

Mindfulness for Well-Being and Stress Management Among College Students

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### Abstract

College student pressures have been steadily increasing over the years, as has the rise in the use of college counseling centers by students who report stress (American College Health Association, 2016). This paper examines mindfulness interventions employed with healthy college students to understand the impact on stress levels in study participants. The term stress, as used in this paper, refers to student self-reported, subjective experience. The review is organized into three sections: (a) mindfulness program protocols; (b) personal practice of mindfulness in instructors; and (c) measures used across studies. This review revealed some common components found among interventions that may have impacted outcomes such as: the personal practice of mindfulness of instructors, additional meditation requirement outside of group, use of an assigned textbook, timeline and accountability measure completed by participants. In addition, some mindfulness techniques that were highlighted and found to be common across studies included: mindful breathing, sitting meditation, mindful attention, body scan meditation, loving kindness meditation, guided imagery, yoga self-compassion and gratitude. Recommendations are presented for developing and evaluating future mindfulness programs for students in college settings.

*Keywords:* college student stress, mindfulness, well-being

### Mindfulness for Well-Being and Stress Management Among College Students

According to the American College Health Association (ACHA, 2016), the academic demands and pressures felt among college-age students have been steadily increasing over the years. Many students feel prepared to balance the demands of college, whereas other students may find balancing schoolwork with jobs, relationships, finances, being away from home and/or other family obligations too much for them to handle. Even the most prepared and organized student could be impacted by excessive stress if they do not have the skills to adequately cope. Therefore, the purpose of this paper is to highlight current literature on mindfulness interventions with healthy college students that focus on managing stress and promoting wellness.

Colleges have also seen a steady rise in the utilization of college counseling centers with students' referencing anxiety, depression and the inability to manage stress effectively as some of the top reasons for their visits (ACHA, 2014). For example, in 2014 the campus counseling center from a mid-western university reported a 20% increase in their students' utilization of counseling services from the previous year (Peale, 2014). The Center for Collegiate Mental Health's (CCMH, 2016) current annual report provides an even broader snapshot. Specifically, when reviewing the mental health habits of over 100,000 college students receiving services at college mental health centers, the report compiled alarming statistics that self-injury type behavior and suicidal ideation are also on the rise, doubling each year for the past six years. Additionally, in 2016, 32.2% of college students reported that their academics had suffered as a result of stress (ACHA, 2016). This has increased 5% since 2008 (ACHA, 2008). These rising trends demonstrate the need to intervene with students in order to provide strategies to manage the pressures that may occur while navigating through their college experience.

An evidenced-based intervention that has been effective in promoting wellness and reducing stress in college students is a mind-body practice called mindfulness (Bergen-Cico, Possemato, & Cheon, 2013; Canby, Cameron, Calhoun, & Buchanan, 2015; Greeson, Juberg, Maytan, James, & Rogers, 2014; Oman, Shapiro, Thoresen, Plante, & Flinders, 2008; Penberthy et al., 2016; Phang, Mukhtar, Ibrahim, Keng, & Sidik, 2015; Ramler, et al., 2011; Rizer, Fagan, Kilmon, & Rath, 2016). Mindfulness is a way of being that embodies the non-judgmental present-moment awareness in one's daily life (Stahl & Goldstein, 2010). Mindfulness is often associated with meditative practices (Davis & Hayes, 2011). Mindful breathing is an example of a meditative practice that involves the intentional focus on the breath (Stahl & Goldstein, 2010). By noticing inhalations and exhalations one can become more consciously aware of one's thoughts and this can serve as a way to access the present moment. Mindfulness is a concept that has its roots in 2500 years of Buddhist tradition and is interpreted from the Pali word, "sati" which encompasses the ideas of awareness, attention and remembering (Siegel, Germer & Olendzki, 2009). Distinguishing itself from Buddhism, Western psychology, psychotherapy, and healthcare have taken a secular approach to integrating mindfulness focusing more on the therapeutic benefits of present-moment awareness (Siegel et al., 2009). For example, the Western approach has expanded beyond, sati, to include qualities such as non-judgment, acceptance and compassion in order to address conditions such as chronic stress and anxiety (Davis & Hayes, 2011; Kabat-Zinn, 2003; Siegel et al., 2009). Kabat-Zinn (2003) is most well known for his application of mindfulness into Western health practices and developed the 8-week Mindfulness-Based Stress Reduction (MBSR) program (McCluskey, 2005). Since its introduction, this program has been adapted and used across many settings such as college campuses (Bergen-Cico et al., 2013) and K-12 school sites (Lagor, Williams, Lerner & McClure, 2013).

Chiesa and Serretti (2009) conducted a meta-analysis examining mindfulness-based stress reduction in healthy people and found MSBR can also be beneficial for decreasing stress levels in healthy individuals. Previous studies have examined the effects of using mindfulness with college students as both a stress management intervention and as way to cultivate well-being in students (Bergen-Cico et al., 2013; Canby et al., 2015; Greeson et al., 2014; Ramler, et al., 2015; Rizer et al., 2016). However, a need exists to look comprehensively across studies that utilize mindfulness with college students and evaluate strategies, procedures and outcomes associated with this type of intervention. Therefore, this review will highlight the current literature on mindfulness interventions that focus on managing stress and promoting wellness. More specifically, looking at aims, analysis methods and procedures. The review is organized into three sections: (a) mindfulness program protocols; (b) personal practice of mindfulness in instructors; and (c) measures used across studies. Recommendations for developing and evaluating mindfulness programs will also be discussed.

Mindfulness Based Stress Reduction (MBSR) is one of the most widely researched programs to date and many protocols stem from, or are adapted, based on this model (Bergen-Cico et al., 2013). The MBSR standard program consists of 2.5 hours meetings once a week for 8 weeks and is delivered in a group setting (Kabat-Zinn, 2003). There is also an additional daylong retreat, bringing the total amount of time committed to this program to 26 hours (Bergen-Cico et al., 2013). However, much of the research conducted on mindfulness in the college setting has been adapted to more closely meet the needs of a time crunched college population. Thus, this review examines adapted mindfulness programs conducted in college and university settings.

### **Mindfulness Program Protocols- 8 weeks**

Oman et al. (2008) evaluated the impact two adapted mindfulness interventions would have on college students' level of stress, rumination and forgiveness ( $n = 44$ ). The aim of this study was to use a randomized control design to incorporate two different mindfulness intervention programs, MBSR and Easwaran's Eight-Point Program (EPP) and compare them to outcomes of a control group. The researchers hypothesized that the MBSR and the EPP mindfulness programs were so foundationally similar, each equally focusing on well-being and meditation practices, that they would both produce comparable outcomes in reducing stress and increasing wellness. The researcher's hypothesized levels of stress and rumination would decrease and forgiveness and hope would increase in the intervention group, as compared to the control group (Oman et al., 2008). Participants ranged in age from 18-24 and consisted of 80% female with ( $n = 32$ ) participants identifying as White, ( $n = 5$ ) as Asian, ( $n = 5$ ) as Hispanic, ( $n = 1$ ) mixed descent and ( $n = 1$ ) chose not to respond. Consent forms were completed and researchers randomly assigned students' into three groups: MBSR ( $n = 15$ ), EPP ( $n = 14$ ) and control group ( $n = 15$ ). Both the MBSR and EPP intervention met for 90 minutes a week for 8 consecutive weeks, both focusing on both formal and informal practice in the cultivation of present moment awareness (Oman et al., 2008). Four scales and questionnaires were utilized in order to measure well-being and stress levels in the participants: Perceived Stress Scale (PSS), Rumination and Reflection Questionnaire (RRQ), Heartland Forgiveness Scale (HFS) and the Adult Dispositional Hope Scale (ADHS) (Oman et al., 2008). These instruments were administered at pre, post and 8-week follow-up. The researchers first hypothesis proved correct with the MBSR and EPP groups finding no significant differences between the groups on outcome measures; thus, demonstrating the similar effects and positive impact of cultivating mindful awareness even if executed in different manners using distinct programs. Overall results indicated teaching

mindfulness to undergraduate college students did lower their perceived levels of stress (half a standard deviation) as evidenced from outcome measures and this result continued into the 8-week follow up (Oman et al., 2008). Additionally, an increased level of forgiveness and a decreased level of rumination were also observed. The results speak to the positive impact a mindfulness intervention can have on college students' levels of stress using either the adapted MBSR or EPP programs. This demonstrates the importance of key components such as, mindful and meditative practices that are essential within a mindfulness program's design. Having participants complete outcome measures at an 8-week post intervention time frame provided evidence of the interventions long-lasting effects and can be considered a strength in the design of this study. This is encouraging information and also demonstrates how some students may have continued to incorporate these mindfulness practices into their everyday lifestyle behaviors.

Lynch et al. (2011) conducted a study to understand the level of acceptance university students would have to an intervention that encompassed cultivating mindfulness ( $n = 10$ ) as compared to a wait-list control group ( $n = 6$ ). Researchers wanted to quantitatively measure the effects, as well as measure physiological changes in participants stress levels. Participants ranged in age from 21-60 years of age; however, no demographic data on race and ethnicity was provided. Similar to Oman et al. (2008), the researchers utilized two evidence based mindfulness interventions, MBSR and Mindfulness Based Cognitive Therapy (MBCT) in devising this study. Mindfulness-Based Cognitive Therapy is also based on MBSR and invokes the techniques of cognitive therapy in order to aid in the relapse of depression in individuals (Lynch et al., 2011). These two mindfulness approaches were combined and adapted into an 8-week pilot program. Similar to Oman et al. (2008) healthy participants with no mental health concerns were recruited from the university campus using flyers and posters; however, this study specifically included

exclusion criteria if the student already had an established formal practice of meditation. Outcome measures used to assess anxiety and stress included Hospital Anxiety and Depression Scale (HADS), Perceived Stress Scale (PSS) and Physiological changes using cortisol (Lynch et al., 2011). Outcome measures used to assess mindfulness and track changes over time included the Freiburg Mindfulness Inventory short version (FMI) and the Measure Yourself Medical Outcome Profile (MYMOP) (Lynch et al., 2011). Although there were no significant differences found in the physiological data, small changes were noted in cortisol levels of intervention group (Lynch et al., 2011). Additionally, no statistically significant differences were observed between the intervention and control group in post-test measures. Lynch et al. (2011) does provide several strengths in that the researchers tailored this adapted MBSR and MBCT to the needs of college students. Specifically, the inclusion of more informal practices of mindfulness makes the program more accessible to students in their hectic academic schedules. Also, the inclusion of a physiological measure of stress in addition to the self-report measure can provide greater depth to understanding small changes that may be undetected in self-report responses by participants.

Ramler et al. (2015) studied the impact an adapted form of MBSR has on student adjustment in a college sample ( $n = 30$ ) as compared to a control group ( $n = 32$ ). Participants consisted of females ( $n = 40$ ) and males ( $n = 22$ ); however, no demographic data on race and ethnicity was provided. Contrasting the self-selected manner in which Oman et al. (2008) and Lynch et al. (2011) chose to enlist participants to their study, Ramler et al. (2015) utilized a non-volunteer sample of enrolled students in a university course. This helped to decrease the self-selection bias of attracting students already interested in mindfulness and this procedure can be seen as a strength in this study. Furthermore, the researchers included both self-report measures physiological measures to assess for student's level of stress. Participants were students enrolled

in a required first semester seminar course in their university program. Similar to Oman et al. (2008) and Lynch et al. (2011), this study's adapted MBSR intervention lasted for 8 weeks, although this study had students participate for 2 hours each week and did not meet consecutively for 8 weeks, but instead alternated meetings with class instruction throughout the semester. This intervention consisted of participation in the group experience as well as readings assigned from a required text. Additionally, a certified instructor in mindfulness conducted the MBSR adapted intervention. However, information regarding the instructor's type of certification, or individual personal mindfulness practice was not mentioned in this article.

Participants completed the Student Adaptation to College Questionnaire (SACQ), the Five Facet Mindfulness Questionnaire (FFMQ) and employed the use of physiological measures using cortisol samples for stress assessment (Ramler et al., 2015). As anticipated, the findings showed a statistically significant positive impact in well-being as seen on the higher scores on the SACQ personal-emotional adjustment subscale (Ramler et al., 2015). Additionally, the participants also scored high on the five subscales on the SACQ as well decreased stress levels as evident from the cortisol measure (Ramler et al., 2015). These findings point to the utility of incorporating a brief adapted mindfulness intervention with a college age population. One limitation surrounds the lack of information regarding the personal practice of mindfulness by the instructor, since it has been shown in previous research that those instructing mindfulness interventions that participate in their own mindfulness practice can impact outcomes in recipients (Grepmaier, Mitterlehner, Loew, & Nickel, 2007). Thus, this information is important when constructing and evaluating a program that measures mindfulness.

In a study with undergraduate students ( $n = 205$ ), Penberthy et al. (2016) examined the impact the inclusion of contemplative practices into a large lecture-format course had on

students' well-being. Participants ranged in age from 18-36 consisted of (68.1%) female and (31.9 %) male; however, no demographic data on race and ethnicity was provided. Similar to Ramler et al. (2015), this study integrated contemplative practices over the course of a semester with students participating in both a didactic and lab component. The following seven instruments were used to measure wellness outcomes: The Self-Compassion Scale (SCS), Compassion to Others Scale, the State Trait Anxiety Inventory (STAI), the Positive and Negative Affect Schedule (PANAS), the Cognitive and Emotional Regulation Questionnaire (CERQ-short), and the Mindfulness Attention Awareness Scale (MAAS). No required text on mindfulness was assigned; however, each instructor had experience in both teaching and practicing meditation practices. Mindfulness was found to serve as a mediator and reduced anxiety, as well as increased self-compassion levels in participants (Penberthy et al., 2016).

### **Mindfulness Program Protocols- 6 weeks**

Canby et al. (2014) studied the effects of using an adapted MBSR intervention with healthy college students and college faculty ( $n = 19$ ) examining well-being and psychological health as compared to a control group ( $n = 25$ ). Participants' average age was 21 with (84%) female and (16%) male. No demographic data on race and ethnicity was provided. The researchers anticipated results to show a decrease in stress and an increase in self-control, emotional intelligence, subjective vitality and mindfulness awareness (Canby et al., 2014). Unlike Lynch et al. (2011), where participants were excluded if they already had a mindfulness practice, Canby et al. (2014) did not stipulate this in the design. The intervention group was led by two instructors both having taught mindfulness previously and both having participated in their own daily mindfulness practice. The group met for two hours once a week for six consecutive weeks. Participants in both groups completed the following measures at three times

during the study: Brief Symptom Inventory (BSI), MAAS, Brief Self Control Scale (SCS), Trait Meta Mood Scale (TMMS) and the Subjective Vitality Scale (SVS) (Canby et al., 2014). Results indicated the MBSR intervention supported the researcher's hypothesis in all areas except emotional intelligence, where a significant finding was not present on the TMMS (Canby et al., 2014). The increase of self-control in participants provides further support for introducing mindfulness practice into college settings, as self-control can have implications for college students' academic outcomes (DeWall, 2014).

### **Mindfulness Program Protocols- 5 weeks**

Bergen-Cico et al. (2013) studied the possible benefits a brief 5-week MBSR intervention integrated, into an academic course, would have on the psychological well-being of students in the areas of self-compassion, mindfulness and trait anxiety. Eighty percent of participants were female with 21 being the average age. The demographic profile included: (65%) White, (3%) Native American, (11%) Hispanic, (12%) Black and (9%) Asian. Similar to previous studies (Canby et al., 2014; Lynch et al., 2011; Oman et al., 2008; Ramler et al., 2015), this research employed an intervention ( $n = 72$ ) and a control group ( $n= 47$ ) design. However, this MBSR protocol was shortened to 5 consecutive weeks for 2 hours sessions (Bergen-Cico et al., 2013). The researchers anticipated the shortened intervention would result in improved psychological health with significant increases in self-compassion and mindfulness and a decrease in trait anxiety (Bergen-Cico et al., 2013). The intervention and control group in this study was led by a professor who received his MBSR training from the University of Massachusetts Center for Mindfulness (Bergen-Cico et al., 2013). Of the studies reviewed, only this study included a mindfulness instructor with this credential; however, the current daily mindfulness practice was not mentioned in this article. As highlighted previously, the daily meditation practice of a person

leading a mindfulness group may impact results (Grepmaier et al., 2007). Therefore, the lack of a current daily practice could be a limitation in this study. In order to measure anxiety, self-compassion and mindfulness, participants completed the Kentucky Inventory Mindfulness Scale (KIMS), Philadelphia Mindfulness scale (PHLM), SCS and the Spielberger State-Trait Anxiety Inventory (STAI-T). The results of this study revealed changes in the treatment group levels of psychological health, as evidenced in the significant improvements in the overall scores on the KIMS and SCS measures administered. However, the STAI-T did not reveal significant reductions in anxiety in the treatment group. Additionally, both the KIMS and PHMS have embedded subscale components, which allow for a more detailed analysis of potential variations in mindfulness. Interestingly, the subscale results from the KIMS and the SCS also did not demonstrate significant results in the areas of acceptance (KIMS) and mindfulness (SCS). Therefore, although composite scores on the KIMS and SCS were significant, contradictory results in subscale outcomes as well as non-significant anxiety outcome (STAI-T) point to the need of prolonging this 5-week adapted intervention to provide more exposure to MBSR content.

Phang et al. (2015) studied the effects a brief 5-week mindfulness intervention would have on the stress levels of Malaysian medical students ( $n = 37$ ), as compared to a control group ( $n = 38$ ). The researchers anticipated the intervention group would have a greater decrease in perceived stress and a greater increase in levels of mindfulness and self-efficacy based on outcome data from pre-post measures (Phang et al., 2015). Additionally, researchers expected the increase in self-efficacy would last up to 6 months after the conclusion of the intervention (Phang et al., 2015). Students volunteered to participate with the only exclusion criteria being, inability to attend 80% of the sessions and inability to commit to a 3-5 minutes of daily meditation practice (Phang et al., 2015). Similar to Bergen-Cico et al. (2013), this current study

design consisted of five consecutive weekly meetings for 2- hours sessions. However, Phang et al. (2015) added the additional requirement of 3-5 minutes of daily meditation practice. Similar to Lynch et al. (2011), this study combined MBSR and MBCT programs to create an adapted mindfulness intervention focusing on specific student needs and emphasized more informal practice. Similar to Lynch et al. (2011) and Canby et al. (2014) the instructor in this study had their own daily personal practice of mindfulness (Phang et al., 2015). Outcome measures included MAAS, PSS, the General Health Questionnaire (GHQ), the General Self-Efficacy Scale (GSE). Additionally, a weekly one-item question asking about participant mindfulness practice was included and assessed using a five-point Likert scale. Results revealed significant reductions in perceived stress and mental distress and significant improvements in mindfulness and self-efficacy at post intervention compared to the control group at 1-week post-intervention (Phang et al., 2015). In contrast, except in the area of self-efficacy, at 6-month post-intervention these effects were less noticeable and were not significantly different than those in the control group. However, it is encouraging that a brief 5-week mindfulness intervention can endure in the area of self-efficacy, especially as it relates to college students and their ability to cope with stress and adapt to the academic demands of college. One reason this 5-week intervention demonstrated significant results in the area of decreased stress levels, as opposed to the Bergen-Cico et al. (2013) study that did not find significant decreases in stress, may be the additional component of the daily meditation requirement of participants. Just as a daily mediation practice in those who teach mindfulness can impact outcomes (Grepmaier et al., 2007), requiring a daily practice in participants may also positively impact outcomes, as seen in the significantly decreased stress levels among participants in this study. Additionally, similar to Lynch et al. (2011), the encouragement and emphasis on the informal (flexible approach) as opposed to formal practice

(structured approach) of mindfulness could possibly impact outcomes in those students who are more resistant to committing to a structured mindfulness program.

### **Mindfulness Program Protocol- 4 weeks**

Greeson et al. (2014) examined the effectiveness a brief mindfulness intervention called Koru has on emerging adult age college students ( $n = 45$ ), as compared to a wait-list control group ( $n = 45$ ). Sixty six percent of participants were female with 25 being the average age. The demographic profile included: White ( $n = 56$ ), African American ( $n = 5$ ), Asian ( $n = 23$ ), Other ( $n = 4$ ) and Chose not to answer ( $n = 2$ ). The researchers anticipated students who participated in a 4-week intervention called Koru would show a decrease in stress, an increase in sleep, mindfulness, self-compassion and gratitude (Greeson et al., 2014). The mindfulness intervention consisted of 75-minute sessions over the span of 4 weeks with a required 10 minutes of daily meditation outside of class time (Greeson et al., 2014). Although, the article does say the instructors are trained in Koru, it does not provide any information on the personal mindfulness practice of the instructors. Outcome measures used in this study consisted of the PSS, Medical Outcome Sleep Scale (MOSDLP9), Cognitive Affective Mindfulness Scale-revised (CAMS-R), SCS and the Gratitude Questionnaire (GQ-6). The results revealed perceived stress in the control group remained unchanged, whereas the Koru group saw a significant reduction in perceived stress, an increase in sleep quality, mindfulness and self-compassion over time in both the intervention and wait-list control conditions (Greeson et al., 2014). Therefore, although this mindfulness intervention is considerably shorter than any other intervention, it proves to be an effective intervention in impacting the well-being of college students in a positive way. Similar to Phang et al. (2015) where a daily meditation practice was required from participants, this current study also required participants to commit to 10 minutes of daily practice outside of the

class setting. The original MBSR training recommendation for outside daily practice is 45 minutes (Kabat-Zinn, 1990); therefore, these findings are encouraging and provide a new possible minimum component needed to infuse mindfulness practices into the everyday habit of the participants when using a brief 4-week model. This requirement of 10 minutes of outside daily practice should be considered in the plan and evaluation of any future mindfulness intervention program. Additionally, although Phang et al. (2015) saw success with only requiring 3-5 minutes of outside daily mindfulness practice, the study results did not demonstrate endurance at 6-month post-intervention; thus, the 10-minute recommendation is proposed.

### **Personal Practice of Mindfulness in Instructors**

As highlighted previously, the personal practice of mindfulness by the instructor has been shown to impact outcomes in a positive manner (Grepmaier et al., 2007). Therefore, it is important to note that of the studies reviewed only four studies specifically stated the personal practice of mindfulness by the instructor. For example, in Penberthy et al. (2016) the three instructors assigned to deliver the contemplative lab sessions all had documented experience in the practice of mindfulness. In the Canby et al. (2014) study, two teachers provided the intervention and both had previous experience teaching mindfulness as well as a personal mindfulness daily practice. The Lynch et al. (2011) study, the instructors all participated in their own daily meditation practice. In the Phang et al. (2015) study the author was also the instructor and was certified in mindfulness with a personal practice of mindfulness. Thus, four studies (Bergen-Cico et al., 2015; Greeson et al., 2014; Oman et al., 2008; Ramler et al., 2008) did not describe the mindfulness practice of the instructor and this omission can be seen as a limitation in the overall design of these studies due to the impact this practice could have on outcomes.

### **Measures Used Across Studies**

Several common measures were utilized to inform participant's mindfulness impact, stress levels and compassion levels. For example, the PSS was used in four studies (Greeson et al., 2014; Lynch et al., 2011; Oman et al., 2008; Phang et al., 2015) to measure the perceived stress of participants from pre-test intervention to post-test intervention. The PSS scale is a self-report instrument that consists of 10-items used to measure the degree to which an individual identifies a situation to be stressful (Cohen, Kamarck, & Mermelstein, 1983). This measure proves to be a consistent way to assess stress across the majority of the studies and should be considered in the design and eventual evaluation of mindfulness programs in the future.

### **Recommendations for Program Evaluations**

Although Bergen-Cico et al. (2015) did not demonstrate significant reductions in trait-anxiety at post-test intervention, the other studies reviewed all resulted in significant decreases in student stress levels. Additionally, all eight studies reviewed (Bergen-Cico et al., 2013; Canby et al., 2014; Greeson et al., 2014; Lynch et al., 2011; Oman et al., 2008; Penberthy et al., 2016; Phang et al., 2015; Ramler et al., 2015) demonstrated significant increases in mindfulness either through the MAAS, or a comparable scale that measured mindfulness. Therefore, this information should be considered emphasizing the reduction of perceived stress and increase of mindfulness as aims or goals in developing a mindfulness program for college students.

### **Additional Meditation Practice by Participants**

Daily meditation, outside of the group experience, should be noted as a recommendation in the development and evaluation of a mindfulness program. For example, three of the studies reviewed required a daily meditation practice outside of the group setting for participants to complete. The Canby et al. (2014) 6-week study required 30 minutes of additional formal meditation (sitting meditation, body scan, mindful yoga) 5 days a week. The Phang et al. (2015)

5-week study required 3-5 minutes of daily meditation practice and the Greeson et al. (2014) 4-week study required 10 minutes of daily meditation outside of the group setting. Interestingly, the other 5-week study (Bergen-Cico et al., 2013) did not require an additional meditation practice and was the only study of the eight reviewed that did not find significant decreases in anxiety at post-treatment. Therefore, these findings support the recommendation for the inclusion of a daily practice of meditation outside of the group/program requirements.

### **Required Text**

Of the studies reviewed, only two (Greeson et al., 2014; Ramler et al., 2015) utilized a required text. Although each of these studies used a different book, both studies incorporated books written by Jon Kabat-Zinn (Greeson et al., 2014; Ramler et al., 2015). As Kabat Zinn (2003) has lead the research in the area of MBSR, utilizing one of his books such as *Wherever You Go, There You Are*, or *Full Catastrophe Living*, in conjunction with the intervention could potentially provide consistency in terminology and content that can be used to evaluate the effectiveness of mindfulness programs.

### **Accountability Measure Related to Mindfulness Practice**

Greeson et al. (2014) and Phang et al. (2015) utilized accountability measures in the interventions in order to assess fidelity of daily mindfulness practices in participants. Although they differed slightly in design where Greeson et al. (2014) was a daily meditation log and Phang et al. (2015) was a weekly one-item question asking about their experience of mindful practice for the previous week, both were a form of accountability put on the participant. This form of accountability can provide a sense of ownership and could be an integral component when evaluating a program and should be considered in the design.

### **Participant's Previous Exposure to Mindfulness Practice**

Lynch et al. (2011) provided exclusion criteria in their study design for participant's who noted having a previous or current mindfulness practice. Whereas, other studies such as Canby et al. (2014) noted that participants revealed prior mindfulness practice but included them in the intervention. To address this inconsistency, future evaluations should ask participants if they have any previous mindfulness experience. Thus, providing a more accurate understanding of the participant's background and better uniformity when trying to evaluate a program's effectiveness.

### **Mindfulness Practices Common Across Studies**

Mindfulness practices common across studies included: mindful breathing, sitting meditation, mindful attention, body scan meditation, loving kindness meditation, guided imagery, yoga self-compassion and gratitude (Bergen-Cico et al., 2013; Canby et al., 2014; Greeson et al., 2014; Lynch et al., 2011; Oman et al., 2008; Penberthy et al., 2016; Phang et al., 2015; Ramler et al., 2015). In the development of mindfulness programs to be evaluated, it is recommended to include these mindfulness practices within the program delivery components.

### **Perspective on Timelines**

The majority of studies demonstrated a decrease in stress and an increase in mindfulness at post-intervention (Canby et al., 2014; Greeson et al., 2014; Lynch et al., 2011; Oman et al., 2008; Penberthy et al., 2016; Phang et al., 2015; Ramler et al., 2015). These results offered support in respect to the effectiveness of brief and adapted mindfulness programs to address stress and mindfulness in college students. Furthermore, the 4-week and shortest intervention, provided similar significant results and these outcomes are especially encouraging considering the time-crunched reality college students' experience. Additionally, Oman et al. (2008) conducted a 2-month post-intervention follow-up of study participants and found that perceived

stress reduction seen at the conclusion of the study persisted at follow-up. However, Phang et al. (2015) conducted a 6-month follow-up among participants and found that perceived stress, mental distress and mindfulness did not endure at the 6-month follow up post- intervention. Although both the 8-week (Oman et al., 2008) and 5-week (Phang et al., 2015) protocols demonstrated significant positive outcomes related to the decrease in perceived stress among participants at post-test administration, the lasting impact was questionable. Thus, a check-in with participants between the 2nd and 6th month post-intervention to provide support and a refresher of mindfulness strategies should be considered as a recommendation in the design of a mindfulness evaluation program. Furthermore, a mindfulness evaluation program should include in the design a 6-month post intervention measure to provide additional data for the endurance and lasting impacts of mindfulness practice in participants' daily life after program completion.

## **Conclusion**

Based on the literature reviewed, mindfulness and its infusion into the college setting serves many benefits including the increase in mindfulness and well-being in college students, as evident across all eight studies reviewed. The results show that adapted and shortened interventions using mindfulness are consistently effective in increasing well-being. Furthermore, the briefest protocol (4-weeks) also showed promising results, where the participants demonstrated significant decreases in stress levels and increases in sleep quality, mindfulness and self-compassion, providing evidence of positive results in the shortest time protocol examined (Greeson et al., 2014). Recommendations for future development of mindfulness programs should consider this 4-week time frame as a viable option for impacting healthy college students positively. Additionally, due to the hectic life and competing demands of college students, informal mindfulness practices should be considered and emphasized in this

population (Lynch et al., 2011; Phang et al., 2015). These informal practices of mindfulness, such as mindful eating, can occur more naturally and may be more appealing to students. This may result in the increase in mindfulness and students' ability to manage stress. Additionally, the secular focus of the MBSR, EPP, MBCT and Koru programs allow for the incorporation of these techniques into daily practice without interfering with existing religious, spiritual and/or practicing or non-practicing traditions of participants. Mindfulness practice can also be beneficial when offered as a proactive treatment buffering college students, possibly removing the potential for chronic stress or clinical levels of anxiety to present (Canby et al., 2014). Additionally, coping strategies that focus on awareness, attention and self-control may be more readily accepted by students as a way to manage stress, specifically those students that may feel there is a stigma attached to seeking mental health services. Consequently, resulting in more balanced and resilient college students who are able to manage their stress and live more mindfully. Based on the studies reviewed, it is recommended that mindfulness instructors have a documented personal practice of mindfulness as this has shown to positively impact outcomes. Interestingly, the importance of an instructor's personal practice of mindfulness is especially relevant in this day and age where apps using mindfulness, without any personal interactions, are being promoted as a way to help with stress. This is an area to be further explored. Future mindfulness programs can be organized to answer the following questions regarding execution and impact: 1) Was the program implemented with fidelity? 2) What are the impacts on stress levels and mindfulness among students at completion? 3) What are the effects on professors' stress levels and classroom climate? 4) How long does the program impact last post-intervention at 2-month, 6-month and one-year follow-up? Recommendations offered in this review should be considered and integrated into the development and evaluation of future mindfulness programs.

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