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Investigation of the Effects of a Yoga Intervention on Experiential Avoidance, Symptoms of Psychological Distress, and Substance Use

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Abstract

The current study sought to examine the utility of yoga for reducing experiential avoidance (EA), as well as symptoms of psychological distress (SPD) and substance use. EA refers to the attempt to avoid or control adverse bodily sensations, thoughts, feelings, and memories despite negative consequences. Yoga is a holistic system of mind-body practices which includes physical postures, stretching, and breathing exercises aimed at maintaining and improving both mental and physical health. Undergraduates (n = 43) from a yoga class and basic exercise classes were recruited to participate and served as the intervention and active control group, respectively. Self-reported measures of EA, SPD (i.e., anxiety, depression), and substance use were collected at pre- and post-intervention time points. It was hypothesized that EA levels would be reduced from Time 1 to Time 2 in students participating in the yoga intervention compared to the control group, and that reductions in EA would mediate the relation between condition assignment and reductions in SPD and reported substance use. Overall, our hypotheses were not supported. Furthermore, our findings indicated Group differences in EA scores at Time 1.

INVESTIGATION OF THE EFFECTS OF A YOGA INTERVENTION ON EXPERIENTIAL AVOIDANCE, SYMPTOMS OF PSYCHOLOGICAL DISTRESS, AND SUBSTANCE USE

by

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Table of Contents

Introduction

Investigation of the Effects of a Yoga Intervention on Experiential Avoidance, Psychopathology, and Substance Use

Experiential avoidance (EA) refers to the process of avoiding internal experiences despite possible negative consequences (Hayes, Wilson, Gifford, Follette, & Strosahl, 1996). This includes the attempt to avoid or control adverse bodily sensations, thoughts, feelings, and memories. Previous research suggests that EA contributes to various types of psychopathology (Zvolensky, Jardin, Garey, Robles, & Sharp, 2016), thus making EA a potential target for intervention. Among the interventions being examined for their potential to reduce EA, those that incorporate contemplative practices have emerged as unique and promising approaches. Contemplative practices encompass multiple types of person-focused practices (e.g., mindfulness and yoga) aimed to *enhance* attention to and acceptance of present moment experiences, a process which is essentially the antithesis of the construct EA which seeks to *avoid* experience. To date, the majority of empirical studies employing contemplative practices to reduce EA have examined mindfulness-based interventions and Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999; Coyne, Cheron, & Ehrenreich, 2008). However, there have been relatively few studies exploring the effects of the widely popularized contemplative practice of yoga on EA.

Yoga is a holistic system of mind-body practices that include physical postures, stretching, and breathing exercises, with the goal of maintaining and improving mental and physical health (Khalsa & Butzer, 2016). Yoga-based interventions may be particularly advantageous for targeting EA because of their theoretical focus on acceptance of physical and psychological states, and because their widespread popularity lends to familiarity and ease of

adoption. Additionally, prior research suggests that yoga may be effective in decreasing psychological symptoms, such as those associated with depression and anxiety (Falsafi, 2016), and has been found to be a helpful adjunct for treatment of substance use disorders (Lutz, Gipson, & Robinson, 2019).

The purpose of the current study was to examine the utility of yoga for reducing EA, and to examine whether EA mediated the effects of yoga on symptoms of psychological distress (SPD) and substance use. Undergraduates from three classes, a yoga class and two basic exercise classes, served as the intervention and active control groups, respectively. College students not only represent a convenient sample for this preliminary research, but they also stand to benefit from interventions aimed at decreasing SPD and substance use, given that this is a high-risk developmental period for mental illness (Merikangas et al., 2010; Atlam, Aldemir, & Altintoprak, 2017). Self-reported measures of EA, SPD (i.e., anxiety, depression), and substance use were collected at pre- and post-intervention time points (called Time 1 and Time 2, respectively). It was hypothesized that EA levels would be reduced from Time 1 to Time 2 in students participating in the yoga intervention, as compared to the control group, and that reductions in EA would mediate the relation between condition assignment and reductions in SPD and reported substance use.

A literature review of research on (a) EA, (b) EA as it relates to SPD and substance use, (c) contemplative practice, (d) mindfulness, and (e) yoga interventions will first be discussed. The remaining sections then outline the specific aims, hypotheses, methods, and results of the current study. Finally, a discussion of our findings as well as directions for future research are also presented. This study examined whether a yoga intervention decreased SPD and substance use (Aim 1), as well as whether reductions in EA were observed from pre- to post-intervention

(Aim 2). Additionally, the current study examined whether the effects of yoga on SPD and substance use were mediated through changes in EA (Aim 3).

Experiential Avoidance

Various definitions of EA have been offered in the literature. Of these, the most widely adopted was offered by Hayes and colleagues (1996), who described it as the process of attempting to avoid or control harmful private or internal experiences despite the negative consequences that may follow. Internal experiences include bodily sensations, thoughts, emotions, and memories. These internal experiences (e.g., anxiety, self-critical thoughts, subjective stress) may be uncomfortable or undesirable for some individuals. They may arise during or following external experiences or stressors that are difficult for an individual to handle. When engaging in EA, individuals may avoid attending to uncomfortable internal experiences through various alternative behaviors, such as engaging in methods of distraction or procrastination of tasks. Thus, EA is often referred to as an avoidant coping strategy. The most commonly accepted conceptualization of EA maintains that the individual continues to engage in this pattern of responses despite awareness of potential or actual negative consequences (e.g., losing a job for failing to complete obligations). For students in particular, these negative consequences could include failing a class for not completing required assignments, or not adequately preparing for an exam.

EA as a construct was developed in the theoretical framework of Relational Frame Theory (RFT). While the complexity of the theory itself is outside the scope of this current document, in brief, RFT represents a behavioral-analytic approach to language and cognition (Hayes, 2004). RFT is fundamentally similar to the account offered by B.F. Skinner (1957) in that it approaches verbal events as activities and not products (Hayes et al., 2001). RFT suggests

that even in the absence of aversive stimuli in the environment, individuals may still experience aversive internal events (Hayes, Bond, & Barnes-Holmes, 2006). Moreover, attempts to suppress (or avoid) these private events are likely to be unsuccessful and may inadvertently increase the occurrence of the very events that the individual is trying to escape. Thus, applied extensions of RFT, such as Acceptance and Commitment Therapy (Hayes et al., 1999), teach individuals to accept aversive internal events in order to diminish the likelihood of maladaptive avoidant behavior.

EA encompasses a variety of manifestations including, but not limited to, emotional, cognitive, and behavioral avoidance. Behavioral manifestations of EA may include avoiding real life situations or events that may trigger an unpleasant internal experience. Occasionally, it may be appropriate to refer specifically to *emotional* or *cognitive* avoidance when the type of internal experience is clearly identified. However, for purposes of the current research, the generic term of *experiential* avoidance is used to encompass both emotional and cognitive avoidance. In addition to representing a psychological construct, EA can also characterize a behavioral tendency or pattern in an individual's efforts to cope with challenging or aversive situations. Hayes and colleagues (1996), provide examples illustrating some ways that EA may come to be a primary, automatic, and generalized coping strategy. They begin by pointing out that exercising conscious and controlled strategies to avoid dangers is adaptive for survival. They suggest that this response pattern can become automatic and generalized toward less dangerous but still aversive circumstances (e.g., fleeing from emotionally threatening social situations). During this process of generalization, one may not yet recognize the negative consequences of avoiding aversive thoughts, emotions, and experiences in general (e.g., expenditure of energy, missed opportunities for potential gain). Furthermore, when used automatically, one may not be able to

recognize when this strategy is incommensurate with the perceived “danger”, and may not be appropriate or effective when applied to these new scenarios. Furthermore, social environments could potentially model and reinforce this strategy. For example, when an adult tells a child to “stop crying,” or distracts the child from the aversive experience with a conciliatory gesture or reward; the child may become silent or their attention may be reoriented, but this does not directly alter the underlying aversive stimulus and response, and it may even undermine the child’s capacity for introspective awareness and subsequent development of self-regulatory strategies.

As individuals undergo socialization over the course of development, they may learn to identify cognitions and emotions as causes for their behavior. This perspective may also contribute to the development of an EA coping strategy (Hayes et al., 1996). If individuals attribute the cause of their desirable behaviors to preceding or associated emotions and cognitions (e.g., being able to finish an assignment because of being in a good mood and feeling focused), naturally the causes of undesirable behaviors may also be attributed to emotions and cognitions (e.g., not being able to finish said assignment because of an irritable mood). By extension, one may tell oneself that perceived antecedents (i.e., emotions and cognitions) associated with undesirable behaviors should be avoided. EA behaviors can be reinforced over time, and a repeated and persistent pattern of EA behaviors can become maladaptive. For example, when a person struggling with anxiety toward school discovers that avoiding schoolwork permits a short-term decrease in anxiety, they may continue to avoid thinking about and working on school assignments, and instead put them off until later. This pattern leads to decreased academic functioning in the face of mounting academic demands, and eventually may cause a student to fall behind, feel hopeless, or uninvested in continued academic training. In

another example, an individual dealing with social anxiety may find relief in avoiding social settings, and in doing so, may deprive themselves of opportunities to develop self-confidence, social skills, and rewarding relationships. Moreover, the immediate effects of EA are often rewarding for the individual (i.e., escape maintained behavior or negative reinforcement), such as a decrease in feelings of anxiety or fear. Thus, adoption of EA-related coping behaviors is congruent with the human tendency to prioritize short-term consequences relative to long-term consequences (Hayes et al., 1996).

EA, SPD, and substance use. It is important to consider the deleterious consequences of a coping strategy predominated by EA. The literature suggests that EA may contribute and be associated with a variety of SPD. For example, multiple studies support a positive association between EA and depressive symptoms in minority students and woman (Zvolensky et al., 2016; Mellick, Vanwoerden, & Sharp, 2017). Additionally, EA was identified as a mediator between anxiety sensitivity and depressive symptom severity (Tull & Gratz, 2008). EA was also found to be positively associated with anxiety disorders in both children (Epkins, 2016; Simon & Verboon, 2016) and adults (Aldao, Nolen-Hoeksema, & Schweizer, 2010; Kashdan, Barrios, Forsyth, & Steger, 2006). Moreover, and of relevance to the current study, EA has also been linked with several negative outcomes in college students. For example, Levin and colleagues (2012) examined EA in relation to alcohol use disorders and alcohol-related problems in a sample of 240 undergraduates. Students completed the Rutgers Alcohol Problem Index (Neal, Corbin, & Fromme, 2006), the General Health Questionnaire (GHQ; Goldberg & Williams, 1988), and the Acceptance and Action Questionnaire-II (AAQ-II; Bond et al., 2011), which was used to assess EA. Additionally, students underwent the Structured Clinical Interview (First & Gibbon, 2004) for the DSM-IV in order to assess for psychopathology, including alcohol use

disorder. They found that students with a history of alcohol abuse or dependence showed significantly higher levels of EA relative to others, and that EA predicted alcohol-related problems after controlling for gender and psychological distress. Lastly, EA mediated the relationship between psychological distress and alcohol-related problems. These results indicate that EA may play a role in the development and maintenance of problematic alcohol use among college students. Accordingly, interventions targeting EA may be of particular benefit to college students with substance use and co-occurring mental health problems.

Taken together, EA is theoretically and empirically associated with a variety of deleterious outcomes and several studies support these relationships in college students, which is particularly relevant to the current study. However, the body of literature on EA is relatively small and more research is needed in order to elucidate its role in psychological health, as well as its capacity to be targeted through intervention. Given that EA is conceptually opposed to acceptance, it follows that interventions that enhance acceptance through contemplative practices (e.g., yoga) may reduce EA and, in-turn, may portend benefits for mental health symptoms. Alternatively, it is possible that interventions have no direct impact on EA, but instead directly affect mental health symptoms, or affect symptoms via some other mechanism(s). The current study contributes to the existing literature by examining the direct effects of a promising yoga-based intervention on SPD and substance use among college undergraduates (Aim 1), and investigating the indirect effects of yoga on the aforementioned outcomes via the theorized mechanism of EA (Aims 2 and 3).

Contemplative Practice

According to The Center for Contemplative Mind in Society, contemplative practice represents an umbrella term that encompasses practices aimed at developing a deep

concentration and quieting of the mind ("Contemplative Practices" n.d.). They are used to cultivate a first-person focus with present-moment experiences as the target of one's attention. Some contemplative practices stem from religious traditions (e.g., Buddhism) and incorporate activities to engender mindfulness. However, many practices have evolved and become secularized for widespread public use in Western culture. According to the Center for Contemplative Mind in Society, contemplative practices typically fall under any one of the following categories (although this list is not exhaustive): generative, cyclical, creative, activist, relational, stillness, and movement. The generative category represents practices aimed at generating thoughts and feelings (e.g., visualization or loving-kindness meditation) rather than calming or quieting the mind. Cyclical practices incorporate rituals or ceremonies typically based in spiritual or cultural traditions. The creative category includes practices with a basis in performance or visual arts, such as listening to music, singing, or dancing. Activist-based contemplative practices can include volunteering or advocating for societal issues. The relational category represents practices with a social component, such as engaging in dialogue, deep listening, or storytelling. Of the most popular types of contemplative practice found in research are those in the stillness and movement categories.

The category of stillness focuses on practices that quiet or calm the mind and body, such as meditation. One example of meditation practice, concentrative meditation, involves sustaining one's attention to a specific stimulus (e.g., the breath) for a period of time. In the event that the mind wanders away from the breath, attention is redirected toward the stimulus. Contemplative practices in the movement category includes physical practices such as tai chi, aikido, and yoga. Stillness and movement-based practices have found their way into psychological research and have become increasingly popular bases for interventions. Though they differ in regard to

execution, these practices share an underlying theoretical basis which is aimed at increasing mindfulness, which incorporates the concept of acceptance.

Mindfulness. A variety of definitions have been offered in the literature to explain the construct of mindfulness. While there is no unanimous agreement among practitioners or researchers, mindfulness can be defined as the practice of bringing a certain quality of attention to the present moment, while adopting a position of acceptance toward other internal or external stimuli that may come to one's attention (Kabat-Zinn, 1990). Mindfulness as a construct, as well as mindfulness-based practices, stem from Buddhist tradition and philosophy. However, contemporary clinicians and researchers have adapted and secularized the construct in order to make it relatable and accessible to a wider range of people (Bishop et al., 2004). In different contexts, investigators have conceptualized mindfulness as being either a state or trait (i.e., dispositional mindfulness). State mindfulness refers to a temporary change in the condition of conscious experience and attentional allocation, such that one is more mindful (e.g., when practicing awareness and acceptance). On the other hand, trait mindfulness refers to a more persistent feature of one's disposition or personality, which may be subject to change over longer periods of time (Tang, 2017).

Research on mindfulness is extensive, and wide-ranging benefits of mindfulness-based interventions have been reported in the scientific literature including: improved quality of life in cancer patients (Carlson, Speca, Patel, & Goodey, 2003), reductions in stress (Chiesa & Serretti, 2009), and reduction in symptoms among those dealing with chronic insomnia (Hubbling, Reilly-Spong, Kreitzer, & Gross, 2014). Of relevance to the current study, a recent meta-analysis by Bamber & Morpeth (2018) examined the effects of mindfulness-based interventions on anxiety symptoms in college students. They reviewed twenty-five studies utilizing mindfulness-

based interventions (e.g., Mindfulness-Based Stress Reduction, Mindfulness-Based Cognitive Therapy) and found a reduction in anxiety symptoms compared to control conditions, with a considerable effect size ($g = .56$, $p < .001$). Additionally, mindfulness has been shown to be negatively related to substance use and related problems among college students. Karyadi & Cyders (2015) examined the relationship between trait mindfulness and alcohol use behaviors in a sample of 240 undergraduates using the Five Facet Mindfulness Questionnaire (FFMQ; Baer et al., 2008) and the Alcohol Use Disorders Identification Test (AUDIT; Babor, Fuente, Saunders, & Grant, 1989). They found that higher trait mindfulness was associated with lower levels of problematic alcohol use. Additionally, when examining specific mindfulness components of awareness and acceptance, they found acting with awareness was associated with lower alcohol use, quantity, duration, and associated problems. Taken together, interventions or programs that promote mindfulness among college students have demonstrated promising results.

Within the mindfulness literature, there is no clear consensus on the ways in which mindfulness is conceptualized and operationalized. Increasing attention has been paid to the roles of specific mindfulness subcomponents, two of which appear to be well-represented across a variety of conceptual constructions. These two components are present moment awareness and acceptance. Bishop and colleagues (2004) suggested mindfulness follows a two-factor structure reflecting the self-regulation of attention and mindful acceptance. Self-regulation of attention refers to the ability to focus one's attention on present moment experiences, such as certain body sensations, thoughts, or feelings. Mindful acceptance involves the ability to adopt a position of acceptance without judgment toward those present moment experiences. The acceptance component of mindfulness is of particular import to the current study, given that it is

conceptually opposed to EA. Thus, one might anticipate that increases in the construct of acceptance will be accompanied by decreases in EA.

***Acceptance*.** When engaged in contemplative practice, such as meditation or yoga, individuals are instructed to bring a certain quality of openness to their present moment experiences. In addition to being open to these experiences, individuals are encouraged to adopt a position of non-judgment. This tolerance should extend to both internal and external stimuli. In other words, acceptance of the present moment involves allowing the current sensations, feelings, and thoughts to happen, and to disregard any expectation of having a particular or differing experience (Hayes et al., 1999). The practice of acceptance is thought to also include an individual being able to maintain a sense of curiosity about the wandering of their attention. This may involve moving attention away from the target (e.g., somatic sensations of breathing) to another internal experience (e.g., thoughts, feelings) that compete for one's attention. In sum, the cultivation of acceptance involves openness to present moment experiences, an attitude of non-judgment, and a curiosity of the wandering mind.

Interventions like Mindfulness-Based Stress Reduction (MBSR; Kabat-Zinn, 2003) and Mindfulness-Based Cognitive Therapy (MBCT; Segal, Williams, & Teasdale, 2002) aim to increase mindfulness via the practice of meditation in order to cultivate non-judgmental acceptance of present moment experiences (Kabat-Zinn, 1982). Rather than getting caught up in a state of preoccupation or avoidance of internal experiences, individuals are taught to let go of judgment, interpretation, or elaboration of present moment thoughts, feelings, or sensations. Furthermore, previous research supports the specific importance of acceptance in the teaching and cultivation of mindfulness. For example, a study conducted by Baer and colleagues (2006) examined the relation between acceptance (measured as *openness to experience*) and trait

mindfulness. In this study, 613 undergraduates were administered five questionnaires to measure mindfulness: The Freiburg Mindfulness Inventory (Walach, Buchheld, Buttenmüller, Kleinknecht, & Schmidt, 2006), the Kentucky Inventory of Mindfulness Skills (Ruth A. Baer, Smith, & Allen, 2004), the Mindful Attention Awareness Scale (Brown & Ryan, 2003), the Cognitive and Affective Mindfulness Scale (Feldman, Hayes, Kumar, Greeson, & Laurenceau, 2007), and the Mindfulness Questionnaire (Chadwick et al., 2008). They found a positive correlation between acceptance (as measured by openness to experience) and mindfulness across all scales. This supports the notion that acceptance is a core component of mindfulness. It follows conceptually, that an effective mindfulness-based intervention may have the potential to increase acceptance and decrease EA, given that acceptance and EA are diametrically opposing constructs (Walach et al., 2006).

Mindfulness and EA. The conceptual and observed relationship between mindfulness and EA reflects a relatively under-studied topic of research. EA has been considered paradoxical in nature, in that attempted thought suppression typically results in the inability to stop thinking said thoughts. A classic example of this phenomenon is the vivid imagery that typically follows when someone is told not to think of a pink elephant. The exercise of instructing individuals not to think of something is commonly used in mindfulness-based interventions. The purpose of the exercise is for individuals to realize that conscious efforts to suppress thoughts are often futile. Namely, the more effort one exerts, the more the thoughts or feelings seem to persist (Wegner & Erber, 1992). However, mindfulness practices promote an awareness and acceptance of those thoughts, and allowing them to pass in favor of attention to the present moment. It stands to reason that mindfulness-based interventions may be useful for interrupting the paradoxical cycle of thoughts and failed suppression, thus contributing to decreases in EA.

Additionally, EA involves avoidance of situations that remind an individual of particular internal experiences, thus leading to a constriction of experiences. Mindfulness-based interventions may interrupt this process by helping individuals to experience their thoughts and feelings in a way that carries a less intense emotional valence, less judgement toward the thought/feeling or toward the self, and more awareness of the distinction between the individual having the internal events and the thoughts or feelings themselves. By altering the way a person relates to internal experiences, mindful-based interventions may be able to help reduce the urge to avoid aversive or challenging experiences.

Due to the paucity of research on this topic, we are limited to speculating how these interventions may affect the process of developing EA as a coping strategy. Preliminary research has supported a negative association between the constructs of mindfulness and EA (Thompson & Waltz, 2010; Mahoney, Segal, & Coolidge, 2015). Additionally, another study supported the idea that EA serves as a potential mediator between dispositional mindfulness and compulsive sexual behavior among men in a residential treatment facility (Brem, Shorey, Anderson, & Stuart, 2017). The existing literature is limited to mostly correlational studies of self-reported EA and mindfulness measures, with a lack of experiments looking at the effects of mindfulness-based interventions on reported EA. Thus, the current study aimed to address this knowledge gap by elucidating the potential effects of a mindfulness-based practice on levels of reported EA. In an effort to further expand the EA literature, it is essential to consider other forms of contemplative practice that incorporate mindful awareness and acceptance, including movement-based practices like yoga. Yoga's theoretical and philosophical basis is closely aligned with the constructs of mindfulness, acceptance, and EA. Yoga is also categorically considered a form of contemplative practice, which as previously discussed, is a superordinate umbrella category of

interventions and practices. Additionally, several yoga-based interventions have been manualized, popularized, and demonstrate benefits for psychological outcomes. Despite being a strong candidate for further investigation, no studies (to date) have examined the effects of a yoga-based intervention on a measure of EA.

Yoga. Yoga has become an increasingly popular subject of research with respect to a variety of populations and psychological outcome measures including: cancer patients, elderly individuals, individuals with anxiety and depression, elementary school students, and college students (Banasik, Williams, Haberman, Blank, & Bendel, 2011; Gonçalves, de Souza Vale, Fontes Barata, Varejão, & Martin Dantas, 2011; Katzman et al., 2012; Butzer et al., 2015; Falsafi, 2016). Yoga can be described as a holistic system of practices aimed at increasing balance, muscle strength, flexibility, somatic awareness, and respiratory function. Additionally, yoga incorporates mindful attention to the body and somatic sensation, with the goal of developing mind-body awareness and related benefits to both mental and physical health (Butzer, Bury, Telles, & Khalsa, 2016). Yoga stems from ancient Indian culture and was originally intended to help individuals advance spiritually (Taimni, 1975). However, as the practice of yoga spread across the world to Western cultures and became the subject of scientific research, many types of yoga practice were secularized.

Spiritual roots aside, yoga practices have maintained a theoretical focus on improving one's physical and mental health. The idea that yoga practices can influence mental health began with descriptions from the sage Patanjali (*circa* 900 B.C; Telles & Singh, 2018). Ancient yogic texts describe two particular mental states that can be accessed through the practice of yoga, which bare a remarkable resemblance to the two-component model of mindfulness (i.e., awareness and acceptance). In *Patanjali's Yoga Sutras*, he describes two mental states that are

supposed to be achieved in succession through yoga practice. The first is *Dharana*, which describes "focusing with effort". This parallels Kabat-Zinn (1990)'s definition of mindfulness when he describes it as "paying attention, on purpose", as well as the first component of the current psychological conceptualization of mindfulness—awareness. The second mental state described by Patanjali is *Dhyana*, which refers to "effortless expansion." *Dhyana* represents an uninterrupted connection between the mind and the object of one's attention during practice (e.g., the breath). In order to achieve *Dhyana*, one must adopt a position of non-judgement (i.e., acceptance) to their present moment experiences, with a gentle but persistent attention to the object of practice. Patanjali goes on to describe the practice of yoga as "the cessation of the turnings of thought". These writings imply that the practitioner trains to become an impartial and transient observer of arising thoughts and feelings, as well as potentially distracting external events, while maintaining attentional awareness of present moment experiences or the object of practice. These fundamental ideas form the basis of many modern-day yoga practices and interventions.

Modern-day interventions and practices are derived from a variety of yogic traditions, and though the majority incorporate elements of physical exercise (e.g., strength training, stretching), the embodiment aspect of yoga differentiates it from a purely physical practice. Embodiment refers to the process of attending and responding to the sensations of the body, and is a hallmark of many mindfulness practices (Impett, Daubenmier, & Hirschman, 2006). In addition to cultivating increased awareness of bodily sensations, the practitioner is encouraged to respond with a nonjudgmental view of the felt-experiences of the body (2006). In this way, individuals learn to practice within a set of comfortable limits while still allowing space to challenge the body physically from a nonjudgmental perspective (Schiffmann, 1996). Engaging

in physical practices that incorporate embodiment may encourage acceptance of the felt sensations of the body and reduce the likelihood of avoiding these experiences.

Given that yoga is rooted in mindfulness practices, it is not surprising it has gained considerable attention among both contemplative and non-contemplative researchers. Previous research suggests yoga may be a useful intervention for various physiological states and somatic ailments. Yoga-based interventions have shown promise for mitigating cardiovascular disease risk factors (Cramer et al., 2014), reducing pain in women with fibromyalgia (Curtis, Osadchuk, & Katz, 2011), and decreasing levels of cortisol (West, Otte, Geher, Johnson, & Mohr, 2004) when compared to exercise or a non-treated control group. Furthermore, a meta-analysis conducted by Pascoe and colleagues (2017) provides strong evidence for yoga on physiological measures related to the human stress response. The authors examined 42 studies and found that interventions including yoga *asanas* (physical postures) were associated with reductions in evening and waking cortisol, resting heart rate, cholesterol, ambulatory systolic blood pressure, and fasting blood glucose, as well as reductions in high frequency heart variability, when compared to an active control group. These findings strongly support the notion that yogic practices can alter the functioning of the autonomic nervous system, the hypothalamic-pituitary-adrenal axis, and markers of metabolic function.

There is also considerable evidence that yoga effects aspects of psychological functioning and symptomatology, including a reduction in symptoms of anxiety (Pascoe & Bauer, 2015) and depression (Cramer, Anheyer, Lauche, & Dobos, 2017), increased levels of psychological well-being (Hadi & Hadi, 2007), as well as increased self-compassion and decreased perceived stress (Riley & Park, 2015). Findings from studies of yoga-related effects in college students are particularly relevant to the present study. A meta-analysis conducted by Gothe & McAuley

(2015) included fifteen randomized controlled trials (RCTs) of interventions and 7 single-exposure studies that involved pre- and post-test comparisons. Their analysis of RCTs indicated a moderate effect of yoga on cognition (g = 0.33), as well as attention and processing speed (g = 0.29), followed by executive function (g = 0.27) and memory (g = 0.18). Across acute exposure studies, a stronger overall effect of yoga on cognition was found (g = 0.56), with the strongest effect for memory (g = 0.78), followed by attention and processing speed (g = 0.49), and executive functioning (g = 0.39). Other lines of research have examined yoga-based interventions with respect to psychological symptoms among undergraduates. One study found positive effects on body-image dissatisfaction among college women (Ariel-Donges, Gordon, Bauman, & Perri, 2018). These findings provide preliminary support for the benefits of yoga-based interventions among college students. However, caution is warranted when discussing the mental and physical health benefits of yoga, as the field is relatively young and there are important methodological limitations, which will be discussed in subsequent sections.

Yoga as an intervention for EA. The philosophical orientation and practice of yoga is closely aligned with the constructs of mindfulness, acceptance, and EA, thus, it makes sense to examine whether these psychological constructs can be altered with yoga-based interventions. A recent literature search reveals no studies of yoga-based interventions with respect to the construct of EA, underscoring the need for foundational studies. Given that yoga has a theoretical focus on increasing the awareness and acceptance of physical and psychological states, and considering the antithetical nature of EA and acceptance, it follows conceptually that a yoga intervention may reduce one's level of EA. Additionally, not only has yoga become increasingly popular in research and schools, but it has become a widely accepted form of physical activity in the western culture. Thus, the acceptability and potential scalability of this

type of intervention with various populations is promising. More research is needed in order to address methodological limitations of previous yoga research, as well as elucidate the potential relation between EA, yoga, SPD, and substance use. Thus, addressing these gaps and limitations served as an aim of the current research.

Research Goals

The purpose of the current study was to examine the effect of a yoga-based intervention on EA, as well as measures of SPD (i.e., anxiety, depression) and substance use in a sample of undergraduate students. Students self-selected to participate in the yoga-based intervention, and they were compared to students who self-selected into an active control condition (i.e., a basic exercise class). Additionally, this study attempted to address methodological limitations of previous research. Specifically, it addressed the relative paucity of replication studies of yoga interventions among college students by examining psychological outcomes and coding fidelity of intervention implementation. Additionally, it utilized a quasi-experimental research design with an active control group, as opposed to a waitlist control group. When indicated (e.g., baseline differences in groups), pre-intervention differences in relevant psychological constructs and outcomes variables were statistically controlled for. Finally, as mentioned previously, this study was designed to generate much-needed data on the effects of yoga on EA. As such, the current study attempted to address important gaps in the existing literature.

Aim 1. The current study examined whether a yoga intervention was successful in decreasing reported SPD and substance use in a population of college undergraduates compared to an active control condition. Specifically, self-reported anxiety and depressive symptoms were assessed to represent a measure of SPD. It was hypothesized that undergraduates in the experimental condition would demonstrate lower SPD and substance use scores at the post-

intervention time point and more negative changes in symptoms from pre- to post-intervention compared with active controls.

Aim 2. The current study examined whether a yoga intervention was successful in decreasing EA compared to an active control. It was hypothesized that the yoga intervention group would demonstrate lower levels of EA at the post-intervention time point as compared to active controls.

Aim 3. The current study evaluated whether changes in reported SPD and substance use were mediated by changes in EA. Specifically, we tested the hypothesis that changes in EA (from pre- to post-intervention) would account for a significant portion of the variance in the changes of outcome measures. It was hypothesized that larger decreases in EA would be predictive of greater reductions in SPD and substance use, and that these changes would be larger in the yoga intervention group than in the control group.

Method

Participants

Participants were 43 undergraduate university students (M_{age} 19.78= , SD = 1.47) at a private research university in the Northeast. Students were enrolled in three half-semester physical education classes on campus over the course of three semesters, for a total of four Waves of data collection (see Table 1). Students over eighteen years of age and volunteering for research participation were eligible to participate in the study.

Primary Measures

All participants completed the following measures via an email link (see **Appendix A** for a copy of all measures). Participants were given one week to complete the survey for each time point.

Demographics. Demographics including: age, year in school, major, gender identity, and racial/ethnic identity were assessed. Given that the current study collected data over the span of three academic semesters, student rosters were provided by the instructors of each class in order to collect information about the semester each student took the physical education class, as well as the time and day the class was taken. Attendance records were also provided by the instructors. Previous experience and frequency of mindfulness, meditation, yoga, stress management practices, or therapeutic services both before and since enrolling in the yoga or exercise class were also assessed.

Experiential avoidance. Self-reported levels of EA were measured using the Multidimensional Experiential Avoidance Questionnaire (MEAQ; Gámez, Chmielewski, Kotov, Ruggero, & Watson, 2011). This scale consists of sixty-two items, including statements about cognitive, emotional, and behavioral experiences. For example, individuals were asked to rate the extent to which they agree with the following statement: "I won't do something if I think it will make me uncomfortable". Responses were along a 6-point scale, where 1 = strongly disagree and 6 = strongly agree. This scale yielded a total EA score, as well as a total for six subscales: Behavioral Avoidance, Distress Aversion, Procrastination, Distraction & Suppression, Repression & Denial, and Distress Endurance. This scale has demonstrated good internal consistency (alpha = .83), significant relations to other measure of avoidance, and has shown greater discrimination in relation to neuroticism relative to preexisting measures of EA. Additionally, the MEAQ has demonstrated significant associations with psychopathology and quality of life (Gámez et al., 2011).

Symptoms of psychological distress. SPD (e.g., depression and anxiety) was assessed using the Brief Symptom Inventory 18 (BSI-18; Derogatis, 1993). This scale consists of eighteen

items that assess for various problems and symptoms related to psychological distress and psychiatric disorders, including examples like “feelings of hopelessness about the future” and “feeling so restless you couldn’t sit still”. Individuals were asked to indicate the presence and severity of symptoms over the past seven days. Answers were indicated on a 5-point scale, where 0 = not at all, and 4 = extremely. The BSI-18 is a shortened version of the Symptoms-Checklist 90-Revised (Derogatis & Savitz, 1999). The BSI-18 yields raw and normalized *t*-scores for each of the three Primary Symptom Dimensions (i.e., Somatization, Depression, and Anxiety) as well as a Global Severity Index. The BSI-18 has good internal consistency (alphas > .80) and convergent validity (alpha > .70; Franke et al., 2017).

Substance use. Substance Use was assessed using a combination of the CRAFFT questionnaire (Knight et al., 1999), as well as a single question adapted from the Brief Screener for Tobacco, Alcohol, and Other Drugs (BSTAD; Kelly et al., 2014). The CRAFFT questionnaire is a nine item screening tool used to assess the frequency and context of alcohol and recreational drug use. Individuals are asked to indicate how many days in the past year they have used alcohol, marijuana, or substances to get high. The name CRAFFT is an acronym of the first letter of six key words of items that assess the details and context of Substance Use (i.e., Car, Relax, Alone, Forget, Friends, Trouble). For these six items, individuals were asked to indicate whether (i.e., “yes” or “no”) various examples of Substance Use apply to their own life. Examples include: “do you ever use alcohol or drugs to relax, feel better about yourself, or fit in?” and “have you ever gotten in trouble while you were using alcohol or drugs?”. Because the CRAFFT does not ask about tobacco use, a single question from the BSTAD was used to assess frequency of tobacco use: “During the past 12 months, on how many days did you smoke cigarettes or use other tobacco products (vape, juul, dip, chew)”. Scores from Time 1 served as

the controlling measure, while Time 2 scores reflected substance use since starting the yoga or basic exercise classes. The CRAFFT yields a total score (0-6), with scores greater than or equal to 2 indicating a positive screen, requiring additional assessment. The current study utilized the total score to represent Substance Use in the analyses. The CRAFFT shows modest to good internal consistency (alpha range = .65-.86) and has high test-retest reliability (alpha = .93; Dhalla, Zumbo, & Poole, 2011).

Mindfulness. Mindfulness was assessed using the Mindful Attention Awareness Scale – State Version (MAAS; Brown & Ryan, 2003). This scale consists of five items, including statements describing a receptive state of mind in which attention is informed by a sensitive awareness of experiences in the present moment. Items include statements such as: "I was finding it difficult to stay focused on what was happening." Individuals were asked to rate the frequency of such statements on a seven-point scale (e.g., 0 = not at all, 6 = very much). This scale yields a total score of mindfulness. The MAAS (alphas > .80) has demonstrated good internal consistency, test-retest reliability, and discriminant, convergent, and criterion validity (2003).

Procedure

Undergraduate students enrolled in a basic exercise class and a beginner yoga class were recruited to participate in the study. During the first class meeting of the semester, students were given a brief oral presentation by the author to inform them about the study. Students were informed verbally and through an electronic consent form that they may choose not to participate at any time, and that no negative consequences or grade penalties would happen as a result.

Data collection occurred at two different time points: at the start of the class (pre-intervention; first class meeting) and at the end of the class (post-intervention; final class

meeting). Participants were granted access to a series of questionnaires to be completed online. A secure online Qualtrics survey link was emailed by the author directly to students, which was completed on personal smartphones or computers. These surveys took approximately 10 minutes to complete for each time point. During the recruitment presentation, participants were informed of an opportunity to receive compensation provided to those who complete both pre- and post-intervention data collection. These participants were entered into a raffle in which five winners (based on randomly generated numbers) had their choice of either a free yoga mat or a $10 Amazon gift card. In the event that participants dropped out of the study, they were thanked for their time and reminded that there were no negative consequences for study withdrawal. Participants had exactly one week to complete each survey before access to the Qualtrics link was closed.

Intervention. This study evaluated the effectiveness of a manualized mindfulness-based yoga intervention, which formed the basis for the beginner yoga course. Kripalu Yoga in the Schools (KYIS) is a secular, school-based intervention that includes traditional yoga training and targets social-emotional well-being. The KYIS curriculum was developed to increase students' self-awareness, self-management, social awareness, relationship skills, and responsible decision-making. These core values are based on the Collaborative for Academic, Social, and Emotional Learning (CASEL) standards (CASEL, 2013). In the KYIS intervention, thematic elements addressing the cultivation of social-emotional skills include introducing the body's basic physiological responses to stress, as well as developing compassion both for the self and others. Instructors complete a one-week, 55-hour training program at the Kripalu Center for Yoga and Health. The curriculum includes 24 sessions in total that each follow the same structure. Each session is designed to span 45 minutes. The current study utilized an adapted 14-session version

of the intervention given that class meets twice a week for seven weeks. The following KYIS sessions were included in the intervention: 1, 2, 4, 5, 6, 7, 9, 10, 11, 13, 14, 15, 16, 24. It should be noted that because only 14 out of 24 sessions were administered, there was minor as well as substantive content of the intervention that participants did not have exposure to. This included: a few standing and sitting postures, practicing compassion for others (sessions 17 and 18), how to create a kinder world (session 19), and interdependence and interconnectedness of communities and relationships (sessions 21, 22, and 23). The KYIS sessions were delivered twice a week and each session was 80 minutes in length. Thus, the total intervention contact time was approximately 18.67 hours.

Each session began with a centering or breathing exercise, such as a silent check-in, in which students took a moment to focus attention on their present moment experience in order to notice any emotions, thoughts, or physical sensations that may arise. This was then followed by the introduction of didactic content to provide a context for the experiential activities students engaged in. Didactic content included introducing students to what is meant by "present-moment awareness" and how to develop awareness of multiple aspects of experience (e.g., body, thoughts, emotions, etc.). Students then engaged, or were encouraged to engage, in experiential activities (e.g., mindful journaling, discussion) to reinforce didactic content, create community among their peers, and encourage students to participate in the learning process. Lastly, students were introduced to various physical yoga practices such as postures and breathing techniques. The purpose of these physical practices was to help students focus on bodily sensations, thoughts, and feelings as they experience them in the present moment.

Undergraduate students enrolled in PED 201: Beginner Yoga at Syracuse University served as the intervention group. The instructor of the class has a B.A. in Integrative Arts, an

MSLIS, as well as a Certificate of Advanced Study in School Media. She has extensive experience teaching yoga to children, families, public school students, as well as college students. She has completed a 200-hour certification from the Kripalu Center for Yoga and Health and is specifically certified to teach the KYIS curriculum. She was responsible for delivering the intervention and was not involved in data collection or the handling of identifying information related to study participants.

Active control. Undergraduate students enrolled in PED 226: Bootcamp Fitness, as well as PED 249 Body Works, at Syracuse University served as the active control group. Bootcamp Fitness is designed to teach students to strengthen and condition the body through intervals of aerobic training, and to engage in exercises and stretches to improve flexibility and prevent injury. Similarly, Body Works is designed to teach students low impact exercises that target all muscles of the body. Each class began with a warm-up and light stretching, followed by a combination of cardio and strength training exercises. Both classes typically followed an interval-style training regimen. These classes provided a well-matched comparison condition (i.e., active control) because they both consisted of physical activity as well as didactic content. Additionally, these classes were the same duration and frequency as the KYIS condition. The physical component of the control condition entailed engaging in low impact physical exercises, which reflect a similar level of physical demand required for engaging in yoga postures in the KYIS condition. The control condition's didactic component consisted of basic information about the body and how to exercise in a safe way to avoid injuries. This parallels aspects of the KYIS condition's content, in that the intervention also included basic information about the body's physiological systems (e.g., the body's response to stress). Both classes were taught by an instructor who is a certified Exercise Physiologist by the American College of Sports Medicine.

Additionally, the instructor has a B.A. in Health Administration, as well as a M.A. in Public Administration and Healthcare.

Fidelity Monitoring

A step-by-step KYIS component protocol checklist (see Appendix A) was completed by the interventionist, as well as a research assistant during the KYIS sessions to check for fidelity of intervention implementation. Four waves of the intervention were delivered over the course of three academic semesters. A portion of the sessions were coded by both the interventionist as well as a research assistant. The research assistant served as an independent observer, which allowed us to analyze observer agreement. Thus, inter-rater agreement was calculated for those sessions that were coded twice.

Power Analysis

An *a priori* power analysis was conducted in order to compute the required sample size for the current study. The effect size used in the analysis was based on a systematic review and meta-analysis conducted by Klatte and colleagues (2016). This study examined the efficacy of yoga in the treatment of a variety of mental disorders (diagnosed by ICD or DSM-5 criteria) as measured by symptom severity. They included 25 studies in the analysis with a total of 1339 subjects. The efficacy of yoga was calculated when compared to the following control groups: untreated, attention control, physical exercise, and standard psychotherapy. Due to the paucity of research examining yoga with the desired outcome measures and population of interest, this meta-analysis conducted by Klatte and colleagues (2016) represented the best fitting reference in which to extract effect sizes. Additionally, and similar to the studies included in the meta-analysis, the current study examined a measure of psychopathological symptoms and utilized an active control in the form of physical exercise. Thus, based on the outcome data from this study

examining the effects of yoga on psychopathological symptoms and severity compared to physical exercise (g = 0.30), we determined that it would be necessary to acquire a sample size of 90 (n = 45 per condition) to test for statistical significance (α = 0.05) at a power level of β = 0.8.

Analysis Plan

In order to assess the effects of the KYIS intervention, as compared with an active control condition, a between-groups design was used with repeated measures taken at two time points.

Preliminary analyses. Prior to the analyses, missing data was handled using multiple imputation. Multiple copies of the original dataset were created with the missing values being replaced by imputed values. The model of interest was then fit to each of the imputed datasets. This method aimed to predict plausible imputed data based on the observed data. Imputation accounts for uncertainty in predicting the missing values by including variability into the multiple imputed values. Group differences at the pre-intervention time point were evaluated using four separate one-way ANOVAs for each dependent measure, as well as Age. Any significant ANOVAs were explored using post-hoc independent sample *t*-tests. Additionally, group differences at Time 1 between the four waves (Table 1) were also examined for each of the three dependent variables (i.e., EA, SPD, Substance Use), as well as Age, using four separate one-way ANOVAs. Significant effects were followed up with a series of post-hoc independent samples *t*-tests to examine the nature of the difference, and the appropriate variables were included as covariates in subsequent analyses. Differences in gender were not examined given that there were too few males (n = 7) in the sample to make sense of gender differences. Additionally, descriptive statistics and zero-order correlations were calculated for each study measure (i.e., EA, SPD, Substance Use, and Mindfulness).

Aims 1 and 2. In order to assess whether the KYIS intervention was effective in decreasing SPD, Substance Use, and EA among college students, a repeated-measures MANOVA (RM-MANOVA) with two within-subject measurements (i.e., Time 1 and Time 2) was used as an omnibus test for overall model significance, with subsequent RM-ANOVAs for each dependent measure. The MANOVA *F* test is robust to potential non-normality when caused by skewedness, rather than by outliers. This is especially the case when sample sizes are approximately equal, such as the case in the current study. The RM-ANOVAs yielded the main effects of Group and Time, as well as a Group x Time interaction term, and model significance. The significance of the overall model and the Group x Time interaction term was evaluated based on a Bonferroni-corrected $\alpha = 0.017$, reflecting adjustment for the three dependent variables. Because the Group x Time interaction term reflects the primary contrast of interest for Aims 1 and 2, significant interactions were followed-up with pairwise post-hoc *t*-tests both between samples at each time point, and within samples over time.

Prior to the RM-ANOVA, dependent measures were examined to ensure they fit the assumptions required by the RM-ANOVA. Specifically, the normality of dependent measure distribution was assessed using a visual inspection of histograms and the Shapiro-Wilk's method. If the data was not normally distributed, data was logarithmically transformed and the assumption of normality was re-examined. Next, the data was evaluated for potential outliers, defined as > 1.96 *SD*s above or below the mean. If outliers were present, all analyses were repeated along two branches, reflecting inclusion and exclusion of outlying data, in order to determine whether these data points were influential. If results of the two-branch analysis were not comparable, outliers were winsorized to 1.96 *SD*s from the mean (i.e., 5^{th} and 95^{th} percentiles) and the primary analyses were performed on the transformed data. If the results of

the two-branch analysis were comparable with respect to *p*-values and effect size estimates, then these outliers were retained without transformation.

Aim 3. Mediation analyses were conducted to examine whether observed changes in SPD and Substance Use were mediated, at least in part, by changes in EA. Ordinary least squares (OLS) regression-based path analyses were used to analyze the direct and indirect effects of the intervention group on measures of SPD and Substance Use, with mediation of indirect effects through changes in EA.

In the classic model of mediation proposed by Baron and Kenny (1986; Figure 1), path "C" demonstrates a direct effect of the independent variable (i.e., *X*) on the dependent variable (i.e., *Y*). Additionally, this model depicts indirect effects of *X* on *Y* in relation to the mediator (*M*). These include an effect of *X* on *M* (path "A"), as well as an effect of *M* on *Y* (path "B"). A longitudinal adaptation of the classic mediation model was used (Figure 2), including *X*, *M*, and *Y* variables with subscripts to indicate time of measurement (either Time 1 or Time 2), as well as *a*, *b*, *c*, and *s* to represent regression coefficients. The proposed study tested a model in which the total effect of X_{T1} (i.e., intervention *vs.* active control) on Y_{T2} (i.e., Time 2 SPD or Substance Use) was represented as the direct effect of path "*c*'." The indirect effect (path "a_1" multiplied by path "b_1") represented the proportion of the total effect of X_{T1} on Y_{T2} (Time 2 SPD or Substance Use; see Figure 2) that could be attributed through M_{T2} (i.e., Time 2 EA). Mediation analyses were conducted via the PROCESS macro for SPSS. Specifically, model 4 in the PROCESS macro was used to test our predictions (Hayes, 2017). This macro utilized Time 1 measurements (i.e., lags) of EA (i.e., M_{T1}), and SPD and Substance Use (i.e., Y_{T1}) as covariates in the model, which helped account for potential selection bias and clarify the specific effects of the intervention.

Prior to mediation analyses, assumptions of this statistical method were tested. First, to ensure the assumption of linearity was satisfied, bivariate scatter plots were created for all continuous variables (e.g., EA, Psychopathology, Substance Use). This allowed for the detection of curvilinear relations. Second, multicollinearity was tested by calculating a Variance Inflation Factor (VIF). A VIF > 10 indicates that multicollinearity may be present. If multicollinearity was found, the data was mean-centered. Third, homoscedasticity was examined via scatter plot and if present, the data was logarithmically transformed. Finally, detection of outliers was tested and treated as previously described.

Exploratory analyses. It is possible that group differences from Time 1 to Time 2 may be observed on the various facets or subscales of EA (i.e., Behavioral Avoidance, Distress Aversion, Procrastination, Distraction & Suppression, Repression & Denial, and Distress Endurance). Thus, Aims 1 and 2 were tested again (i.e., using a RM-MANOVA with subsequent RM-ANOVAs) using each of the six subscales as an outcome variable. Additionally, it is possible that group differences from Time 1 to Time 2 may be observed on the subscales of the SPD measure (i.e., Anxiety, Depression). To test this, Aims 1 and 2 were tested again using Anxiety and Depression each as an outcome variable.

Results

Descriptive Statistics

Descriptive statistics for study measures can be found in Table 2. The sample (n = 43) was predominately female (84%) and seniors (38%) in college. Ethnic/racial identity was indicated as follows: White (72%), Asian (12%), Hispanic or Latino (9%), and Black or African American (7%). Students enrolled in a beginner yoga class served as the intervention group (n = 23), while students enrolled in two basic exercises classes (n = 20) that both incorporate aerobic

and strength training served as the active control group. The active control group consisted of students enrolled in either a Bootcamp Fitness (n = 14) or a Body Works (n = 6) general physical education class. Based on data from the Student Enrollment Fall 2019 census, obtained from the Office of Institutional Research and Assessment, our sample does not seem to be comparable to the gender and racial composition of the general Syracuse University student body as a whole (53.4% female; 56.2% White).

Attendance records for Wave 1 of the intervention group were not obtained given that there were no students who signed up to participate in the study for the first Wave. Attendance records for the intervention group were able to be accessed for Waves 2, 3, and 4. For these participants, 87% had perfect attendance (i.e., did not miss any sessions). Of the students that did miss sessions, 2 students missed one session, and 1 missed two sessions. Since this was a class taught in the context of a for-credit university course, there was an attendance policy for students. They were permitted to miss two sessions without any grade penalty. Each additional missed class resulted in five points being deducted from their final grade.

Attendance records for Wave 1 of the active control group were not accessible because they were requested retroactively and instructor did not have them on file. Additionally, no attendance records were available for Wave 2 given that no data collection for the active control group occurred for Wave 2. Attendance records for the active control group were able to be accessed for Waves 3 and 4. For these participants, 86% had perfect attendance and two students missed one session. The attendance policy for students in the control classes were as follows: each student was permitted to miss two sessions without a grade penalty, and their grade dropped by a letter for each additional session missed.

Fidelity

The number of sessions delivered was 54 out of a possible 56 (14 sessions * 4 waves). Two sessions were not delivered due to fire alarms in the building where the intervention was taking place. 53 of the sessions were coded by the interventionist, and 23 of those sessions were also coded by an independent observer. Of the sessions delivered, fidelity and inter-rater agreement were 100%.

Preliminary Analyses

Prior to the analyses, missing data was handled using multiple imputation. The number of missing cases was 2.3% (n = 1). This case was missing 14 variables (i.e., five questions on the MAAS-State, nine questions on the CRAFFT). Differences in demographic composition between the intervention and active control groups was analyzed for Age, Race, and Gender. A Mann-Whitney U test indicated that age did not differ between the intervention and control groups, U = 191.5, p = 0.34. A chi-squared test of independence revealed no significant association between Group and Race (i.e., 0 = white, 1 = non-white), X^2 (1, N = 43) = 0.003, p = 0.96. Finally, a Fisher's Exact Test did not indicate a significant association between Group and Gender (0 = female, 1 = male), OR = 0.29, p = 0.22.

Next, dependent measures were examined to ensure they fit the assumptions required by the RM-ANOVA. The EA and SPD variables were normally distributed, thus the variables did not need to be transformed. The Substance Use variable turned out to be positively skewed and thus was logarithmically transformed. However, following a log transformation with the addition of a constant, the assumption of normality was still violated with an even smaller p-value on the Shapiro-Wilk normality test. It was decided to retain the variable untransformed given that a MANOVA is robust to non-normality when caused by skewedness rather than outliers, and no outliers were present for Substance Use. Three outliers were present for the EA variable, thus all

analyses were repeated along two branches. The results of the two-branch analysis were comparable with respect to *p*-values and effect size estimates, so these outliers were retained within the analyses.

Finally, group differences at the pre-intervention time point were evaluated using four one-way ANOVAs with the following measures: SPD, Substance Use, EA, and Age. Results indicated a significant difference between groups for EA, $F(1, 41) = 6.81$, $p = 0.01$. A post-hoc independent samples *t*-test revealed that those in the intervention group ($M = 219.52$, $SD = 39.88$) had significantly higher EA scores at Time 1 compared to active controls ($M = 192.20$, $SD = 26.23$), $t(41) = -2.61$, $p = 0.01$. No significant differences were observed for Time 1 SPD, $F(1, 41) = 3.01$, $p = 0.09$, Time 1 Substance Use, $F(1, 41) = 1.66$, $p = 0.21$, or Age, $F(1, 41) = 0.85$, $p = 0.36$. Age, as well as differences in Time 1 scores for EA, SPD, and Substance Use were also examined across the four waves. Results of the one-way ANOVAs (Table 3) indicated a significant difference in SPD, $F(1, 41) = 10.20$, $p = 0.002$. Post-hoc comparisons revealed that Wave 4 ($M = 10.09$, $SD = 7.99$) had significantly lower BSI scores at Time 1 compared to Wave 1 ($M = 34.00$, $SD = 11.35$, $t(15) = 5.09$, $p < 0.001$), Wave 2 ($M = 28.60$, $SD = 8.26$, $t(14) = 4.25$, $p < 0.001$), and Wave 3 ($M = 34.43$, $SD = 13.32$, $t(30) = 5.54$, $p < 0.001$). There were no statistically significant differences in scores between Wave 1 and 2, Wave 1 and 3, or Wave 2 and 3 (p's > 0.05).

Test of Aims 1 and 2

In order to assess whether the KYIS intervention was effective in decreasing SPD, Substance Use, and EA, a repeated-measures MANOVA (RM-MANOVA) with two within-subject measurements (*i.e.*, Time 1 and Time 2) was used as an omnibus test for overall model significance, with subsequent RM-ANOVAs for each dependent measure (Table 4). Results of

the MANOVA indicated no significant Group X Time interaction in predicting the set of dependent measures, $F(3, 80) = 0.26$, $p = 0.85$, $\eta_p^2 = 0.01$. Subsequent RM-ANOVAs revealed no significant Group X Time interactions for EA, $F(1, 81) = 0.11$, $p = 0.74$, SPD, $F(1, 81) = 0.16$, $p = 0.69$, or Substance Use, $F(1, 81) = 0.74$, $p = 0.39$.

Due to observed differences in Wave on Time 1 SPD, both Wave and SPD were included as covariates in the analyses when EA or Substance Use was the outcome variable. Thus, the RM-ANOVAs for Aims 1 and 2 were conducted without any covariates (i.e., as reported above), with Time 1 SPD as a covariate, with Wave as a covariate, and with Time 1 SPD and Wave both as covariates. This did not change results, all *p's* > 0.05. Furthermore, because differences in Time 1 EA were observed between the two conditions, Time 1 EA scores were used as a covariate (both individually as well as in combination with Time 1 SPD and Wave) in the analyses when SPD or Substance Use was the outcome variable. This did not alter results either, all *p*'s > 0.05.

Results of the MANOVA omnibus test did indicate a significant Group effect $F(3, 80) = 4.21$, $p = 0.008$, partial $\eta^2 = 0.14$. Subsequent RM-ANOVAs indicated a significant Group effect for SPD $F(1, 81) = 8.67$, $p = 0.004$, such that the KYIS group had higher average SPD ($M = 29.28$, $SD = 12.49$) compared with the control group ($M = 22.5$, $SD = 12.48$). Additionally, there was a significant Group effect for EA $F(1,81) = 13.75$, $p = 0.0004$, such that the KYIS group ($M = 214.85$, $SD = 38.72$) had higher levels of EA, as compared with controls ($M = 189.90$, $SD = 28.41$). Post-hoc analyses indicated no significant difference in SPD between the intervention and active control, all *p*'s = > 0.017.

Test of Aim 3

A mediation model was used to explore whether observed changes in SPD and Substance Use were associated with changes in EA (Table 5). No curvilinear relations were detected, and a VIF of < 10 was observed, indicating no presence of multicollinearity. The homoscedasticity assumption was also retained.

SPD. In Step 1 of the mediation model, the regression of Group on SPD (no mediator included in model), after controlling for Time 1 EA and Time 1 SPD, was not significant, b = -0.01, $t(38)$ = -0.04, p = 0.97. Step 2 showed that the regression of Group on the mediator (EA), after controlling for Time 1 EA and Time 1 SPD, was also not significant b = -0.11, $t(38)$ = -1.69, p = 0.10. Step 3 of the mediation process showed that the regression of EA on SPD, controlling for Group, Time 1 SPD, and Time 1 EA, was not significant b = 0.14, $t(38)$ = 0.33, p = 0.74. Step 4 of the analyses revealed that, controlling for Time 2 EA, Time 1 EA, and Time 1 SPD, Group was not a significant predictor of SPD, b = 0.01, $t(37)$ = 0.05, p = 0.96. A Sobel test was conducted and found no mediation in the model (z = -0.28, p = 0.78) with an indirect effect size of -0.02.

Substance use. In Step 1 of the mediation model, the regression of Group on Substance Use (no mediator included in the model), after controlling for Time 1 EA and Time 1 Substance Use, was not significant, b = -0.34, $t(38)$ = -1.08, p = 0.29. Step 2 showed that the regression of Group on the mediator (EA), after controlling for Time 1 EA and Time 1 Substance Use, was also not significant b = -0.10, $t(38)$ = -1.54, p = 0.13. Step 3 of the mediation process showed that the regression of EA on Substance Use, controlling for Group, Time 1 Substance Use, and Time 1 EA, was not significant b = -0.00, $t(37)$ = -0.00, p = 0.99. Step 4 of the analyses revealed that, controlling for Time 2 EA, Time 1 EA, and Time 1 Substance Use, Group was not a significant predictor of Substance Use, b = -0.34, $t(37)$ = -1.03, p = 0.31. A Sobel test was

conducted and found no mediation in the model ($z = 0.00$, $p = 0.99$) with an indirect effect size of 0.00.

Exploratory Analyses

Exploratory analyses were conducted in order to look at potential changes from Time 1 to Time 2 between the intervention and active control on the six subscales of EA: Behavioral Avoidance, Distress Aversion, Procrastination, Distraction & Suppression, Repression & Denial, and Distress Endurance (Table 6). Results of a RM-MANOVA indicated no overall model significance between the intervention and active control group on any of the six EA subscales over time, $F(6, 77) = 0.29$, $p = 0.94$, partial $\eta^2 = 0.02$. Furthermore, a RM-MANOVA was conducted to explore potential changes in Anxiety and Depression between groups from Time 1 to Time 2. Results indicated no overall model significance between the intervention and active control group on Anxiety or Depression over time, $F(2, 81) = 0.0.27$, $p = 0.77$, partial $\eta^2 = 0.01$ (Table 6).

Discussion

The current study was conducted in order to examine whether a yoga intervention was successful in decreasing reported Experiential Avoidance, SPD, as well as Substance Use in a sample of undergraduates. We also wanted to test the potential mediating role of EA, such that observed changes in SPD and Substance Use were associated with changes in EA. Additionally, this study attempted to address methodological limitations of previous research. Namely, we implemented a rigorous methodology that incorporated fidelity of intervention implementation, utilized an active versus a waitlist control group, and addressed the scarcity of replication studies of yoga interventions among college students. Most notably, the current study was the first (to date) to examine the effects of a yoga-based intervention on a measure of EA.

It should be noted that based on our power analysis, we were underpowered to test for statistical significance given our sample size (n = 43). Nonetheless, our findings do not support our hypotheses that the KYIS intervention would be successful in decreasing SPD, Substance Use, or EA. Additionally, in order to test the potential mediating role of EA, it was important to first establish a significant effect of the KYIS intervention on SPD and Substance Use. However, the KYIS intervention was presently unrelated to changes in these outcomes, thus our hypothesis was not supported. We also looked at measures of anxiety and depressive symptoms specifically and found no significant differences in these outcomes following the intervention. This finding is generally inconsistent with the literature, as previous research has found yoga interventions to have significant effects on measures of anxiety and depression symptoms. For example, a recent meta-analysis conducted by Zoogman and colleagues (2019) examined 38 RCTs in 2,295 adults and found that compared to control conditions, yoga had a large and significant effect on symptoms of anxiety (d = 0.80). Furthermore, yoga interventions with college students specifically have been found to be successful in decreasing symptoms of depression (Falsafi, 2016). As such, it is possible that sample demographic differences such as age, gender, or mental diagnoses could account for the inconsistency in results.

Furthermore, the skill of observing, typically used as a measure of the mindfulness subcomponent awareness, has been found to be associated with increased anxiety sensitivity in college students with problematic alcohol use (Kraemer, O'Bryan, Johnson, & McLeish, 2017). For participants in our intervention group, 61% screened positive on the CRAFFT (i.e., requiring further assessment about substance use), with 39% reporting scores suggesting 60% or higher probability of abuse and/or dependence. Thus, while the students in the intervention group were introduced to the concepts and practice of mindfulness, it may be that increasing mindful

awareness could have increased their fear of anxiety-relevant situations. It is possible that as students in the intervention group began to develop increased mindful attention, perhaps they did not equally develop the skill of acceptance. This is logical given that significant reductions in EA were not observed, and EA is considered the opposing construct to acceptance. One could also speculate that 14 sessions of a mindfulness-based yoga intervention is not enough in order to adequately develop the skill of acceptance in order to see significant reductions in EA, as well as anxiety symptoms. Future research might consider exploring dosage of yoga interventions on measures of EA and acceptance. This may help to clarify the amount of exposure and/or practice required in order to see significant changes in these constructs.

Additionally, the effect size of yoga interventions on depressive symptoms has been found to decrease from moderate to low when compared to an active control (Breedvelt et al., 2019). Our results could be consistent with this finding, in that perhaps the effects of yoga on depressive symptoms are comparable to other forms of physical exercise when the intervention group is compared to a well-matched control (i.e., a basic exercise class), as was the case in our study. Future studies might consider utilizing an experimental design in which the intervention group is compared to both a well-matched active control (i.e., a basic exercise class), as well as a waitlist control. This could help to clarify and compare the true benefits of physical activity, a component of both yoga and basic exercise, compared to the added embodiment element of yoga on depressive symptoms. Furthermore, the field would benefit in general from additional meta-analyses (such as the one conducted by Breedvelt et. al, 2019), looking at the changes in effect sizes on various outcomes when yoga is compared to an active rather than a waitlist or other non-treated control. As such, we attempted to address the methodological limitation of waitlisted controls in yoga research by utilizing a well-matched active control. This is important for the

future of yoga research so we do not potentially overstate the benefits of yoga on various outcomes.

With regards to Substance Use, we found no significant reductions in Substance Use between the intervention and control groups over time. Unfortunately, research on the effects of yoga interventions has remained limited to studies examining it as an adjunct to other forms of treatment, as well as studies focusing on specific populations (e.g., individuals with a diagnosed substance use or other mental disorder, individuals with HIV, chronic pain, etc.). This is also the case for studies looking at the relation between substance use and measures of EA. The majority of these studies look at populations in treatment for a substance use or other mental disorders. Conducting research with only these specific populations limits our ability to generalize findings to the general population, or the population of interest specifically (i.e., college students). Additional research with more general populations, as well as using specific measures of EA will be an important step toward surmising the consistency of our findings within the literature.

With regard to specific measures of EA, studies examining the relation between substance use, psychopathological symptoms, and EA typically use the AAQ-II as a measure of EA. This is problematic given that the AAQ-II was created as a measure of psychological inflexibility. Psychological inflexibility describes the process in which behaviors are rigidly guided by psychological reactions to stimuli rather than direct contingencies or personal values (Bond et al., 2011). Some researchers mistakenly use EA and psychological inflexibility interchangeably. However, EA is theoretically one of six components that make up the construct of psychologically inflexibility within the context of applied extensions of RFT, such as Acceptance and Commitment Therapy (Hayes et al., 1999). Research using the AAQ-II as a measure of EA specifically is problematic in that we are unable to confidently conclude or

interpret significant findings in AAQ-II scores as changes in EA. Furthermore, Rochefort and Colleagues (2018) examined the construct validity of the AAQ-II and MEAQ and found that the AAQ-II demonstrated suboptimal patterns of convergent and discriminant validity with measures of neuroticism and negative affect (Big Five Inventory, Big Five Aspect Scale, Positive and Negative Affect Schedule), the MEAQ, and mindfulness (FFMQ). Conversely, the MEAQ demonstrated optimal levels of convergent and discriminant validity. Factor analyses also revealed that the AAQ-II loads on indicators of neuroticism and negative affect, while the MEAQ loads on factors with mindfulness. They concluded that the AAQ-II likely functions as a measure of neuroticism or negative affect, while the MEAQ functions more as a measure of EA. As such, these results have considerable implications for research examining EA. Our study is one of few that addresses this limitation by using the MEAQ as a measure of EA, rather than the AAQ-II. Additional studies utilizing specific measures of EA is an important direction for future research.

It is also possible that the time of year in which Time 1 data was collected impacted the current findings, particularly periods of increased academic pressure. We found that participants in Wave 4 of the study had significantly lower SPD scores compared to the other three waves. Data was collected during the fall and spring semesters and each semester is divided into two sessions. The yoga and general education classes were both taught over the course of one session which lasted seven weeks (i.e., half a semester). This means that Time 1 data was collected during the beginning, and in the middle of both the fall and springs semesters. While Waves 1, 2, and 3 were collected in the middle of the fall or spring semester, or in the beginning of the spring semester, Wave 4 was collected at the beginning of the fall semester following summer vacation. Unlike Wave 4, participants in Waves 1 and 3 were in the midst of taking mid-terms for their

other regular semester-long classes during data collection for Time 1. Given that this time in the semester presents students with an increased workload and pressure to perform well on exams, this could be a reason why students may have been experiencing increased anxiety, depression, and somatization symptoms. Additionally, and unlike Wave 4, Time 1 data for participants in Waves 2 and 3 was collected during the spring. Thus, it may be the case that students experience increased SPD during the spring semester due to increases in stress or pressure to perform well in closing out their academic year.

Limitations

The current study has several limitations worth noting. First, this was a Quasi-experimental study, thus there was no random assignment into the control or intervention group. Relatedly, we observed group differences in reported EA at Time 1, such that individuals choosing the yoga class had higher levels of baseline EA compared to those in the control group. This finding could be consistent with a self-selection bias, such that participants with higher EA were more likely to select a physical education class (i.e., yoga) that incorporates attention to psychological as well as physical states, rather than a class that is solely focused on physical states, such as the class used for the control group. In other words, participants who self-selected into the yoga class may have been seeking psychological support, thus potentially creating a selection bias among in the sample. This could be evidenced by their higher reported EA and SPD scores compared to the control group. It is also plausible that self-selection characteristics could have influenced the observed effect of treatment condition on the outcome variables of interest over time.

Furthermore, we found that compared to controls, the intervention group had higher overall EA and SPD scores. In addition to having higher Time 1 EA, the intervention group,

unlike controls, were introduced and encouraged to practice mindfulness. It can be said that participants in the control group were not engaging in the same level of introspection as the intervention group. While participating in a mindfulness-based yoga intervention, participants may have come to notice or pay attention to negative thoughts, feelings, or physical sensations they have not previously or deliberately attended to. Perhaps taking these opportunities for a more serious reflection into their present moment experiences resulted in the perpetuation of engaging in EA. Moreover, as mentioned previously EA has been found to be positively associated with anxiety disorders in children and adults, as well as depressive symptoms in women (which made up 91% of the intervention group). Thus, it follows that the intervention group would have higher overall SPD given they started out with higher EA, and were encouraged to engage in a level of introspection that the control group was not. It may be the case that significant decreases in EA and SPD are more difficult to achieve when the intervention group is starting out with significantly higher EA levels at Time 1. Future research could utilize an experimental design with random assignment in order to eliminate the likelihood of self-selection bias and pre-intervention group differences. Without group differences in EA at Time 1, it may be more likely that significant reductions in SPD could be observed.

A second limitation of the current study was that the sample was predominately white, college-aged, females, which may limit generalizability of these findings; this a problem shared by the majority of studies within the yoga literature. As such, future research should seek to incorporate more diverse samples in order to extend our ability to generalize findings. Third, the current study was a nested design and given the sample size, a multilevel modeling approach would not have been appropriate. This is a limitation in the sense that individual-level analyses using nested data disregard the similarities individuals within a common environment have

relative to individuals from a different environment. For example, it can be argued that individuals who were delivered the KYIS intervention in the spring are more similar to one another than they are to individuals who were delivered the intervention in the fall. Thus, individual-level analyses are not able to adequately examine the effects of group-level factors. As such, future studies with a bigger sample size might consider using a multilevel modeling approach given that it would allow researchers to analyze data existing at different levels. Finally, based on our power analysis, we did not collect data from enough participants in order to test for statistical significance ($\alpha = 0.05$) at a power level of $\beta = 0.8$. More specifically, we were underpowered to test for significant differences in SPD ($g = 0.30$) following a yoga intervention when compared to physical exercise.

Conclusion

Overall, we found that the KYIS intervention was presently unrelated to decreases in EA, SPD, or Substance Use in a population of undergraduates. Nonetheless, tests of these relations could be improved by conducting studies utilizing random assignment of participants, as well as a more diverse sample. A strength of the current study was the rigorous methodology utilized. Future researchers examining the benefits of yoga should uphold such high standards in regard to the experimental rigor of their studies. For example, incorporating fidelity of implementation as well as the utilization of an active control. This will help to parse out the true benefits of yoga, rather than just the physical exercise component itself. Furthermore, the field would benefit from additional studies looking at substance use in a low-risk population of college students specifically, rather than focusing on a clinical sample. Perhaps yoga could curb the likelihood of progression into substance abuse or problems in this population, however more research is needed in order to make any further conclusions. Moreover, rates of anxiety symptoms and

suicide-related outcomes have increased considerably in this population over the past decade (Duffy, Twenge, Joiner, 2019), thus warranting further attention from the field and intervention.

Appendix A

Demographics

Please enter your age:

What is your year in school?

- Freshman
- Sophomore
- Junior
- Senior
- Graduate Student

What is your major?

What is your gender identity?

- Male
- Female
- Other
- I prefer not to respond

What is your racial/ethnic identity? (Select all that apply)

- Hispanic or Latino
- American Indian or Alaska Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White
- Other
- I prefer not to respond

Have you ever practiced any form of meditation (e.g., mindfulness, zazen) or yoga? If so, please describe in detail.

- ○ Yes
- ○ No

Are you currently practicing any form of meditation (e.g., mindfulness, zazen) or yoga (past 2 weeks). If so, please describe in detail.

- ○ Yes
- ○ No

Are you currently engaging in any practices or receiving services (e.g., seeing a therapist) for stress management? If so please describe.

- ○ Yes
- ○ No

Multidimensional Experiential Avoidance Questionnaire (MEAQ)

Please indicate the extent to which you agree or disagree with each of the following statements

1	2	3	4	5	6
strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

1.	I won't do something if I think it will make me uncomfortable	1	2	3	4	5	6
2.	If I could magically remove all of my painful memories, I would	1	2	3	4	5	6
3.	When something upsetting comes up, I try very hard to stop thinking about it	1	2	3	4	5	6
4.	I sometimes have difficulty identifying how I feel	1	2	3	4	5	6
5.	I tend to put off unpleasant things that need to get done	1	2	3	4	5	6
6.	People should face their fears	1	2	3	4	5	6
7.	Happiness means never feeling any pain or disappointment	1	2	3	4	5	6
8.	I avoid activities if there is even a small possibility of getting hurt	1	2	3	4	5	6
9.	When negative thoughts come up, I try to fill my head with something else	1	2	3	4	5	6
10.	At times, people have told me I'm in denial	1	2	3	4	5	6
11.	I sometimes procrastinate to avoid facing challenges	1	2	3	4	5	6
12.	Even when I feel uncomfortable, I don't give up working toward things I value	1	2	3	4	5	6
13.	When I am hurting, I would do anything to feel better	1	2	3	4	5	6
14.	I rarely do something if there is a chance that it will upset me	1	2	3	4	5	6
15.	I usually try to distract myself when I feel something painful	1	2	3	4	5	6
16.	I am able to "turn off" my emotions when I don't want to feel	1	2	3	4	5	6
17.	When I have something important to do I find myself doing a lot of other things instead...	1	2	3	4	5	6
18.	I am willing to put up with pain and discomfort to get what I want	1	2	3	4	5	6
19.	Happiness involves getting rid of negative thoughts	1	2	3	4	5	6
20.	I work hard to avoid situations that might bring up unpleasant thoughts and feelings in me	1	2	3	4	5	6
21.	I don't realize I'm anxious until other people tell me	1	2	3	4	5	6
22.	When upsetting memories come up, I try to focus on other things	1	2	3	4	5	6
23.	I am in touch with my emotions	1	2	3	4	5	6
24.	I am willing to suffer for the things that matter to me	1	2	3	4	5	6
25.	One of my big goals is to be free from painful emotions	1	2	3	4	5	6
26.	I prefer to stick to what I am comfortable with, rather than try new activities	1	2	3	4	5	6
27.	I work hard to keep out upsetting feelings	1	2	3	4	5	6
28.	People have said that I don't own up to my problems	1	2	3	4	5	6
29.	Fear or anxiety won't stop me from doing something important	1	2	3	4	5	6
30.	I try to deal with problems right away	1	2	3	4	5	6

1	2	3	4	5	6
strongly disagree	moderately disagree	slightly disagree	slightly agree	moderately agree	strongly agree

31.	I'd do anything to feel less stressed …….	1	2	3	4	5	6
32.	If I have any doubts about doing something, I just won't do it ……...	1	2	3	4	5	6
33.	When unpleasant memories come to me, I try to put them out of my mind ……	1	2	3	4	5	6
34.	In this day and age people should not have to suffer ……...	1	2	3	4	5	6
35.	Others have told me that I suppress my feelings …….	1	2	3	4	5	6
36.	I try to put off unpleasant tasks for as long as possible ……...	1	2	3	4	5	6
37.	When I am hurting, I still do what needs to be done ……...	1	2	3	4	5	6
38.	My life would be great if I never felt anxious …….	1	2	3	4	5	6
39.	If I am starting to feel trapped, I leave the situation immediately ……...	1	2	3	4	5	6
40.	When a negative thought comes up, I immediately try to think of something else …….	1	2	3	4	5	6
41.	It's hard for me to know what I'm feeling ……...	1	2	3	4	5	6
42.	I won't do something until I absolutely have to ……..	1	2	3	4	5	6
43.	I don't let pain and discomfort stop me from getting what I want …….	1	2	3	4	5	6
44.	I would give up a lot not to feel bad ……	1	2	3	4	5	6
45.	I go out of my way to avoid uncomfortable situations ……	1	2	3	4	5	6
46.	I can numb my feelings when they are too intense ……..	1	2	3	4	5	6
47.	Why do today what you can put off until tomorrow ……	1	2	3	4	5	6
48.	I am willing to put up with sadness to get what I want ……	1	2	3	4	5	6
49.	Some people have told me that I "hide my head in the sand" …….	1	2	3	4	5	6
50.	Pain always leads to suffering ……..	1	2	3	4	5	6
51.	If I am in a slightly uncomfortable situation, I try to leave right away ……	1	2	3	4	5	6
52.	It takes me awhile to realize when I'm feeling bad …….	1	2	3	4	5	6
53.	I continue working toward my goals even if I have doubts …….	1	2	3	4	5	6
54.	I wish I could get rid of all of my negative emotions ……..	1	2	3	4	5	6
55.	I avoid situations if there is a chance that I'll feel nervous……..	1	2	3	4	5	6
56.	I feel disconnected from my emotions …….	1	2	3	4	5	6
57.	I don't let gloomy thoughts stop me from doing what I want …….	1	2	3	4	5	6
58.	The key to a good life is never feeling any pain ……..	1	2	3	4	5	6
59.	I'm quick to leave any situation that makes me feel uneasy ……	1	2	3	4	5	6
60.	People have told me that I'm not aware of my problems ……	1	2	3	4	5	6
61.	I hope to live without any sadness and disappointment ……...	1	2	3	4	5	6
62.	When working on something important, I won't quit even if things get difficult ……	1	2	3	4	5	6

5-item Mindful Attention Awareness Scale – State Version

Instructions: Using the 0-6 scale shown, please indicate to what degree were you having each experience described below *right now as you have been completing these questions on this tablet computer*. Please answer according to what *really reflected* your experience rather than what you think your experience should have been.

	not at all			some what			very much
1. I was finding it difficult to stay focused on what was happening.	0	1	2	3	4	5	6
2. I was doing something without paying attention.	0	1	2	3	4	5	6
3. I was preoccupied with the future or the past.	0	1	2	3	4	5	6
4. I was doing something automatically, without being aware of what I was doing.	0	1	2	3	4	5	6
5. I was rushing through something without being really attentive to it.	0	1	2	3	4	5	6

The Brief Symptom Inventory 18

Instructions: The BSI 18 consists of a list of problems people sometimes have. Read each one carefully and circle the number of the response that best describes HOW MUCH THAT PROBLEM HAS DISTRESSED OR BOTHERED YOU DURING THE PAST 7 DAYS INCLUDING TODAY. Circle only one number for each problem. Do not skip any items.

How much were you distressed by:

0=Not at all 1=A little bit 2=Moderately 3=Quite a bit 4=Extremely

Faintness or dizziness
Feeling no interest in things
Nervousness or shakiness inside
Pains in heart or chest
Feeling lonely
Feeling tense or keyed up
Nausea or upset stomach
Feeling blue
Suddenly scared for no reason
Trouble getting your breath
Feelings of worthlessness
Spells of terror or panic
Numbness or tingling in parts of your body
Feeling hopeless about the future
Feeling so restless you couldn't sit still
Feeling weak in parts of your body
Thoughts of ending your life
Feeling fearful

CRAFFT; single question adapted from the Brief Screener for Tobacco, Alcohol, and Other Drugs regarding tobacco use

Please answer all questions **honestly**; your answers will be kept **confidential**.

During the PAST 12 MONTHS, on how many days did you:

1.	Drink more than a few sips of beer, wine, or any drink containing **alcohol**? Put "0" if none.	☐ # of days
2.	Use any **marijuana** (weed, oil, or hash by smoking, vaping, or in food) or "**synthetic marijuana**" (like "K2," "Spice")? Put "0" if none.	☐ # of days
3.	Use **anything else to get high** (like other illegal drugs, prescription or over-the-counter medications, and things that you sniff, huff, or vape)? Put "0" if none.	☐ # of days

READ THESE INSTRUCTIONS BEFORE CONTINUING:
- **If you put "0" in ALL of the boxes above, ANSWER QUESTION 4, THEN STOP.**
- **If you put "1" or higher in ANY of the boxes above, ANSWER QUESTIONS 4-9.**

		No	Yes
4.	Have you ever ridden in a **CAR** driven by someone (including yourself) who was "high" or had been using alcohol or drugs?	☐	☐
5.	Do you ever use alcohol or drugs to **RELAX**, feel better about yourself, or fit in?	☐	☐
6.	Do you ever use alcohol or drugs while you are by yourself, or **ALONE**?	☐	☐
7.	Do you ever **FORGET** things you did while using alcohol or drugs?	☐	☐
8.	Do your **FAMILY** or **FRIENDS** ever tell you that you should cut down on your drinking or drug use?	☐	☐
9.	Have you ever gotten into **TROUBLE** while you were using alcohol or drugs?	☐	☐

10. During the PAST 12 MONTHS, on how many days did you smoke cigarettes or use other tobacco products (vape, juul, dip, chew)? _____# of days

Fidelity of implementation observation form

Session #_____

Materials and Setup	Yes	No
• Set up yoga mats, blocks, additional lesson materials, etc. prior to the start of the lesson		
Centering/Breathing Exercise	Yes	No
• Students engaged in breathing exercises to center themselves and connect to the breath		
Didactic Content	Yes	No
• A concept or idea was introduced during the lesson providing the foundation for practice that day (e.g., eight limbs, anatomy or physiology, introduction to meditation, etc.)		
Experiential Activities	Yes	No
• Engaged in an activity to reinforce didactic content for the lesson (e.g., discussion, relaying benefits of yoga on different aspects of functioning, meditation practice, suggesting an outside activity such as mindful eating or journaling)		
Warm-ups	Yes	No
• Students engaged in a warm-up activity to warm up their joints and muscles in preparation for asana practice		
Yoga Practice	Yes	No
• Students engaged in a sequence of yoga postures via clear verbal instructions, demonstration of poses, along with adjustments, variations, and props as necessary		
Relaxation	Yes	No
• Students engaged in relaxation following asana practice (e.g., Savasana or “corpse pose”)		
Closure	Yes	No
• The class ended with a brief closing activity (e.g., silent check-in, bowing head forward, ringing a bell or singing bowl, or a moment of silence) before the students transition to the rest of their day		

Notes

Tables

Table 1
Number of Participants for Each Wave

	Intervention	Control
Wave 1	0	6
Wave 2	5	0
Wave 3	13	8
Wave 4	5	6

Table 2
Descriptive Statistics and Significant Group Differences

Variable	Group				
	Intervention		Control		
	M	***SD***	***M***	***SD***	***t***
Age	19.61	1.53	20.07	1.38	
EA Time 1					
Total	219.52	39.88	192.20	26.23	-2.61**
Behavioral Avoidance	40.83	9.75	35.55	8.27	-1.89
Distress Aversion	49.74	12.68	41.30	7.53	-2.60**
Procrastination	28.70	6.84	25.75	5.75	-1.57
Distraction & Suppression	31.17	5.52	30.30	5.31	-0.53
Repression & Denial	39.57	12.78	33.60	8.36	-1.78
Distress Endurance	47.48	8.32	51.30	6.19	-1.69
EA Time 2					
Total	210.17	37.59	187.60	30.59	-2.14*
Behavioral Avoidance	38.57	9.94	33.95	7.82	-1.67*
Distress Aversion	46.39	11.68	40.60	10.01	-1.73
Procrastination	27.35	6.75	24.90	5.58	-1.28
Distraction & Suppression	28.22	5.80	26.15	5.00	-1.24
Repression & Denial	38.04	11.65	35.45	8.27	-0.83
Distress Endurance	45.39	8.52	50.45	6.34	2.18*
SPD Time 1					
Total	31.13	16.52	23.25	12.64	-1.74
Anxiety	11.26	5.84	8.35	4.98	-1.74
Depression	11.26	6.78	7.55	4.58	-2.07*
SPD Time 2					
Total	27.43	12.49	21.75	12.28	-1.50
Anxiety	9.30	4.28	7.95	4.56	-1.00
Depression	9.74	5.18	7.65	5.02	-1.34
Substance Use					
Time 1	2.04	1.74	1.40	1.50	-1.29
Time 2	1.43	1.50	1.35	1.35	-0.19
Mindfulness					
Time 1 Average	4.12	1.48	4.52	1.14	0.98
Time 2 Average	4.26	1.25	4.59	1.33	0.84

*Note: EA = Experiential Avoidance. SPD = symptoms of psychological distress. * $p < 0.05$ and ** $p < 0.017$.*

Table 3
Results of One-Way ANOVAs for Wave Differences

	df	Sum of Squares	Mean Square	*F*	*p*
EA					
Wave	1	172	172.20	0.13	0.72
Residuals	41	55880	1362.90		
SPD					
Wave	1	1934	1934	10.20	< 0.01
Residuals	41	7771	189.50		
Substance Use					
Wave	1	0.32	0.32	0.12	0.74
Residuals	41	113.87	2.28		
Age					
Wave	1	0.11	0.11	0.05	0.82
Residuals	35	78.16	2.23		

Note: EA = Experiential Avoidance. SPD = symptoms of psychological distress.

Table 4
Results of RM-MANOVA and RM-ANOVA for EA, Psychopathology, and Substance Use

Variable	***df***	***F***	**partial η^2**		
Group	3	4.21**	0.14		
Time	3	0.67	0.02		
Group X Time	3	0.26	0.01		
	df	**Sum of Squares**	**Mean Square**	***F***	***p***
EA					
Group	1	15542	15542	13.75	< 0.001
Time	1	1096	1096	0.97	0.33
Group X Time	1	121	121	0.11	0.74
Residuals	81	91592	1131		
SPD					
Group	1	1416	1416.1	8.67	0.004
Time	1	154	153.80	0.94	0.33
Group X Time	1	26	25.80	0.16	0.69
Residuals	81	13220	163.20		
Substance Use					
Group	1	4.45	4.45	1.95	0.17
Time	1	2.62	2.62	1.15	0.29
Group X Time	1	1.67	1.67	0.74	0.39
Residuals	81	30.23	2.28		

*Note: EA = Experiential Avoidance. SPD = symptoms of psychological distress. ** $p < 0.01$.*

Table 5
Results of Mediation Analyses

Steps in Mediation Model	*b*	*SE*	*t*	*p*
SPD				
Step 1				
Outcome: SPD				
Predictor: Group	-0.01	2.51	-0.04	0.97
Step 2				
Outcome: EA				
Predictor: Group	-0.11	6.23	-1.69	0.10
Step 3 & Step 4				
Outcome: SPD				
Mediator: EA	0.14	0.07	0.33	0.74
Predictor: Group	0.01	2.64	0.05	0.96
Substance Use				
Step 1				
Outcome: Substance Use				
Predictor: Group	-0.34	2.98	-1.08	0.29
Step 2				
Outcome: EA				
Predictor: Group	-0.10	6.44	-1.54	0.13
Step 3 & Step 4				
Outcome: Substance Use				
Mediator: EA	-0.00	0.08	-0.00	0.99
Predictor: Group	-0.34	3.12	-1.03	0.31

Note: EA = Experiential Avoidance. SPD = symptoms of psychological distress.

Table 6

Results of RM-MANOVA for Exploratory Analyses of EA Subscales, Anxiety, and Depression

Variable	*df*	*F*	partial η^2
EA Subscales			
Group	6	2.29	0.15
Time	6	1.59	0.11
Group X Time	6	0.29	0.02
Anxiety & Depression			
Group	2	2.95	0.07
Time	2	0.83	0.02
Group X Time	2	0.27	0.01

Note: EA = Experiential Avoidance.

Table 7
Zero-Order Correlations for Study Measures

Variable	1	2	3	4	5	6	7	8	9	10	11	12
1. EA	-											
2. Behavioral Avoidance	0.82**	-										
3. Distress Aversion	0.87**	0.73**	-									
4. Procrastination	0.68**	0.43**	0.47**	-								
5. Distraction & Suppression	0.57**	0.53**	0.53**	0.34**	-							
6. Repression & Denial	0.73**	0.43**	0.54**	0.50**	0.20	-						
7. Distress Endurance	-0.45**	-0.26*	-0.25*	-0.20	0.02	-0.21	-					
8. SPD	0.44**	0.24*	0.30**	0.31**	0.01	0.53**	-0.19	-				
9. Anxiety	0.40**	0.23*	0.28**	0.23*	0.08	0.45**	-0.30**	0.95**	-			
10. Depression	0.43**	0.22*	0.28**	0.34**	-0.02	0.54**	-0.34**	0.95**	0.85**	-		
11. Substance Use	0.07	-0.06	-0.00	0.07	-0.05	0.26*	-0.03	0.35**	0.30**	0.38**	-	
12. Mindfulness	0.21	-0.20	-0.06	-0.06	-0.00	-0.22*	0.29**	-0.56**	-0.57	-0.53**	-0.21*	-

Note: EA = Experiential Avoidance. SPD = symptoms of psychological distress. * $p < 0.05$, ** $p < 0.01$.

Figures

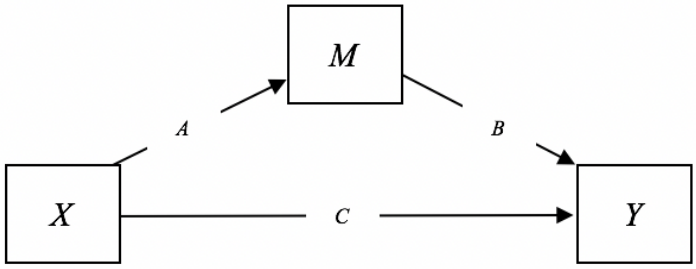

Figure 1. Baron and Kenny (1986) Model for Mediation

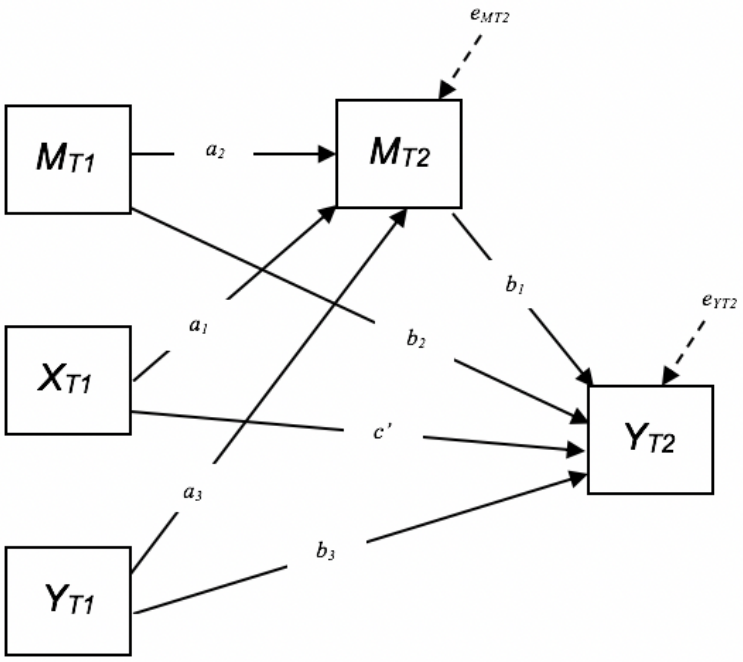

Figure 2. Longitudinal Mediation Model

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EDUCATION

In Progress **Syracuse University**
Master of Science in Psychology
Advisor: Joshua Felver, Ph.D.
School Psychology Program (APA and NASP approved)
Syracuse, NY
GPA: 3.67
Thesis title: *Investigation of the Effects of a Yoga Intervention on Experiential Avoidance, Symptoms of Psychological Distress, and Substance Use*

2013-2017 **Ohio University**
Bachelor of Arts in Psychology
Minor Biological Sciences
Minor Philosophy
Athens, OH
GPA: 3.83
Honors Thesis title: *Mindfulness, cortisol, and sexual minorities: Investigation of the effects of mindfulness on diurnal cortisol patterns in sexual minorities*

2010-2013 **Lorain County Community College**
Post-Secondary Enrollment Program
Elyria, OH
GPA: 3.87

RESEARCH INTERESTS

- Effects of contemplative practice on experiential avoidance (EA), as well as EA as a potential mediator between the effects of contemplative practice on academic and socioemotional functioning, and psychopathology
- Role of mindfulness interventions in improving academic and socioemotional functioning in children and adolescents

CLINICAL EXPERIENCE

2019-present **Psychological Evaluator**
Arc of Onondaga, **Syracuse, NY**
Responsibilities: Administered cognitive and adaptive assessments to children and adults with developmental disabilities, conducted functional behavioral

assessments and created behavior intervention plans for agency residents, and sat on the Human Rights Committee (HRC) offering input on safety and promoting independence in agency residences.
Supervisors: Joseph Himmelsbach, Ph.D.

2018-2019 **Student Clinician**
Psychological Services Center
Syracuse University, Syracuse, NY
Responsibilities: provided individual and group therapy, conducted intake interviews, and performed psychological assessments for a variety of psychological disorders in children, adolescents, and adults in the community under the supervision of licensed psychologists.
Supervisors: Afton Kapuscinski, Ph.D., Kevin Antshel, Ph.D., Joseph Himmelsbach, Ph.D.

2019 **Psychologist Intern**
Frazer K-8 School, Syracuse University
Responsibilities: Provided direct behavioral intervention services to students including: conducted comprehensive functional behavior assessments using indirect methods (e.g., interviews with direct care staff), direct observations, and brief structured conditions in the natural environment, generated hypotheses about potential functions of challenging behavior, designed, implemented, and evaluated a reinforcement-based intervention matched to these functions, and helped teachers implement the intervention.
Supervisors: Kristi Cleary, Ph.D., Brian Martens, Ph.D.

2018-2019 **Social Skills Group Facilitator**
Psychological Services Center
Syracuse University, Syracuse, NY
Responsibilities: Facilitated a 10-week social skills curriculum to a group of children ages 7-12 with Autism Spectrum Disorder and/or Attention Deficit Hyperactivity Disorder under the supervision of a licensed psychologist.
Supervisor: Kevin Antshel, Ph.D.

2015-2017 **Volunteer**
Appalachian Behavioral Care, Athens, OH
Responsibilities: Volunteered weekly at an inpatient psychiatric hospital, supervised interaction with residents, facilitated group athletic activities, and purchased Christmas gifts for patients.
Supervisor: George Eberts, M.A.

RESEARCH EXPERIENCE

2018-2019 **Research Assistant**
Investigation of the Effects of Brief Intervention for Academic and Socioemotional Outcomes

The Mind-Body Lab
Syracuse University, Syracuse, NY
Responsibilities: organized participant recruitment, administered assessment measures of academic and socioemotional functioning, substance use, and trait mindfulness. Approximate sample size: 50
Faculty Advisor: Joshua C. Felver, Ph.D.

2018-2019 **Research Assistant**
Assessment of Cognitive and Behavioral Outcomes Among College Students Completing a Course on Mindfulness and Meditation
The Mind-Body Lab
Syracuse University, Syracuse, NY
Responsibilities: Observed and coded fidelity of intervention, organized participant recruitment, administered assessment measures of cognitive and socioemotional functioning. Approximate sample size: 115
Faculty Advisors: Joshua C. Felver, Ph.D., & Dessa Bergen-Cico, Ph.D.

2018-2019 **Research Assistant**
Evaluation of Effects of Brief Interventions
The Mind-Body Lab
Syracuse University, Syracuse, NY
Responsibilities: Train undergraduate students to administer Trier Social Stress Test (TSST), use BIOPAC equipment, and Aqknowledge software, organize participant recruitment. Approximate sample size: 30
Faculty Advisor: Joshua C. Felver, Ph.D.

2017-2019 **Interventionist/Research Assistant**
Adolescent Stress Reduction Project
The Mind-Body Lab
Syracuse University, Syracuse, NY
Responsibilities: Delivered the Learning to BREATHE intervention to high school students, observed and coded fidelity of intervention, organized participant recruitment, administered assessment measures of cognitive and socioemotional functioning, substance use, and trait mindfulness. Approximate sample size: 115
Faculty Advisor: Joshua C. Felver, Ph.D.

2017-2018 **Research Assistant**
Understanding the Relation Between Mindfulness-Based Interventions, Reading, and Attention
The Mind-Body Lab
Syracuse University, Syracuse, NY
Responsibilities: Administer questionnaires to children in grades pre-K to 7th to measure attention, executive functioning, processing speed, stress, and trait mindfulness. Approximate sample size: 450
Faculty Advisor: Joshua C. Felver, Ph.D.

2017-2019 **Research Assistant**
Brief Effective Strategies for Test-stress (BEST) Study
The Mind-Body Lab
Syracuse University, Syracuse, NY
Responsibilities: Administer questionnaires to college students to measure stress, anxiety, and mindfulness, organize participant recruitment and randomization. Approximate sample size: 55
Faculty Advisor: Joshua C. Felver, Ph.D.

2015-2017 **Principal Investigator**
Mindfulness, Cortisol, and Sexual Minorities: Investigation of the Effects of Mindfulness on Diurnal Cortisol Patterns in Sexual Minorities
Psychosocial Processes and Health Laboratory
Ohio University, Athens, OH
Responsibilities: Developed and proposed an undergraduate honors thesis examining the effects of trait mindfulness on evening diurnal cortisol levels in a population of sexual minority young adults (i.e., LGBTQ), analysis conducted using data from The Daily Activities, Stress, & Health (DASH) Study conducted at Ohio University under principal investigator Dr. Peggy M. Zoccola. Approximate sample size: 130 participants
Graduate Student Supervisor: Andrew W. Manigault
Faculty Advisor: Peggy M. Zoccola, Ph.D.

2016-2017 **Research Assistant**
Blood Donor Competence, Autonomy, Relatedness Enhancement (CARE)
Clinical Psychophysiology Lab
Ohio University, Athens, OH
Responsibilities: Trained in motivational interviewing, conducted telephone interviews with participants in order to enhance individual autonomy regarding future blood donations. Approximate sample size: 300 participants.
Faculty Advisor: Christopher R. France, Ph.D.

2016-2017 **Research Assistant**
The Mindfulness Intervention and Repeated Acute Stress (MIRAS) Study
Psychosocial Processes and Health Laboratory
Ohio University, Athens, OH
Responsibilities: Ran participants through study protocol, which included a standardized laboratory Tier Social Stress Test (TSST) on participants, as well as an Implicit Association Test (IAT), evaluated participants' performance on TSST. Additionally, I am assisting in data entry and cleaning for the study. Approximate sample size: 240 participants
Faculty Advisor: Peggy M. Zoccola, Ph.D.

2016-2017 **Research Assistant**
The Daily Activities, Stress, & Health (DASH) Study
Psychosocial Processes and Health Laboratory

Ohio University, Athens, OH
Responsibilities: Took a leadership role as a primary research assistant for this study, prepared packages to mail to participants containing measures for salivary cortisol as well as daily measures of stress and support, entered data of daily stress and support surveys. Approximate sample size: 130 participants.
Faculty Advisor: Peggy M. Zoccola, Ph.D.

2015-2016 **Research Assistant**
Predicting Responses to an Arm Illusion Paradigm
Clinical Psychophysiology Lab
Ohio University, Athens, OH
Responsibilities: Obtained informed consent from participants, set up iMotions program to analyze participants' facial expressions to a video of a blood draw, hooked up cerebral oxygenation and cardiovascular measures to participants, conducted a blood draw arm simulation. Approximate sample size: 75 participants.
Faculty Advisors: Christopher R. France, Ph.D., & Janis L. France, Ph.D.

PUBLICATIONS

Manigault, A. W., Figueroa, W. S., Hollenbeck, C. R., Mendlein, A. E., Woody, A., **Sinegar, S. E**., Hamilton, K. R., Scanlin, M. C., Johnson, R.C., Zoccola, P. M. (2017). A Test of the Association Between Mindfulness Subcomponents and Diurnal Cortisol Patterns. *Mindfulness*, 1–8. doi.org/10.1007/s12671-017-0829-4

CONFERENCE PRESENTATIONS

Felver, J., **Sinegar, S.,** Morton, M., (2018, February). School-Based Yoga Intervention Increases Adolescent Resiliency. Oral Presentation at the NASP 2018 Annual Convention, Chicago, IL.

Sinegar, S., Morgan, A., France, M., Linz, M., Smith, K., France, J., & France, C., (2016, April). Do the effects of a simulated blood draw differ among sexes? Oral Presentation at the 30th annual meeting of the Ohio Undergraduate Psychology Research Conference, Lorain, OH.

POSTER PRESENTATIONS

*indicates undergraduate mentee

Sinegar, S., *Sousa, S., *Fowajuh, C., Felver, J. (2019, June). An Investigation of the Effects of a Yoga Intervention on Academic and Socioemotional Outcomes. Poster presented at the annual Mind & Life Summer Research Institute, Garrison, NY.

Felver, J. C., Clawson, A. J., **Sinegar, S. E.**, Helminen, E. C., Koelmel, E. L., Morton, M. L., (2019, June). Reconceptualizing the Measurement of Mindfulness. Poster presented at the annual Mind & Life Summer Research Institute, Garrison, NY.

Sinegar, S., *Salim, J., Morton, M., Felver, J. (2018, May). Evaluating the Relationship Between State Mindfulness and Burnout in Teachers. Poster presented at the annual Syracuse University Department of Psychology Poster Session, Syracuse, NY.

Sinegar, S., Manigault, A., Figueroa, W., Hollenbeck, C., Mendlein, A., Woody, A., Hamilton, K., Scanlin, M., Johnson, R., Zoccola, P. (2017, April). Mindfulness, Cortisol, and Sexual Minorities: Investigation of the effects of Mindfulness on Diurnal Cortisol Patterns in Sexual Minorities. Poster presented at Ohio University's annual Student Research and Creative Activity Expo, Athens, OH.

BOOK CHAPTERS

Felver, J. C., Clawson, A. J., Helminen, E. C., Koelmel, E. L., Morton, M. L., & **Sinegar, S. E.** (2018). Reconceptualizing the measurement of mindfulness. In D. Grimes, H. Lin, & Q.

EDITORIAL SERVICE

Ad Hoc Reviewer

Mindfulness, 2019
Contemporary School Psychology, 2018
Journal of School Psychology, 2018

TEACHING EXPERIENCE

2018 **Instructor**
Psychology of Childhood
Department of Psychology, Syracuse University, Syracuse, NY
Responsibilities: Created lectures, weekly quizzes, exams, and class activities, led class discussions on various psychological theories and concepts, graded exams, quizzes, and extra credit assignments.

2018 **Guest Lecturer**
Health Psychology
Responsibilities: Presented on various coping strategies for stress, including the benefits of mindfulness on psychological and physical health.
Instructor: Brad Diamond, B.A.

2017-2018 **Teaching Assistant**
Foundations of Human Behavior

Department of Psychology, Syracuse University, Syracuse, NY
Responsibilities: Taught four recitation sections, created lectures, weekly quizzes, exam reviews, and class activities, led class discussions on various psychological theories and concepts, was in charge of all of the grading for both the recitation and the lecture sections of the course.
Supervisor: Shannon Houck, Ph.D.

2016-2017 **Teaching Assistant**
Statistics for the Behavioral Sciences
Department of Psychology, Ohio University, Athens, OH
Responsibilities: Created exams, graded exams and projects, taught students how to use SPSS software, helped students choose research topics, helped students prepare their research projects and presentations, tutored students for test preparation as well as general class material.
Supervisor: Craig McCarthy, Ph.D.

RELEVANT ASSESSMENT PROFICIENCY

- Wechsler Intelligence Scales for Children, 5th edition (WISC-V)
- Wechsler Adult Intelligence Scales, 4th edition (WAIS-IV)
- Wechsler Individual Achievement Test, 3rd edition (WIAT-3)
- Woodcock Johnson Tests of Achievement, 4th edition (WJ-ACH)
- Woodcock Johnson Tests of Cognitive Abilities, 4th edition (WJ-COG)
- Vineland Adaptive Behavior Scales, 3rd edition (Vineland-3)
- Behavior Assessment System for Children, 3rd edition (BASC-3)
- Conner's Continuous Performance Task – Third Edition (CPT-3)
- Gordon Diagnostic System (GDS) – Continuous Performance Test
- Schedule for Affective Disorders and Schizophrenia for School-Age Children (K-SADS)
- Test of Memory Malingering (TOMM)
- Personality Assessment Inventory (PAI)
- Socio-sexual Knowledge and Attitudes Test- Revised (SSKAAT-R)
- Adaptive Behavior Assessment System, 3rd edition (ABAS-3)
- Test of Nonverbal Intelligence, 4th edition (TONI-4)

RELEVANT CERTIFICATIONS AND TRAINING

- MATCH-ADTC
- Dialectical Behavioral Therapy
- Cognitive Behavioral Therapy
- Trauma-Focused Cognitive Behavioral Therapy
- Learning to BREATHE
- Yoga4Classrooms
- Soles of the Feet

- CITI Human Subjects Training

PROFESSIONAL AFFILIATES

- National Association of School Psychologists (NASP), Student Member
- Phi Beta Kappa Honors Society, Lambda of Ohio
- Psi Chi International Honors Society, Ohio University Chapter

HONORS AND SCHOLARSHIPS

2017	Magna Cum Laude, Ohio University
2014-2017	Dean's List, Ohio University
2015-2017	Dean's List Scholarship
2016	Edwin L. & Ruth Kennedy Distinguished Professor Scholarship

LEADERSHIP AND SERVICE EXPERIENCES

2018-present	Communications and Diversity Committee, Syracuse University
2018-2019	NYASP Student Liaison, Syracuse University
2018-2019	NASP Student Affiliate Committee, Syracuse University
2016-2017	Membership Chairperson, Psi Chi, Ohio University
2016-2017	Member, We Are First, Ohio University
2013-2017	President, A Stitch In Athens Knitting Club, Ohio University
2013-2014	Volunteer, Ohio University, Southeastern Ohio Food Bank

REFERENCES

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