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“The program affects me ‘cause it gives away stress”: Urban Students’ Qualitative Perspectives on Stress and a School-Based Mindful Yoga Intervention

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Abstract

School-based mindfulness and yoga studies generally measure stress-related outcomes using quantitative measures. This study answers the following research questions: how do youth define stress and in what ways, if any, was a mindful yoga intervention helpful to youth during experiences of stress. To explore youths’ own perspectives on stress, stressors in youths’ lives, and perceived changes in responses to stress post-intervention, we conducted focus group discussions with 22 middle school students from low-income urban communities following a 16-week mindful yoga intervention. Using thematic analysis, three themes emerged: (1) youth conflated stress with negative emotions; (2) peer and family conflicts were common stressors; and (3) youth reported improved impulse control and emotional regulation following the intervention. Study findings have implications for refining intervention content (e.g., discussions of stress), as well as

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Conflicts of Interest

The authors have no conflicts of interest to declare.

Ethical Considerations

All appropriate ethical guidelines on research involving human subjects were followed. The Johns Hopkins Bloomberg School of Public Health Institutional Review Board reviewed and approved this research, according to NIH regulations.

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informing the selection and development of quantitative measures for future research on stress and stress responses in urban youth.

Keywords

stress; mindfulness; yoga; qualitative; youth; schools

Introduction

There is increasing awareness of the harmful effects of early toxic and chronic stress on youth social, emotional, and cognitive development and long-term functioning.^{1,2,3} Exposure to toxic stress is common for youth in low-income urban communities with high rates of crime and violence.^{4,5,6} Interventions that teach urban youth positive strategies for responding to stress may offer potential to enhance youth resilience and healthy social-emotional development. Youth mindfulness and yoga programs are increasingly recognized as a promising type of intervention for this purpose.^{7,8,9} To best develop and refine such programs, research is needed to explore what urban youth perceive to be stressful in their lives and whether and how programmatic strategies may help youth to better manage these stressors. To address these issues, this study evaluated how urban youth define stress, sources of urban youths' stress, and applicability of mindful yoga strategies to youth stressful experiences.

Assessment of Youth Stress

According to the transactional model of stress and coping, an individual's appraisal of an event or situation as stressful is based on his or her perceptions of environmental demands exceeding personal resources to cope effectively.^{10,11} Thus, individuals who expand their repertoire of coping skills should gain confidence in their abilities to effectively manage challenging events or situations, reducing their perception of events as stressful. Most research on youth stress has relied on counts of stressful events rather than on qualitative data on how youth define and perceive stress, and has focused on older adolescent samples^{1,12,13} despite research demonstrating that youths' perceived stressors differ in early, middle and late adolescence and are often situation-specific.¹⁴ For instance, studies have shown that romantic and family relationship stressors are higher in early and middle adolescence relative to childhood,^{15,16} whereas academic-related stressors are higher in late adolescence relative to early developmental stages.^{17,18} Qualitative data exploring how urban youth conceptualize and perceive stress can augment the current literature by identifying sources of stress of particular significance to this population that may be targeted by interventions and for which improved assessments can be developed.

Mindfulness and Yoga for Youth

Mindful yoga practice may serve to increase youths' skills for coping with stress. A growing literature suggests that school-based mindfulness and yoga programs may have benefits for youth, including disadvantaged urban youth.^{19,20,21} Mindfulness and yoga are each contemplative practices, characterized by directed and sustained attention to the breath or other chosen focus and non-judgmental present moment awareness.^{22,23} Contemplative

practices have been found to promote executive functioning (e.g., planfulness, abstract thinking, focused attention) and emotional regulation (e.g., inhibition).^{24,25} These skills in turn foster positive socio-emotional and behavioral outcomes, enhancing capacities for resilience and stress management.⁷ Self-regulation is associated with emotion and attention regulation, self-representations, empathy and compassion.²⁶

Studies on school-based mindfulness and yoga programs for youth have generally measured perceived stress levels and related-outcomes using quantitative measures.^{27,28,29} Three studies that incorporated some qualitative data (e.g., open-ended survey items, concept mapping of writings) among primary and secondary grade youth found that youth who participated in 5, 8, and 16 week mindfulness programs^{30,31,32} reported greater self-regulation, awareness, and stress management. Two additional qualitative studies found 13-21 year olds frequently cited greater self-awareness and changes in their perceptions of stress as a result of a Mindfulness-Based Stress Reduction program,³³ and high school students reported reductions in stress, increased use of yoga to manage negative emotions, greater optimism, and kinesthetic awareness.³⁴

It is not clear, however, whether measures used in these studies adequately capture all key aspects of students' stress experiences and program-related changes in stress levels and reactivity. Reductions in stress were reported, but urban youth perspectives on how and when newly learned coping skills were applied were not explored, a gap the current study addresses. This literature also lacked details about how urban youth conceptualize stress and what aspects of their lives they find most stressful. Qualitative data from urban students has potential to inform the way we design interventions to improve youth stress management and how we can best engage underserved youth in these interventions, especially in school settings. Qualitative data regarding perceived stressors and stress responses following a mindfulness program can augment information from quantitative measures and may identify additional outcomes of interest and clarify intervention mechanisms of action.

The Current Study

This study investigated urban elementary and middle school students' perspectives on stressful experiences and use of stress management skills learned during a mindful yoga program. This study is an extension of previous qualitative program findings related to mindful yoga skills learned and program implementation.^{35,36} Data from youth focus groups were analyzed to explore the experiences of fifth and sixth grade urban students who attended a 16-week school-based mindfulness and yoga program. We explored the following domains: (1) how youth conceptualized stress; (2) common sources of stress identified by youth; and (3) youths' perceptions of shifts in their ability to cope with stress after participating in the school-based mindfulness and yoga program.

Methods

Sample

Qualitative data were collected in three schools (labeled herein as Schools 1, 2, and 3), in which the mindful yoga program was delivered to fifth and sixth grader volunteer

participants. The schools were located in underserved urban areas characterized by high rates of crime, violence, and poverty (Table 1). At the conclusion of the 16-week mindfulness and yoga intervention, we conducted six focus groups involving 22 fifth (n=8) and sixth (n=14) grade program participants (age range: 10-13; median age = 11). The 22 youth (n=10 males) were a subset of participants in the program; classroom teachers at each school were asked to identify a diverse group of youth – based on grade, sex, and program attendance and engagement – to participate in focus groups.

Procedures

Youth focus groups—Boys and girls in the three intervention schools participated in focus groups lasting 35 minutes on average. Focus groups ranged in size from two to six youth and were conducted using a semi-structured interview guide. Topic areas relevant to this paper pertained to how youth defined stress (e.g., “What does stress mean to you?”), what other youth and adults should know about youth and stress (e.g., “What do you think other youth should know about youth and stress?” “What do you think that adults should know about youth and stress?”), what youth learned in the program about stress (e.g., “What did you learn about stress in the program?”), and new skills they now applied to stressful situations (e.g., “Have you used what you learned in the program outside the program to help you with stress?”). To elicit whether their current responses to situations they perceived as stressful were affected by the program, we asked youth how they currently reacted to various situations and whether this was different from how they would have reacted prior to program participation (“Something just happened that really upsets and stresses you. What would you say or do?” [PROBE: Are these things you learned in the program?]).

School-Based Mindfulness and Yoga Program

The program was implemented by the Holistic Life Foundation (HLF), a Baltimore-based non-profit organization serving disadvantaged urban youth. The program, previously implemented with fourth and fifth graders four times a week for 45 minutes,²¹ was adapted to be implemented two times a week for 16 weeks. The program was designed to incorporate breath work, physical poses, and discussions to reduce stress and improve attentiveness among youth. Most sessions began with centering (breathing quietly), followed by active yoga-based poses (e.g., sun salutation sequence in addition to basic standing, seated, and balancing poses) and breath work (e.g., belly and ocean breathing), and ended with a brief period of guided reflection (e.g., corpse pose). Short discussions about health and mindfulness topics (e.g., compassion) were woven throughout the sessions. Detailed program information has been previously reported.^{35,36,37}

Qualitative Analysis

All focus group transcripts were independently coded by the first three authors using thematic analysis.³⁸ Thematic analysis utilizes inductive coding to meaningfully condense qualitative data into themes based on patterns in the data. Emergent themes and subthemes were discussed as a group and any coding differences were discussed until consensus was reached. Each transcript was randomly assigned a coder who classified codes into themes,

which were then verified by the remaining two coders. This paper focuses on themes related to stress.

Results

Three themes common across all schools emerged from youth responses to questions about stress. First, youth defined stress as synonymous with intense negative emotional states like anger, depression, and frustration. Second, the most common stressors youth experienced involved interpersonal conflict with peers, family members, and teachers. Third, youth reported that they applied emotional regulation skills and prosocial stress responses learned during the program to real-time stressors in the classroom and outside of school.

Theme 1: Lack of differentiation between stress and negative emotions

Across the schools, youth defined stress as synonymous with intense negative emotional states, such as depression, anger, frustration, and loneliness. A sixth grade male student defined stress as “something that has to do with emotions, like emotions and physical reactivity...like the way you feel about certain things” (School 2). Two female students conceptualized stress as depression, with one sixth grade female explaining: “Like you’re depressed for a long time then sometimes people don’t wanna get out of bed or don’t wanna eat or don’t wanna get shower or anything like that” (School 2).

Several youth equated stress with anger, as this fifth grade female’s report highlights: “When you’re stressed out at somebody and they make you really angry... I get mad, I get stressed out and mad” (School 1). A sixth grade student referred to stress as a mental or physical pain. Some students equated stress with feeling pressured by time and people, resulting in irritation. One sixth grade male stated: “Sometimes I come to school stressed because when I wake up I have to hurry up and get out of the house and come to school and everybody’s in my face and they just talk and I get irritated” (School 3). Another sixth grade male talked about the relationship between pressure, negative emotions, and stress: “[Stress is] like the way how you feel. I feel pressured. Sad. Frustrated” (School 2).

Theme 2: Interpersonal Conflict as a Major Source of Stress

When asked about sources of stress, youth across schools reported similar types of perceived stressors, most related to interpersonal conflict with peers or family members. Commonly reported stressors, in order of frequency, were: verbal conflicts with peers, physical aggression with peers, family conflict, and inequitable treatment of classroom misconduct.

Verbal conflict with peers—Verbal conflict with peers was the most frequently reported stressor by youth across schools. In particular, bullying by peers resulted in stress and anger. A fifth grade female described how a fellow female peer constantly berated her: “This girl she always picking on me, she always trying to yell at me, trying to ride me” (School 1). Another fifth grade female at the same school noted “I get mad when someone’s picking on me” (fifth grade female, School 1). Peers spreading rumors was a frequent stressor for youth as this sixth grade female reported, “Like there’s this group in our class and they’ll like... they’ll talk about anybody. So they’ll look at you to get you upset and they’ll talk about you

and talk about you... they make up little rumors” (School 1). More female youth reported verbal conflict as a significant stressor than did male youth, but males were not immune to this type of stress. For instance, a fifth grade male recounted his experience when classmates lied about him: “When people lie on me... In class make me feel like...your ugly self” (School 1).

Physical aggression with peers—Threats of physical aggression by peers were the second most frequently reported stressor. Stress was described as both a consequence and also a cause of fights. For example a fifth grade female student said: “Like some kids... they be stressed and they wanna fight” (School 1). Other students seemed to refer to fighting as an expectation if a conflict could not be resolved verbally. For example, a sixth grade male said: “Like if somebody messing with you...we be ready to fight” (School 2). This stressor was discussed by both fifth and sixth grade youth, but was more frequently reported by male than female youth.

Family conflict—Family conflict emerged as the third most common stressor for youth. Many conflicts involved siblings and resulted in negative reactions such as yelling or a loss of sleep. For example, a fifth grade male said: “My sisters, they, uh, when they, maybe messing stuff up and getting me in trouble... [I] get mad at them... I would just yell at them” (School 3). Other students reported conflict with parents. A fifth grade male remarked that asking his mother to prepare food was stressful: “Sometimes my mother stress me out too. Every time I ask her if she’ll cook, she’ll yell at me” (School 1). Other youth recalled how distrust from adults – particularly parents – was stressful. A fifth grade female (School 3) recounted a time when she was punished because her stepfather did not believe her when she said the family dog had fleas, and he punished her by sending her to the basement to complete all the chores before it was discovered a few days later that she was telling the truth. Other youth generally referred to their families as sources of stress, as this fifth grade female noted when talking about how the program instructor helped her de-stress: “ ‘cuz I have family issues at home and he [program instructor] would help me get away the stress” (School 2).

Inequitable treatment by teachers—A less frequently reported stressor involved teachers’ inconsistent application of discipline. A few youth talked about feeling stressed because their classroom teachers displayed preferential treatment of some students, reprimanding only a few students when others had violated the same rules. As a sixth grade male reported:

When we be in the classroom and everybody be talking. And then she [teacher] still be in the classroom and everybody starts talking. And then like if one of us starts talking, she’ll [teacher] come right to us and say something. But the whole class be talking and she [teacher] only blames one person. (School 3)

This quote highlights that some students perceived teachers did not act impartially when students misbehaved, and these perceived inequities were a source of stress for youth.

Other stressors—Less frequently mentioned stressors included being overwhelmed with responsibilities including parenting siblings, being tired, the death of loved ones, and test-

taking anxiety. One fifth grade male spoke about being overwhelmed by the stress of too many household responsibilities and other demands: “I had some chores to do. I had other things to do so I didn’t know which one to do ‘cause I had to get the chores done before like eight o’clock or somethin’... So I had other stuff to do too so I was stressed out” (School 2). Some youth reported their parents expected them to take care of younger siblings, a stressful responsibility especially when siblings would not follow directions. One fifth grade female (School 3) recounted the stress she experienced when she was expected to watch her younger sisters: when she sent her sisters to bed, she was woken up to deal with a mess they created in the microwave, compromising her sleep. Tiredness and physiological ailments (e.g., headaches) were a source of stress for other youth as well, as noted by this sixth grade male: “Sometimes me just being tired and sometimes headaches. That’s what stresses me...” (School 3). One sixth grade female talked about how difficult it was for her to cope with loved ones dying: “When people pass. It’s hard... It’s hard for me to take it” (School 1).

Theme 3: Application of Mindfulness and Yoga Skills: Promoting Impulse Control and Reducing Interpersonal Conflict

A previous paper focused on descriptions of skills learned during the program and, to a lesser degree, the contexts (e.g., family, classroom) in which skills were used.³⁷ In this paper, we focus specifically on youth perceptions of the relationship among mindful yoga skills learned, emotional regulation mechanisms, and skills application in stressful contexts.

Impulsive reactions—Youth retrospectively reported greater impulsivity and interpersonal conflict prior to the intervention, including responding to conflicts by yelling, arguing, and physical aggression. For example, one sixth grade male noted that even though he did not want to argue with others, it was the means by which he dealt with interpersonal conflict prior to the program: “Sometimes I argue with people I don’t want to argue with, students and family members” (School 3). Many students who identified peers’ threats of physical aggression as stressors also reported that they previously engaged in physical fights in response to these provocations. A sixth grade female described how she would fight back after being physically assaulted by peers: “I react in a fight...because she [peer] got me so mad ‘cause she hit me” (School 2).

Youth described prior disruptive and defiant behavior as they talked about the changes they made in acquiring new, prosocial skills. This was particularly evident from one fifth grade male’s advice to use breathing strategies as alternatives to angry responses like physical fighting: “If you were stressed out because you didn’t want to fight, but they were trying to force you to fight, you would get real angry. Do deep breathing” (School 1). Another sixth grade male put these skills into action when peers were harassing him: “When somebody tells you something and like you just don’t think it through and just start a fight... like they taught us how to think about it and breathe...I know people that were picking on me and I calmed down before... yeah. I was breathing in and out” (School 1).

Impulse control: Reduced negative behavioral reactions—Nearly all youth in our qualitative sample reported developing new skills or improving existing skills (e.g., physical poses, breathing), as reported in a separate paper.³⁷ During focus group discussions, youth

described real-life stressful situations when they applied these skills to control negative emotions (e.g., annoyance, anger) and better manage their stress. These contexts were predominantly interpersonal. The application of program skills resulted in reduced stress; as a sixth grade male remarked: “the program affects me ‘cause it gives away stress” (School 2).

Youth reported that intervention skills helped them to engage in prosocial behavior by disengaging from high conflict situations (e.g., separating themselves from the aggressor) and thinking before acting in aggressive ways. This perspective was articulated by a sixth grade male who reported: “The program makes you actually think about things twice, twice before you...start to yell and stuff...get mad...tantrum” (School 2). A sixth grade male described practicing poses in his classroom seat to reduce and manage negative emotions triggered by classmates’ behaviors: “So they [classmates] was being annoying and I was sitting down and I was doing them [poses in his chair].... They stopped. They stopped it. It made me feel relief” (School 2). In this instance, use of program skills diverted the student’s attention away from upsetting peer behavior, and the behavior stopped.

Several students discussed breathing as a strategy for calming down in anger-provoking situations. As another example, a fifth grade female reacted to sibling conflict by focusing on her breath and going to her room: “When I get mad at my sister, I breathe. I go in my room (School 1).” The breathing exercises and choice to exit a stressful situation (e.g., leaving the classroom; taking walks; playing sports or games) helped youth control their stress and separate themselves from the sources of their stress.

Breathing enabled youth to shift attention inward rather than focusing on external stressors (e.g., siblings, peers), which was beneficial in regulating their negative emotions feelings. Two program participants found breathing techniques particularly useful for managing their anger: “Yeah so I got mad, then I started using the breathing exercises. Started using the breathing exercises to calm down. I wasn’t mad no more” (fifth grade male, School 2) and “Like if I want to let out my anger I don’t but I just like deep breathe” (fifth grade female, School 1). To calm down, another student combined breathing techniques and poses: “Like if I’m mad, the Breath of Fire. It helped me by deep breathing. It helped me do deep breathing. The sunrise for like waking up and getting mad when things happen. ‘Cause when you stretch it calms you down when you’re doing it and also deep breathing” (fifth grade female, School 1).

One student said she would recommend the program to others who had difficulty with anger because breathing skills were an effective anger management strategy: “I would tell them if they’re having trouble...with breathing and anger...why don’t you just come to yoga...it will teach you how to learn, how to do the right breathing exercise” (fifth grade male, School 2). Several students reported they fought less with peers after participating in the program, as this fifth grade male noted: “Yeah, now I only get in, I only get in, get in fights like for certain things” (School 1).

Impulse control: Promoting emotional regulation through cognitive control—

Youth also described applying cognitive strategies to distance themselves from stressors and

regain emotional equilibrium. For example, a fifth grade male reported that when stressed “you can just like block people out and like, uhh, like anything that you have problems with, you can just use like the things you got taught in yoga to help you” (School 3). Redirecting attention away from stressful stimuli was another strategy, as this fifth grade female noted: “And you put that behind you and then think of something positive” (School 2).

Several youth described a combination of removing themselves from emotionally provoking situations and diverting their attention elsewhere, often using breathing techniques or visual imagery. For example, a sixth grade female described how she first told people to quiet down when they were loud and when they did not favorably respond, she used her breathing and physically removes herself from the stressful situation to help calm down:

“Yeah, breathing. Sometimes if they [peers] say something, sometimes I might say something back [“I tell them to be quiet.”]. But, sometimes I just focus on it and I just breathe...I just sit down and try to calm myself down... I just walked away. I walked away and kept on breathing in and out and then I came back” (School 3).

Another youth combined breathing exercises with imagery, to regulate his emotions: “Sometimes when I get mad, I just breathe deep. I just, like I picture me being in a certain place I like, and I just thought I could just overcome everybody and then I just stop being mad” (sixth grade male, School 3). These comments illustrate that youth were aware of their emotions (e.g., anger), could identify stressful triggers, and were able to redirect their attention and mitigate their negative emotions and experience of stress.

Reducing the physical and psychological impact of stress through mindful yoga—Youth reported using intervention poses and skills taught in the program to reduce physical and psychological effects of stress. As one sixth grade male explained, yoga stretches helped him with stress-induced tight muscles: “Different things that were stressing me, it helped me with my muscles stretch out a little bit” (School 3). A fifth grade male described how yoga stretches also helped with memory, depression, and stress: “It’s good like if you lost your memory, if you going through stress, depressed.... It’ll wake you up, like you stretch” (School 1).

Limitations to skills application—Not all youth participating in the focus groups were able to adopt program strategies to deal with their stressors. One youth remarked on the difficulty of learning to walk away from a conflict or remembering the strategies imparted by the program: “Its just hard to walk away if they do something. ... I mean I don’t remember doing any like poses or anything for stress” (School 1). Another student noted that children his age should not (and, in his experience, did not) experience stress but that the program skills would be helpful in the future when more stress is likely to occur.

Discussion

This study assessed qualitative data from urban youth who participated in a school-based mindfulness and yoga program. We explored how youth defined stress, what stressors youth experienced most frequently, and how youth stress responses may have changed following program participation. Three themes emerged: youth defined stress as negative emotional

states; interpersonal conflict was a major source of stress for youth; and youth applied skills developed in the program to real-life stressors. Findings from these data have potential to inform future program development both by identifying relevant information about stress in the lives of urban students and also by providing an example of how qualitative data from youth can offer nuanced perspectives on emotional experiences.

Youth Perspectives on Stress, Stressors, and Use of Program Skills

First, many youth did not distinguish anger and other negative emotions from stress. When asked about what stress meant to them, youth frequently equated stress with depression, anger, irritation, and frustration and to a lesser extent with feeling “pressured.” Youth defined stress as unpleasant emotional experiences and tended not to distinguish between minor annoyances, irritations, and frustrations and major factors that persist beyond the current situation to affect other aspects of their lives. This conceptualization of stress is similar to descriptions given by Irish sixth grade youth exposed to a five-week classroom mindfulness program.³⁰

Youth did not appear to recognize stress as a state of feeling overwhelmed and unsure of how to cope, a state that may *lead to* negative emotions. This finding has implications for mindfulness program development; instructors may want to consider discussing stress as distinct from negative emotions, highlighting more explicitly that depending on how one responds to stress, more positive emotional outcomes may be possible. This distinction may provide youths with a sense of greater empowerment, as mindful practices can serve as tools that increase their options for handling stress effectively, reducing the likelihood of prolonged negative emotions. A consideration is whether youths’ developmental stage allows for a nuanced differentiation of stressors from reactions to stressors. Knowledge of youths’ developmental level and vocabulary is critical for informing effective communications with them about stress, stressors, and reactions to stress.

Second, stressors most frequently reported by youth involved interpersonal conflict such as being verbally and physically provoked by peers, followed by conflicts with siblings and parents, household responsibilities, and perceived preferential treatment by classroom teachers. Largely consistent with these reports, Costello and Lawler (2014)³⁰ noted that interpersonal disagreements were the most frequent sources of stress in their Irish youth sample, followed by future worries, inability to cope, and having too many tasks. For many students, stress was closely linked to physical fighting. Whether stress was considered a source or a result of physical fighting is unclear from the data and warrants further investigation.

It is important to recognize the socioeconomically disadvantaged environments within which the youth in this sample live, circumstances that often involve assuming adult-like responsibilities in the family. Disrupted or insufficient sleep and resulting tiredness was a source of stress for some focus group participants. Expectations to care for younger siblings were also stressful for some youth, especially when the duties compromised their sleep. Other youth reported parents’ distrust of them caused stress. Whereas reducing stressors relating to financial hardship and structural inequalities is often extremely difficult to achieve without policy-level interventions, assisting youth in how they manage stressful

experiences is one option for enhancing the resilience of young people facing chronic adversities. School based programs – including mindfulness and yoga – may help youth better manage the adult-like stressors they experience at early ages.

Students' perceptions that teachers gave preferential treatment to select students holding some accountable for misbehavior and not others – was a notable classroom-related stressor. This finding suggests that enhancing trust among students and teachers, as well as promoting a prosocial classroom climate, may be important for reducing stress in the school setting. Mindfulness-based interventions for teachers that promote teacher emotional awareness and compassionate responses to student demands may have benefits for both teachers and students,^{39,40,41} particularly in low-resource public school settings with large class sizes and many students at risk for behavioral and emotional issues.

Third, youth reported greater impulse control as a result of the program. Emotional regulation skills included use of breathing, poses, and imagery. As a result of the program, youth reported better identifying their emotions, associating them with stressful triggers, and utilizing newly learned skills to promote positive responses. For instance, youth mentioned reduced physical aggression, anger, and argumentative responses in response to interpersonal conflicts. Youth were also able to choose when it might be most effective to remove themselves from an interpersonal situation that was becoming tense or potentially violent. Through improved prosocial interactions with classmates, mindfulness and yoga interventions may potentially have downstream effects, such as improving classroom dynamics and climate, but this requires further study.

Limitations and Strengths

This study has several limitations. First, the data were gathered from youth participants in a single mindful yoga intervention. The program was implemented in three different schools by different instructors, however, and perspectives were generally consistent across students and instructors, enhancing confidence in the findings. Second, bias may be present in the sample given all student participants received the program, and focus group discussions were conducted only upon program completion. The increased awareness that is hypothesized to result from participating in mindful yoga programs may make these youth particularly attentive to certain aspects of stress. Even with elevated awareness, we found that youth often lacked a language for communicating about stress, a future direction for program development. Third, both parental permission and student assent were required for participation in the mindful yoga program, so participants may have differed from non-participants (e.g., having more involved parents). Finally, focus groups were conducted with only a subset of intervention participants and, although efforts were made to select a representative set of students for focus groups, their perspectives may not fully reflect those of the total intervention sample.

This study also has notable strengths. We collected data from elementary and middle school youth, addressing a gap in the research on how primary school youth define stress and identify sources of stress. Including an urban and predominantly African American sample of youth exposed to high rates of neighborhood violence offers a perspective on stress in an underserved and vulnerable population of youth.

Future Directions

Our findings have implications for selecting and designing quantitative measures of perceived stress and negative emotions for urban adolescents. For instance, youth frequently described feeling angry and using aggressive behaviors to address interpersonal stressors. There are few validated self-report measures of youth anger, aggressive behaviors, and interpersonal stressors, in contrast to many commonly used measures of youth depressive and anxiety symptoms. Our data suggest that it may be valuable to assess anger, frustration, aggression, and interpersonal stress in urban elementary and middle school students. Quantitative measures could assess different types of stressors highlighted by youth (e.g., interpersonal, academic), using methods that maximize content relevance, such as vignettes describing stressful scenarios with which youth can identify. Further qualitative work may help inform developmentally and culturally appropriate wording for quantitative measures.

Mixed methods measurement strategies may also be useful in exploring intervention mechanisms and explaining variability in program impacts on youth stress. For instance, reductions in perceived stress may mediate effects of program participation on downstream emotional and behavioral issues. Future studies may also evaluate the extent to which exposure to stress and trauma may influence youths' level of engagement in, and benefit from, mindfulness and yoga interventions.

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References

1. Compas, BE.; Jaser, SS.; Benson, MA. Coping and emotion regulation: Implications for understanding depression during adolescence. In: Nolen-Hoeksema, S.; Lori, HM., editors. *Handbook of depression in adolescents*. New York: Routledge/Taylor & Francis; 2009. p. 419-440.
2. Reiss F. Socioeconomic inequalities and mental health problems in children and adolescents: A systematic review. *Social Science Medicine*. 2013; 90:24–31. [PubMed: 23746605]
3. Singh GK, Ghandour RM. Impact of neighborhood social conditions and household socioeconomic status on behavioral problems among US children. *Maternal and Child Health Journal*. 2012; 16(1): 158–169. [PubMed: 21165763]
4. Brenner AB, Zimmerman MA, Bauermeister JA, Caldwell CH. The physiological expression of living in disadvantaged neighborhoods for youth. *Journal of Youth and Adolescence*. 2013; 42(6): 792–806. [PubMed: 23086016]
5. Goodman E, McEwen BS, Dolan LM, Schafer-Kalkhoff T, Adler NE. Social disadvantage and adolescent stress. *Journal of Adolescent Health*. 2005; 37(6):484–492. [PubMed: 16310126]
6. Latkin C, Curry A. Stressful neighborhoods and depression: A prospective study of the impact of neighborhood disorder. *Journal of Health and Social Behavior*. 2003; 44(1):34–44. [PubMed: 12751309]
7. Greenberg MT, Harris AR. Nurturing mindfulness in children and youth: Current state of research. *Child Development Perspectives*. 2012; 6(2):161–166.
8. Zenner C, Herrnleben-Kurz S, Walach H. Mindfulness-based interventions in schools: A systematic review and meta-analysis. *Frontiers in Psychology*. 2014; 5:1–20. [PubMed: 24474945]

9. Zoogman S, Goldberg SB, Hoyt WT, Miller L. Mindfulness interventions with youth: A meta-analysis. *Mindfulness*. 2014; 6:290–302.
10. Lazarus, RS.; Folkman, S. Stress, appraisal, and coping. California: Springer Publishing Company; 1984.
11. Lazarus RS. Progress on a cognitive-motivational-relational theory of emotion. *American Psychologist*. 1991; 46:819–834. [PubMed: 1928936]
12. Larson R, Ham M. Stress and “storm and stress” in early adolescence: The relationship of negative events with dysphoric affect. *Developmental Psychology*. 1993; 29:130–140.
13. Spear LP. Heightened stress responsivity and emotional reactivity during pubertal maturation: Implications for psychopathology. *Developmental Psychopathology*. 2009; 21(1):87–97.
14. Seiffge-Krenke I, Aunola K, Nurmi JE. Changes in stress perception and coping during adolescence: the role of situational and personal factors. *Child Development*. 2009; 80(1):259–279. [PubMed: 19236405]
15. Small SA, Eastman G, Cornelius S. Adolescent autonomy and parental stress. *Journal of Youth and Adolescence*. 1988; 17:377–392. [PubMed: 24277665]
16. Nieder T, Seiffge-Krenke I. Coping with stress in different phases of romantic development. *Journal of Adolescence*. 2001; 24(3):297–311. [PubMed: 11476608]
17. Seiffge-Krenke, I. Stress, coping, and relationships in adolescence. Mahwah, NJ: Erlbaum; 1995.
18. Wagner BM, Compas BE. Gender, instrumentality, and expressivity: Moderators of the relation between stress and psychological symptoms during adolescence. *American Journal of Community Psychology*. 1990; 18:383–406. [PubMed: 2264556]
19. Burke CA. Mindfulness-based approaches with children and adolescents: A preliminary review of current research in an emergent field. *Journal of Child and Family Studies*. 2009; 19:133–144.
20. Diamond A, Lee K. Interventions shown to aid executive function development in children 4 to 12 years old. *Science*. 2011; 333:959–964. [PubMed: 21852486]
21. Mendelson T, Greenberg MT, Dariotis JK, Gould LF, Rhoades BL, Leaf PJ. Feasibility and preliminary outcomes of a school-based mindfulness intervention for urban youth. *Journal of Abnormal Child Psychology*. 2010; 38(7):985–994. [PubMed: 20440550]
22. Bishop SR. What do we really know about mindfulness-based stress reduction? *Psychosomatic Medicine*. 2002; 64(1):71–83. [PubMed: 11818588]
23. Brown KW, Ryan RM. The benefits of being present: mindfulness and its role in psychological well-being. *Journal of Personality and Social Psychology*. 2003; 84(4):822–848. [PubMed: 12703651]
24. Birdee GS, Yeh GY, Wayne PM, Phillips RS, Davis RB, Gardiner P. Clinical applications of yoga for the pediatric population: A systematic review. *Academic Pediatrics*. 2009; 9(4):212–220. [PubMed: 19608122]
25. Galantino ML, Galbavy R, Quinn L. Therapeutic effects of yoga for children: a systematic review of the literature. *Pediatric Physical Therapy*. 2008; 20(1):66–80. [PubMed: 18300936]
26. Davidson RJ, Dunne J, Eccles JS, Engle A, Greenberg M, Jennings P, Jha A, Jinpa T, Lantieri L, Meyer D, Roeser RW, Vago D. MLERN. Contemplative practices in mental training: Prospect for American education. *Child Development Perspectives*. 2012; 6(2):146–153. [PubMed: 22905038]
27. Biegel GM, Brown KW, Shapiro SL, Schubert CM. Mindfulness-based stress reduction for the treatment of adolescent psychiatric outpatients: A randomized clinical trial. *Journal of Consulting and Clinical Psychology*. 2009; 77:855–866. [PubMed: 19803566]
28. Schonert-Reichl KA, Lawlor MS. The effects of a mindfulness- based education program on pre- and early adolescents’ well-being and social and emotional competence. *Mindfulness*. 2010; 1:137–151.
29. White LS. Reducing stress in school-age girls through mindful yoga. *Journal of Pediatric Health Care*. 2012; 26:45–56. [PubMed: 22153143]
30. Costello E, Lawler M. An exploratory study of the effects of mindfulness on perceived levels of stress among school-children from lower socioeconomic backgrounds. *The International Journal of Emotional Education*. 2014; 6(2):21–39.

31. Wisner BL. An exploratory study of mindfulness meditation for alternative school students: Perceived benefits for improving school climate and student functioning. *Mindfulness*. 2013; 5:626–638.
32. Metz SM, Frank JL, Reibel D, Cantrell T, Sanders R, Broderick PC. The effectiveness of the Learning to BREATHE program on adolescent emotion regulation. *Research in Human Development*. 2013; 10(3):252–272.
33. Kerrigan D, Johnson K, Stewart M, Magyari T, Hutton N, Ellen JM, Sibinga EM. Perceptions, experiences, and shifts in perspective occurring among urban youth participating in a mindfulness-based stress reduction program. *Complementary Therapies in Clinical Practice*. 2011; 17(2):96–101. [PubMed: 21457899]
34. Conboy LA, Noggle JJ, Frey JL, Kudesia RS, Khalsa SBS. Qualitative evaluation of a high school yoga program: Feasibility and perceived benefits. *Explore NY*. 2013; 9(3):171–180. [PubMed: 23643372]
35. Dariotis JK, Mirabal-Beltran R, Cluxton-Keller F, Gould LF, Greenberg MT, Mendelson T. A qualitative evaluation of student learning and skills use in a school-based mindfulness and yoga program. *Mindfulness*. 2016; 7(Special issue on “Applications of Mindfulness-Based Interventions in School Settings”):76–89. [PubMed: 26918064]
36. Dariotis JK, Mirabal-Beltran R, Cluxton-Keller F, Gould LF, Greenberg MT, Mendelson T. A qualitative exploration of implementation factors in a school-based mindfulness and yoga program: Lessons learned from students and teachers. *Psychology in the Schools*. forthcoming; (Special issue on “Using Mindfulness to Improve the Wellbeing of Students and Caregivers”)
37. Gould LF, Mendelson T, Dariotis JK, Ancona M, Smith AS, Gonzalez AA, Smith AA, Greenberg MT. Assessing fidelity of core components in a mindfulness and yoga intervention for urban youth: applying the CORE Process. *New Directions in Youth Development*. 2014; 142:59–81.
38. Boyatzis, RE. Transforming qualitative information: Thematic analysis and code development. Thousand Oaks, London, & New Delhi: SAGE Publications; 1998.
39. Jennings PA, Greenberg MT. The prosocial classroom: Teacher social and emotional competence in relation to student and classroom outcomes. *Review of Educational Research*. 2009; 79(1):491–525.
40. Meiklejohn J, Phillips C, Freedman ML, Griffin ML, Biegel G, Roach A, Burke C, Pinger L, Soloway G, Isberg R, Sibinga E, Grossman L, Saltzman A. Integrating mindfulness training into K-12 education: Fostering the resilience of teachers and students. *Mindfulness*. 2012; 3:291–307.
41. Roeser RW, Skinner E, Beers J, Jennings PA. Mindfulness training and teachers’ professional development: An emerging area of research and practice. *Child Development Perspectives*. 2012; 6(2):167–173.

Table 1

School and Neighborhood Characteristics

	Free and Reduced Meals (FARM) ^{1,2}			Neighborhood Characteristics			Economic Indicators	
	Fifth		Sixth	Crime Rate Index ³	Murder Rate ³	Less Than High School Education (%) ³	Median HH Income in Zip Code (2011 Dollars) ⁴	Unemployment ^{4,5}
School								
1	90.7		91.0	323	887	24.5	35,620	15.5
2	79.3		78.8	239	546	19.0	47,472	11.4
3	89.2		86.7	396	830	28.2	31,018	16.5
State				110	169	12.2	70,004	7.4
National				100	100	15.4	55,970	8.9

¹ baltimorecityschools.org;
² mdreportcard.org;
³ <http://www.cdrsearch.com>;
⁴ city-data.com;
⁵ marylandpolicy.org/dnn/Research/Analysis/StateofWorkingMaryland/Employment.aspx.

Table adopted from Dariotis et al., forthcoming.