

# Mixed Methods Evaluation of a Mindful Movement Program to Improve Mental Health in Urban High School Students

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**Objective:** This study reports on a mixed methods evaluation of a Mindful Movement (MM) program for mental health outcomes in an urban high school during the 2017–2018 school year. The MM program had been previously designed and implemented several years prior to this evaluation. **Methods:** Students were randomly assigned to participate in either the MM group or a health class (comparison group) at the start of the school year. The MM program ran for 5 days a week for 18 weeks as part of the high school curriculum. Quantitative measures were administered at the beginning of the program and at the end of the semester, and included measures of mood, self-esteem, mindfulness, perceived stress, and self-regulation. **Results:** At pretest, the MM group fared significantly worse than the health group in confusion, vigor, and emotional regulation, which were not detected at posttest. However, there were also no significant differences between groups from pretest to posttest, or significant improvement from pre- to posttest for the MM group. The qualitative results demonstrate that the students did make improvement in the targeted outcomes. **Conclusion:** The results of this study provide qualitative evidence that the program helped students in several areas of functioning. The quantitative results suggest that the skills and tools learned in the program may serve as protective measures against decline in functioning. The discrepancies between findings are discussed with implications for future research and program development.

**Keywords:** adolescence; mental health; mindfulness; mixed methods; urban youth; yoga

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Adolescence is a period of exponential cognitive, physiological, and physical development (Silk et al., 2003; Zeman et al., 2006), which contributes to heightened vulnerability for developing serious stress-sensitive psychological disorders and antisocial behaviors. The pressure to experiment with substances and sexual exploration looming within a high school setting may also serve as a source of stress. When considering the complicating factors of community, school achievement, and poverty, the challenges for adolescents navigating life dramatically increase. The importance of stress reduction to the overall health and well-being of youth can be considered and has implications for decreasing adverse outcomes, such as suicide (James et al., 2004), school completion, and other self-injurious and medication behaviors.

Urban youth today experience stress from innumerable sources. The environmental circumstance of living in an urban setting may serve as a constricting force, limiting the youth's ability to move about his community. It has been suggested that youth residing in urban areas may have different and higher mental health needs due to the stressors of living in the city, such as violence and concerns regarding personal safety (Harper, 2010). Other factors associated with city living, such as poverty and neighborhood cohesion, can also compromise adolescents' mental health. For example, over a fifth (22.1%) of children living below 100% of the federal poverty level had a behavioral health or developmental disorder (Cree et al., 2018). Neighborhoods with less social cohesion were less likely to buffer the effects of stress on adolescent anxiety, depression, behavior/conduct disorders, and suicidal ideation (Kingsbury et al., 2019). For those adolescents involved with the juvenile justice or child welfare system this involvement may force them to be relegated to some level of home confinement, which may be experienced as stressful. For adolescents who are members of minority groups, these factors place them at increased levels of stress. They may be experiencing personal issues related to cultural, sexual (Toomey et al., 2018), and/or racial identity. For example, Meyer (2003) has offered an empirically supported framework that explains the stress lesbian, gay, and bisexual (LGB) and other minority youth face due to their marginalized status. The probability of trauma histories for this population, both simple and complex, may further exacerbate an already stressful existence. Summarily, there is an onslaught of personal, social, family, and community-level factors that impact urban youth with implications for their psychological well-being.

Mental health issues are prominent among adolescents in the United States. According to data in the 2016 National Survey of Children's Health, children ages 3–17 years have concerning rates of behavioral/conduct, anxiety, and depressive disorders, with 7.4% having behavior problems, 7.1% having anxiety, and 3.2% having depression (Ghandour et al., 2019). Further, the prevalence of these disorders increases with age. For example, the prevalence of anxiety disorders in 12–17-year-olds is 10.5%, versus 6.6% for 6–11-year-olds and 1.3% for 3–5-year-olds (Ghandour et al., 2019), however, on the positive side these youth are also developmentally primed for specialization and novel skills (Daly et al., 2015).

Social workers recognize the unique needs of this age group and search for “tools” to help guide adolescents through this developmental stage and the accompanying problematic and stressful situations. There is no way to shield adolescents from the effects of personal, social, family, or community trauma. Distraction strategies (Skinner & Zimmer-Gembeck, 2007) may be a way to begin to manage stress by employing behaviors to forget the stressful situation with activities that are

leisurely or physical in nature. Research has demonstrated that mindfulness-based intervention can effectively reduce psychological distress and promote mental health outcomes (Brown & Ryan, 2003; Kabat-Zinn, 1994; Segal *et al.*, 2002).

Yoga is a mindfulness tool that has been shown to be effective in mitigating stress. It is an ancient mind–body practice that involve several techniques (physical posture, controlled breathing, and deep relaxation), that have been shown to improve emotional regulation in adults (Ferreira-Vorkapic *et al.*, 2015). In adolescents, developing emotional regulation has been shown to be critical in mitigating the negative effects of stress (Frank *et al.*, 2014). In addition to increased emotional regulation, there are also other benefits related to mental health. Yoga programs have been shown to help reduce stress and tension, increase attention spans, and cultivate stronger relationships in youth (Frank *et al.*, 2014). The different parts of yoga address different areas of well-being. For example, controlled breathing helps to develop concentration, relaxation and meditation relieve stress and anxiety, and different physical postures yield different benefits as well. Strong, challenging postures help to increase self-confidence and efficacy, postures focusing on balance develop concentration, and other poses energize the body, while others induce relaxation or introspection. However, all of this helps a person become more aware of their body and its sensations, which is helpful in learning emotional regulation.

Qualitative and quantitative studies have shown that yoga has benefited high school students in these areas, and schools have begun to implement yoga programs to help ameliorate poor outcomes. One qualitative study found improved self-image, optimism, and increased social cohesion with family and peers, as well as reduced stress and interest in the use of drugs and alcohol in a sample of ninth and tenth graders (Conboy *et al.*, 2013). In another qualitative study, Wang and Hagins (2016) found that high school students participating in a yoga-based program reported increased self-regulation, mindfulness, self-esteem, physical conditioning, academic performance, and stress reduction. In terms of quantitative support, one study reported significant decreases in anger, depression, and fatigue from yoga, when compared to those participating in a physical education (PE) class (Felder *et al.*, 2015). One systematic review conducted in 2015 of randomized controlled trials found that nine studies had significant effect sizes in changes for mood indicators, tension and anxiety, self-esteem, and memory for studies in schools between the experimental and control groups (Ferreira-Vorkapic *et al.*, 2015), which included both children and adolescents (ages 5–18). Frank *et al.* (2014) found significant reductions in revenge motivation and reported hostility for at-risk youth participating in yoga-based program. In another study conducted by Frank *et al.* (2017), significant increases in student emotional regulation, positive thinking, and cognitive restructuring in response to stress were found in inner-city middle school students participating in a yoga-based program.

Research on school-based yoga interventions is in its early stages, but initial results are promising (Butzer *et al.*, 2015). As yoga-based programs are being designed and delivered in various school settings, it is important to evaluate these efforts to determine best practices. A recent study identified 36 programs that were being offered in schools, with almost 5,400 yoga instructors reaching students in more than 940 schools across the United States (Butzer *et al.*, 2015). As chronic stress has shown to have adverse effects on learning, establishing yoga programs in schools may be highly beneficial (Frank *et al.*, 2014).

In the pursuit of the profession's commitment to social justice and equality, more inquiry to empower vulnerable populations is needed. Thus, the purpose of this article is to report on the findings of an evaluation of an existing Mindful Movement (MM) yoga-based program in an urban high school with students who were predominately ethnic and racial minorities.

## METHODS

### Program Information

This study evaluated a yoga-based MM program at a charter high school in an urban area of New York during the 2017–2018 school year. Data taken from the New York City Department of Education's website (NYC Department of Education, n.d.) show that for the 2017–2018 academic year, 76% of the 402 students reported as Hispanic, 15% Black or African American, 5% White, 2% as multiracial, 1% Asian, and less than 1% as American Indian or Alaskan Native. The student population was 52% female and 48% male. The majority of the students (83%) were categorized as economically disadvantaged. Approximately 21% of the students were classified as having physical and/or mental disabilities.

The MM program was independently designed and implemented by the school prior to the evaluation. At the time of the study, the MM program was in its fourth year at the high school as an established part of the school's curriculum. The MM program was designed by the MM teacher, and was based on the Bent on Learning ([www.bentonlearning.org](http://www.bentonlearning.org)) curriculum, which is an organization dedicated to bringing yoga to NYC public schools. A graduate of the Bent on Learning teacher training, the teacher the program's lesson plans, then adapted, expanded, and then create a semester-long MM program. The MM teacher had been employed at the school for 4 years as an established math teacher, when she decided to design the MM program and pitch it to the administration. The timing worked out well, as the school's PE sections were getting too big and the school needed to hire another PE teacher and create more gym space. Instead the school was able to count the MM as one PE credit, which students are required to take each year. Thus, the MM curriculum is an independent curriculum (i.e., not part of a life skills or broader curriculum), but counted as PE credit. See Table 1 for how the curriculum was integrated into the high school programming.

**TABLE 1. MM Program Integration Into High School Curriculum**

| Grade | Semester A | Semester B |
|-------|------------|------------|
| 9th   | PE         | Art        |
| 10th  | MM         | Health     |
| 11th  | PE         | Theater    |
| 12th  | MM         | Elective   |

*Note.* MM = Mindful Movement; PE = physical education.

The MM program aimed to provide a balance of pranayama (breathwork), asana (physical posturing), relaxation, positive visualization, and reflective journaling. A methodological decision was made to not identify the programs as “yoga” in order to dispel preconceived notions, however, they are rooted in yogic philosophy and principle. Thus it is believed that the MM program is comparable to yoga.

Most classes began with 2–3 minutes of active breathwork (such as breath counting) followed by at least 20 minutes of asana, teaching students how to keep an awareness on the relationship with the body. There was a balance of vigorous (vinyasa flow) and restorative poses throughout the week. Finally, there were 3–7 minutes of conscious relaxation at the end of each session followed with either positive visualization, body scan, and/or tense and release relaxation. Journaling sessions included celebrating our gifts, telling/writing our “stories,” and reflecting on growth throughout our lives. Students also had many opportunities to work together and create different presentations in class. For example, presentations included “use yoga poses to tell a story” and “teach a 10-pose yoga class to your peers.” Class periods were 56 minutes long, but after students changed their clothes and settled, the actual program time was about 45 minutes 4 days a week and 30 minutes 1 day a week. The shorter class period was on Wednesdays, when the students had a half-day in order to accommodate professional development for staff and teachers. For the shorter session, the physical practice was eliminated and focused on mindfulness, journaling, and relaxation.

Because the program had time to develop and received a great deal of positive feedback, the school sought out more formal program evaluation and contacted the lead researcher. This study was an outcome evaluation, a type of program evaluation where we seek evidence that the program has made positive changes in the target population (Krysiak, 2018). Given that both qualitative and quantitative methods can provide meaningful insight into the effectiveness and efficacy of yoga-based programs, it was determined that a mixed methods approach would best assess the impact and value of the program and future development. Mixed methods combine both qualitative and quantitative approaches and allow the limitations of each approach to be offset by the other (Krysiak, 2018). Thus both quantitative measures of mental health outcomes and qualitative focus groups to gather participant feedback were conducted.

The evaluation of the MM program lasted one semester (18 weeks from September through January), and consisted of five sessions a week. The evaluation targeted tenth graders in the fall semester, as those are the students, in theory, that would not have taken the class before. The school guidance counselor was in charge of creating the scheduling and class lists, and was tasked with randomly assigning the students to either the MM program or a health class. Although there was no formal randomization process by research standards, there was also no specific reason why the students were assigned to either the MM or health class. This process was influenced by scheduling priorities and conflicts. As indicated in the curriculum description above, all tenth graders are required to take health for one semester and MM the other semester. Thus, the students were split in half, with the first group taking MM first, and then health second semester, and the second group starting with health and MM in the second semester.

## Quantitative Methods

After consulting with the researcher on methodology, the MM teacher developed and administered a pre- and posttest for the students participating, with the understanding that this would be most likely a “piloting” of the data collection methods. The measures chosen were based on the outcomes that the program intended to target (emotional regulation, mindfulness, mood, self-esteem, and stress), and the measures chosen are commonly used for yoga programming in high schools. Additionally, it was believed that many of these topics were also covered in the health class, which was the comparison group. For example, the health class also covered the topic of stress, but from a factual and theoretical perspective, whereas the MM program taught ways and used experiential learning to decrease stress. Thus, the idea was to see if the MM program was more successful than decreasing stress than the health class.

The data were collected by the school in the beginning of the fall semester (September 2017) and the end of the fall semester (early January 2018). The health teacher also administered the same set of surveys to her class. The surveys were not distributed again for the spring semester, as the student in the health class would’ve been in the MM class in the fall. The MM teacher was not involved in administering the surveys to the health class except for giving them to the health teacher and receiving them back. The MM teacher then sent the de-identified data to the researcher for analysis.

## Quantitative Measures

***Emotional Regulation.*** Emotion regulation refers to the processes by which individuals influence which emotions they have, when they have them, and how they experience and express these emotions (Gross, 1998). Emotional regulation was measured by the Difficulties in Emotional Regulation Scale (DERS). The original DERS is a 36-item scale (Gratz & Roemer, 2004), however in order to reduce burden and fatigue of respondents, for this study the scale was modified to 28 items. Respondents were asked to indicate their level of agreement to statements such as “I have difficulty making sense out of my feelings,” “When I’m upset, I acknowledge my emotions,” “When I’m upset, I become out of control,” and “When I’m upset, I feel like I can remain in control of my behaviors.” The DERS is a well-validated and widely used self-report measure for assessing emotion regulation problems among adolescents and adults. The possible range for this study was 28–140, with a higher score indicating a higher level of difficulty with emotional regulation.

***Mindfulness.*** Mindfulness interventions aim to foster greater attention to and awareness of present moment experience (Creswell, 2017). Mindfulness was measured using the Child Acceptance and Mindfulness Measure (CAMM). The CAMM is a 25-item measure of mindfulness and assesses the degree to which children and adolescents observe internal experiences, act with awareness, and accept internal experiences without judging them (Greco et al., 2006). The possible score was 0–84, with a higher score indicating a higher level of mindfulness, and asked respondents how often certain statements were true (e.g., “At school, I walk from class to class without noticing what I’m doing,” “I tell myself that I shouldn’t feel the way I feel,”

“I pay close attention to my thoughts,” and “I notice small changes in my body, like when my breathing slows down or speeds up”). For this study, the scale was reduced from 25 to 21 items to minimize participant burden.

**Mood.** Mood was measured using the Brunel Mood Scale, commonly known as BRUMS (Terry et al., 1999). The 24-item scale asks how often respondents felt a certain way over the past month. Moods included “panicky,” “lively,” “confused,” “worn out,” “annoyed,” and “nervous.” For this study, the possible range is 0–96, with a higher score indicating a more negative mood. The 24 items are further divided evenly into six four-item subscales: (a) anger, (b) confusion, (c) depression, (d) fatigue, (e) tension, and (f) vigor.

**Self-esteem.** Self-esteem was measured by the 10-item Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). The RSES is believed to be a unidimensional scale measuring both positive and negative feelings about one’s self (Rosenberg, 1965). Items include statements such as “I feel I do not have much to be proud of” and “On the whole, I am satisfied with myself.” For this study, the possible range is from 0 to 30, with a higher score indicating a higher self-esteem. It is suggested that scores between 15 and 25 are within normal range and scores below 15 indicate low self-esteem.

**Stress.** Stress was measured by the 10-item Perceived Stress Scale (PSS; Cohen et al., 1983). The PSS asks respondents to indicate how frequently they have felt a certain way, such as “In the last month, how often have you felt difficulties were piling up so high that you could not overcome them?” and “In the last month, how often have you felt that you were unable to control the important things in your life?” The possible score was 0–40, with higher score indicating higher level of stress. Scores ranging from 14 to 26 would be considered moderate stress, and 27 high stress.

## Qualitative Methods

Three focus groups and one individual interview were held from January to March 2018 by the first two researchers. Approval from the authors’ home institution at the time was sought, as this portion of the outcome evaluation included direct contact with the participants. All students assigned to the MM program were invited to participate, and the researchers obtained parental consent and assent.

School staff were responsible for the recruitment of the students to participate in the focus groups. The school home sent informational letters and informed consents to the parents to return. The response rate was 50%, with 25 out of 50 parental consents returned. These students were then gathered during their normal class time by the school staff, where the researcher explained the procedures of the focus group and then obtained assents from the students. The focus groups were audiotaped and one co-researcher recorded notes.

The first focus group had seven students, the second one had 11 students, and the third focus group had six students, totaling 24. Each focus group lasted approximately 35–45 minutes. An individual interview was conducted with one participant, who was unable to attend a focus group but wanted to contribute. The focus groups were semistructured in that a series of questions was developed to guide the

participants, however, the researchers allowed the discussion to evolve naturally. In order to not bias the respondents, we did not specifically ask about the intended outcomes, but asked more general questions about benefits and reactions to the program (see Appendix). The recordings of the focus groups were transcribed by a graduate research assistant.

Data were analyzed using a qualitative software package, Atlas.ti 8. The data were analyzed by the first two authors. With the preconceived notion that we were looking for outcomes, each transcript was read several times by the researchers. Independently, quotes and key words and phrases were assigned codes related to outcomes. The researchers then compared their themes and reconciled them to the results that are in in the following section.

## RESULTS

### Quantitative Results

A total of 102 students were included in this study. Of these 102, 49% were female, 38.2% were male, and 12.7% were unreported. The majority (77.5%) were in the tenth grade, with the remaining students from the ninth, 11th, and 12th grades. As commonly experienced in research in high schools, with absences, activities such as sports, and other common school-related issues, only about two-thirds of the sample completed the measures.

As seen in Table 2, at pretest, the MM group significantly differed from the health group for confusion, vigor, and emotional regulation. For each of these measures, the MM students were higher in confusion ( $t = 2.104$ ,  $df = 66$ ,  $p = .04$ ), lower in vigor ( $t = -2.348$ ,  $df = 67$ ,  $p = .02$ ), and had more difficulty in emotional regulation ( $t = 2.309$ ,  $df = 661$ ,  $p = .02$ ). However, based on independent  $t$  test analysis, these differences between the MM and health classes were not detected at posttest.

Further, paired  $t$  tests were also run for each of the groups to test for changes from pre- to posttest. It appears as if the MM group improved overall in decreased negative mood (with the exception of increased confusion), difficulty with emotional regulation, and improved in the areas of self-esteem and mindfulness. The MM group also, however, increased in stress levels. However, none of these changes were statistically significant. There were no significant differences between pre- and posttest for the health group either.

### Qualitative Results

The focus groups were analyzed with the targeted outcomes in mind. The data showed that students expressed improvement in each of the areas.

**Emotional Regulation.** Emotional regulation, in the form of calming down, was experienced by the students. Students also spoke of being able to control their emotions by reducing anger and becoming calm.

“I had it seventh period so we had it right after lunch and at lunch it was like, we waste mad energy and everything and then when we come we just breathe. You feel relaxed, you feel calm.”

TABLE 2. Pre- and Posttest Scores by Group

| Measure     | Pretest            |       |           | Posttest           |       |           |
|-------------|--------------------|-------|-----------|--------------------|-------|-----------|
|             | Group ( <i>n</i> ) | Mean  | <i>SD</i> | Group ( <i>n</i> ) | Mean  | <i>SD</i> |
| EmoReg*     | MM (31)            | 77.61 | 16.29     | MM (29)            | 73.41 | 15.85     |
|             | Health (32)        | 68.25 | 15.89     | Health (29)        | 66.55 | 17.17     |
| Mindfulness | MM (31)            | 43.13 | 6.66      | MM (27)            | 45.30 | 8.47      |
|             | Health (32)        | 45.22 | 7.33      | Health (27)        | 45.67 | 7.85      |
| Mood        | MM (31)            | 27.32 | 12.35     | MM (27)            | 26.04 | 13.57     |
|             | Health (30)        | 25.00 | 14.45     | Health (26)        | 28.81 | 14.74     |
| Anger       | MM (33)            | 7.24  | 4.73      | MM (32)            | 6.50  | 4.75      |
|             | Health (38)        | 5.61  | 4.32      | Health (31)        | 6.32  | 4.11      |
| Confusion*  | MM (32)            | 5.44  | 3.25      | MM (32)            | 5.81  | 4.92      |
|             | Health (36)        | 3.70  | 3.54      | Health (32)        | 5.38  | 2.98      |
| Depression  | MM (34)            | 4.09  | 3.94      | MM (30)            | 3.80  | 3.95      |
|             | Health (37)        | 3.16  | 3.86      | Health (30)        | 3.47  | 4.15      |
| Tension     | MM (35)            | 5.51  | 3.11      | MM (30)            | 4.80  | 3.85      |
|             | Health (34)        | 4.03  | 3.34      | Health (31)        | 5.03  | 3.78      |
| Vigor*      | MM (35)            | 5.97  | 3.29      | MM (31)            | 7.00  | 2.93      |
|             | Health (34)        | 7.97  | 3.78      | Health (29)        | 7.38  | 3.57      |
| Stress      | MM (30)            | 19.07 | 6.14      | MM (28)            | 20.14 | 6.78      |
|             | Health (34)        | 19.56 | 6.87      | Health (30)        | 19.43 | 6.52      |
| Self-esteem | MM (29)            | 19.69 | 4.05      | MM (28)            | 20.46 | 6.28      |
|             | Health (32)        | 20.97 | 5.18      | Health (26)        | 21.23 | 4.70      |

Note. MM = Mindful Movement; *SD* = standard deviation.

\* $p < .05$  between groups at pretest.

“And you can use the breathing exercises like outside of the program. When we had like finals week, I used the breathing exercises to calm me down.”

“She’s [MM teacher] made me like not react to like certain things like, she’s made me like not take out my emotions on everybody else. Like, to center myself and fix myself and with the breathing, some poses, like to just ground myself and not take out those emotions that, to people that don’t deserve for me to be mean to them.

“I’m really being mad for no reason. Like you really think to yourself, this is retarded, why am I being mad? And you just let it, you just let it go.”

**Mindfulness.** In addition to being able to control their emotions, students were able to take it one step further and know the difference between action and reaction. The students expressed becoming more aware of their body and emotions, and being able to not react and withhold judgement.

“Your feelings in the moment . . . don’t act on your feelings in the moment, think about it like, breathe first, and then react. Because the reaction you have automatically to the situation could like, might be wrong.”

“It helped, the mindfulness, the conversations everyone had, helped me. Like my own, my own peers are going through some of this stuff so let me help.”

“It’s great, it’s tuning into your body, listening to your body as to what they need . . .”

“I was very stuck up and now with more, when I see people now like or I see somebody down and they look upset I just kind of put myself in their shoes and I try not to judge and have an attitude with them because I don’t know what they’re going through or what they’ve been through.”

**Mood.** The MM class was offered at the end of the day, in either the seventh or eighth period. Improved mood emerged as a frequent outcome of the class. This improvement in mood often occurred immediately after the class, but there were no indication how long this lasted, or the longer-term impact.

“It’s a mood changer.”

“There was one day that we had an activity where you choose if you were sad or mad or happy, and then at the end of the lesson for that day, if you were mad you would become relaxed or happy. Like it just changes your whole mood.”

**Stress.** Students shared what some of their daily stressors were while they were in school. They repeatedly expressed that the classes were a source of stress relief for them.

“Especially to have it [MM] eighth period because I went through a whole day of stressful work and finally to go to Mindful Movement and just relax, get to stretch my body and stuff. And you know, final relaxation. I don’t know, I just like it.”

“When the day is stressful then like you get to sleep. . . .”

**Self-esteem.** Students spoke of learning new skills that enabled them to have confidence in certain areas. These included confidence in their own academic abilities and how they felt about themselves, most commonly in the form of self-worth.

“We talked about like how to handle things in life, how to turn it into something positive.”

“Sometimes you just need to feel that confidence like, like I’m okay, I got this. So that’s why sometimes we do warrior [a yoga pose] and stuff like that.”

“My favorite lesson was like self-value. Like believing in yourself and being independent and we would do like poses that you had to struggle and like depend on yourself that you wouldn’t fall and to ground yourself.”

“In your head you wanna quit and you wanna give up but just think about your breath and it’s really all mental, you can get through . . .”

“As long as you’re happy with yourself and what you’re doing, how you’re doing it or whatever you’re doing, then that’s all that really matters.”

“I was failing four classes and then, she [MM teacher] would tell me to sit in the front or just pay attention more and not get distracted. . . she would tell me like just complete my work on time and like keep doing it and then I ended up passing all my classes.”

## DISCUSSION

Overall, the quantitative results of the study failed to find significant differences between groups at posttest, or significant improvement from pre- to posttest for the MM group. However, the results of this study do suggest that the gap in mental health outcomes close on some level for the MM and health students. At pretest, the MM group fared significantly worse than the health group in confusion, vigor, and emotional regulation. However, at posttest, these differences were not detected. It is unclear why these groups were significantly different for these specific measures at the time of pretest. There was one guidance counselor responsible for the group assignment and she was new to the school that academic year, so she was unfamiliar with the students. Thus there likely wouldn't be an unconscious bias when assigning students to the MM or health class. This question remains intriguing, but unanswered.

The lack of differences at posttest may seem inconsequential, however, interestingly, when considered in the context of the literature, it mirrors other findings. A lack of significant findings is seemingly a common theme in current yoga high school research. Despite the lack of significant findings at posttest, this study shows interesting findings that have been mirrored in other studies (Hagins & Rundle, 2016; Wang & Tice-Brown, 2021), in that yoga may be proactive in achieving positive health outcomes. The relationship between yoga and improved mental health is one that has been established, so all the ways these changes manifest are important to uncover. Perhaps the changes are not so drastic over such a short period of time that a posttest analysis with a small sample size would detect. Yet differences at pretest and null differences at posttest is also an important indicator to consider. Thus it is important to make this inference to continue the knowledge base to indeed determine if yoga can be a preventative or proactive measure. It would be important to note that neither Wang and Tice-Brown (2021) or Hagins and Rundle (2016) were true experimental designs, but rather quasi-experimental. Although this current study did not utilize formal randomization methods, it did assign students to either the MM or health groups without bias or logic.

The question then becomes, why are researchers in this area not finding significant findings? This failure may be related to methodology, such as contamination of subjects (students are largely integrated in schools), or measurement issues in terms of constructs chosen to be measured, as well as sensitivity of measures. Perhaps these measures are not sensitive enough to intricacies of high school students experiencing a natural increase in stress and confusion developmentally. It is also possible that these measures have not been validated enough in non-White populations, which this sample was mostly comprised. Language barriers and cultural interpretations of these measures may greatly impact the reliability and validity. For example, the CAMM measure (which was also used in the present study) was found to have more than one factor loading in two studies (deBruin et al., 2013; Wang et al., 2019),

whereas most studies, including the original validation, only found one (Wang et al., 2019). The need to continue to refine reliability and validity in multiple populations is a critical step in determining whether outcomes are being met.

Another area to explore in terms of measurement is to incorporate biometrics, which may provide a more unbiased assessment. For example, some yoga researchers are using blood pressure as a measure for stress (Harris et al, 2016). The more we can diversify our measurement, the greater ability we will have to figure out the pieces of the puzzle. Another possibility is to explore different outcomes, such as effects on educational attainment, measured effects of hope on stress and improvement in parental relationship as positive outcomes. All of these methodological issues need to be continually defined through ongoing research and investigation.

Although these findings do not statistically support changes based on the MM program, even more puzzling is that the qualitative feedback provides evidence of the impact. At the focus groups held at the end of the semester in January 2018, students did verbally indicate tremendous benefits and growth as a result of having been in the MM class. Qualitative data can help make sense of quantitative data, help pinpoint the methodological issues, and/or raise other questions. It appears that based on students' subjective comments, the MM program was able to improve the intended outcomes. Of course, these are qualitative data that cannot be representative of all high school students.

There are some obvious limitations to this study, such as sample size. A second limitation to this study was that it was not a true experimental design with systematic random assignment to groups, nor were the groups comparable in three of the measures at pretest. Third, the integration of students is unavoidable in a high school setting. In research settings, this is known as "contamination" where the intervention and control groups interact (Rubin & Babbie, 2014). Thus, outside of a controlled, clinical setting, these limitations are bound to be present. It has been suggested that contamination can occur if experimental and control groups share the same waiting room (Rubin & Babbie, 2014). These students have a very high level of interaction with one another, so it is quite possible that students from the MM group might share what they've learned or ask others their opinions on part of the curriculum.

However, all of these limitations are in fact realities of conducting research in a school setting. This evaluation was just the beginning of unpacking the effects of this program on the students. To this day the program continues, thus there are opportunities to refine the methodology, such as the assignment to groups and measures. It is important to remember that the main goal of this study was for program evaluation purposes and not basic research. Thus, despite the limitations and lack of significant findings, it is still imperative that we share our experiences and findings as we continue to refine the research methodology and best practices for yoga and mindfulness in the schools.

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## APPENDIX A

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### Draft of Focus Group Questions

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10th graders 15 and 16 years old

1. What did you think of the MM program?
  2. Now that the MM program has been over for a few weeks, have lessons stayed with you?
    - a. What do you remember about what you were taught?
    - b. What lessons still help you?
  3. Can you describe how the program has changed how you view:
    - a. Your struggles?
      - i. Has the MM program helped you deal with your struggles?
    - b. Other peoples' struggles?
      - i. Has the program helped you relate better or treat others better? If so, how?
      - ii. Based on what you have learned, what ways can you help others?
    - c. The problems in the world?
      - i. Has the MM program inspired or helped you to think about social justice, or how to better improve the world? How to create a more equal, fair, and just world?
  4. What are your thoughts on the equal and fair rights and opportunities of others? How have they changed after the MM program?
  5. What suggestions do you have to improve the MM program?
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