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Associations between Executive Functioning and Social Adjustment in Urban School Children Participating in a Mindful Yoga Practice

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MINDFULNESS AND SOCIAL ADJUSTMENT IN URBAN SCHOOL CHILDREN

Associations between Executive Functioning and Social Adjustment in Urban School Children
Participating in a Mindful Yoga Practice

An Honors Thesis

Presented to

The Department of Psychology
Of the University of New Orleans

In Partial Fulfillment

Of the Requirements for the Degree of
Bachelor of Science, with Honors in Psychology

by

Victoria A. Sacco

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Abstract

The present study is a preliminary investigation assessing the associations between socioemotional adjustment and executive functioning problems in a low-income, high-risk sample of elementary students who participated in a mindful yoga practice. Mindfulness is a concept that encompasses attention within the present moment and requires acceptance and nonjudgment. Rather than being an outcome-reliant principle, it emphasizes the individual's present state of mind and being (Kabat-Zinn, 2003). Recently, mindfulness has become a popular phenomenon in research. It has shown to be a highly effective coping strategy and mediator for cognitive, emotional, and behavioral problems (Flook, 2010; Hayes & Feldman, 2004; Broderick & Metz, 2009; Mendelson et al., 2010). However, little research has been done to assess the role mindfulness plays in children. The objective for this study was to investigate the associations between contextual stress, mindfulness, executive functioning difficulties, emotion dysregulation, and aggression. Data for these variables was reported via self-report (n=21), parent-report, and teacher-report at one time towards the end of the yoga curriculum. Mindfulness was not associated with executive functioning or emotional dysregulation. However, parent and teacher reports did reveal significant links among more aggression, executive functioning difficulties, and emotion dysregulation. Discussion notes the limitations of the current study and recommendations for improving the study design to improve the study of positive interventions for children experiencing high-stress lifestyles.

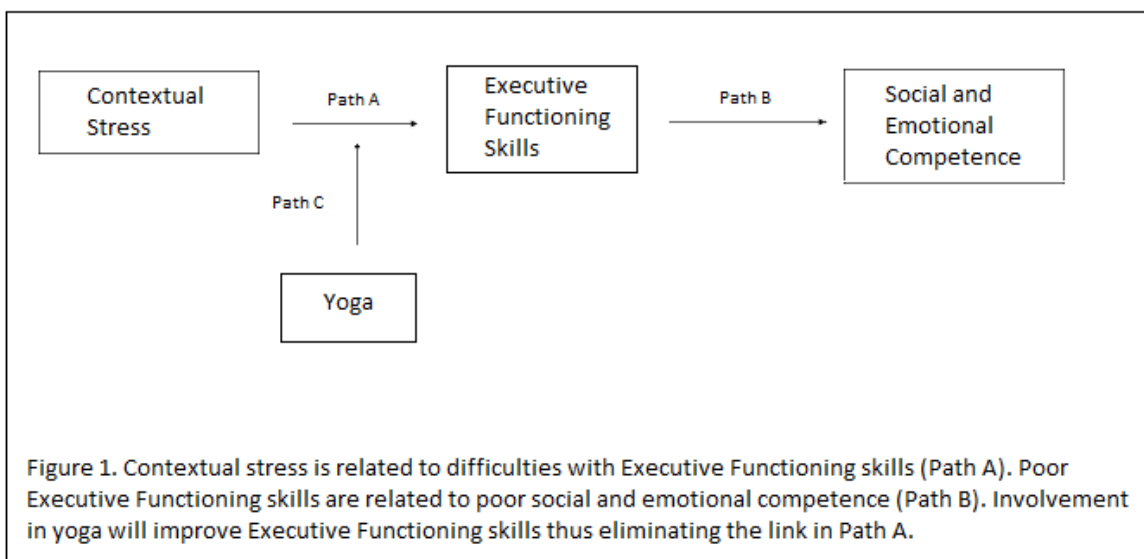
Keywords: Mindfulness, Yoga, Executive Functioning, Emotion Regulation, Children

Introduction

New Orleans' public education system has suffered criticism for years in regards to its low graduation rates and poor test scores, a problem that disproportionately impacts ethnic minorities and the economically disadvantaged. The majority of students in New Orleans public schools are eligible for free or reduced-price lunches (82% vs. 48% nationally) and the schools primarily serve African American students (89% vs. 16% nationally), meaning that the New Orleans public school system primarily serves poor African American students (U.S. Department of Education, National Center for Education Statistics, Common Core of Data, "State Nonfiscal Survey of Public Elementary/Secondary Education"). These underserved children may often come into contact with highly stressful scenarios such as family or interpersonal problems, violence, and financial conflict (e.g., Hall, Chipperfield, Perry, Ruthig, & Goetz, 2006) that could lead to poor academic performance, low social emotional skills, and behavioral issues (Mendelson, 2010). Under pressure to align students' academic performances with high expectations of a newly transformed school environment, as well as the push for an increased focus on social and emotional learning, many school leaders have become more open-minded to mental training strategies, such as mindfulness (Greenberg et al., 2003).

Mindfulness, defined as the "awareness that emerges through paying attention on purpose, in the present moment, and nonjudgmentally to the unfolding of experience moment by moment" (Kabat-Zinn, 2003), has been linked to many social and emotional benefits for children (Flook, 2015; Greenberg et al., 2003; Meiklejohn et al., 2012) and adults. One common way to practice mindfulness is through yoga. Yoga has three defining elements: controlled breathing, physical postures, and meditation. Each of these promotes relaxation, flexibility and strength, both physically and mentally (Berger, 2009). Through a mindfulness yoga practice, one can learn

volitional control, focus, and sustained attention, while also learning emotion-coping techniques and methods that promote altruistic temperaments (Davidson et al. 2012). Davidson and Colleagues (2012) propose an organizational framework to describe the mechanism through which consistent engagement in contemplative practices (e.g., yoga) may foster mindfulness over a period. Repeated practice may produce structural and functional changes in the brain that will, in turn, lead to changes in psychological functions, allowing for changes in observed behaviors. Mental skill sets suggested for students' potential maximum success include the ability to regulate one's own emotions, attention, and actions, while exhibiting compassion and empathy towards others (Davidson et al, 2012). Research to support this organizational framework is promising, but research specific on the benefits of mindfulness in elementary schools is lacking. The study aims to test the theoretical model shown in Figure 1. The model posits that contextual stress is related to difficulty with Executive Functioning (EF) skills (path A), which negatively impact social and emotional competence (path B). A repeated yoga practice is hypothesized to improve children's EF skills (path C) thus mitigating the negative impact of contextual stress.



Contextual Stress

Contextual stress refers to the poverty-related stressors many children face on a daily basis. Examples of contextual stress include homelessness, street violence, conflict among family members, frequent moving, trauma, and other daily hassles (Wadsworth et al., 2008). Exposure to poverty-related stressors often has long-term consequences (Mcloyd, 1998). For example, Mcloyd (1998) found that low socioeconomic status (SES) is related to lower test scores in achievement, lower intellectual functioning and socioemotional problems. These problems tend to be confounded by low teacher expectations, less help in academic readiness skills, and fewer resources (Mcloyd, 1998). Furthermore, Blair (2010) suggests that the stress these children face has a profound impact on their brain functioning and limits the development and skills of self-regulation/control and executive functioning needed for academic success.

Executive Functioning Skills

Executive functioning (EF) skills are an instrumental aspect in a child's mind that aids in planning, bringing the plan to action, concentration, and focus (Flook, 2010). Flook and colleagues (2010) delivered the Mindful Awareness Practices (MAPS) to 64 third grade children (45% Caucasian, 23% Latino, 14% Asian, 9% African American, and 9% other) in elementary school. Over a period of eight weeks, MAPS occurred twice a week for half an hour. Each session consisted of sitting meditation, a reflective or goal-oriented objective (consisting of emphasis on awareness of one's self, thoughts, and feelings, as well as others, the environment, sensory awareness, and self-regulation), and body scan or meditation while lying down. Using the *Behavior Rating Inventory of Executive Functioning* (BRIEF; Gioia, Espy, & Isquith, 2003), teachers and parents reported significant improvements in global indices of behavioral regulation (Inhibit, Shift, Emotional Control) and Metacognition (Initiate, Working Memory,

Plan/Organize), for students who participated in MAPS, compared to the control group. These results were most pronounced for students with low initial levels of EF skills. Furthermore, individual scale analyses show that results were driven by three subscales: initiate, monitor, and shift. Importantly, these subscales are an integral piece in practicing mindfulness during Yoga. These skills are acquired through breathing exercises: Initiate refers to acknowledging one's breath, monitor refers to the perception of the breath and distinguishing whether one's attention has drifted from it, and lastly, shift requires one to refocus on the breath once attention has drifted (Flook, 2010).

Using a slightly different mindfulness program, Napoli, Krech, and Holley (2005) implemented the Attention Academy Program (AAP) with 194 first, second, and third graders. The program occurred bimonthly over the span of 24 weeks during the children's physical education class. Each session lasted 45 minutes and followed a format that focused on breathing exercises, body scan visualization, and physical tasks like yoga. Teachers reported significant improvements in attention and social skills subscales, using the *ADD-H Comprehensive Teacher Rating Scale*, (ACTeRS; Ullmann, Sleator, & Sprague, 1984), a scale fit for a non-ADHD population. Students also reported a significant increase on their selective attention performance via a computer visual field test wherein participants had to identify the spaceship while avoiding other distracters (*Test of Everyday Attention for Children*; Mannly, Nimmo-Smith, Watson, Anderson, Turner, & Robertson, 2001). Overall, these studies demonstrate the feasibility of mindfulness in schools and its reported impact on attention, social competence, and emotion regulation, perhaps results more pronounced in youth with initially poor executive functioning skills.

Social/Emotional Competence

Hayes and Feldman (2004) propose that mindfulness is the key to a strong emotion regulation capability. They note that the two most hazardous emotion responses to one's psychological and mental health are avoidance (e.g., distraction, denial, thought-distorting) and over-engagement (e.g., rumination, over-thinking, worrying, and obsessive thoughts). By contrast, the foundation of mindfulness lies in one's focus on the present moment without judgment. Additionally, social and emotional competence has been indicated by decades of research to be strongly connected with one's executive functioning skills (Riggs, 2006). Riggs' review (2006) suggests that social-emotional problems (e.g., lack of awareness, impulsivity) are often a result of executive functioning inadequacies. In a study by Cole and colleagues (1993), preschoolers who scored below average in total executive functioning skills were found to exhibit high externalizing (misbehaving, aggressive) behaviors compared to those who scored above average in executive functioning tasks. Broderick and Metz (2009) implemented "Learning to B.R.E.A.T.H.E" to increase emotion regulation through mindfulness in a sample of 120 high school girls, mostly Caucasian (93.3%). The treatment took place twice a week for five weeks for 32-43 minutes each session during class. The curriculum followed a format highlighting six major lessons that were comprised of body awareness, understanding and managing one's thoughts and feelings, becoming aware of one's thoughts and feelings, reducing negative feelings about oneself, and maintaining mindfulness throughout daily life. Compared to the control group (n=17), participants in the intervention group reported an increase in emotion regulation, greater awareness of feelings, and an increase in self-acceptance and more feelings of calmness and relaxation. One study highlighted the physiological effects a mindfulness-based yoga intervention had on students. Results indicated significant improvements in the

participant's' involuntary stress response, in support of prior research linking yoga with increased self-regulatory responses (Mendelson et al., 2010). In a randomized control trial, 46 students belonged to a control group, while the rest of the fourth and fifth graders (n=51) completed 45 minute sessions four times a week over the span of 12 weeks. Participants learned about the fundamental principles of mindfulness, including breathing exercises, body scans, and guided discussions on potential daily stressors and how to cope with or manage them in a healthy manner. They also participated in yoga exercises, postures, and stretching. Compared to the controls, there was a significant enhancement in students' stress response—specifically lessened rumination, intrusive thoughts, and emotional arousal. Thus, students' self-regulatory responses improved, and negative, intruding thoughts decreased, revealing promise for emotional and regulative outcomes through mindfulness.

Expected Outcomes

The overall body of mindfulness research lends initial support for the positive impact on child development that may help to buffer against the negative impact of contextual stress. Blair's (2010) review of the psychosocial effects on children in poverty suggests that the effects of stress are greatly correlated to problems with executive functioning and self-regulation/control, leading to non-optimal outcomes. The review expresses the need for interventions that may encourage resiliency or reverse the detrimental effects of stress in developing children (Blair, 2010). Mindfulness could be such an intervention. Research indicates the positive impact of mindfulness practice on improved executive functioning skills, and self-regulation, self-acceptance, emotion regulation, socio-emotional problems and externalizing behavior problems (Cole, 1993; Napoli, 2005; Hayes & Feldman, 2004; Broderick & Metz, 2009; Mendelson, 2010; Riggs, 2006;).

Based on these findings, the current study set out to examine the following associations on a sample of low-income, high-stress elementary school students. The primary purpose was to serve as an initial investigation in support of the benefits of contemplative practices such as yoga in an academic environment serving school-age youth. We anticipated that youth living in high stress environments would report higher difficulties in executive functioning and emotion-regulative skills than those who were not living in high stress environments. Additionally, we expected that youth who participated in yoga classes would show positive correlations between levels of mindfulness, executive functioning, and emotion regulation, and a negative correlation with externalizing behavior problems.

Hypotheses

Contextual stress was hypothesized to be positively correlated with difficulties in EF, emotion dysregulation, and aggression. Mindfulness was hypothesized to be negatively correlated with poor EF and emotion dysregulation. Poor EF skills were hypothesized to be positively correlated with emotion dysregulation. Finally, aggression was hypothesized to be positively correlated with EF difficulties and emotion dysregulation.

Method

Participants

Participants were recruited from one public charter school. All students (approximately 300 1st-6th graders) were eligible for participation and were being taught yoga two to three times a week for an entire semester by a certified yoga instructor. Participants were selected for inclusion on the basis of parental consent/youth assent and availability to fill out questionnaires. For students who were deemed eligible for participation after the consent procedures, parents and teachers were asked to complete a packet of questionnaires about each child. Parents were asked

to report their children's demographic information (age, gender, and ethnicity), assisted meal program qualifications, and past yoga or meditation experience, as well as their own age, yoga/meditation experience, ethnicity, and marital status. Students were also asked to report their age, ethnicity, whether they received free or reduced lunch, and past yoga/meditation experience. Parental consent was given for 24 students, but 3 students declined to be a part of the study. After obtaining proper parental consent/youth assent, the final youth sample was comprised of 14 girls and 7 boys (N=21). Their ages ranged from 6 to 12 years old, with a mean of age of 9.55 years. Most participants (87.5%) were African American (4.2% were Hispanic, 4.2% were Native American, and 4.2% other). Regarding past mindfulness-related experience, a majority of parents self-reported that they had not participated in yoga (90.5% negative vs. 9.5% affirming) or meditation (71.4% negative vs. 28.6% affirming) before. Most students endorsed they had no yoga (65% negative, 35% affirming) or meditation experiences (63.2% negative, 36.8% affirming) prior. This was the second year that the elementary school had implemented this intervention. In the year before, only some of the students were able to partake in the yoga curriculum, which is likely the reason why there are some discrepancies in youth-reported past yoga/meditation experience. View Table 1 for more participant characteristics.

Table 1.
Demographics of Study Sample

Gender	
<i>n</i>	21
% Male	33.3
% Female	66.7

Ethnicity	
<i>n</i>	21
% African American	87.5
% Hispanic	4.2
% Native American	4.2
% Other	4.2

Age	
<i>n</i>	21
% 6-8	25.1
% 9-12	66.6

Parental level of education	
<i>n</i>	21
% Less than high school	4.8
% High school graduate or GED	71.4
% Associate's degree	19.0
% College or higher	4.8

Parental Marital Status	
<i>n</i>	21
% Single	75
% Divorced	5
% Married	20

Lunch Assistance	
<i>n</i>	21
% Free lunch	100
% Reduced Lunch	
% No Assistance	

Procedures

Data collection from youth, parents, and teachers occurred at one time towards the end of the yoga curriculum. After obtaining parental consent and student assent, the research team distributed a packet of questionnaires to each participant. Children completed self-report questionnaires at school and received a small gift (e.g., key chains) with a value under \$2 as a thank you for their participation.

Parent-report questionnaire packets were sent home with students for their parents to complete. For teacher-report data, homeroom teachers were asked to complete questionnaires using a secure online survey generator (i.e., Qualtrics). Teachers were asked to complete the questions only after parent data was collected. As compensation for parent and teacher time, the teachers were given gift certificates to be used for school supplies.

Measures

Contextual Stress. Qualification for free lunch was selected as our indicator of contextual stress. However, 100% of participants and their parents reported that they received free lunch. Because the indicator of contextual stress was positively endorsed by all participants, contextual stress could not be included in further analyses.

Child and Adolescent Mindfulness Measure (CAMM; Greco, Baer, & Smith, 2011). The CAMM is a 10-item self-report measure assessing mindfulness in youth, for example, “I keep myself busy so I don’t notice my thoughts or feelings”. Items are rated on a 5-point scale (0 = “never true”; 4 = “always true”) and scores are calculated by reverse scoring and summing the items to create a total mindfulness measure. While this measure has only been tested in children ages 9 and older, this study pilot tests the battery in a younger sample of children. A factor analysis by Greco et al. (2011) showed strong support for the structure of this measure in school

age children. Internal consistency for the CAMM has been shown to be good, with an alpha score of .81 (Greco et al., 2011). Internal reliability consistency in the current sample, however, was .62, which is less than the desired.

Abbreviated Dysregulation Inventory (ADI; Mezzich, Tarter, Giancola, & Kirisci, 2001). The ADI is a 30-item measure designed to assess 3 aspects of dysregulation (emotional/affective, behavioral, and cognitive) in adolescents. For the purposes of this study, only the emotional/affective scale was administered and adapted to be parent-report. The Emotional/Affective Dysregulation (ED) subscale consists of 10 items that measure poorly regulated emotional behavior (e.g., “I have trouble controlling my temper”). Each item on the ADI is rated on a 4-point scale from 0 (never true) to 3 (always true). The ED subscale has shown good internal consistency in past research (Cronbach’s $\alpha = .88$; Marsee, 2008) and revealed good internal consistency in this study as well, with an alpha score of .94.

Peer Conflict Scale-Child Self-Report (PCS; Marsee & Frick, 2007). The 20-item PCS is adapted for younger children and has a self-report, parent-report, and teacher report measure assessing aggression. Items are rated on a 4-point scale (0 = “not at all true,” 1 = “somewhat true,” 2 = “very true,” and 3 = “definitely true”) and for the purpose of this study, scores are calculated by summing the items to create a total aggression score. In a sample of youth ages 6-17, Marsee, Weems, and Taylor (2008) found no age-related significant differences and supports the use of this item with younger children. Internal consistency for the PCS scales in past research was good, with alphas ranging from .76 to .87 for the four subscales (Marsee & Frick, 2007). For the current study, questions were edited to better reflect a younger sample of youth. Reliability revealed an alpha score of .94 for parent-report, .97 for teacher-report, and .85 for youth-report.

Behavioral Rating Inventory of Executive Functioning (BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000). The BRIEF is an 86-item parent and teacher-report instrument designed to measure impairments in executive functioning in children ages 2 and above. The index consists of eight subscales. For the purpose of this study, only the three subscales proposed to be central to mindfulness were administered: Shift, Monitor, and Initiate. A total of 24-items (parent report) and 27-items (teacher report) were used. Items are rated on a 3-point scale (1 = “never”, 2 = “sometimes”, and 3 = “often”.) Internal consistency ranges from .80-.98, and test-retest reliability is moderate (.82 for parents, .88 for teachers; Gioia et al., 2000). In the current study, internal reliability ranged from .81-.87 for parent-report and .86-.97 for teacher-report, providing good evidence of reliability.

Behavioral Assessment System for Children- Second Edition (BASC-2; Reynolds and Kamphaus, 2004) is a parent and teacher report instrument designed to measure children’s behaviors. The Teacher Rating Scale (TRS) assesses children’s observable behaviors at school. It consists of 139 items (ages 6-21). Only the externalizing problems (e.g., aggression) subscale was used in this study. The Parent Rating Scale (PRS) assesses children’s behaviors in home and the community. It consists of 150-items (ages 6-11) and 160-items (ages 12-21). Only the externalizing problems (e.g., aggression) subscale was used in this study. Items from both instruments are scored on a 4-point scale (0 = “Never”, 1 = “Sometimes”, 2 = “Often”, and 3 = “Almost Always”).

Psychometric properties are reported in the manual (Reynolds and Kamphaus, 2004). Overall, the scales have shown good internal consistency ranging from .90-.91 (Reynolds & Kamphaus, 2004). The present study revealed an internal reliability score of .81 for parent-report and .96 for teacher-report. Table 2 summarizes the statistics and reliability for each scale used.

Table 2.

Summary Statistics and Reliability

<i>Construct</i>	<i>No. of items</i>	<i>Mean</i>	<i>SD</i>	<i>Range</i>	<i>Coefficient alpha Reliability</i>
<i>Youth Report (n=21):</i>					
<i>CAMM</i>	10	20.7	6.9	33	0.62
<i>PCS</i>	18	6.7	7.9	25	0.85
<i>Parent Report</i>					
<i>Shift (BRIEF subscale)</i>	8	13.5	3.5	11	0.81
<i>Monitor (BRIEF subscale)</i>	8	15.2	4.0	15	0.87
<i>Initiate (BRIEF subscale)</i>	8	13.4	3.4	12	0.81
<i>Aggression (BASC-2 subscale)</i>	11	5.7	4.9	18	0.81
<i>PCS</i>	18	4.4	8.1	34	0.94
<i>Emotional/Affective Dysregulation</i>	10	6.1	8.3	30	0.94
<i>Teacher report</i>					
<i>Shift (BRIEF)</i>	10	16.8	4.7	14	0.91
<i>Monitor (BRIEF)</i>	10	17.9	4.5	13	0.86
<i>Initiate (BRIEF)</i>	7	14.3	4.4	14	0.97
<i>Aggression (BASC-2)</i>	10	26.0	6.6	16	0.96
<i>PCS</i>	20	30.9	11	27	0.97

Results

Dysregulation of emotions reported by the participants' parents were found to correlate positively with parent-reported aggression ($r = .90, p < .001$), parent-reported peer conflict ($r = .80, p < .001$), youth-reported peer conflict ($r = .68, p < .010$), and parent-reported externalizing behaviors ($r = .85, p < .001$). Teacher-reported aggression was positively correlated with both parent (Shift subscale: $r = .73, p < .05$) and teacher-reported poor EF skills (Shift subscale: $r = .82, p < .05$; Monitor subscale: $r = .83, p < .05$) and teacher-reported peer conflict ($r = .90, p < .006$). Due to the lack of variance within the sample (100% of participants meeting the requirements for "contextual stress"), all hypotheses involving contextual stress were not tested. Contrary to what was hypothesized, mindfulness was not significantly correlated with any other variables. EF skills were not significantly correlated with emotion dysregulation. See Table 3 in the Appendix for all correlations tested.

Discussion

Our aim for this study was to pilot test a yoga curriculum thought to be beneficial for students, particularly those within a low-income, high-stress environments. The present study sought to examine preliminary data supporting the relationships between mindfulness, EF skills, contextual stress, emotion dysregulation, and aggression. Poor EF was positively correlated with aggression. This supports prior research connecting EF difficulties to externalizing behaviors such as aggression. This finding highlights the importance of executive functioning skills and the need for finding positive interventions that serve in externalizing behaviors through the promotion of EF skills.

As expected, aggression was also found to be positively correlated with emotion dysregulation. Emotion dysregulation has been described as an affliction where one either

experiences or expresses emotion in an inappropriate manner or context. It's suggested to require a great deal of control or self-regulatory responses and/or coping mechanisms (Roll et. al, 2012). Thus, it is not surprising that aggression might be a by-product from a lack of emotional regulation. Similar to EF skills, the link between aggression and emotion dysregulation support an intervention that targets improved emotion regulation in order to reduce aggressive problem behaviors.

We hypothesized that poor EF would be positively correlated with emotion dysregulation but no significant links were found. This is contradictory to past research and may be, in part, due to study limitations. Additionally, we expected that after participating in a mindful yoga practice, mindfulness in students would negatively correlate with aggression, poor EF, emotion dysregulation, and contextual stress. However, we did not find evidence to support these claims. There are many reasons why this lack of findings is plausible and does not negate the rapidly growing body of research that supports the link between mindfulness practices and aggression, EF skills, and emotion regulation. First, it is plausible that the measure used to assess mindfulness was not age-appropriate for the participants, and there was no parent or teacher report of mindfulness. Second, our internal consistency of the mindfulness measure was lower than expected. Third, we have no measures of engagement in yoga practice nor changes over time of mindfulness, thus we cannot assume that this yoga class impacted youth's mindfulness. Finally, hypotheses related to contextual stress were unable to be analyzed due to the lack of variance within the sample.

Limitations and Future Directions

Despite a large initial sample size (300 eligible students), only 24 parents consented to the research and only 21 of those students agreed to participate. The small sample size reduces

the power and requires caution when interpreting the results. To remedy this issue for future studies, it would be ideal to establish deeper relationships with school leadership and staff, in addition to expanding communication with parents. Presumably, this could potentially lead to increased teacher, parent, and student participation. It is also recommended that data is collected prior to the behavioral intervention, as well as recorded at post-test, to sufficiently analyze changes over time in variables of interest.

Within this study, we found no significant link between the students' levels of mindfulness and their emotional, behavioral, or cognitive problems. This may be partially due to the poor internal reliability of the measure used to determine students' mindfulness, the CAMM (Child and Adolescent Mindfulness Measure; Greco, Baer, & Smith, 2011, Cronbach's $\alpha = .62$). This was the first time that this measure was used with younger children. The children in this study ranged from six years to twelve years old with a mean of 9.55. It is likely that questions within this measure were not matched to the children's comprehension level. It is also possible that the concept of mindfulness may be too abstract for young children to consciously grasp or self-report. Given that mindfulness is a relatively new construct studied in children, there is not a sufficient amount of research on measures assessing mindfulness in children. Further research should focus on developing age appropriate self-report measures of mindfulness, as well as parent and teacher reports of child mindfulness.

Furthermore, the results from this study are specific to a population of youth exposed to contextual stress indicators (i.e., 100% of participants qualified for free lunch at school). Due to the lack of variance in income levels, results correlating contextual stress to mindfulness, executive functioning, emotion dysregulation, and aggression were not analyzed. Though the current study was unable to report findings for our hypothesis, previous research has indicated

that populations in poverty tend to be the most vulnerable to stress or problems in executive-functioning and self/emotion regulation. For future studies, it is recommended to have either additional measuring tools for contextual stress or a control group for comparison.

Conclusion

Results from this study lend initial support for the relationship between aggression and emotion regulation and EF skills in a sample of youth exposed to indicators of contextual stress, highlighting areas to target with future interventions. While many of the hypotheses were non-significant, it is not surprising given the many limitations of the study. Future studies are needed to add to the paucity of research of research supporting the benefits of mindfulness practices in youth exposed to contextual stress. Specifically, studies need to assess change over time, as well as follow-up assessment to examine the potential lasting impact of repeated mindfulness practices.

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Appendix 1- Correlations

Table 3.
Means, SDs, and Correlations of Variables

Measure	Mean (SD)	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Mindfulness, Self-Report	20.68 (6.85)	—												
2. EF Shift, Teacher- Report	16.75 (4.74)	.328	—											
3. EF Monitor, Teacher- Report)	17.88 (4.45)	.701	.884**	—										
4. EF Initiate, Teacher- Report	14.33 (4.42)	.556	.519	.845**	—									
5. EF Shift, Parent- Report	13.47 (3.53)	-.098	.827*	.798*	.449	—								
6. EF Initiate, Parent- Report	13.44 (3.40)	.077	.619	.591	.320	.794**	—							
7. EF Monitor, Parent- Report	15.21 (3.98)	.049	.648	.499	.242	.747**	.716**	—						
8. Emotion Dysregulation, Parent-Report (ADI)	6.1 (8.28)	-.513	-.258	-.477	-.555	.426	.397	.329	—					
9. Aggression, Self-Report (PCS)	6.70 (7.92)	-.074	-.678	-.791	-.438	.330	.119	.308	.684**	—				
10. Aggression, Teacher-Report (PCS)	30.86 (10.99)	.010	.845*	.704	.107	.527	.183	.247	-.519	-.447	—			
11. Aggression, Parent-Report (PCS)	4.44 (8.07)	.419	-.133	-.170	-.233	.161	.077	.327	.798**	.537	-.359	—		
12. Aggression, Teacher- Report (BASC)	16.89 (6.57)	.250	.817*	.827*	.320	.732*	.488	.546	-.262	-.781	.899**	-.338	—	
13. Aggression, Parent- Report (BASC)	5.71 (4.92)	-.205	-.158	-.515	-.604	.156	.225	.239	.895**	.300	-.550	.726*	-.437	—

* $p < .05$. ** $p < .01$.

