). The remaining 19 eligible students who received parental consent and provided student assent were enrolled in the study trial. Each of the 19 students was randomized by coin toss within their respective schools to participate groups in the fall (treatment group,  $n = 9$ ) or spring (control group,  $n = 10$ ). The project coordinator then informed the students of their group start dates (fall vs. spring). A total of four groups, ranging in sizes from 4 to 5 students, were conducted during school hours in the two respective school campuses. Each group was led by two group therapists, both of whom are advanced doctoral clinical psychology students. No prior training or practice in mindfulness was required or reported by study group leaders. Group leaders received training on the Learning to BREATHE curriculum and subsequently received weekly supervision from the first and last authors. Treatment groups were conducted from October 2013 through May 2014.

### Intervention

The intervention was based on the Learning to BREATHE (L2B) curriculum (Broderick 2013), a mindfulness-based program designed to facilitate the development of emotion regulation for middle and high school students. Goals of the program include helping students understand their thoughts and feelings, learning how to use mindfulness-based skills to manage emotions, and providing opportunities for guided group practice. The L2B program contains six core themes: body awareness (Body), understanding and working with thoughts (Reflection), understanding and working with feelings

(Emotion), integrating awareness of thoughts, feelings and bodily sensations (Attention), reducing harmful self-judgments (Tenderness), and integrating mindful awareness into daily life (Habit). The intervention for the current study included twelve 60-minute group sessions, with two sessions on each of the six core themes. Each session included an opening mindful movement, short didactic presentation of the topic or theme of that week, group activities that illustrate the theme, guided discussion about the activity, and in-session group mindfulness meditation practice. The core practices include body scan, mindfulness of thoughts, mindfulness of emotions, loving-kindness practice, and mindful movement. See Table 1 for a description of the intervention structure, themes, and corresponding activities and practices. Student workbooks were used to aid in the group activities. Each week, students were asked to practice the skills being taught that week. Audio recording of mindfulness practices were also provided to students to support their home-based practice.

### Assessment

Assessments occurred at three time points for students within the immediate treatment condition: pre-treatment, post-treatment, and 3-month follow-up. Students in the delayed treatment condition completed a second baseline assessment at the conclusion of the immediate treatment group, resulting in four assessment time points. Assessments were conducted in family homes or at the school district office depending on family preferences. All instruments were administered separately to students, and then to parents by the same interviewer. Internal consistency is reported at time 1. Baseline assessments could not be completed prior to the start of the intervention groups for one of the families in the

wait-list control condition. Two families dropped out of the immediate treatment condition but completed assessments at all three time points. This yielded a retention rate of 89.4 %. Using intent-to-treat conventions, our main analyses included all families for whom baseline data was obtained ( $n=18$ ). Finally, two families in the delayed treatment condition did not complete the 3-month follow-up assessment.

### Measures

#### *Child Behavior Problems*

Child behavior problems were measured by the parent-informant Child Behavior Checklist (CBCL; Achenbach and Rescorla 2001) and the youth-informant Youth Self-Report (YSR; Achenbach & Edelbrock, 1987). The CBCL and YSR contain 118 and 102 descriptions of behavioral and emotional problems, respectively, in which the parent or child reported whether each item was not true (0), somewhat or sometimes true (1), or true or often true (2) of the child based on the preceding 3 months. Items were summed to create three broad-band factor scores for Internalizing (anxious/depressed, withdrawn, and somatic complaints), Externalizing (aggressive and destructive), and Total problems. The broad-band factor scores of internalizing problems ( $\alpha=.75$  for parent-report and .87 for youth-report) and Externalizing problems ( $\alpha=.89$  for parent-report and .84 for youth-report) are used in this study. All parents completed the English, Chinese, or Spanish version of the CBCL. Published internal consistency estimates were satisfactory for the Chinese version ( $\alpha=.80$  and .83 for the Internalizing and Externalizing subscales, respectively; Yang et al. 2000) and the Spanish version of the CBCL ( $\alpha=.88$  and .93 for the Internalizing

**Table 1** Chronological summary of the Learning to Breathe (L2B) curriculum structure

Week	Theme	Activity	Practice
1	Introduction + Theme B: Body	Mindful Eating	Mindful Breathing
2	Theme B: Body	Sense Doors	Body Scan
3	Theme R: Reflection	The Big Event	Mindfulness of Thought
4	Theme R: Reflection	My Mind is a Cast of Characters	Mindfulness of Thought
5	Theme E: Emotion	The Lineup, White Polar Bear	Finding the Feeling
6	Theme E: Emotion	The Great Cover-Up	Surfing the Waves
7	Theme A: Attention	A Stressed-Out Case	Mindfulness of Emotion
8	Theme A: Attention	How Much Can You handle?	Mindful Walking
9	Theme T: Tenderness	Ways We Care for Ourselves	Practicing Kindness
10	Theme T: Tenderness	Stream of Gratitude	A Person Just Like Me
11	Theme H: Habits	Design to Re-mind	Gratitude Practice
12	Theme H: Habits + Closing	Closing Circle	Mindful Listening and Speaking

and Externalizing subscales, respectively; Bernedo et al. 2008).

### Emotion Regulation

Youth completed a 10-item Emotion Regulation Questionnaire for Children and Adolescents (ERQ-CA; Gullone and Taffe 2012). The scale measures emotion regulation strategies of cognitive reappraisal (e.g., “When I want to feel happier about something, I change the way I’m thinking about it”,  $\alpha = .81$ ) and expressive suppression (e.g., “I control my feelings by not showing them”,  $\alpha = .44$ ). Items are rated on a 5-point scale ranging from strongly disagree (0) to strongly agree (4). Published internal consistency estimates are satisfactory ( $\alpha = .82$  and  $.75$  for cognitive reappraisal and suppression, respectively; Gullone and Taffe 2012).

### Post-intervention Evaluation

The post-intervention satisfaction questionnaire evaluates youth’s overall experience in the program. Youth rated, on a 10-point Likert scale, how helpful they found various components of the mindfulness program (1 = not useful, 10 = very useful). They also rated how often they practiced mindfulness and used the audio files to support their practice. Finally, youth responded to open-ended questions about what they have learned and whether they would recommend the program to their friends.

**Table 2** Baseline characteristics by intervention condition

	Immediate treatment (n = 9)		Delayed treatment (n = 10)		<i>t</i> (18)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
<i>Socio-demographics</i>					
Child Gender	4 Males; 5 Females		4 Males; 6 Females		
Child Ethnicity	4 Latino; 5 Asian		7 Latino; 3 Asian		
Child age	12.33	.71	13.10	.74	2.31*
<i>Parent Report</i>					
Internalizing Problems	56.00	7.75	51.44	9.10	.65
Externalizing Problems	53.44	11.88	53.00	7.45	1.87
<i>Child Report</i>					
Internalizing Problems	55.56	10.22	58.44	8.56	-1.14
Externalizing Problems	50.44	8.76	58.22	8.97	-.10
PHQ-9	6.00	4.87	7.22	5.04	.53
Cognitive Reappraisal	2.30	1.00	1.64	.59	-1.69
Expressive Suppression	1.81	.60	1.81	.72	.00

\* $p < .05$

### Data Analyses

To determine the effects of the intervention, ANCOVA analyses were conducted to examine the effect of condition on post-treatment measures of child internalizing and externalizing behavior problems, cognitive reappraisal, and expressive suppression, controlling for baseline measures. To explore changes over time in the full sample, repeated measures ANOVA were conducted to examine effects of time. Intention-to-treat (ITT) analyses were conducted, and the missing data of two students at 3-month follow-up were handled using the last-observation-carried-forward method, which is considered a conservative approach. Finally, data on treatment acceptability (enrollment rate, retention rate, and levels of satisfaction) were reported.

### Results

Table 2 displays means and standard deviations of demographic variables, and child behavior problems at baseline for immediate and delayed treatment groups. Based on independent samples *t* tests, there were no significant differences for internalizing problems, externalizing problems, depression score, cognitive reappraisal, and expressive suppression at baseline. Students were, on average, older in the delayed treatment compared to those in the immediate treatment. There was an 89.47 % overall retention rate in the intervention study (two students dropped out of treatment). Youth on average attended

**Table 3** Summary of primary treatment outcomes

	Time 1				Time 2				ANCOVA		
	Immediate treatment		Delayed Treatment		Immediate treatment		Delayed Treatment		<i>F</i> (1,18)	<i>p</i>	$\eta^2$
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>			
<i>Parent Report</i>											
Internalizing Problems	56.00	7.75	51.44	9.10	50.22	7.34	53.89	8.49	.57	.463	.04
Externalizing Problems	53.44	11.88	53.00	7.45	49.22	11.48	51.00	4.50	5.71*	.032	.29
<i>Child Report</i>											
Internalizing Problems	55.56	10.22	58.44	8.56	47.00	8.69	51.78	7.56	3.37†	.088	.19
Externalizing Problems	50.44	8.76	58.22	8.97	44.11	8.15	53.22	9.00	.03	.866	.00
Cognitive Reappraisal	2.30	1.00	1.64	.59	1.76	.94	1.93	1.01	1.06	.321	.07
Expressive Suppression	1.81	.60	1.81	.72	1.28	.97	1.68	.74	.00	.951	.00

\* $p < .05$ , † $p < .10$

10.28 (85.63 %) out of 12 sessions among the intent-to-treat sample and 10.90 (90.86 %) sessions among the completers.

Table 3 displays the results indicating that immediate treatment was associated with reduction in parent-reported externalizing problems ( $F(1, 18) = 5.71, p = .032$ ) and marginally associated with reduction in youth-reported internalizing problems ( $F(1, 18) = 3.37, p = .088$ ). The observed effect sizes were in the “medium to large” range for internalizing problems ( $\eta^2 = .19$ ) and in the “large” range for externalizing problems ( $\eta^2 = .29$ ). Immediate treatment was not associated with change in youth-reported externalizing problems, parent-reported internalizing problems, emotion suppression, or cognitive reappraisal.

To explore changes over time in the full sample, secondary analyses were conducted in which data were pooled for all participants to examine pre-to-post intervention change. Time 1 (baseline) data from the immediate treatment condition was combined with time 2 (second baseline) pre-treatment data from the delayed treatment condition to create a pooled

pretest group. Time 2 (post-treatment) data from the immediate treatment condition was combined with time 3 (post-treatment) data from the delayed treatment condition to create a pooled post-test group. A repeated measures ANOVA was conducted to examine effects of time. As displayed in Table 4 and Fig. 2a–c, in the pooled sample following treatment, youth showed reductions in parent-reported externalizing problems, child-reported internalizing problems, and expressive suppression. All these effects were maintained at the 3-month follow-up. However, there was no effect of time on parent-reported internalizing problems, child-reported externalizing problems, or cognitive reappraisal.

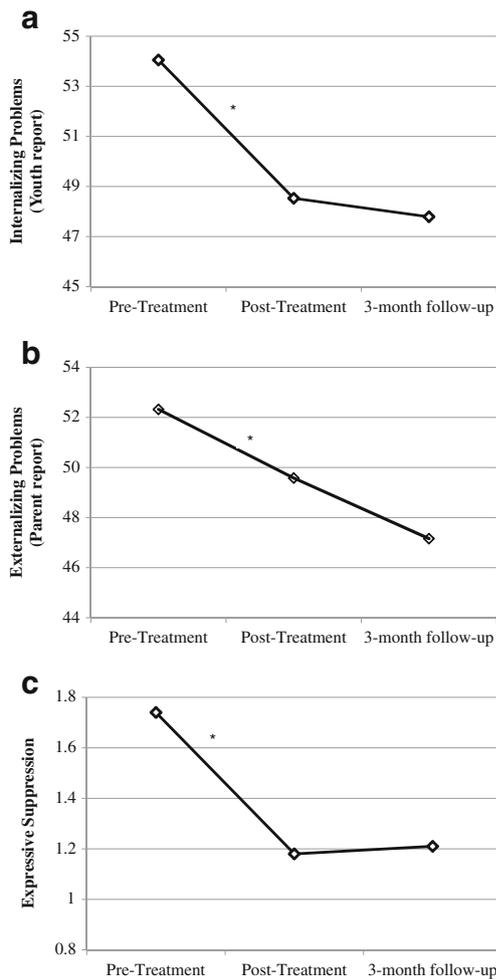
At week 12, youth reported moderate levels of satisfaction. They gave an overall mean rating of 7.21 ( $SD = .67$ ) on a scale of 1 to 10 across different components of the mindfulness program. In terms of engagement, 75 % of youth reported practicing mindfulness at least 4–6 times a week and 66.67 % reported using the audio files at least once a week. In open-ended

**Table 4** Pre-treatment, post-treatment, and follow-up outcomes in the full sample

	Pre-treatment <i>M</i> ( <i>SD</i> )	Post-treatment <i>M</i> ( <i>SD</i> )	Follow-up <i>M</i> ( <i>SD</i> )	<i>F</i> (2, 34) Time
<i>Parent Report</i>				
Internalizing Problems	55.32 (7.90)	51.21 (9.08)	49.84 (11.59)	2.68
Externalizing Problems	52.32 (8.56) <sup>a</sup>	49.58 (8.73) <sup>b</sup>	47.16 (10.97) <sup>b</sup>	5.98**
<i>Child Report</i>				
Internalizing Problems	54.05 (8.85) <sup>a</sup>	48.53 (8.54) <sup>b</sup>	47.79 (11.42) <sup>b</sup>	4.44*
Externalizing Problems	51.32 (8.78)	48.42 (9.48)	50.11 (9.72)	1.02
Cognitive Reappraisal	2.11 (1.00)	1.85 (.92)	1.72 (1.00)	1.49
Expressive Suppression	1.74 (.66) <sup>a</sup>	1.18 (.88) <sup>b</sup>	1.21 (.90) <sup>b</sup>	5.43**

Means with different superscripts denote significantly different means

\* $p < .05$ , \*\* $p < .01$



**Fig. 2** **a.** In the pooled sample following treatment, youth showed improvement on youth internalizing problems, with treatment effects maintained at 3-month follow up. **b.** In the pooled sample following treatment, youth showed improvement on parent-reported youth externalizing problems, with treatment effects maintained at 3-month follow up. **c.** In the pooled sample following treatment, youth showed improvement on expressive suppression, with treatment effects maintained at 3-month follow up

responses, students stated that they practiced mindfulness in response to stress, for example, “when my mom and I argue about things” or “when my body was really tense and I wanted to calm down.” In terms of what they have learned, half of the study participants said they learned “relax or calm down” whereas others said they learned “to be more grateful,” “to pay attention to the body different ways of breathing”, or “how to get rid of sticky thoughts.” When asked to identify what they liked the least about the program, two students said it was too short, two students did not like mindful walking practice, and one student stated that (s)he did not like working with other kids that s(he) did not know. Finally, 91.67 % said they would recommend the mindfulness program to a friend for various reasons, for example, because it “can help them with emotions and stress,” “is fun and teaches you how to relax,” and “is a great way to learn about others and learn about yourself.”

## Discussion

Findings from the current study demonstrate that a school-based mindfulness-based program was effective in reducing behavior problems and expressive suppression among ethnic minority youth. Relative to youth in the delayed treatment condition, youth who were in the immediate treatment group demonstrated lower levels of parent-reported externalizing problems and lower levels of youth-reported internalizing problems. The observed effect sizes in our study are comparable to that found in recent meta-analysis of mindfulness-based interventions for child and youth behavior problems (Burke 2010). Furthermore, the observed improvements in youth behavior problems were maintained at the 3-month follow-up. Taken together, our study provided initial evidence that a mindfulness-based program is efficacious in reducing behavior problems among youth of Asian and Latino descent.

In the current study, we found program effects for youth-reported internalizing problems but not those reported by parents. On the other hand, the intervention reduced parent-reported externalizing problems but not those reported by the youth. The result is consistent with previous work that found mindfulness-based stress reduction interventions to significantly reduce self-reported anxiety and depressive symptoms in adolescents (Biegel et al. 2009). It is also consistent with studies that found that mindfulness practices led to improvements in parent-reported externalizing problems but not parent-reported internalizing problems (Bogels et al. 2008). Other studies have also documented that Mindfulness-Based Cognitive Therapy for Children (MBCT-C), another type of mindfulness-based intervention, significantly reduced parent-reported internalizing problems (Semple et al. 2010) and parent-reported externalizing problems (Lee et al. 2008), but not child-reported depressive or anxiety symptoms. In light of our study findings and past studies that suggest discrepancy between parent and child self-report on child functioning (e.g., Achenbach 2006; Briggs-Gowan et al. 1996), greater attention needs to be given to the selection of informant reports. Parents may be relatively insensitive to their children’s depressive symptoms (Angold et al. 1987), whereas children or youth often underreport externalizing problems (Pierce et al. 1999). Future studies should incorporate non-self-report assessment methods, including teacher- or parent-report of child functioning and other objective or performance indicators of functioning.

Our study also found that participation in a mindfulness program led to a reduction in the use of expressive suppression (inhibiting emotional expressive behavior) in the pooled pre-to-post treatment analyses of the entire sample, but it did not have an effect on cognitive reappraisal (changing the meaning assigned to an event). Mindfulness emphasizes open and non-judgmental awareness of one’s thoughts, feelings, and bodily sensations, regardless of valence. The inverse relationship between mindfulness and expressive suppression

is consistent with the previous work that found mindfulness to increase emotional awareness and acceptance of emotional responses among adolescents (Metz et al. 2013). Ethnic minorities, including individuals of Asian and Latino descent, tend to use more expressive suppression as an emotion regulation strategy compared with European-Americans (Gross and John 2003). Expressive suppression is often associated with adverse psychological functioning for European-Americans (e.g., depression, lower life satisfaction, and lower self-esteem) (Gross and John 2003). However, recent scholars have identified the importance of context in understanding the link between expressive suppression and wellbeing (Butler et al. 2007; Soto et al. 2011). In particular, they found that the deleterious effects of suppression were reduced among individuals who hold more interdependent cultural values, although they did not find it to be positively associated with psychological wellbeing. Given that ethnic minorities tend to suppress their emotions more, mindfulness meditation may be particularly relevant for them as they practice being more aware and accepting of their own emotions. Finally, we did not find a significant relationship between mindfulness training and cognitive reappraisal. This is likely due to the fact that mindfulness trains the mind to simply observe any thoughts that may enter the mind rather than to engage or replace them, as in the case of cognitive behavioral intervention.

Nineteen out of the 55 eligible youth (35 %) enrolled in our study. Our study enrollment rate was comparable to another school-based randomized trial in Puerto Rico, where 35 % of adolescent with depressive symptoms participated in the study (Rosselló et al. 2008). Yet our enrollment rate was lower than those reported by other studies with comparable research design (school-based preventive intervention for adolescents with elevated depressive symptoms), where 52 % (McCarty et al. 2013) and 63 % (Horowitz et al. 2007) of adolescents enrolled in the study. One of the reasons that may account for our lower rates of study enrollment is that our study consists of underserved ethnic minority families and youth. It is possible that stigma is associated with mental health concerns among immigrant families, and some studies have found that ethnic minority youth and families show lower treatment engagement and recruitment (Bui and Takeuchi 1992). In addition, youth in our study had to be pulled out of class to participate in the mindfulness program. Many parents were concerned that this arrangement would compromise their child's learning and hence declined to provide consent for treatment. Although we tried to reduce barriers by framing the mindfulness program as an "enrichment program" that promotes school performance, our recruitment rates suggest that this effort was not sufficient. In the future, it may be helpful to conduct parent information sessions to provide parent psychoeducation on stress and wellbeing and highlight the role and benefits of mindfulness, especially its link to school performance.

Despite our relatively low enrollment rate, we observed high retention and engagement rates in our study. Data on post-treatment evaluation suggests that youth find the mindfulness program helpful and are willing to recommend it to a friend. However, at the same time, we noted some administrative challenges in implementing the mindfulness program at the two schools. Some school teachers raised concerns that they did not know that the mindfulness program was being implemented at the school and expressed reluctance when asked to release students from class. Challenges also arose when we tried to follow the research protocol while observing existing school district protocol. For example, during the recruitment phase, school counselors expressed burden associated with the depression screening process. A total of 306 students completed the screener, so the process of conducting risk assessments with students who indicated suicidal ideation was extremely labor- and time-intensive which, in turn, impacted the school counselor workforce. Overall, we discovered that buy-in from all constituencies (teachers, parents, school counselors, and administrators) was critical. The quality of implementation and levels of student engagement can be expected to increase as a function of the extent to which all parties in the school context understand the value of an evidence-based intervention, and convey this message consistently to students (Lyon et al. 2013).

Several limitations of the current study should also be noted. Given that this was a small pilot trial, we had limited power to detect therapeutic effects and relatively large standard errors. Second, there is heterogeneity in a very small sample, so we cannot address subgroup differences or moderation effects adequately. Future studies should re-examine the extent to which youth/family acculturation or ethnicity may moderate treatment effects. Third, one of the measure subscales (expressive suppression) had low internal consistency in the current study, which poses some concerns about whether these items appropriately tap the intended construct in these cultural groups. The adult version of the Emotion Regulation Questionnaire has been used among Chinese (e.g., Soto et al. 2011) and Spanish (e.g., Cabello et al. 2013) participants with good psychometric properties. Future studies should continue to examine the psychometric properties of the child version of the ERQ in other cultural groups. Fourth, no prior training or practice in mindfulness was required or reported by study group leaders. Further studies should examine the extent to which group leaders' own practice of mindfulness may impact treatment effects. Finally, our study included only child- and parent-report of child behavior problems and child-report of emotion regulation. Future trials should include multiple-informant and multi-method assessments of outcome.

Notwithstanding these limitations, results from this randomized clinical trial provide evidence that a mindfulness-based program may be beneficial for ethnic minority youth in reducing

internalizing and externalizing behavior problems and the use of expressive suppression. Despite the small sample size, observed treatment effect sizes were in the medium to large range and the observed improvements were maintained at 3 months following the intervention. Although challenges arose, our findings suggest that the intervention was somewhat feasible to implement in public schools and appealing to students. Furthermore, this pilot study highlights how the program can be delivered in ways that can help engage low-income ethnic minority families given their familial and cultural concerns.

**Compliance with Ethical Standards** Following approval by the Institutional Review Board at University of California, Los Angeles and Fuller Theological Seminary, participants were recruited from two K-8 elementary schools in an urban public school district in the greater Los Angeles area that serves a high proportion of ethnic minority and low-income immigrant families.

**Conflict of Interest** The authors declare that they have no competing interests.

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