

The Pennsylvania State University

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Department of Human Development and Family Studies

**USING CONTEMPLATIVE PRACTICES TO PROMOTE COLLEGE STUDENTS'  
SOCIOEMOTIONAL COMPETENCIES AND HEALTHY TRANSITION TO  
COLLEGE: A CONCEPTUAL AND EMPIRICAL ANALYSIS**

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## ABSTRACT

The transition to college reflects a period of a great flux and novelty in all areas of the young person's life. In Western societies, many young people are expected to find their niche through college education or further vocational training and grow into healthy, independent, and contributing individuals. As a "rite of passage", entering college is associated with separation from family and friends, transition to become independent and self-regulating, and integration into a new social and academic environment. Thus, college is characterized by both increased freedoms as well as heightened need to cope with new challenges in all areas of life. Unfortunately, there are numerous data sources that indicate that being a college student is stressful and the recent rise in mental health problems has been characterized as a "crisis". When the normative developmental instability characteristic of emerging adulthood is paired with inadequate coping it provides a high-risk context for a wide range of negative consequences from poor adjustment to college, academic failure, substance abuse, to severe psychopathologies and disorders.

The purpose of this dissertation was to examine the developmental and socioemotional factors impacting transition and adjustment to college and the potential of contemplative practices to enhance first year college students' health and wellbeing during this time period. First, I theoretically analyzed the stress and coping processes during transition to college and proposed a conceptual model of how mindfulness and compassion skills may strengthen college students' coping processes before, during, and after a challenging encounter. Second, I presented the post-test outcomes of a randomized controlled trial that aimed to evaluate the Learning to BREATHE (L2B) mindfulness-based intervention in a convenience sample of 109 first year

college students. The pre-post results showed that, compared to the control group, students in the intervention reported a significant decrease in depression and anxiety symptoms and increase in life satisfaction. Furthermore, we found a marginally significant decrease in sleep issues and alcohol consequences. Third, I evaluated the 3-month follow-up data of the L2B intervention and examined hypothesized factors that might mediate the outcomes. The findings showed that the assignment to the mindfulness intervention was predictive of a decrease in distress and an increase in life satisfaction at the 3-month follow-up. Furthermore, the increase in reported mindfulness states mediated the outcome of distress, but not life satisfaction. The greater use of mindfulness practices mediated both distress and life satisfaction outcomes at follow-up. I concluded that mindfulness-based practices may positively impact both prevention of students' mental health issues and promotion of their socioemotional competencies.

Given the current issues with worldwide instabilities, 21<sup>st</sup> century education needs to be multifaceted, providing youth with the necessary cognitive and socioemotional skills to face the increasingly more complex and fast-paced world. For young adults to become engaged citizens of our global society, essential aspects of their education need to include the development of inner clarity, compassion, and self-awareness. Mindfulness and compassion practices and skills may offer a developmental resource for handling both daily hassles as well as major transitions and life events through the combined effect of paying attention, regulating thoughts and emotions, and utilizing effective coping tools. Creation of mindful and compassionate communities may be the next step in the broader contemplative agenda that will allow young people to practice inner clarity, socioemotional competencies, and the desire to work together for the greater wellbeing of all. I look forward to that hopeful future.

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May all sentient beings have the opportunity to experience inner peace, joy, openness, stability, and togetherness. May we all keep (re)turning to the source of compassion and wisdom that is already within us.



## Chapter 1: Overall Introduction

The transition to college represents a critical developmental period characterized by both increased opportunities for growth and heightened risks for maladjustment (Schulenberg, Sameroff, & Cicchetti, 2004). The U.S. national surveys have shown that college students face high levels of stress, mental health issues, and related negative consequences, ranging from poor social relationships, psychiatric disorders, and academic difficulties to substance abuse, drop out, and even death (The American College Health Association, 2013). Kadison & Geronimo (2004) called attention to the rising mental health crisis among students by coining the term “*College of the Overwhelmed*”. Given the current issues, there is a need for a broader college-related research agenda emphasizing the notion that “*mental health is a foundation for the well-being and academic success of students, all colleges and universities, regardless of their interest in mental health per se*” (Hunt & Eisenberg, 2010, p. 8). The American College Health Association (2010, 2012) calls for a more integrated approach to the promotion of mental health among college students since it is difficult to educate young people effectively if they are struggling, coping maladaptively, or lacking supports.

There has been an interest in providing evidence-based programs to promote youth’s adaptation to the college environment and prevent potential maladjustment (Conley, Durlak, & Dickson, 2013; Regehr, Glancy, & Pitts, 2013). One relatively new approach to enhance students’ wellbeing is through various forms of contemplative practices that include meditation, mindfulness skills, and compassion practices. Based on the reviews of universal prevention studies and stress-targeted interventions for college students, skills-based programs, including those involving contemplative practices, that target cognitive, behavioral, and mindfulness skills

have been consistently beneficial to students' mental health (Conley et al., 2013; Regehr et al., 2013).

As a result, there has been an increasing call for the current educational system to move beyond narrowly defined academic accomplishments and include an emphasis on young people's socioemotional development and competencies through contemplative practices (Davidson et al., 2012; Roeser, 2014; Zajonc, 2016). A core component of contemplative education is to educate the young person as a whole (Shapiro, Brown, & Astin, 2011) including mental and behavioral trainings that promote executive functioning, emotion regulation, and prosocial behavior (Roeser & Pinela, 2014; Roeser & Zelazo, 2012). The largest body of contemplative research has involved mindfulness practices with adult participants but there is growing interest in evaluating these practices in emerging adulthood (Bamber, Kraenzle Schneider, & Schneider, 2016; Ramler, Tennison, Lynch, & Murphy, 2016; Shapiro et al., 2011). Through systematic cultivation of present moment awareness and a caring attitude, contemplative practices, such as mindfulness and compassion, aim to enhance young people's overall wellbeing and daily functioning, improve healthy connections between one's self and others, and create greater alignment between one's values and behaviors. Secular contemplative practices do not pertain to any specific religion or spirituality but rather nurture facilitation of self-awareness, kindness, and wisdom (Bernstein et al., 2015; Brown & Ryan, 2003; Plante, 2010; Roeser & Eccles, 2015).

Mindfulness, the most commonly studied contemplative practice, can be conceptualized as a nonjudgmental present-moment awareness that is purposefully cultivated with an attitude of openness and curiosity (Kabat-Zinn, 1994). A variety of theoretical models have conceptualized mindfulness processes as enhancing concentration, adaptive emotion regulation, and improved

well-being (Farb, Anderson, & Segal, 2012; Holzel et al., 2011; Shapiro, Carlson, Astin, & Freedman, 2006). Furthermore, some studies have shown that an increase in self-compassion mediates these positive outcomes (Baer, 2010; Holzel et al., 2011; Roeser et al., 2013). There is a need to continue to expand our understanding of mindfulness to include not only as a present moment awareness, but also to include mindful actions of kindness and caring towards one's self and others (Greenberg & Turksma, 2015).

A recent review of mindfulness programs with college students concluded that these programs showed promise in reducing college students' stress and mental health symptoms (Bamber & Schneider, 2016). The authors reviewed 57 intervention studies that included different types of mindfulness meditative practices. Findings suggested that enhanced attention and awareness were related to improvement in emotional regulation, which further led to increased life satisfaction and learning capacities, factors that further facilitate a healthy transition to college. It should be recognized that such evidence is quite preliminary and that most reviewed studies lacked control groups, reported high attrition, and many only used self-reports. These methodological issues have been raised as an important concerns when determining the effectiveness of these programs for youth and young adults (Davidson & Kaszniak, 2015; Greenberg & Harris, 2012). Thus, the current evidence is limited and lacks scientific rigor, but initial studies show promising results that warrant further investigation.

### **The Current Studies**

This dissertation includes a series of three papers focused on contemplative practices that are intended to enhance first year college students' socioemotional competencies and skills to promote healthy adaption and adjustment to the university setting. Specifically, the studies

provide an in-depth conceptual and empirical evaluation of the potential enriching effects of contemplative practices on students' mental health processes.

**Paper 1: Developmental and Socioemotional Processes during Transition to College and the Interplay with Contemplative Practices.** The first paper aims to integrate the potential use of contemplative practices with current conceptual approaches to stress and coping processes during emerging adulthood. First, I provide an overview of the issues and challenges emerging adults are facing during transition to college, drawing on the revised version of the transactional stress model by Lazarus and Folkman (1984). Second, I introduce a conceptual model of adaptive stress and coping processes enhanced by mindfulness and compassion skills as a way to deepen and strengthen attentional, cognitive, and socioemotional competencies and thus impact the appraisal and coping resources and emerging adults' mental health. Specifically, mindfulness and compassion skills (MCS) may play an important role in promoting a healthy stress response by strengthening emerging adults' socioemotional competencies and supporting the development of adaptive appraisal and coping resources before, during, and after a coping encounter. In particular, MCS practices were postulated to enhance (1) preparedness to cope with challenging situations, (2) productive stress response through (re)appraisal of stressors and skillful use of coping resources; and (3) healthy post-coping reflections. Therefore, MCS practices may be a useful preventive tool to strengthen emerging adults' ability to adjust to a new academic environment and fulfill the developmental tasks of this period.

**Paper 2: Promoting Healthy Transition to College through Mindfulness Training with 1st year College Students: Pilot Randomized Controlled Trial.** The second paper examines examine the feasibility and efficacy of promoting healthy transition to college through a developmentally timed mindfulness intervention with first-year college students. The

randomized controlled trial utilizes an adapted version of an evidence-based mindfulness program for teens called Learning to Breathe (L2B) that was delivered during the first semester of freshmen year (called “Just BREATHE”). The training aimed to provide students with essential mindfulness skills to better manage stress, regulate emotions, and meaningfully build social relationships. The study utilized a battery of psychosocial measures with a focus on intrapersonal awareness, interpersonal awareness, and health behaviors. The pre-post results found that the intervention group, in comparison to the control group, reported significantly less depression and anxiety symptoms and significantly higher life satisfaction. Furthermore, marginally significant differences were found in sleep quality and alcohol consequences measures. We concluded that mindfulness-based interventions introduced at the beginning of the first year of college may be an effective approach to addressing college students’ mental health issues. This paper was published in January 2017 in the Journal of American College Health.

**Paper 3: First-year College Students’ Well-being: The Effects of Mindfulness Intervention at 3-month Follow-up and Potential Mechanisms of Change.** This study examines a 3-month follow-up of results of the Just BREATHE randomized trial with first-year college students and the potentially mediating mechanisms of the results. A series of mediation models will be employed to examine the intervention effects on distress and life satisfaction outcomes and the mediating role of “change in mindfulness states between post-test and follow-up” (measured by Mindful Attention and Awareness Measure, MAAS, Brown & Ryan, 2003) and “the use of mindfulness practice between post-test and follow-up”. The study will discuss implications for future mindfulness studies with college students.

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## **Chapter 2: Developmental and Socioemotional Processes during Transition to College and the Interplay with Contemplative Practices**

The transition to college reflects a period of a great flux and novelty in all areas of the young person's life. In Western societies, many young people are expected to find their niche through college education or further vocational training and grow into healthy, independent, and contributing individuals. College is meant to strengthen the young person's ability to reason, to meaningfully engage with others, and to become an active citizen in the society (Astin & Astin, 2015). Almost 50% of young people in the U.S. enroll in higher education directly after high school (U.S. Department of Education, 2009), experiencing a dramatic shift in personal responsibilities, social environment, and institutional supports (Cleary, Walter, & Jackson, 2011; Evans, Forney, Guido, Patton, & Renn, 2009; Hurrelmann, 1990). As a "rite of passage", entering college is associated with separation from family and friends, transition to become independent and self-regulating, and integration into a new social and academic environment (Tinto, 1988). Thus, college is characterized by both increased freedoms as well as heightened need to cope with new challenges in all areas of life (Schulenberg, Sameroff, & Cicchetti, 2004).

There are numerous data sources that indicate that being a college student is stressful and the recent rise in mental health problems has been characterized as a "crisis" (The American College Health Association, 2014). When the normative developmental instability characteristic of emerging adulthood is paired with inadequate coping it provides a high-risk context for a wide range of negative consequences from poor adjustment to college, academic failure, substance abuse, to severe psychopathologies and disorders (Dennhardt & Murphy, 2013; Kadison & DiGeronimo, 2004; The American College Health Association, 2013). Since college environment is one of the last institutional opportunity to impact people's lives (Masten et al.,

2004), it is necessary for research on emerging adulthood to take into account how stress and coping processes may impact students' mental health and the unfolding of developmental tasks during this time period (Byrd & McKinney, 2012).

This paper has two foci. First, I provide a conceptual analysis of factors influencing the coping processes during the transition to college drawing on the transactional stress model by Lazarus and Folkman (1984). Second, I present a model of how mindfulness and compassion skills and practices may provide value in deepening and strengthening attentional, cognitive, and socioemotional competencies and thus impact the appraisal and support coping resources in a given situation. I will conclude with implications for preventive interventions suggesting that mindfulness and compassion skills may provide a developmental, preventive approach to mental health needs of emerging adults.

### **Issues and Challenges in Transition to College**

From the developmental lifespan perspective, transitions are major periods in one's life that bring up normative discontinuities, mainly departures from previous roles and opportunities for development of new patterns and functioning (Baltes, 1987; Bronfenbrenner & Morris, 2006). Some studies show that transition to young adulthood is characterized by a paradoxical increase in both average wellbeing and psychopathology incidence (Schulenberg & Zarrett, 2006). Young people are excited about the newly gained freedoms and independence while having to cope with an instability in all areas of their lives. Some individuals may thrive under the newly gained freedom and enjoy independence of tackling new challenges because the absence of institutional structures provides an opportunity for increased self-selection of choices and activities. However, for some individuals, the lack of coping abilities and institutional

supports creates a mismatch between needs and available resources that may negatively impact mental health and wellbeing (Byrd & McKinney, 2012).

According to Erickson's developmental stages (1968), students in the transition to college are usually focused on the challenge of developing a healthy identity while exploring intimacy with others. Thus, young people face the need to foster both understanding of oneself and meaningfully connecting to others. These new tasks and accompanied emotions necessitate the development and employment of a wide range of personal and interpersonal resources that allow them to effectively cope with the daily stressors. Arnett (2000) coined the term "emerging adulthood" (EA) to bring attention to the evolving nature of competencies and skills that young people need to cultivate and master. As a transition to college, this "age of instability" (Arnett, 2007) is marked by fluctuations, frequent changes, and struggles that require a set of adaptive resources beyond those established in earlier years (Masten et al., 2004).

Given the wide range of tasks and responsibilities, transition to college has been associated with students' elevated stress levels and high demands on self-regulatory skills. In fact, the college population is considered to be an at-risk group for developing a variety of serious psychopathologies, including depression, anxiety, substance abuse, and other stress-related physical and psychological conditions (The American College Health Association, 2014). In the 2014 American College Health Association - National College Health Assessment (ACHA-NCHA) national survey, undergraduate students reported that over the course of a school year 87% felt overwhelmed, 83% exhausted, 61% very lonely, 55% overwhelmingly anxious, 48% hopeless, 33% so depressed their daily functioning was affected, and 9% seriously considered suicide. The term "*College of the Overwhelmed*" encapsulates the rising mental health crisis among college students who are experiencing a higher prevalence of intensifying

stress-related difficulties compared to same-age controls (Kadison & DiGeronimo, 2004). At the same time, there is a continuing trend that using mental health services is stigmatizing with a relatively low rates of students (14%) seeking help (D. Eisenberg, Downs, Golberstein, & Zivin, 2009) while many self-medicate with drugs and alcohol (The American College Health Association, 2014).

Although undergoing increased stress during the transition to college is normative, the extent to which individuals can learn active coping strategies to handle negative emotional states or unproductive behavioral patterns is predictive of their ability to successfully adjust to the new environment (Dvořáková et al., 2017; Masten, Burt, & Coatsworth, 2006). Research has shown that students suffering from mental health problems tend to have worse peer and faculty relationships, less involvement in college activities, and lower grades and graduation rates (Byrd & McKinney, 2012; Keyes et al., 2012; Salzer, 2012; Storrie, Ahern, & Tuckett, 2010). Thus, mental health issues are an obstacle for successful adjustment to college and need to be considered when designing preventive efforts.

### **International Differences in College Experience**

A recent survey by the World Health Organization (Auerbach et al., 2016) show that college students' unaddressed mental health issues and graduation rates are a worldwide concern. Not surprisingly, there is a considerable variation in college students' experiences between and within countries. Some of the main distinctions can be recognized in the financial affordability of higher education (Usher & Medow, 2010), professional and practical orientation of college studies (Kivinen & Nurmi, 2003), and college living arrangements (Rodger & Johnson, 2005). In the U.S., the cost of higher education has risen considerably in the last 30 years (Baum, Kurose, & McPherson, 2013) and more than half of the median family yearly income is spent on one year

of higher education (Usher & Medow, 2010). There are mixed opinions whether enrollment fluctuates with college fees (Bruckmeier & Wigger, 2014), but for vulnerable and minority populations this is often the case (Baker & Velez, 1996). The affordability of college education and associated debt contributes to college students' financial stress and increases negative future outlook (Guo, Wang, Johnson, & Diaz, 2011). However, in many Western countries, education cost is either very low or free. For example, German higher education is publicly funded and although some fees were reintroduced in 2007, due to the large disapproval by the public, the fees were eliminated again. Free or low cost education is offered in many countries, such as Finland, Denmark, Slovenia, Czech Republic, and Brazil, among others. Although students still have to pay for their living expenses, their financial burden is considerably lower.

Another aspect of college is represented in its ability to link academic learning to practical real-world experience. In many European countries, students report getting relevant work experience during studies and directly connecting their field of study through their student employment (Kivinen & Nurmi, 2003). The Nordic model of education is arranged to include gradual accrual of professional competencies during college and ease the transition into working life. For example, within four years after graduation, many North European students do not need to get additional training in comparison to other European workers. Furthermore, more than 50% of graduates in Finland, Norway, Germany, Spain, Austria, Italy, and England work in jobs directly relevant to their studies. In contrast, in the U.S., only 27% of undergraduates work in their field of study and about 40% are underemployed since their jobs do not require college degree (Abel & Deitz, 2014). There is further variability depending on the major, the local labor markets, or consideration of graduate degree holders, but it is certain that opportunities for practical training and hands-on experiences can provide a more rounded college experience.

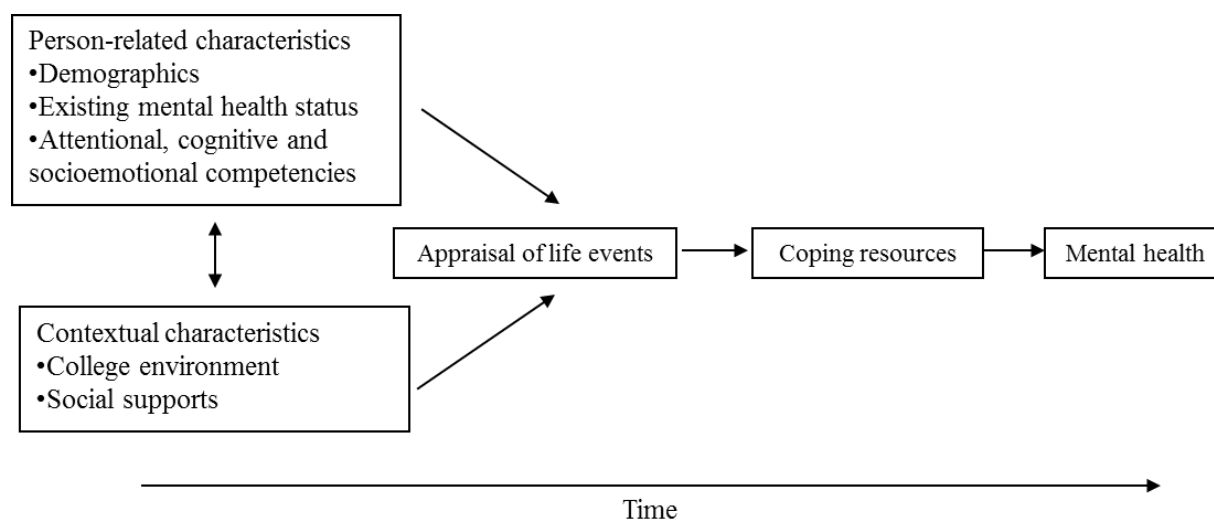
Finally, the living arrangements during the transition to college, such as the need to leave home and move into residential halls, may also play an important role in students' stress levels. For example, many North American freshmen live in residential halls which is associated with a sudden disconnect from family and social supports and an additional financial cost (U.S. Department of Education, 2009). However, there are also very positive aspects of US residential college life, including the development of new friendship networks and interests. There is research showing that on-campus living can be linked to academic performance (Pike, Schroeder, & Berry, 1997), but dormitory-style living can also lead to higher stress, superficial peer interactions, and benefits only for extroverted students (Rodger & Johnson, 2005; Valins & Baum, 1973). Rodger & Johnson (2005) also showed that students living in apartment-style on-campus residences (with more than one roommate) compared to students sharing a single room with another person reported a higher sense of belonging to the university community. This U.S. residential context is different than typical UK or German residential halls which usually have single rooms to ensure more privacy to students. In other countries, such as the Czech Republic or Germany, many students continue living in their home while commuting to school. This setup creates different experience because they continue to be rooted in their family system and can draw upon their social connections. Therefore, while the transition to college is a period of developmental challenge and opportunity in many countries, there are substantial international differences in college experience that may further influence students' stress. Now, I will focus on the particular processes that impact students' stress, mental health, and wellbeing.



### Appraisal and Coping Model during Transition to College

In order to fully characterize stress and coping during the transition to college I utilize the transactional model of appraisal and coping adapted from Lazarus & Folkman (1984) as illustrated in Figure 1.

Figure 1 Factors affecting healthy adjustment during the transition to college (adapted from Lazarus & Folkman, 1984)



During college, mental health is reflected in the capacity to lead a meaningful life, connect and relate to others, learn and utilize healthy coping skills, succeed in one's chosen field of academic studies, and aim to contribute to society. As a state of mental, social, and physical wellbeing, mental health can be viewed as a set of skills/competencies that is acquired and finely tuned across the lifespan depending on the person's adaptive capacities to process and cope with life conditions (Boldi & Vigna, 2016; Hurrelmann, 1990; Masten & Coatsworth, 1995; Nagaoka, Farrington, Ehrlich, & Heath, 2015). Therefore, the key factor in investigating mental health outcomes are not stressors themselves (except in the case of extreme and/or constant traumatic events) but the appraisal of these stressor and how one uses coping resources to meet these challenges (Beck & Clark, 1997). Figure 1 presents a model of how coping resources in the

college transition affects college students' mental health (adapted from Lazarus and Folkman, 1984).

I conceptualize personal and contextual characteristics as the resources and vulnerabilities influencing both the appraisal and coping process. Person-related characteristics include factors such as social/economic/cultural background, preexisting mental health issues, and attentional, cognitive, and socioemotional competencies. Contextual characteristics include the quality of the college environment and access to social supports. The personal and contextual characteristics are interactive and influence each other in any instance. Variation in these characteristics influences whether students might appraise a particular life event(s) as potentially threatening or not threatening (benign) to one's wellbeing (primary appraisal). When a situation is found to be potentially stressful, the student needs to evaluate if they are equipped with enough resources and tools to manage the event (secondary appraisal). The evaluative distinction between a threat and challenge is important because a demanding event can be appraised as a fear evoking stressor or as a learning opportunity and result in a corresponding biopsychosocial response (Blascovich & Tomaka, 1996; Lazarus & Folkman, 1984). These appraisals set the context for students' daily functioning, their reactivity to demands, and their coping actions (Folkman & Lazarus, 1985; Jamieson, Mendes, Blackstock, & Schmader, 2010). Since students face a wide variety of demands during transition to college, they need to clearly perceive and evaluate the opportunities presented in the new academic and social environment.

Coping describes the way people respond to the stressful situations and the approach or strategies they employ. When the appraised demands exceed existing resources, stress arises and psychological well-being may deteriorate if coping is unsuccessful. Especially during major developmental transitions, previously learned coping may not suffice the situational demands

and may need to be enhanced or replaced by higher order coping strategies (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; Skinner & Zimmer-Gembeck, 2007). When a cycle of demands exceeding resources continues over an extended period of time, it increases the susceptibility for mental health disorders and may lead to lasting negative consequences. Here I present in more detail the personal and contextual resources as they may impact the stress processes during transition to college.

### **Person-related characteristics during transition to college**

Students' individual differences in biological predispositions, personality, home environment, access to resources, and cultural context influence their ability to manage the developmental stressors of transition to college and the associated shift from greater parental supervision to increasing need for independent self-regulatory skills. Here, I highlight students' demographic characteristics, existing mental health status, and attentional, cognitive, socioemotional competencies as they relate to appraisal, coping, and mental health.

*Socio/economic/cultural characteristics.* Disadvantaged populations, such as first-generation students, may be at higher risk for maladaptation in the college environment because they often have lower grades in high school, may receive less family support during decision-making about college, and feel less academically capable in college (Ishitani, 2003). Students with financial difficulties often have to work during college, increasing the stressors from balancing school and work and the risks for dropping out (Baker & Velez, 1996; Guo, Wang, Johnson, & Diaz, 2011). Ethnic minority students may be also less prepared for the challenges associated with college, less comfortable in the college environment, feel the strain of stigmatization, and need additional college supports to successfully adjust to the new environment (Kuh, Cruce, Shoup, & Kinzie, 2008). Prillerman, Myers, and Smedley (1989)

proposed a multidimensional model of stress and coping that highlights the additional stressors minority students face in predominantly White colleges. Besides of the generic daily life stressors all students face, minority students deal with a lack of connection with the same background peers and faculty as well as stressors related to racial discrimination. These additional stress factors put disadvantaged students at higher risk for dysfunctional cognitive and emotional responses to the college environment increasing the likelihood of psychological distress, maladaptive coping patterns, and poor academic outcomes (Gordon L. Berry & Asamen, 1989).

***Existing mental health status.*** In a cross-national college sample, 83% of college students with a diagnosable mental health disorder reported an onset prior to college entry, mostly anxiety and mood disorders (Auerbach et al., 2016). In a U.S. sample, students who felt less emotionally prepared for college also reported lower GPA and poor ratings of their college experience (The Jed Foundation, The Jordan Matthew Porco Foundation, & The Partnership for Drug Free Kids, 2015). The preexisting psychological issues may increase students' vulnerability to stress and compromise their ability to utilize available resources and establish new ones (Compas, Wagner, Slavin, & Vannatta, 1986). For example, depressed adults evaluate life situations as more threatening, feel more inadequate about their resources, and react in a more confrontational and hostile way (Folkman & Lazarus, 1986). For college students, through the increased developmental demands placed on them, their mental health issues may become more pronounced, further preventing them from developing healthy skills for managing stress (Cleary et al., 2011). Mental health can be linked to individual qualities like optimism, healthy confidence, and self-efficacy (Scheier, Carver, & Bridges, 1994) which represent adaptive factors predictive of effective coping and positive adjustment to college (Aspinwall & Taylor,

1992; Brissette, Scheier, & Carver, 2002). Currently, most college studies do not distinguish between students with or without existing mental health problems (Conley, Durlak, & Kirsch, 2015), warranting further research into the interactions with contextual factors in college (Hunt & Eisenberg, 2010).

*Attentional, cognitive, and socioemotional competencies.* The ability to carefully deploy attention and regulate emotions is a central aspect of cognitive functioning, academic success, self-regulation, and prosocial behavior (LaBerge, 1995; Shapiro, Brown, Astin, & Society, 2008). The socioemotional competencies of recognizing and managing emotions, setting achievable goals, establishing positive relationships, and making safe choices are closely related to college adjustment, risky behaviors, and social relationships (Dymnicki, Sambolt, & Kidron, 2013). Furthermore, the socioemotional ability of self-regulation has been linked to healthy coping in challenging situations across the lifespan and is considered an adaptive resource of emerging adulthood that may uniquely predict adulthood success (N. Eisenberg, Spinrad, & Eggum, 2010; Masten et al., 2004; Moffitt et al., 2011; Roisman, Masten, Coatsworth, & Tellegen, 2004). At the same time, poor emotion regulation is a key issue in problematic behaviors and mental health issues (Wolff & Ollendick, 2006).

In the appraisal and coping process, the combined effect of paying attention, regulating thoughts and emotions, and utilizing effective coping tools represent developmental resources for handling both daily hassles as well as major transitions and life events. Students who are able to notice and perceive clearly the presented challenges may be better able to engage executive control to self-regulate and utilize available coping resources (Teper, Segal, & Inzlicht, 2013). Furthermore, they may have a greater ability to develop new coping resources that are more suitable to manage the situational demands (Compas et al., 2001).

In particular, the attentional, cognitive, and socioemotional competencies are reflected in (1) the intrapersonal qualities of being aware of one's values, paying attention to one's needs and goals, and developing the tools to achieve one's life objectives, and (2) the interpersonal skills of prosocial behaviors, the ability to receive adult supports, and the capacity to construct meaningful peer relationships. Both intra and interpersonal skills are needed during challenging times of confusion for students to self-regulate as well as to be able to reach out and utilize social support or other professional help when faced with significant stressors and challenges.

### **Contextual resources during transition to college**

Contextual resources provide an additional set of protective and risk factors that, in interaction with the students' personal resources, influence how students approach the developmental tasks of the transition. Here, I will highlight how aspects of the college environment and access to social supports relate to transition to college.

***College environment.*** The broader elements that impact a student's college learning atmosphere relate to (1) the school mission and quality of education, (2) resources including financial resources, availability of scholarships, size of campus, or access to a counseling center, and (3) cultural characteristics, such as the statement of values, respect for diversity, perception of safety, interest in community-building, service learning activities, access to social supports, or opportunities for healthy social encounters (Astin, 1999; Kuh et al., 2008; Tinto, 2007). For example, asserting students' health and wellbeing as a college priority and proactively building towards that goal gives students a clear message of the university values that would transpire into students' behaviors. The theory of student involvement (Astin, 1999) emphasizes the need for well-rounded students' college experiences that tie together the components of learning, resources available to students, and individual needs and interests. Empirical evidence has

confirmed that engagement in meaningful university-related activities promotes student's adjustment and academic thriving (Astin & Astin, 2015).

It has been repeatedly noted that the current characteristics of most western-style education emphasizes standardization, narrow specialization, and educational achievement through learning that is often divorced from the youth cultural environments (e.g. their communities and home cultures) (Cole, 2005). Although there is wide variation, for many college and universities, nurturing students' development of character, responsibility, and values is a relatively low priority (Astin & Astin, 2015). A single-minded attention on grades and academic achievement may take away from the students' possibility to explore their own values, their desires, and potential. With the focal concern on financial success that is reinforced by the large college debt students have to bear, students may choose seemingly more prestigious careers that do not fully align with their interests and values. These mismatch between career goals and values may create additional risk that impact students' attitude to higher education and success as young adults.

***Social supports.*** Social support provided by family members, peers, or other sources has both beneficial direct effect on wellbeing and protective function against stress (Kessler, Price, & Wortman, 1985). The access to social supports is a valuable resource regardless of stressful situations and proactively contributes to people's positive affect and psychological health. In demanding situations, the buffering hypothesis states that social support can shield the individual from the pathogenic effects of stress by responding to the specific needs prompted by the event (Thoits, 1986). In particular, healthy social support may prevent or mitigate the severity of threatening stress appraisal or assist with positive reappraisal of a stressor (Cohen & Wills, 1985). The different forms of social support relate to informational, instrumental, and emotional

functions (e.g. Thoits, 1995). Informational support refers to people who assist the distressed individual with better understanding of the difficult situation and with choosing appropriate resources or coping strategies. Instrumental support represents access to financial and material resources that can be used to resolve a certain problem or allow the individual to recuperate from the effects of stressful situations through pleasant activities, such as vacation. Emotional support denotes having access to people who provide psychologically nurturing and emotionally caring presence during stressful events.

The empirical evidence specifies that perceived social support rather than the actual use of social networks during distress may have a greater positive effect on mental health (Wethington & Kessler, 1986). The act of receiving social support may lead to increased distress due to perceived augmented vulnerability, mismatch between the desired and actual social response, or prolonged sense of unmet needs (Rook, 1992; Uehara, 1990) because social relationships also contain aspects such as peer pressure, codependence, misunderstandings, or encouragement of maladaptive coping strategies (Spitzberg & Cupach, 1998). These factors are especially important for college population because the effects of social support may vary depending on the individual, their particular needs, and the context of the situation.

During transition to college, young students are facing a double-edged task of developing healthy social relationships. Healthy family relationships protect students from the adverse effects of college stress (Hall et al., 2016; Johnson, Gans, Kerr, & LaValle, 2010; Larose & Boivin, 1998) while the developmental task of establishing emotional independence from family members and becoming socially integrated in the new environment is a necessary step towards healthy young adulthood (Chickering & Havighurst, 1981; Masten et al., 2004). The sense of loneliness can be common in first-year college students (Cutrona, 1982) and is associated with



poor social adjustment and academic performance (Hawken, Duran, & Kelly, 1991; Mounts, Valentiner, Anderson, & Boswell, 2006). Since many U.S. first-year college students live in shared room residential halls, roommate relationships also influence the context for establishing healthy sense of self and meaningful connections with others. High quality roommate relationships can have a positive effect on students' wellbeing; however low quality relationships may further exacerbate mental health vulnerabilities, relationship insecurities, and stress levels (Canevello, Granillo, & Crocker, 2013; Dusselier, Dunn, Wang, Shelley, & Whalen, 2005; Guassi Moreira, Miernicki, & Telzer, 2016; Haeffel & Hames, 2014). Further complexity arises with peer-related activities, such as social integration through Greek societies or athletic involvement, because certain groups may provide a sense of belonging but also promote maladaptive drinking behaviors (Turrisi, Mallett, Mastroleo, & Larimer, 2006). Thus, a sense of healthy social connectedness and access to meaningful social supports can be considered an adaptive resource for young people, especially when paired up with healthy choices of coping strategies (Dumont & Provost, 1999).

### **Coping and Mental Health in College Students**

There have been various ways of conceptualizing ways of coping but the main broad categories relate to problem solving, emotion focused, and meaning making (Lazarus & Folkman, 1984; Park & Folkman, 1997). Problem-focused coping includes strategies such as problem solving, planning, or seeking instrumental or informational social support with the intention to actively resolve the stressful issue and find a renewed state of wellbeing. Emotion-focused coping aims to deal with the associated emotions by accepting the situation, soothing the emotions, or seeking emotional supports to return to a balanced mental state (Carver, Scheier, & Weintraub, 1989). One coping behavior may represent both, problem solving as well as emotion

soothing (e.g. Compas et al., 2001). For example, leaving an argument may serve the purpose of calming down emotions which in turn could aid with generating new alternatives to the problem. Meaning-focused coping reflects the person's ability to make meaning of their experiences based on their beliefs about themselves and the world and, if necessary, make adjustments to one's mindsets and opinions. Based on fundamental world perspectives (e.g. religious or spiritual) and accumulated life experiences, people view the world, others, and themselves as benevolent, trustworthy, and efficacious (vs. unkind, dangerous, or incapable) which in turn impacts their appraisal of demands, choices of coping strategies, and post-coping reflections.

Another dimension of coping relates to the attitudes of avoidance or approach to the stressful situation (e.g. Tobin, Holroyd, Reynolds, & Wigal, 1989). Building on the main coping categories, problem-focused coping with an attitude of avoidance could lead to an aggressive argument to control the situation while an attitude of approach could lead to seeking more information about the problem itself and planning steps towards possible solutions. In emotion-focused coping, an attitude of avoidance could result in distancing and suppression of emotions while attitude of approach could result as self-regulation and positive appraisal of the stressful situation. Similarly, meaning-focused coping with an attitude of avoidance could reflect in uncritically defending one's opinions and an attitude of approach could reflect in learning more about the opposing views and respecting the different perspectives. However, in the early stages of handling stressful situations, short-term distraction from emotional stimulus may temporarily release cognitive load and provide more resources to manage the situation in long run. Therefore, the particular context is necessary for effective evaluation of adaptive coping (Suls & Fletcher, 1985).

Generally, college students' active problem-solving coping has been found more adaptive than avoidant emotion-focused coping (Pritchard, Wilson, & Yamnitz, 2007; Sasaki & Yamasaki, 2007) and maladaptive coping, such as withdrawal, avoidance, self-blame, or substance use has been associated with lower retention, higher levels of mental health issues, and psychological distress (Mahmoud, Staten, Hall, & Lennie, 2012; Scott et al., 2004). Similarly, approach based emotion-focused coping, such as acceptance and positive reframing has been associated with improved wellbeing (Scheier et al., 1994). Seeking social supports as a coping resource provides benefits depending on the particular situation (e.g Thoits, 1995). For example, college students' co-rumination, such as extensively complaining about a difficult class, have been associated with higher alcohol consumption in women (Ciesla, Dickson, Anderson, & Neal, 2011) while supportive social interactions were associated with higher levels of mental health (Zimet, Dahlem, Zimet, & Farley, 1988). The instrumental use of academic help has been consistently linked to greater wellbeing and academic success in college students (Gerdes & Mallinckrodt, 1994; Karabenick & Knapp, 1991; Tinto & Russo, 1994).

Unfortunately, a recent college report (The Jed Foundation et al., 2015) indicated that the most frequently quoted coping strategies during stressful times were avoidance-based, specifically sleeping (70%) and spending time online, watching TV, or playing videogames (64%). Furthermore, the fact that the rate of alcohol and drug abuse disorders is twice as high among college students as in the general population may signal that for some students, substance use is used as an avoidant coping technique (Blanco et al., 2008). Among students, 67% reported drinking on average almost 5 alcoholic drinks during one event (The American College Health Association, 2014). In a sample of 27, 000 students, students with poor mental health reported more frequent and heavier binge drinking with the intention of getting drunk (Weitzman, 2004).

Given the high levels of unmanaged stress during the transition to college, college students may have less well-developed coping skills and frequently engage in risky behaviors as part of the coping process.

The research literature shows that there is a high level of complexity in evaluating the effectiveness of coping strategies in college students and drinking is a good example. It is not surprising that students who drink as a way to cope with psychological distress experience higher levels of alcohol-related negative consequences (Martens et al., 2008; Neighbors, Lee, Lewis, Fossos, & Larimer, 2007). At the same time, college retention has been associated with a more pronounced increase in binge drinking in comparison with those who drop out (Schulenberg & Maggs, 2002). One of the contextual factors for heightened drinking behavior is peer influences reflected in participation in Greek societies and athlete groups (Turrisi et al., 2006). As such, social drinking and experimentation is also related to social connectedness and making new friends, representing an important development task of this period. These findings warrant a search for effective coping alternatives that would also satisfy the developmental needs of young adults.

Therefore, it is necessary to recognize the complexity of coping functions and the relative efficacy depending on the particular stress experience (e.g, Suls & Fletcher, 1985). A skillful combination of the different ways of coping is necessary for healthy development and unfolding of developmental tasks (Compas et al., 2001; Folkman & Lazarus, 1985). The effectiveness of coping strategies may be more dependent on the students' specific needs and their capacity to correctly appraise the current situation, reflect on the available resources, and then determine possible actions. Therefore, students' ability to pause, reflect, self-regulate, and then choose an effective coping strategy may be the key. Here, I will present an alternative perspective to how

certain social-emotional-cognitive competencies and skills, in particular mindfulness and compassion, may play a role in the coping process during transition to college.

### **Socioemotional Wellbeing Characterized by Mindfulness and Compassion Skills**

Mindfulness and compassion skills (MCS) are considered fundamental personal qualities inherent to human experience that may be further developed and nurtured throughout one's life (Goetz, Keltner, & Simon-Thomas, 2010; Greenberg & Turksma, 2015; Roeser & Eccles, 2015). The research literature offers in depth discussion of the differences between mindfulness and compassion as well as the interconnected nature of these constructs (Brown & Ryan, 2003; Germer, 2009; Neff, 2003). Here, I will describe each of them separately but then focus on the common ground to emphasize that both are needed for healthy and engaged functioning in the society.

One of the most cited mindfulness definitions is by Jon Kabat-Zinn which defines mindfulness as the process of "*paying attention in a particular way: on purpose, in the present moment, and non-judgmentally*" (1994, p. 4). More specifically, Shapiro and her colleagues (2006) built on this definition and hypothesized three main elements of mindfulness that work together and simultaneously towards the process of moment-to-moment awareness. These constitute the (1) underlying intention and purpose for engaging in (2) the cultivation of attention and presence with (3) an attitude of openness and non-judgment. From a self-regulation perspective, Hölzel et al. (2011) suggested that the mindfulness-in-action process unfolds by (1) regulating attention (2) through the practices of body awareness and (3) emotion regulation, that (4) causes a shift in the conceptualization and experience of the self. The aspects of attention and awareness are suggested to be necessary steps towards developing enhanced concentration, adaptive emotion regulation, and a caring attitude (Hölzel et al., 2011). Mindfulness that

explicitly includes compassionate behaviors could be more clearly described as heart-mindfulness (Shapiro et al., 2006), or even “heartfulness” (Kabat-Zinn, 2005).

Compassion is complementary to mindfulness (Birnie, Speca, & Carlson, 2010) but emphasizes the relational aspects, such as cultivating loving kindness during times of suffering, and including one’s self in the circle of benefactors (Hofmann, Grossman, & Hinton, 2011). The various models of compassion highlight the evolutionary emergence of compassion as a mechanism promoting cooperative relationships (Goetz et al., 2010; Mayseless, 2016) and the importance of positive and prosocial mental states that broaden attention and provide greater personal resources (Fredrickson, 2001). The self-compassion approach then specifically focuses on the times of suffering or emotional distress and how to respond to one’s self with kindness rather than criticism or judgment (Neff, 2003).

Some findings suggest that “*wandering mind is an unhappy mind*” (Matthew A. Killingsworth and Daniel T. Gilbert, 2010), considering awareness and attention one of the primary foundations of wellbeing (Hölzel et al., 2011). Furthermore, positive emotions, such as compassion, have the capacity to broaden one’s thinking and strengthen an individual’s resilience to be better prepared to face stressful situations and more rapidly recover from difficult experiences (Fredrickson, 2001). Empirically, mindfulness and compassion (for self or others) are closely related as some studies found that enhanced mindfulness predicts increased self-compassion (Birnie et al., 2010; Shapiro, Brown, & Biegel, 2007) and enhanced self-compassion mediates the benefits of mindfulness practice (Kuyken et al., 2010; Roeser et al., 2013). These findings may be partly a result of the intercorrelations between these constructs (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006), the difficulty with teasing apart the unique contributions of each (Hölzel et al., 2011), or issues with measuring these phenomena using self-reports

(Davidson & Kaszniak, 2015). For this paper, I will continue using mindfulness and compassion together as a personal resource that contributes to both personal and interpersonal wellbeing.

From a developmental perspective, mindfulness and compassion practices may enhance the evolutionary process of human development where one's self-centered perspective broadens to include greater and wider perspective (Fredrickson, 2001; Goetz et al., 2010; Shapiro et al., 2006). Mindfulness and compassion can be characterized as: (1) a momentary, episodic *state* of present and caring awareness, (2) a more stable, *trait*-like disposition towards mindful and considerate daily functioning, and (3) a set of *practices* that cultivates the shift from discrete moments of mindfulness and compassion to a mindful and kind-hearted way of living (e.g. Davidson, 2010). The initial states of mindfulness and compassion may occur only as an occasional, episodic experience of presence and caring against the backdrop of automatic habits and a sense of separation (Roeser & Eccles, 2015). Through age-appropriate enrichment and socialization practices, individuals' capacities may expand into the "zone of potential" awareness and compassion, leading to a more trait-like mindful and compassionate functioning in the world. Purposefully engaging in mindfulness and compassion practice may represent an evolutionary step in developmental growth by enhancing one's ability to perceive and engage in life with more clarity and kindness (Goetz et al., 2010; Shapiro et al., 2006).

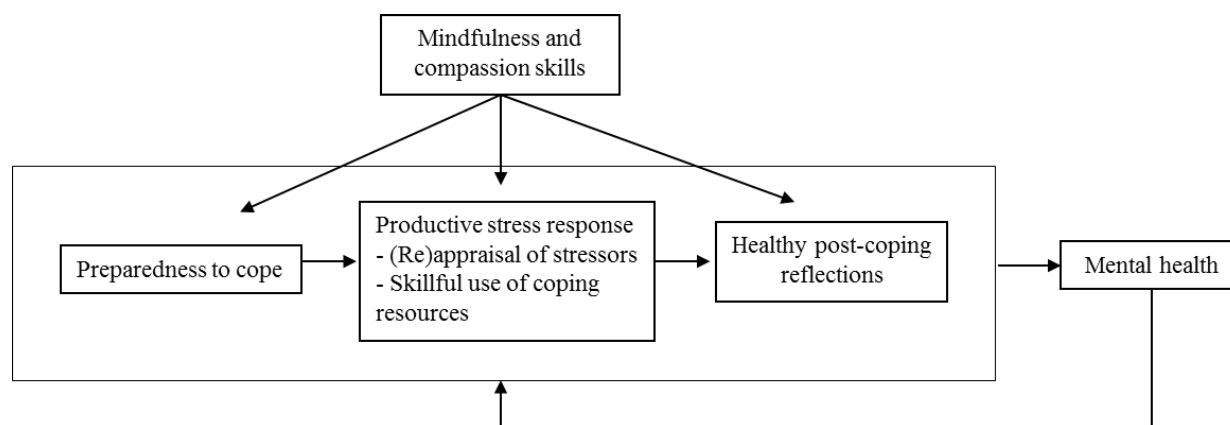
In college students, mindfulness and compassion either as a disposition or a practice has been positively associated with a wide range of positive outcomes, including mental health, self-regulation, cognitive flexibility, executive control, social connectedness, empathic and reflective tendencies, healthy eating, physical activity, and lower substance use and physiological reactivity to stress (Bamber, Kraenzle Schneider, & Schneider, 2016; Dvořáková et al., 2017; Karyadi & Cyders, 2015; Neff, Rude, & Kirkpatrick, 2007; Pommier, 2011; Regehr, Glancy, & Pitts, 2013;

Shapiro, Brown, et al., 2008). However, there is much less information on how mindfulness and compassion may impact college students' coping and lead to improved wellbeing. Next, I will propose a number of ways in which MCS might promote adaptive coping in the transition to college.

### **Adaptive Processes during Transition to College**

There are a number of ways in which mindfulness and compassion skills might promote adaptive coping in the transition to college, including the processes antecedent and subsequent to stressful encounters. Taking into account the sequential aspect of coping, I propose that MCS enhances 1. Preparedness to cope, 2. Productive stress response through (re)appraisal of stressors and skillful use of coping resources, and 3. Healthy post-coping reflections. The figure 2 depicts the proposed relations.

Figure 2 Adaptive stress and coping processes enhanced by mindfulness and compassion skills



#### **Preparedness to cope**

At the pre-coping phase, MCS may be associated with a greater proactive coping through accumulation of effective resources and anticipatory coping by more consciously selecting to participate in meaningful situations or to avoid risky or potentially negative situations. Proactive coping refers to a general preparation for demanding life situations by acquiring resources and



skills that would help to prevent or mitigate potential stressful experiences (Aspinwall & Taylor, 1997). Anticipatory coping is more specific as it is intended to prevent a particular stressful occurrence that is likely to happen through antecedent-focused emotion regulation (Gross, 2014). For example, young adult seeking social connections may choose to attend a culturally relevant alcohol-free social event instead of a fraternity party often associated with a drinking culture and a higher potential for negative consequences. By promoting students' perceptual clarity, positive affect, and caring attitude, MCS may lead one to choose contexts that avoid more stressful situations (proactive niche picking) and thus lower the likelihood of experiencing some types of stressful events.

Through mindfulness practice, students may enhance their general set of resources and begin to recognize their automatic response to an immediate experience (Farb, Anderson, & Segal, 2012; Hölzel et al., 2011). The attitude of observing internal experiences leads to a reduction in automatic negative reactivity, enhanced openness to any affective states (pleasant or unpleasant), and overall a more self-compassionate response to the situation at hand (Bernstein et al., 2015). The associated psychological flexibility allows the individual to adaptively move between affective states, ideas, and behaviors (McCracken, Gutierrez-Martinez, & Smyth, 2013) potentially enhancing students' equanimity in daily life. In studies with healthy college students, mindfulness-based practice mediated positive wellbeing outcomes as reflected in reduced stress and rumination, improved mental health, and healthy choices indicated by better sleep quality and lower incidence of negative alcohol consequences (Dvořáková et al., 2017; Shapiro, Oman, Thoresen, Plante, & Flinders, 2008).

Positive affect also plays a central role in developing lasting personal assets (Fredrickson, 2001) and benefits the stress and coping process by maintaining an optimal level of coping

resources (Folkman & Moskowitz, 2003). In Fredrickson's broaden-and-build theory (2001), positive emotions are linked to exploration, engagement, and action behaviors that allow the individual to expand their thinking and lead to more openness and curiosity. The process of an "upward spiral of the heart" (Kok & Fredrickson, 2010) suggests that positive emotions, a sense of connectedness, and wellbeing reciprocally enhance each other. Therefore, students' who are more psychologically flexible and capable of self-regulation can take more advantage of positive social and emotional opportunities. For example, compared to a no-treatment control group, college students who attended mindfulness interventions reported higher levels of optimism and positive judgements (Kiken & Shook, 2011) and showed enhanced prosocial behavior and forgiveness of others (Condon, Desbordes, Miller, & DeSteno, 2013; Oman, Shapiro, Thoresen, Plante, & Flinders, 2008).

Given the wide variety of tasks during the transition to college, student's self-compassion and caring attitude may also support improved daily functioning. In a study following first year college students during their first semester, students who reported higher levels of self-compassion were better able to adjust to the new college environment, felt less homesick and depressed, and more satisfied with their college social relationships (Terry, Leary, & Mehta, 2012). Furthermore, self-compassion had a protective influence on the negative effects of social difficulties where students lower in self-compassion were more sensitive to the quality of their social life and experienced more homesickness and dissatisfaction. In another study with college students, the authors utilized a naturalistic experiment of responsiveness to other people's suffering (Condon et al., 2013). Results indicated that a meditation-focused intervention enhanced participants' prosocial behavior as they demonstrated more frequent virtuous behavior than did the control group.

Furthermore, mindfulness in college students has been associated with health behaviors, such as healthy eating, quality sleep, and overall physical health (Murphy, Mermelstein, Edwards, & Gidycz, 2012; Roberts & Danoff-Burg, 2010). The mindful capacity to act with awareness was also associated with lower alcohol use in terms of quantity, duration, and problematic behaviors (Fernandez, Wood, Stein, & Rossi, 2010; Karyadi & Cyders, 2015). Therefore, students who are more dispositionally reflective and emotionally aware or those who receive mindfulness training may make healthier choices. MCS may work, in part, by enhanced attention and anticipatory emotion regulation, increasing their ability to opt out of situations that may be counterproductive to their wellbeing, selectively chose to engage in meaningful and healthy activities (e.g. healthy niche picking), and prevent undesirable outcomes from occurring (Gross, 1998).

### **Productive stress response through (re)appraisal of stressors and skillful use of coping resources**

When facing demands, MCS skills may enhance the student ability to appraise everyday situations as normative experiences and see them as a challenge rather than threat. In stressful situations, mindful students may refrain from engaging in initially threatening appraisal and shift towards a more positive reappraisal (Garland, Gaylord, & Fredrickson, 2011). Furthermore, students may have a wider range of personal and social coping resources to skillfully employ a combination of problem and emotion-based coping which may be reciprocally promoted by meaning making coping (Folkman, 2008; Park & Folkman, 1997).

*(Re)appraisal of stressors.* The initial appraisal process of evaluating a situation as threatening or challenging may be primed by MCS skills to assess demands more objectively as normative learning opportunities. Mindful students may develop a more stable access to their

personal and social resources to handle challenging situations, therefore appraising the upcoming events as manageable (Weinstein, Brown, & Ryan, 2009). For example, when academic demands are approached with eagerness to learn and succeed rather than anxiety and low confidence, students perform significantly better and feel more satisfied and committed to stay in school (Chemers, Hu, & Garcia, 2001; Webster Nelson & Knight, 2010). Even brief engagement in reflecting on positive experiences has been related to students feeling less threatened, more confident in test appraisal, and resulted in better test performance (Webster Nelson & Knight, 2010).

In the secondary appraisal of assessing available coping resources when stressful encounter arises, mindful students may be better able to identify the reactive response to a stressful experience and shift toward an attitude of witnessing the situation ((Farb et al., 2012; Hölzel et al., 2011). The mindful coping model by Garland et al. (2011; 2009) describes positive reappraisal through a process of decentering or “re-perceiving” (Shapiro et al., 2006) when the individual actively disengages from the initial negative judgement and through a metacognitive state of awareness turns towards a positive meaning making approach to the stressful encounter. The key aspect is the open minded state of broadened mindfulness and associated psychological flexibility that allows the individual to reframe the situation and adopt a more positive stance. In students, the ability to make positive meaning as a part of the appraisal and coping process may enrich their college experiences by broadening their beliefs about themselves and the world and strengthen their ability to manage future challenging situations (Park & Folkman, 1997).

Furthermore, MSC may lead to an extinction of habitual emotional reactions and enhance people’s ability to experience a stimulus without engaging in conditioned reactivity, such as fear response or avoidance (Baer, 2003; Hölzel et al., 2011; Shapiro et al., 2006). Through the

repeated turning towards unpleasant sensations paired up with increased relaxation levels, conditioned patterns may be transformed and more adaptive states elicited (Segal, Williams, & Teasdale, 2002). Hölzel et al. (2011) also postulate that MSC may lead to “nonappraisal” which does not refer to cognitive appraisal but to the ability to be exposed to a stressor mainly on a sensory level (bottom-up processing) with less engagement in the cognitive activation (top-down processing). This capacity may be more accessible to individuals with higher levels of meditation expertise (Brefczynski-Lewis, Lutz, Schaefer, Levinson, & Davidson, 2007). Beginners may need to employ more cognitive efforts through active regulation of attention and reappraisal to be able to observe a distracting stimulus non-judgmentally. In advanced practitioners, an accepting attitude and sustained attention may become automated, reflecting less need for cognitive resources (Brefczynski-Lewis et al., 2007; Hölzel et al., 2011).

***Skillful use of coping resources.*** When coping with stressful encounters, applying MCS may augment the students’ coping resources by building on the adaptive functions of problem solving, emotion processing, and meaning finding. For example, during college examination, students experience contradictory appraisals, emotions, and motivations reflecting the dynamic and multifaceted process of appraisal and coping (Folkman & Lazarus, 1985; Jamieson et al., 2010). By using mindful somatic awareness, the student may be better able to stay calm and attentive to the experience of stress in the body and employ specific regulatory skills, such as deep breathing or body scan. Through the lower reactivity to the challenging event and acceptance of difficult emotional states, students can better recognize and process their emotions before taking actions. Finally, by drawing on the caring aspect of compassion, students may be better able to evaluate when they need to “take care of themselves” during the times of distress or more effectively utilize social supports.

Therefore, MSC may support a skillful deployment of available coping resources depending on the particular situation. For example, a student who feels homesick may reflect on how much they miss their parents and the importance of close and meaningful relationships for every human being. The student may notice the habitual reactivity to overeat or spend excessive time on social media and instead make the conscious decision to reach out to close friends, participate in activities that would allow him or her to meet like-minded people, or expand the limits of their comfort by engaging in new areas of interests. In a conflict with a roommate, the student may be better able to regulate their emotions and openly discuss the possible solutions rather than suppressing their own needs or starting an argument. In academically challenging situations, the student may spend more time reflecting on the choices that he or she has to solve the issue. Rather than procrastinating or simply dropping the class, the student may choose to ask for help from the professor or teaching assistant or may organize a study group with their peers, taking deliberate steps towards the long-term goal of graduation.

### **Healthy post-coping reflections**

After a stressful encounter and accompanied coping, there is an opportunity to evaluate the consequences and future implications (Skinner & Beers, 2016). Negative mental habits, such as rumination and catastrophizing have been reported to aggravate the experience of distress and potentially trigger major psychopathologies (Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008). On the other hand, healthy reflections and positive attitude following a stressful event may aid the recovery process (Cho, Lee, Oh, & Soto, 2016; Davidson & Kaszniak, 2015; Kok & Fredrickson, 2010) and benefit future appraisals and coping choices (Folkman, 2008; Skinner & Beers, 2016).

Mindfulness and self-compassion may serve as an antidote to ruminative and self-critical thoughts and may protect students from engaging in maladaptive repetitive thinking after a negative emotional experiences (Neff et al., 2007; Shapiro, Oman, et al., 2008). Different types of rumination, such as recurrent angry thoughts, avoidant thinking, or co-rumination with others has been associated with alcohol use in college students, emotional distress, and sleep disturbance (Ciesla et al., 2011; Morrison & O'Connor, 2005; Takano, Iijima, & Tanno, 2012). Conversely, mindfulness practice has been found to reduce ruminative thoughts and behaviors and increase positive mood states (Jain et al., 2007; Shapiro et al., 2007; Shapiro, Oman, et al., 2008). Furthermore, a study with college students found that participants higher on dispositional mindfulness showed a faster emotional recovery after viewing pictures with unpleasant content (Cho et al., 2016), suggesting that MCS may impact the duration of affective experiences. Therefore, through the enhanced attention skills, self-acceptance, and non-judgment, students' personal resources may be freed up to skillfully shift the focus of their attention to the present moment and/or engage in constructive reflections on the previous situation.

Positive emotions also play restorative function after a stressful encounter and allow the individual to regain an optimal level of coping resources (Folkman, 2008). The ability to reflect on a challenging situation without being overly critical or overwhelmed by negative affect can enhance students' ability to learn from their own mistakes and develop new meaning and strategies for future situations. In a college study, self-compassion was associated with students' ability to recognize alternative goals, perceive less fear of failure, and greater competence to manage academic demands (Neely, Schallert, Mohammed, Roberts, & Chen, 2009; Neff, Hsieh, & Dejitterat, 2005). Therefore, healthy reflections and caring attitude may inform the upcoming stress cycle and strengthen the students' efficacy to face future demands.

### **Developmental and Preventive Approach to Mental Health Needs of College Students**

For preventive interventions to be effective, they need to be built on knowledge of the developmental processes of risk and protective factors. When these risk and protective factors have been identified they can serve as targets of universal prevention/intervention programs in educational settings to prevent common risks in the general population but also to promote adaptive processes and alter maladaptive pathways in certain subgroups (Greenberg & Abenavoli, 2017). During developmental windows of opportunity and challenge, preventive interventions that include MCS may have higher impact because of the increased vulnerability of the whole system (Granic, 2005). The process of appraisal and the healthy selection of coping strategies may be improved by strengthening protective attentional, socioemotional, and cognitive factors to buffer the individual against mental health malfunction. Given the instabilities of emerging adulthood, freshmen are particularly in need of practices and trainings aimed at providing effective coping resources. Universities need to address students' mental health issues and proactively promote wellbeing through effective regular offerings of evidence-based programs (Conley et al., 2015; Regehr et al., 2013).

Given the mental health issues and associated maladaptive coping in college students, preventive efforts in strengthening college students' cognitive-social-emotional skills are one method to support the students' wellbeing and adjustment to college. The newly defined transdisciplinary approach of developmental contemplative science intends to deepen our current understanding of how certain mental and behavioral practices, such as mindfulness and compassion, can both alleviate distress and facilitate the development of positive human capacities during this critical developmental period (Roeser & Eccles, 2015; Roeser & Pinela, 2014). Through creating greater alignment between the person's needs and opportunities for



adaptive engagement with their environment, mental enrichment practices of mindfulness and compassion may mitigate the effects of risk factors and strengthen protective factors (Roeser & Pinela, 2014). In particular, MCS may have the potential to positively impact the appraisal and coping processes through enhanced attention and cognitive skills, social-emotion regulation, and overall regulatory skills. Therefore, these practices may offer suitable prevention focus in higher education for enhancing the development of a young person as a whole (Shapiro, Brown, et al., 2008).

### **Conclusion**

This conceptual paper identified various factors impacting mental health during transition to college. The stress model by Lazarus and Folkman (1984) served as a foundation to explore the stress and coping processes and related personal and contextual characteristics. Furthermore, the socioemotional aspects of mindfulness and compassion were presented as a way to enhance personal and interpersonal wellbeing of college students. In particular, MCS practices were postulated to enhance 1. Preparedness to cope, 2. Productive stress response through (re)appraisal of stressors and skillful use of coping resources, and 3. Healthy post-coping reflections. Therefore, these practices may be a useful preventive tool to strengthen students' ability to adjust to the new college environment and fulfill the developmental tasks of this period. Further examination of MSC in college students is needed to assure they can effectively and sustainably reduce stress and enhance coping processes.

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### **Chapter 3: Promoting Healthy Transition to College through Mindfulness Training with 1st year College Students: Pilot Randomized Controlled Trial**

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#### **Introduction**

College education aims to strengthen young people's intellectual abilities and prepare them for productive and successful adulthood, however students' high rates of mental health concerns, sleep issues (Jensen, 2003), and excessive drinking undermine the original purpose of college (Jensen, 2003; Mallett et al., 2013; The American College Health Association, 2013). In particular, the developmental transition of entering college warrants greater understanding since it is characterized by a radical shift in personal responsibilities, a sudden drop in institutional supports, and an abrupt change of social environments (A. W. Astin, 1999; Evans, Forney, Guido, Patton, & Renn, 2009; Schulenberg, Sameroff, & Cicchetti, 2004). In comparison with other years, freshmen endorse higher levels of ongoing and chronic stress (Misra & McKean, 2000; Towbes & Cohen, 1996) which provides fertile grounds for poor coping strategies, unhealthy relationships, and deteriorating academics (Schulenberg et al., 2004). The complexity of challenges associated with entering college call for developing effective institutional structures to facilitate a healthy and integrated developmental transition to young adulthood (Hurrelmann, 1990; Maggs, Jager, Patrick, & Schulenberg, 2012; Schulenberg et al., 2004).

The development of stress-related difficulties and maladaptive coping is of great concern because it further perpetuates distress and mental health problems. A critical issue is the initiation and consequences of frequent binge drinking during the freshman year (Turrisi, Mallett, Mastroleo, & Larimer, 2006). Alcohol consequences, which are not solely a result of alcohol consumption but rather an additional construct associated with students' willingness to



experience such consequences, augment the risk for long-term negative outcomes (Mallett, Varvil-Weld, Turrisi, & Read, 2011). Furthermore, stress and alcohol use are closely linked to poor sleeping habits which further impacts students' academic success and overall wellbeing (Singleton & Wolfson, 2009).

To attend to the current issues in the educational system, college education needs to broaden its reach and foster the “*development of the “whole person”*” (Shapiro, Brown, & Astin, 2011, p. 4) which includes the development of socioemotional competencies as well as academic skills. There is a growing interest in using mindfulness practices to promote college students' personal growth and wellbeing by cultivating awareness and insight. Mindfulness can be conceptualized as a practice of accepting and non-judgmental attitude to the present moment thoughts and feelings (Kabat-Zinn, 1996) which establishes a groundwork for intrapersonal and interpersonal awareness. Specifically, by cultivating non-judgmental attention and caring attitude towards body sensations, thoughts, and emotions, students may learn effective stress management techniques, and emotion regulation skills. Furthermore, students may become better equipped to make healthier choices, develop healthy relationships, and be resilient to face challenges associated with the transition process (Shapiro et al., 2011).

The burgeoning literature on mindfulness interventions in the college population has demonstrated a wide array of benefits including stress reduction (J. Astin, 1997; Shapiro, Oman, Thoresen, Plante, & Flinders, 2008), greater emotional wellbeing, (Jain et al., 2007; Rosenzweig, Reibel, Greeson, & Brainard, 2003), and improved interpersonal relationships (J. S. Cohen & Miller, 2009; Shapiro, Schwartz, & Bonner, 1998) as well as health-related behaviors, including the promotion of better sleep (Greeson, Juberg, Maytan, James, & Rogers, 2014). A recent review of universal prevention programs for higher education students concluded that skills-

oriented programs; in particular, mindfulness and cognitive-behavioral strategies were the most effective (Conley, Travers, & Bryant, 2013). The same was found for stress-targeted interventions for college students where the cognitive/ behavioral/ mindfulness-based programs consistently showed a positive impact on students' psychosocial wellbeing (Regehr, Glancy, & Pitts, 2013).

Despite the accumulating evidence, there is a lack of research on mindfulness-based trainings targeted to promote the 1<sup>st</sup> year college students' experiences. To date, there are two published studies that have implemented mindfulness-based programs during the first year of college. A quasi-experimental study of 51 students who attended 1<sup>st</sup> year wellness seminar found no group differences in psychosocial adjustment and stress management (Conley, Travers, et al., 2013). Only the post-test data of "self-perceived improvements" was significantly higher in the intervention group. Another quasi-experimental study of 56 students found post-test significant group differences in students' social-emotional adjustment and stress levels in salivary cortisol (Ramler, Tennison, Lynch, & Murphy, 2016). However, the study lacked pre-test data, warranting caution in results interpretation. At present, there continues to be a need for high quality evidence utilizing experimental designs to evaluate the effects of incorporating developmentally tailored mindfulness programs into higher education (Shapiro et al., 2011).

The current pilot randomized controlled trial was conducted to evaluate the efficacy and feasibility of an 8-session mindfulness training aiming to promote 1st year college students' health and wellbeing. The pilot study utilized an evidence-based, universal mindfulness program Learning to BREATHE (L2B) that has been shown to improve adolescents' emotion regulation skills and self-perceived sense of well-being (Broderick, 2013; Broderick & Metz, 2009; Metz et al., 2013). The intention was to use a program originally designed for youth in terms of the

language, expectations, and skills development that could be further adapted to the specific needs of 1<sup>st</sup> year college students. The aims of the L2B program are highly relevant to the developmental tasks during the transition to college: learning stress management skills, building the capacity for emotional regulation, strengthening the ability to focus and deliver quality performance, and establishing meaningful social relationships (Chickering & Havighurst, 1981; McCoy, 1977). We hypothesized that at the end of the intervention students who participate in the L2B program, in comparison to the wait-list control group, would demonstrate better outcomes in the areas of mental health and wellbeing (depression, anxiety, life satisfaction), intrapersonal awareness (mindfulness, self-compassion), interpersonal awareness (social connectedness, compassion for others), and health behaviors (sleep, alcohol use).

## **Methods**

### **Participants**

Participants were 109 first-year undergraduate students recruited from a large, public university in Pennsylvania. Recruitment commenced a few days prior to, and in the first three weeks of the Fall 2015 academic semester. In collaboration with Residential Life Services and the Honor's College at the institution, potential participants were recruited through recruitment e-mails offering an opportunity to participate in a stress-management mindfulness program. Furthermore, flyers were posted at commonly visited locations and information booths were held at freshmen involvement fair.

Students were considered to be eligible for the study if they were first-year students residing in on-campus residence halls, and at least 18 years of age. The participants were almost all 18 years of age ( $M=18.2$ ,  $SD=0.4$ , range=18-19) and the majority of the sample were female (66%, 72 females, 37 males). The sample was ethnically diverse with half of the sample

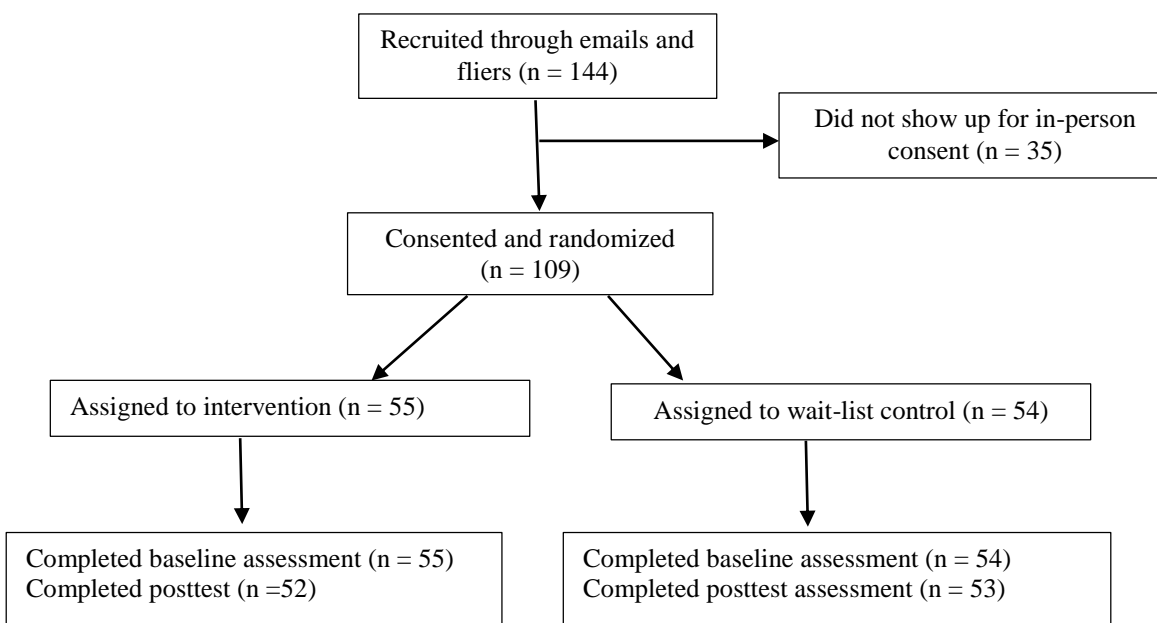
identifying as Caucasian (50%), Asian (26%), African American (5%), Hispanic (8%), and mixed (10%). A small portion of the sample (16%) were international students (21 international, 88 domestic) and only 14% of the sample reported attending counseling services or therapy in the previous six months. Twenty-two percent reported having some experience with mindfulness or meditation; of those, the majority reported practicing less than once a month.

### **Procedure**

The flow of participants' enrollment, randomization, and analysis is shown in Figure 3. Students were recruited via emails and flyers and emailed initial screening for eligibility. Eligible students were invited to an in-person informed consent meeting ( $n = 144$ ). The students who did not show up for consent procedures ( $n = 35$ ) were dropped and we did not have any further communication with them. Students who completed the informed consent were e-mailed a secure link to access a baseline questionnaire (September 2014). Since we had a predominantly female sample, the sample was stratified by gender and each group was randomized separately (using the <https://www.randomizer.org/>) to assure balanced number of males and females in the intervention and control group. Participants were randomized to the intervention group ( $n = 55$ ,  $n$  of females = 35, Fall 2014) or to a wait-list control group ( $n = 54$ ,  $n$  of females = 37, Spring 2015) and informed about their assignment by email. A post-test survey was e-mailed to all participants when the intervention was completed (November 2014). Surveys were delivered using the Qualtrics program. Furthermore, half of the students from the intervention and control group were randomly assigned to complete ecological momentary assessments (Moskowitz & Young, 2006) through smartphones. These data are not included in this article and will be reported elsewhere. Small financial compensation was provided for completion of the surveys. To increase responsiveness, payment increased from pre-test (\$10) to post-test (\$15) and was

delivered after the post-test assessment (November 2014). All procedures were approved by the university Institutional Review Board.

Figure 3 Participant flow of enrollment, randomization, and data collection



## Intervention

In collaboration with the L2B program developer (Dr. Trish Broderick), two trained facilitators adapted the program to target the developmental challenges specific to 1st year college students. After every session, facilitators completed a fidelity log focused on delivering all content components. The program was delivered with 99% fidelity. To maximize implementation quality all lessons were videotaped and reviewed by the program developer and two additional fidelity coders who provided weekly feedback about program implementation.

Participants assigned to receive the L2B program in the fall semester were asked to attend a total of 8 sessions over 6 weeks (2 sessions per week for the first two weeks and 1 session for each of the remaining 4 weeks). Sessions were held in the evening in the freshman residential

halls, with each session lasting approximately 80 minutes. The groups consisted of 20-25 students, with one lead and one assistant facilitator.

The L2B program is structured to gradually cultivate inner strength and empowerment throughout the eight sessions, with core themes associated with each session that are developed around the BREATHE acronym (for details, see Broderick & Metz, 2009). Goals of the program include enhancing students' emotion regulation skills, introducing simple mindfulness techniques so that students may better manage stressful situations, and facilitating the learning process in a supportive, group environment. To facilitate outside of classroom practice and promote program retention, students were provided with home practice cards (a simple practice associated with the core theme), stickers that reminded them to use mindfulness techniques in response to stress (e.g., three mindful breaths), as well as home worksheets with additional mindfulness suggestions. Students were advised to place the handout materials in a visible place that would remind them of their participation in the L2B program and their intention to practice mindfulness skills in daily life. Further, students were provided with a link to access an audio recording of guided meditations (e.g., body scan, loving-kindness practice) led by the lead facilitators.

## **Measures**

***Depression.*** The Primary Health Questionnaire (PHQ, Spitzer, Kroenke, & Williams, 1999) is an 8-item screening instrument which assesses depressive symptoms (e.g., feeling down, depressed or hopeless) over the previous two weeks. The PHQ has demonstrated validity and excellent internal consistency in research on college populations (alpha=0.90, Singh & Brown, 2014). In the present sample, Cronbach's alpha was 0.81 and 0.87 for the pre- and post-test scores, respectively.

**Anxiety.** The 7-item Generalized Anxiety Disorder Scale (GAD, Spitzer, Kroenke, Williams, & Lowe, 2006) was used to assess frequency of experiencing anxiety-related symptoms in the previous two weeks. The GAD has demonstrated internal consistency ( $\alpha=0.91$ ) and concurrent validity in college populations (Singh & Brown, 2014). Observed reliabilities for the GAD in the present sample was 0.87 and 0.90 for the pre- and post-test scores, respectively.

**Satisfaction with Life.** The satisfaction with life scale (SWL, Diener, Emmons, Larsen, & Griffin, 1985) is a brief, 5-item questionnaire which assesses one's overall cognitive judgement of their life, with a Likert scale from 1 (strongly disagree) to 7 (strongly agree). Sample items include, "If I could do my life over, I would change almost nothing", and "I am satisfied with my life". Cronbach's alpha for the SWLS was 0.88 for the SWL scores at both time points.

**Mindfulness.** The mindfulness attention awareness scale (MAAS, Brown & Ryan, 2003) is a 12-item instrument which captures mindfulness by assessing the frequency of the opposing construct; mindlessness (e.g., "It seems I am running on automatic without much awareness of what I am doing"). Participants are asked to rate the extent to which they function mindlessly in daily life, with a Likert scale from 1 (almost never) to 6 (almost always). Eight items with the highest factor loadings were selected for the present study. Observed reliabilities for the MAAS in this sample were 0.88 and 0.90, respectively.

**Self-compassion (SCS).** The Self-Compassion Scale (SCS, Neff, 2003) is a 12-item instrument which assesses one's tendency to address failure and painful emotions with a sense of warmth, kindness, and understanding. Responses are provided on a 5-point Likert scale from 1 (almost never) to 5 (almost always). Cronbach's alpha was 0.86 across the two time points.

***Social Connectedness.*** The Social Connectedness Scale (SCC-R, Lee & Robbins, 1995) was used to assess individuals' interpersonal closeness in the social context. From the full measure, 7-items of highest factor loadings were used on a Likert-type scale from 1 (strongly disagree) to 6 (strongly agree), with sample items such as, "Even around people I know, I don't feel that I really belong". Observed reliabilities for the SCC-R in the current sample was 0.89 for both time points.

***Compassion.*** The Compassion Scale (CS, Pommier, 2011) is a 24-item instrument which captures the degree of awareness, sympathy, and concern for others' suffering. A Likert scale is used from 1 (almost never) to 5 (almost always). Observed reliabilities were 0.90 and 0.91, respectively.

***Sleep.*** Subjective sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI, Buysse, Reynolds, & Monk, 1989). The PSQI is a validated instrument which assessed 7 aspects of sleep: sleep latency, sleep duration, sleep efficiency, sleep disturbances, sleep medication use, and daytime dysfunction, and overall sleep quality over the previous month. These component scores (ranging from 0 to 3, with 3 demonstrating greater dysfunction) are summed to yield a total sleep score ranging from 0 to 21, with higher total scores indicating poorer sleep quality.

***Alcohol use.*** To obtain an assessment of peak drinking, participants reported the number of drinks they consumed during an occasion on which they drank the most during the past 30 days (Marlatt & Baer, 1998). Frequency of getting drunk was assessed with a single item that asked the number of times the respondent got drunk or very high from alcohol use during the past 30 days.



***Alcohol Consequences.*** Alcohol-related consequences were obtained using The Young Adult Alcohol Problems Screening Test (YAAPST, Hurlbut & Sher, 1992). Students were asked to indicate the frequency of occurrence for 10 consequence from the YAAPST (e.g., hangover, blacking out).

***The L2B Acceptability Questionnaire*** (LAQ, Dvorakova, Agrusti, & Broderick, n.d.) To evaluate acceptability of the program, students in the intervention group answered 10 questions about their overall experience, practices they learned, and confidence in using mindful skills in the future. The survey included a mix of open-ended, 5-point Likert-Scale, 0-100 rating, and Yes/No questions.

### **Data Analysis**

Prior to data analyses, data were inspected for normality and outliers. To reduce skew and kurtosis found in alcohol measures, a square root transformation (D. C. Howell, 2007; Tabachnick & Fidell, 2007) was administered to all 3 assessments of alcohol use and the transformed variables were used in the data analysis. Independent *t*-tests were computed to assess statistical differences on any baseline differences between the two groups. The two randomly assigned groups did not differ significantly on any baseline psychosocial characteristics. However, in the intervention group, there were significantly higher number of students who attended therapy in the last 6 months ( $t=2.73, p < .05$ ). Furthermore, males demonstrated higher mindfulness scores on the MAAS in comparison to females ( $t=3.06, p < .05$ ), and males reported lower anxiety in comparison to females on the GAD ( $t=2.20, p < .05$ ). To examine intervention effects data were analyzed using Analysis of Covariance (ANCOVA). Separate ANCOVAs were run for each outcome measure using gender, pre-test scores, and therapy-attendance as covariates and the group assignment as predictor. Cohen's *d* for the

intervention group vs. wait-list control group was computed for each outcome measure. (J. Cohen, 1988) All statistical analyses were performed with SPSS Version 21.0 with the alpha level used to determine two-tailed significance  $p < .05$ . Given the small sample size, reduced alpha = .10 was considered to indicate noteworthy marginal significance. The analysis was conducted as an intent-to-treat, including all randomized participants. At post-test, there was only 6% of missing data and therefore listwise deletion was utilized to handle missing data.

### **Results**

The attendance of the L2B program was high with over 60% of participants attending at least 6 out of 8 sessions. On average, students attended 5.21 sessions ( $SD=2.72$ ). A small portion of students (14%) did not attend any sessions due to scheduling conflict or personal reasons.

The pre and post-test unadjusted means are displayed in Table 1 and the adjusted post-test means, ANCOVA results, and effects sizes are displayed in Table 2. In the domain of mental health and wellbeing, the intervention participants reported significantly lower levels of depression ( $F(1,98)=6.53, p<0.05, d=-0.34$ ), significantly lower levels of anxiety ( $F(1,98)=4.92, p<0.05, d = -0.48$ ), and significantly higher levels of life satisfaction ( $F(1,97)=10.59, p<0.05, d=0.41$ ) compared to the control participants. The indicators of intrapersonal awareness (mindfulness, self-compassion) and interpersonal awareness (social connectedness, compassion) were not significantly different between the groups at the post-test.

Table 1 Unadjusted pre and post-test mean comparison for all outcome variables

Outcome variable	Intervention				Control			
	Pre		Post		Pre		Post	
	<i>M</i>	(SD)	<i>M</i>	(SD)	<i>M</i>	(SD)	<i>M</i>	(SD)
Depression	7.36	(4.26)	6.06	(5.00)	6.31	(4.78)	7.33	(5.36)
Anxiety	7.80	(4.82)	5.94	(4.38)	6.41	(5.24)	6.71	(4.64)
Satisfaction with life	21.76	(7.52)	23.43	(7.11)	22.67	(6.95)	21.27	(7.65)
Mindfulness	4.03	(1.02)	4.18	(1.03)	4.15	(1.00)	4.36	(1.04)
Self-compassion	2.77	(0.72)	3.02	(0.80)	2.98	(0.74)	3.10	(0.75)
Social Connectedness	4.20	(1.07)	4.09	(1.14)	4.29	(1.17)	4.29	(1.27)
Compassion	3.80	(0.39)	3.80	(0.46)	3.78	(0.44)	3.76	(0.47)
Sleep Issues	6.18	(3.22)	5.58	(2.66)	5.02	(2.53)	6.02	(3.41)
Alcohol Peak	3.93	(8.64)	2.22	(3.38)	4.33	(5.43)	4.75	(8.17)
Frequency Drunk	0.64	(1.09)	0.51	(0.90)	1.06	(1.31)	0.96	(1.31)
Alcohol Consequences	1.87	(3.06)	1.57	(3.38)	1.91	(2.62)	2.39	(3.10)

*Note:* Summary statistics of alcohol-related variables represent data before transformations. *N* of participants = 109, intervention=55, control=54.

Table 2 Intervention effects on all outcome variables, adjusted post-test means, ANCOVA results, and effects sizes

Outcome variable	Adjusted post-test mean and standard error				<i>F</i>	<i>p</i>	<i>d</i>
	Intervention <i>M</i>	(SE)	Control <i>M</i>	(SE)			
Depression	5.96	0.55	7.98	0.55	6.53	0.012	-0.34
Anxiety	5.43	0.59	7.23	0.56	4.92	0.029	-0.48
Satisfaction with life	23.80	0.62	20.91	0.62	10.59	0.002	0.41
Mindfulness	4.22	0.11	4.31	0.11	0.29	0.595	-0.07
Self-compassion	3.11	0.07	3.00	0.08	1.17	0.282	0.17
Social Connectedness	4.16	0.12	4.21	0.12	0.08	0.771	-0.10
Compassion	3.81	0.05	3.75	0.05	0.98	0.325	0.05
Sleep Issues	5.33	0.39	6.36	0.40	3.35	0.070	-0.53
Alcohol Peak	0.95	0.18	1.35	0.18	2.32	0.131	-0.37
Frequency Drunk	0.49	0.08	0.57	0.07	0.49	0.485	-0.03
Alcohol Consequences	0.70	0.12	1.04	0.12	3.72	0.057	-0.24

*Note:* Significance statistic was calculated using ANCOVA with treatment group as a predictor and pretest scores, gender, and therapy as covariates. Cohen's *d* was calculated by using raw scores of group difference means and pooled standard deviations. *N* of participants=109, intervention=55, control=54.

In the area of health behaviors, the intervention students reported marginally significant lower levels of sleep issues ( $F(1,97)=3.35, p<0.1, d=-0.53$ ) than did the control participants.

There were no significant group differences in the frequency of drinking. Alcohol peak, as a

number of drinks at a particular occasion changed in the expected direction with the effect size  $d = -0.37$ , however the result was not significant. Furthermore, there was a marginally significant group difference in the alcohol consequences where the intervention group reported lower count of alcohol-related consequences in comparison with the control group ( $F(1, 97) = 3.72, p < 0.1, d = -0.24$ ).

In terms of the program evaluation, students reported learning a wide variety of new practices and ideas as a result of the program. The three most effective in-class practices were 3 mindful breaths (82%), breath awareness (50%), and mindfulness of emotions (27%). Almost all (98%) students would recommend attending the program to a friend or classmate. Most students found the program useful for (1) stress reduction and stress management (95%), (2) self-regulation skills (52%), and (3) leading a healthier lifestyle (48%). Finally, on a scale of 0-100 students reported mean level of 74.91 ( $SD = 21.78$ ) confidence in using the skills they learned in future stressful situations. Separate qualitative analysis of the open-ended questions is in preparation for publication.

## Discussion

Given the national reports of stress-related difficulties and maladaptive behaviors in college students (The American College Health Association, 2013), this pilot randomized controlled study aimed to evaluate the efficacy and feasibility of an evidence-based developmentally adapted mindfulness L2B program with first year college students. We found that attending a mindfulness program in the first semester of college led to significant improvements in students' life satisfaction, depression, anxiety, sleep issues, and alcohol consequences in comparison with the control group. Indicators of intra and interpersonal

awareness were not impacted by the intervention. In terms of program evaluation, students' rated the program highly and would recommend attending the program to their peers.

During the first year of college in particular, students need to develop skills that would reinforce their ability to manage stress-related adversity. It has been documented that the first year of college can be associated with worsened psychological and physical health (Pritchard, Wilson, & Yamnitz, 2007). We found similar phenomena in the control group as students reported a decline in life satisfaction and mental health, and increase in sleep issues, alcohol use, and consequences across the 1<sup>st</sup> semester. However, our pilot intervention findings suggest that through mindfulness training this pattern can be prevented and students' wellbeing can even improve in the first semester.

Mindfulness skills can provide students with a toolset of healthy ways to approach discomfort and challenging experiences associated with entering college. Rather than emotionally reacting, students learn how to regulate their emotions which leads to a sense of empowerment, a positive loop that helps students make healthier decisions (Shapiro et al., 2011). The intervention effects on depression, anxiety, and life satisfaction are particularly important as they play a foundational role in predicting students' success and adjustment (Pritchard et al., 2007) which in turn leads to better long-term adult outcomes (Maggs et al., 2012).

Mindfulness trainings also tend to improve awareness of one's self and others, providing foundation for more compassionate behaviors (J. S. Cohen & Miller, 2009). In our pilot study, we did not find significant results in either domain of intrapersonal and interpersonal awareness. Previous studies have discussed the difficulties with measuring mindfulness and compassion since they capture more subtle aspects of life (Grossman, 2008). Also, it may be the case that involvement in mindfulness practices can lead one to become initially aware of one's

mindlessness in everyday life. In fact, this pilot intervention program had students differentiate between mindful and mindless activities and thus the intervention group was made more aware of when they were not mindful. More intensive assessments, such as ecological momentary assessments that are collected closer to the activation time (Moskowitz & Young, 2006) may increase the accuracy of reporting and reveal the underlying dynamics in these outcomes.

Health behaviors in college, such as sleep and alcohol use, have been a target of interventions with moderate success (Brown FC, Buboltz WC Jr, & Soper B., 2006; Scott-Sheldon, Carey, Elliott, Garey, & Carey, 2014). College students especially struggle with transitioning into sleep due to stress-related rumination, tension, and hyperarousal (Jensen, 2003). However, in mindfulness studies, participants often report having easier time with sleeping because they are able to clear their minds by focusing on breathing and relaxing their bodies (A. J. Howell, Digdon, & Buro, 2010). Mindfulness practices, such as body scan when students learn to bring relaxed sense of awareness to different body parts, may more effectively prepare students for a restful sleep. Since quality sleep is associated with better academic outcomes (Trockel, Barnes, & Egget, 2000), it represents an important outcome in college intervention research, warranting continued investigation of how sleep is improved through mindfulness practice and its consequences.

In terms of alcohol-related outcomes, this is the first intervention that has reported effects on alcohol consequences in a typical college freshman population. Although we did not find significant effects on alcohol use, there was an overall decrease in alcohol use in the intervention group and an increase in the control group. A recent review of alcohol interventions with freshmen found on average weighted mean effect size of 0.11 - 0.19 for intervention-inactive control studies (Scott-Sheldon et al., 2014) while we found non-significant  $d = -0.37$  for alcohol

use and marginally significant  $d = -0.24$  for alcohol consequences suggesting that mindfulness practices may positively effect students' decision-making related to substances. Since alcohol consequences are related to students' willingness to experience the negatives associated with drinking (Mallett et al., 2013), mindfulness skills may provide students with both the awareness of the negative consequences as well as the tools to make healthier decisions.

Finally, the program evaluation results showed that students found their participation in the program beneficial and meaningful. The high attendance of the program suggests that when students are given an opportunity to learn effective stress management skills they seek it out. In terms of the program format, students also indicated that they would be interested in taking a course like this for credit. In general, universal prevention programs for higher education students are recommended to be presented as routinely offered classes together with increasing campus services aiming at students' psychosocial wellbeing (Conley, Durlak, & Dickson, 2013). Our findings suggest that the adapted L2B program which is designed as a universal prevention program could be offered as a part of a freshmen orientation class, as a residential hall program offering with additional incentives, or freestanding 6-week class that is offered only to freshman. Furthermore, we would recommend the possibility that L2B could be added as a prevention effort led by the health and counseling centers to decrease the occurrence of stress-related disorders.

### **Limitations**

Several limitations need to be noted. The small sample was recruited from a large public university in the U.S., and thus it is not clear whether these results will generalize to other types of colleges. Liberal arts colleges, community colleges, or universities in other countries represent distinct cultural contexts with different base rates of mental health concerns and stressor and

these setting also may provide different types of supports to their students during the 1<sup>st</sup> year of college. Furthermore, the lack of an active control group prevents us from isolating the specific effects of the program versus the general benefits of attending a regular group outside of classroom. Self-report measurement may increase social desirability bias and future studies would benefit from including physiological measurement, time intensive assessments, and second-person objective perspectives on students' lived experiences, such as assessments from family members, friends, or teachers. Students self-selected into the study, creating a potentially biased sample of students more motivated to improve their stress management and mindfulness skills than the general college population. Motivation may be a critical aspect of perceived changes and more research is needed in this area. Another limitation was that the mindfulness program was not incorporated in their course offering, fully relying on students' motivation to attend. This also represents strength of the study because students made time for the program, although it was not required. Finally, the fact that findings are only at post-test does not offer any evidence about the retention of effects and the trajectories of mental health and wellbeing across the whole first year in college. These initial positive findings lead to the need to collect data at several follow-up time points in order to assess if there are lasting effects. This is an area that has not received sufficient attention (Davidson & Kaszniak, 2015), especially in college populations.

### **Conclusion**

The first year of college is a particularly fruitful developmental period when mindfulness-based intervention efforts may prevent a decline in mental health and promote students' wellbeing and health behaviors. The entry to college as a transition into young adulthood may be one of the last institutional and educational windows of opportunity to change young people's life course (Masten et al., 2004). Successfully moving through the transition of emerging



adulthood has a determinant impact on adult success (Maggs et al., 2012) and as a result students' wellbeing is an essential part of universities' public agenda. There is a need for further research on the potential benefits of mindfulness programs in colleges that will include larger sample sizes, long-term follow-ups, and integration with academic material. Although there are some preliminary indications of the potential benefits of mindfulness to foster students' adjustment into college, the evidence must be strengthened before universities are willing to adopt these programs on a wider scale.

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## **Chapter 4: First-year College Students' Well-being: The Effects of Mindfulness Intervention at 3-month Follow-up and Potential Mechanisms of Change**

### **Introduction**

Throughout college and especially in the first year, emerging adults experience high levels of instability and stress as they tackle new developmental tasks, changes in social roles, and associated stressors (Towbes & Cohen, 1996). The most recent report of college students' mental health (Center for Collegiate Mental Health, 2016) shows persistently rising rates of psychosocial distress and demand for mental health services, mostly concerning students' depression and anxiety. It has been argued that prevention is a cost-effective option that can prevent dysfunction before its incidence (Kazdin, 1993; Mrazek & Haggerty, 1994). A variety of prevention efforts have been employed to strengthen students' ability to cope with stress, however, only a few target first-year undergraduates and report follow-up effects (Conley, Durlak, & Kirsch, 2015). A large body of research has shown that stress and mental ill-health in the first year of college are associated with low academic achievement, poor social connections, and difficult personal adjustment (Chemers, Hu, & Garcia, 2001; Friedlander, Reid, Shupak, & Cribbie, 2007; Kadison & DiGeronimo, 2004; Pritchard, Wilson, & Yamnitz, 2007; Salami, 2011). Thus, there is a need for effective evidence-based prevention techniques that would equip first-year college students with the necessary coping and self-regulation skills to facilitate healthy transition to college.

Broadly, observational studies with first-year college students have shown that coping skills mediate the relationship between self-efficacy beliefs and adjustment to the college environment (Chemers et al., 2001), suggesting that enhancing self-regulatory skills may strengthen socioemotional and academic abilities (Shapiro, Brown, Astin, & Society, 2008). Two

meta-analysis of universal stress-reducing prevention programs for college students found that the most effective universal mental health skills were focused on relaxation, cognitive-behavioral modifications, and mindfulness practice (Conley et al., 2015; Regehr, Glancy, & Pitts, 2013). The key feature of effective interventions was a supervised practice of skills which were reinforced in further sessions. However, only 19% of reviewed studies (20 out of 103 interventions) aimed directly at freshmen and less than 30% reported follow-up data (Conley et al., 2015). Overall, six studies with supervised practice were conducted with first-year college students and three provided follow-up data. In an experimental unpublished dissertation study with 85 first-year nursing students, 3 sessions mindfulness intervention was associated with a decrease in students' depression, systolic, and diastolic measures at a 4-month follow-up (Leggett, 2010). An experimental study with 35 first-year medical students found that students who learned self-hypnosis and relaxation techniques reported less stress and anxiety over time, especially during exam time periods and in the beginning of their second semester (Whitehouse et al., 1996). Additionally, an experimental study with 22 first-year law students using 4 session stress-reduction and coping skills intervention found a decrease in stress and anxiety that endured into the follow-up (Sheehy & Horan, 2004). These findings suggest that behavioral rehearsal and cultivation of positive skillsets may provide young students with a valuable resource to handle the tumultuous time of entering college.

Mindfulness programs that teach a variety of socioemotional and self-regulation meditation practices have been receiving an increasing popularity due to its potential to promote and strengthen young people's wellbeing. Mindful awareness can be conceptualized as the ability to pay attention to one's mental, emotional, and physical states with curiosity, non-judgment, and kindness (Kabat-Zinn, 1994). It is distinguished as a momentary *state* of mindful

awareness, dispositional *trait*-like tendency, and the *practice* itself that aims to increase the recurrence of state awareness and lead to a more mindful functioning in daily life (e.g. Davidson & Kaszniak, 2015). A wide range of mindfulness programs (most commonly Mindfulness-Based Stress Reduction program, MBSR) have been researched in different populations with overall general positive effects on psychological and physical wellbeing (e.g. Black, 2014; Grossman, Niemann, Schmidt, & Walach, 2004). However, less research has been employed with youth and young adults (Greenberg & Harris, 2012), warranting further evidence of its positive benefits.

The newly defined developmental contemplative science (DCS) is built on the framework of positive youth development and focuses on a mindful and compassionate cultivation of purposeful psychosocial identity, meaningful contribution to the society, and caring relating to the self and others (Roeser & Pinela, 2014). Mindfulness and compassion are considered, at their basic level, intrinsic human capacities that can be further developed through intentional training, education, and socialization (Roeser & Eccles, 2015). Through an alignment between the person's needs and their opportunities for adaptive engagement with their environment (Roeser & Pinela, 2014), these principles aim to comprehensively promote human flourishing and optimal developmental growth.

During the transition to college, mindfulness and compassion practices may play an important role in enhancing a healthy stress response through strengthening students' socioemotional competencies and supporting the development of adaptive appraisal and coping resources before, during, and after a coping encounter (Dvořáková, 2017). First, mindfulness and compassion may proactively stimulate students' ability to accumulate resources that would allow them to make healthy choices and prevent or mitigate the effects of potentially challenging situations. Second, through enhanced self-awareness, emotion regulation, and self-compassion,

students may be better able to objectively appraise daily normative events as non-threatening or use effective personal and social coping resources when needed. Finally, after a coping event, students may use mindfulness and compassion skills to engage in healthy reflections about the particular event (rather than rumination and self-criticism) which may strengthen student's ability to handle an upcoming stress cycle. Although this full model has not been empirically tested, some current evidence points to the potentially beneficial effects of mindfulness on students' distress and wellbeing.

A narrative review of college mindfulness programs focusing on mental health symptoms found overall promising results for mindfulness practice to decrease students' anxiety and stress (Bamber, Kraenzle Schneider, & Schneider, 2016). However, the existing reported findings were undermined by small sample sizes, single group designs, and paucity of follow-up results. The review referenced one study with first-year college students that reported follow-up data. The experimental study utilized single session mindfulness and acceptance-based behavioral therapy approach (Hayes, Strosahl, & Wilson, 2012) and found a significant decrease in depression and increase in acceptance measures at a 3-month follow-up (Danitz & Orsillo, 2014). However, the study faced high levels of dropout with only 50% of students completing the follow-up. Other existing college studies that reported follow-up data found mixed results. For example, Shapiro et al. (2011) conducted a randomized controlled study with 30 undergraduate and graduate students who participated in an MBSR program. At post-intervention and one-year follow-up, only more mindful students (higher mindfulness trait at baseline) reported significant reductions in stress and increases in mindfulness. A small quasi-experimental study of 13 graduate students who participated in MBSR and 15 matched controls found a significant decrease in anxiety at post-test and 3-week follow-up (Barbosa et al., 2017). Other studies with no-control group found

decreases in distress that stayed stable at the one or two-months follow-up (Newsome, Waldo, & Gruszka, 2012; Shapiro, Jazaieri, & Goldin, 2012). More randomized controlled studies with follow-up are needed to provide evidence of the sustainability of mindfulness interventions effects.

Furthermore, more research is needed on the mediating factors of mindfulness intervention effects in universal college populations (Shapiro, Carlson, Astin, & Freedman, 2006). The core of any mindfulness intervention are practices that bring more present-centered attention into daily life. It has been hypothesized that the mediating factor leading to reduction in distress is the change in mindfulness that results from the intervention (Bamber et al., 2016). A randomized controlled trial with 44 undergraduates who either participated in mindfulness/meditation treatment or were in the wait-list control found that mindfulness effects were strengthened between post-test and 2-month follow-up and mindfulness scores predicted reductions in stress and rumination across measurement points (Shapiro, Oman, Thoresen, Plante, & Flinders, 2008). Another quasi-experimental study of 31 undergraduates found that the amount of meditation practice reported by intervention participants was associated with their improvement in cognitive abilities (Helber, Zook, & Immergut, 2012). On the other hand, an MBSR single-group study with 25 graduate student participants found that the amount of meditation practice during the intervention was significantly associated with mindful attention scores at 2-month follow-up but not with any wellbeing measures at post or follow-up (Shapiro et al., 2012). Currently, there is little research examining the processes that might occur after the end of a mindfulness-based intervention. Do participants continue with their mindfulness practice after the intervention is completed? How do participants evaluate their self-perceived mindfulness after an intervention is completed? For example, continuing to cultivate beneficial

habits after a mindfulness intervention may mediate the positive effects of self-control on long-term goals (Galla & Duckworth, 2015). Given the volatility of transition to college and continuous exposure to stressors, it is important to examine if and how college students use newly learned skillsets after a completion of an intervention.

Therefore, this study aims to expand our knowledge of mindfulness effects during the transition to college and the mediating effects of mindfulness practice on intervention outcomes at follow-up. This study evaluates the longer-term effects of a pilot randomized controlled trial of the Learning to BREATHE (L2B) intervention with first year college students in which the post-test results were presented in Paper 2 of this dissertation and recently published (Dvořáková et al., 2017). Our pre-post test results showed that the mindfulness intervention was feasible to implement in the college sample and effective in significantly improving participants' anxiety, depression, and life satisfaction, and marginally improving sleep quality and alcohol consequences. Here we examine (1) if there are continued effects of the L2B Program 3-months after the end of the intervention on both measures of well-being and distress and (2) if these longer-term effects are mediated by a change in mindfulness and the use of mindfulness practice after the intervention was completed.

To evaluate follow-up effects, the study assesses students' wellbeing from two different angles - distress and life satisfaction. As noted in previous research (Kazdin, 1993; Kazdin, Siegel, & Bass, 1992), increasing adaptive functioning and reducing maladaptive functioning are too interrelated goals that may be achieved through different pathways. The construct of life satisfaction during emerging adulthood measures the overall experience of generally healthy population of emerging adults (Diener, Emmons, Larsen, & Griffin, 1985). In young adults, life satisfaction is strongly associated with retention, psychological wellbeing, prosocial behavior,

and health behaviors (Caprara & Steca, 2005; Elliott & Healy, 2001; Mahmoud, Staten, Hall, & Lennie, 2012; Werner & Crick, 1999) which suggests that life satisfaction represents an umbrella of healthy daily functioning. The distress construct was defined as a general negative affect and impairment in mental health reflected in symptoms of anxiety and depression (D Watson & Clark, 1984; David Watson, Clark, & Carey, 1988). In college students, the general sense of distress and negativity is associated with substance abuse, poor health, social dysfunction, and overall maladaptive patterns that may extend into adulthood (Martens et al., 2008; Masten et al., 2004; Morrison & O'Connor, 2005). Therefore, the two constructs, distress and life satisfaction, intend to encompass college students' experience during transition to college.

The study tests two mediational models of how the mindfulness-based program may affect first-year college students' distress and life satisfaction at 3-month follow-up (see Figures 4 and 5). First, we hypothesize that the mindfulness intervention assignment (predictor) would lead to a significant improvement in distress and life satisfaction at 3-month follow-up (c pathway). Second, we hypothesize that the mindfulness intervention would lead to an increase in self-reported mindfulness states between post-test and follow-up (mediator 1) and self-reported use of mindfulness practice between post-test and follow-up (mediator 2) because students in the intervention group learned a wide variety of meditation and mindfulness practices applicable to daily life. These pathways will be statistically termed  $a_1$  and  $a_2$  (respectively). Third, we hypothesize that students who perceive being more mindful on daily basis and practice more mindfulness may be better able to manage their stress and report more satisfaction in their lives. Therefore, it is expected that the increase in mindfulness states (mediator 1) and use of mindfulness practice (mediator 2) will lead to an increase in distress (outcome 1) and life satisfaction (outcome 2). These pathways will be statistically termed  $b_1$  and  $b_2$  (respectively). To

test the mediation effect, we will examine the statistical significance of the indirect effect given by the  $a*b$  pathway (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). To report partial or full mediation, the  $c'$  pathway that includes predictor and mediator would decrease in size or become insignificant (respectively).

Figure 4 Mediation model of mindfulness intervention effects on outcomes (distress and life satisfaction)

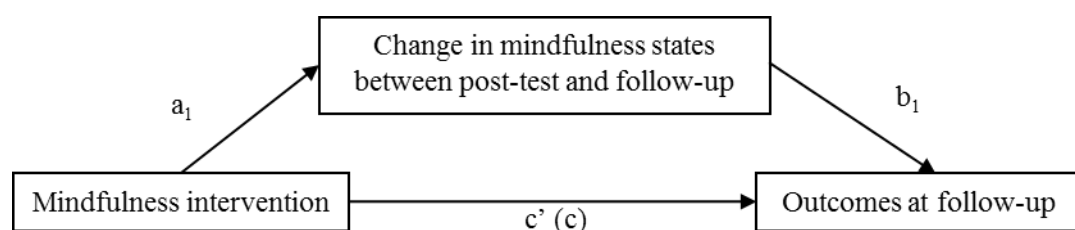
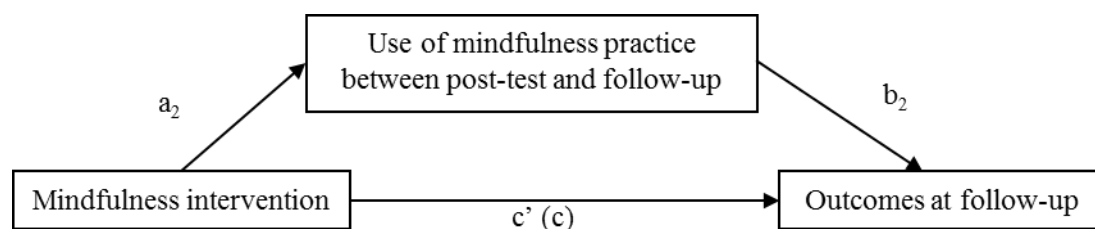


Figure 5 Mediation model of mindfulness intervention effects on outcomes (distress and life satisfaction)



We note that there is considerable controversy regarding measurement issues in assessing mindfulness (Brown, Ryan, Loverich, Biegel, & West, 2011; Davidson & Kaszniak, 2015; Grossman, 2008). The main challenge is evaluating one's mindfulness through self-report and the potential inaccuracy of those results, in spite of the fact that numerous studies have shown self-reported mindfulness has mediated change in adult populations (e.g. Roeser et al., 2013). Given these concerns, we chose to evaluate students' mindfulness through two different avenues. First, we utilized a commonly used self-report focused on mindfulness/mindlessness disposition in daily life that has shown good validity and reliability in college population (Mindful Attention



and Awareness Scale, MAAS, Brown & Ryan, 2003). This measure intends to capture the “frequency of mindful states over time” (p.824) and it correlates with daily mindfulness practices (Brown & Ryan, 2003; Shapiro et al., 2012). Second, we examined students’ reported use of mindfulness practice (meditation & mindful movement) after the end of an intervention to provide further insight about continuation of participants’ practice.

## **Methods**

### **Participants**

The study recruited 109 first-year undergraduates at a large, public university in Pennsylvania in the first three weeks of the Fall 2015 semester. Students living the residential halls received invitation emails to participate in a free stress-management mindfulness program. Additionally, recruitment flyers were posted on campus and distributed during freshmen involvement fair.

Eligibility was determined based on age (above 18 years) and first-year undergraduate student status. The mean age of the sample was 18.2 years ( $SD=0.4$ , range 18-19) and 66% were females (72 females, 37 males). The ethnically diverse sample consisted of 50% Caucasian, 26% Asian, 8% Hispanic, 5% African American, and 10% mixed. International students represented 16% of the sample (21 international, 88 domestic) and 14% attended counseling services or therapy during 6 months prior to baseline reporting. A small portion of students (22%) reported previous experience with mindfulness practices and/or meditation, however the majority practiced less than once a month.

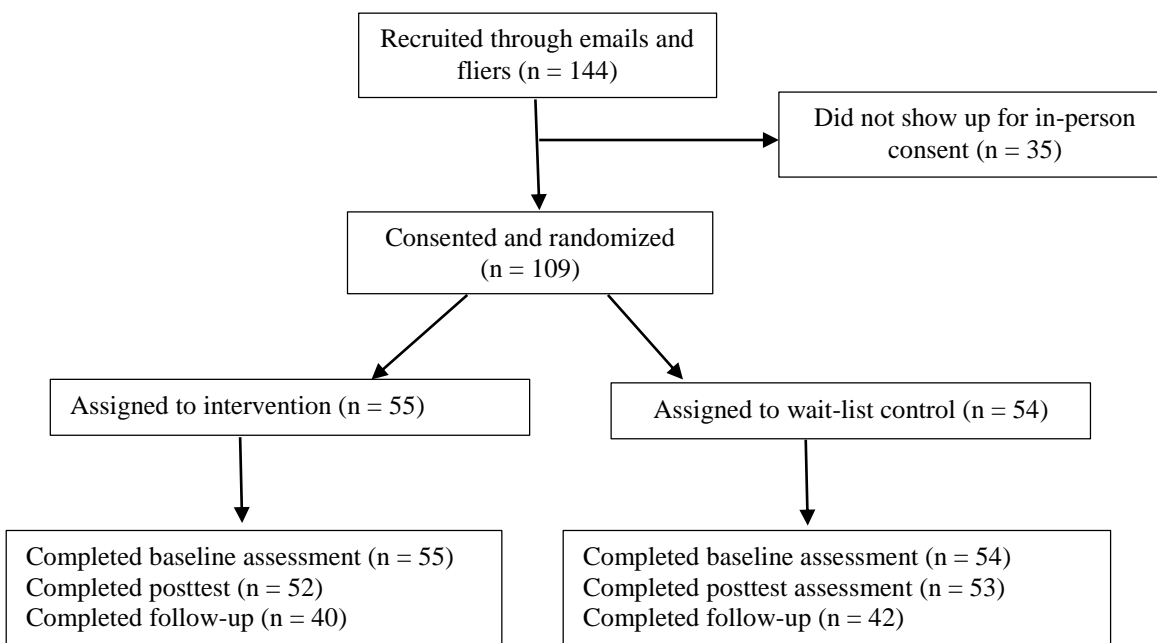
### **Procedure**

Figure 6 shows the flow of students’ enrollment, randomization, and data analysis. Students who contacted the research team with an interest in the mindfulness program were

emailed initial eligibility screening survey. Eligible students ( $n=144$ ) were invited to schedule an in-person informed consent meeting. Students who did not attend the consent meeting were dropped from the study ( $n=35$ ). The 109 consented students were emailed a secured Qualtrics link to a baseline survey in September 2014, post-test survey in November 2014, and 3-month follow-up survey in February 2015. Both groups received financial compensation for completing the surveys. Payment increased from baseline to follow-up to stimulate participants' responsiveness in subsequent surveys (\$10 baseline, \$15 post-test, \$20 follow-up).

The sample was stratified by gender and randomized to the intervention and control group separately to assure an equal number of males and females in each group (using the <https://www.randomizer.org>). The intervention group received the mindfulness program in the Fall 2014 ( $n=55$ ,  $n$  of females = 55) and the wait-list control was scheduled to receive the mindfulness program in the Spring 2015 ( $n= 54$ ,  $n$  of females=37). Half of the intervention and control group was randomized to complete ecological momentary assessments (Moskowitz & Young, 2006). These data are in preparation for publication. The study was approved by the Institutional Review Board.

Figure 6 Participant flow of enrollment, randomization, and data collection



## Intervention

The study utilized an evidence-based, universal mindfulness program Learning to BREATHE (L2B) that has been shown to improve adolescents' coping skills and a sense of well-being (Broderick, 2013; Broderick & Metz, 2009; Metz et al., 2013). The L2B intervention is described in more detail in the Learning to Breathe manual (Broderick, 2013) and in the outcomes paper (Dvořáková et al., 2017). Under the supervision of the program developer, the main program facilitators adapted the program to fit the college environment by revising the meditation cues, examples, and discussion prompts.

## Measures

***Mindfulness intervention.*** Group random assignment was coded 1 for the intervention group participating in the adapted L2B program and 0 for the wait-list control group.

***Distress.*** The distress variable was created by combining the 8-item depression screening survey, the Primary Health Questionnaire (PHQ, Spitzer, Kroenke, & Williams, 1999), and the 7-item anxiety screening survey, the Generalized Anxiety Disorder Scale (GAD, Spitzer,

Kroenke, Williams, & Lowe, 2006). Both measures capture symptoms in the previous two weeks and use the same 4-items frequency scale from “Not at all” (1) to “Nearly every day” (4). Sample items included reporting problems, such as “Little interest or pleasure in doing things”, “Trouble falling or staying asleep, or sleeping too much”, and “Worrying too much about different things”, and “Becoming easily annoyed or irritable.” Given the commonalities between depression and anxiety symptoms in college populations, the combined variable was a useful construct of overall distress. In the present sample, the distress measure demonstrated excellent internal consistency (Cronbach’s alpha > 0.90) for all time points.

***Life satisfaction.*** The Satisfaction with Life 5-item scale (SWL, Diener et al., 1985) was used to assess students’ overall cognitive evaluation of their life outlook. Sample items include, “In most ways my life is close to my ideal” and “The conditions of my life are excellent” with answers on a Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). Observed reliabilities measured by Cronbach’s alpha were above 0.88 for all time points.

***Mindfulness states.*** Students completed the Mindful Attention Awareness scale (MAAS, Brown & Ryan, 2003) reflecting their mindful attention and awareness in everyday experiences. For this study, we chose 8 items from the original scale with the highest factor loadings. The sample items consisted of statements such as “I find it difficult to stay focused on what’s happening in the present” and “I rush through activities without being really attentive to them” using 6-scale Likert scale ranging from “Almost never” (1) to “Almost always” (6). Items were reverse coded with higher numbers representing higher mindful awareness. Observed reliabilities in this sample were above 0.88 for all time points.

***Use of mindfulness practice.*** Students from both intervention and control group were asked two questions about their use of mindfulness meditation and mindful movement practices

in the two months prior to the data collection at pre, post, and follow-up. At post-test, the intervention reported their use of mindfulness meditation and movement outside of their participation in the mindfulness intervention. At follow-up, both groups reported their overall use of mindfulness practice. First, we probed if they have practiced any of the listed mindfulness practices. If they answered “Yes”, they answered a follow-up question on how often they engaged in the practices in the last 2 months. We combined the two questions using a scoring of 0 (no meditation or mindful movement practice), 1 (less than once a month), 2 (one to three times a month), 3 (weekly), 4 (two to six times a week), 5 (daily), 6 (multiple times a day). The following questions (Table 3) were answered by both intervention and control group at follow-up.

Table 3 The use of mindfulness practice questionnaire at follow-up

Please tell us about your contemplative practices <u>in the last 2 months</u> (since mid-December).	
1a. Have you done any of these: Meditation (e.g., mindfulness/vipassana, zen meditation, guided visualization)? Yes x No	If yes: 2a. How frequently you engaged in meditation in the last 2 months (since mid-December)? 1 = Less than once a month, 2 = One to 3 times a month, 3 = Weekly, 4= 2-6 times a week, 5 = daily, 6 = Multiple times a day
1b. Have you done any of these: Meditative movement (e.g., yoga, qi gong, tai chi, martial arts)? Yes x No	If yes: 2b. How frequently you engaged in meditative movement in the last 2 months (since mid-December)? 1 = Less than once a month, 2 = One to 3 times a month, 3 = Weekly, 4= 2-6 times a week, 5 = daily, 6 = Multiple times a day

### Data Analysis

Structural equation modeling of mediation analysis was used to evaluate the hypothesized mediational models. Statistical analyses were performed with Mplus 7 (Muthén & Muthén, 2010) and SPSS, version 23. All regression and mediation analysis controlled for the baseline of the outcome variable, gender, and attendance of therapy prior to college. An independent sample *t*-test found that students who completed the 3-month follow-up did not significantly differ on baseline variables of interest from students who did not complete the follow-up. To handle

missing data at 3-month follow-up (25%), the FIML approach as a feature of Mplus program was employed for all mediation analysis, assuming that the data was missing at random.

## Results

### 1. Sustainability of effects at 3-month follow-up

First, we examined the mindfulness intervention effects at 3-month follow-up. The means, standard deviations, and correlations between variables of interest for each group are reported in Tables 4 and 5.

The regression results indicated that the mindfulness intervention (the predictor) significantly predicted a decrease in distress and an increase in life satisfaction at 3-month follow-up, controlling for baseline of the outcome variable, gender, and attendance at therapy prior to entering college. Thus, the direct effect of the predictor was found to be significantly different from 0 based on the 95% bootstrap confidence intervals for distress, unstandardized  $Beta = -1.747$ ,  $SE = .919$ , 95% CI  $[-3.610, -0.038]$ , and life satisfaction, unstandardized  $Beta = 2.834$ ,  $SE = 1.182$ , 95% CI  $[.497, 5.116]$ . These results represent the c pathways (in parenthesis) in Figures 7-10.

Table 4 Means and standard deviations for mediators and outcomes by intervention and control group

	Intervention			Control		
	Pre-test <i>M</i> (SD)	Post-test <i>M</i> (SD)	Follow-up <i>M</i> (SD)	Pre-test <i>M</i> (SD)	Post-test <i>M</i> (SD)	Follow-up <i>M</i> (SD)
Mindfulness	4.03 (1.02)	4.18 (1.03)	4.44 (1.16)	4.15 (1.00)	4.36 (1.04)	4.25 (1.06)
Use of practice	.91 (1.08)	1.27 (1.54)	1.34 (1.34)	.85 (1.19)	.35 (1.07)	.28 (.77)
Distress	7.58 (4.01)	6.27 (4.42)	5.25 (4.90)	6.36 (4.47)	7.02 (4.53)	6.38 (5.03)
Life Satisf	21.76 (7.52)	23.43 (7.11)	23.76 (6.76)	22.67 (6.95)	21.27 (7.65)	21.26 (8.30)

Table 5 Correlation coefficients between variables of interest by intervention and control group

	1.	2.	3.	4.
<b>Intervention</b>				
1. Distress at 3-month follow-up	1.00			
2. Life satisfaction at 3-month follow-up	-.209	1.00		
3. Change in mindfulness states between post-test and follow-up	-.544**	.155	1.00	
4. Use of mindfulness practice between post-test and follow-up	-.126	.063	.288 <sup>+</sup>	1.00
<b>Control</b>				
1. Distress at 3-month follow-up	1.00			
2. Life satisfaction at 3-month follow-up	-.232	1.00		
3. Change in mindfulness states between post-test and follow-up	-.260 <sup>+</sup>	.187	1.00	
4. Use of mindfulness practice between post-test and follow-up	-.171	.307*	.287 <sup>+</sup>	1.00

Note: . \*\* $p < .01$ , \* $p < .05$ , <sup>+</sup> $p < .1$

## 2. The mediating role of “change in mindfulness states between post-test and follow-up”

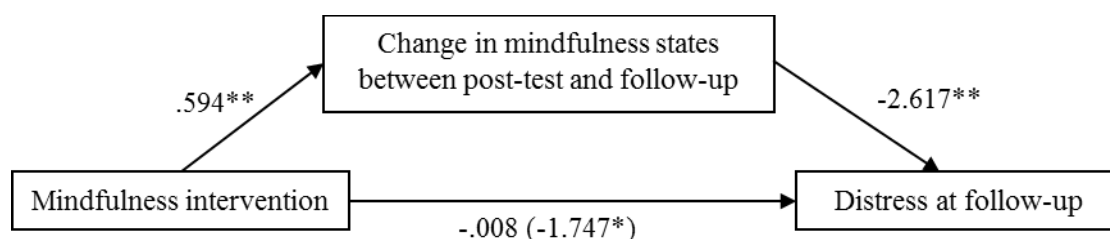
**Distress.** The estimated mediation model is depicted in Figure 7 and we evaluated it’s fit using chi-square statistic and other common indices of practical fit (West et al., 2012), specifically the CFI (Bentler, 1990), TLI (Tucker & Lewis, 1973), and RMSEA (Browne & Cudeck, 1993; Steiger & Lind, 1980). The  $X^2$  value of model fit was not statistically significant ( $X^2=2.455$ ,  $df=3$ ,  $p > 0.05$ ), thus suggesting that the model is consistent with the observed data. All remaining model fit indices also suggested that the model provided satisfactory fit to the data based on conventional standards of close fit (CFI=1.00, TLI=1.03, and RMSEA = 0.000).

Next, we examined the role of change in mindfulness states (MAAS) between post-test and follow-up (the mediator) in mediating the effect of mindfulness intervention (the predictor) on distress at 3-month follow-up (the outcome). Assignment to the mindfulness intervention positively predicted an improvement in mindfulness states measured by the difference in MAAS between post-test and follow-up, unstandardized  $Beta=.594$ ,  $SE = .186$ ,  $p < .01$  (a pathway), and the change in mindfulness states significantly predicted a decrease in distress at follow-up, unstandardized  $Beta = -2.617$ ,  $SE = .536$ ,  $p < .01$  (b pathway). Therefore, mindfulness

intervention was found to have a statistically significant negative indirect effect (unstandardized  $Beta = -1.555$ ,  $SE = .577$ , bootstrap 95%  $CI = [-2.932, -0.612]$ ) on the level of distress at 3-month follow up.

Finally, the mediation results showed that the direct effect of the predictor on the outcome (with the mediator included) decreased to a non-significant level, unstandardized  $Beta = -.008$ ,  $SE = .084$ ,  $p > .05$ . Based on these findings, we can conclude that the effect of the mindfulness intervention on distress at 3-month follow-up was fully mediated by the change in mindfulness states.

Figure 7 Estimated mediation model of mindfulness intervention effects on distress using change in mindfulness states as a mediator



*Note:* The outcome analysis included covariates of baseline variable, gender, and attendance of therapy prior to college. \*  $p < .05$ .

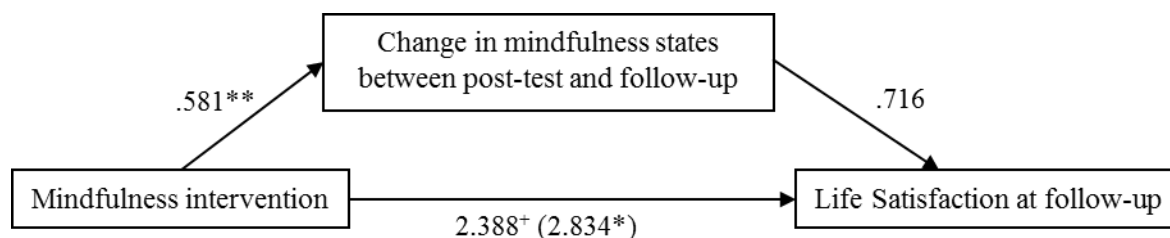
**Life satisfaction.** The estimated mediation model (Figure 8) was first evaluated using chi-square statistic and other common indices of practical fit. The  $X^2$  value was not statistically significant ( $X^2=3.183$ ,  $df=3$ ,  $p > 0.05$ ), suggesting that the model fits the observed data. Similarly, the practical fit indices indicated that the model provided satisfactory fit to the data based on conventional standards (CFI=.997, TLI=.992, and RMSEA = 0.024).

In the next step, we evaluated the role of change in mindfulness states (MAAS) between post-test and follow-up (the mediator) in mediating the effect of mindfulness intervention (the



predictor) on life satisfaction at 3-month follow-up (the outcome). Mindfulness intervention positively predicted an increase in mindfulness states, unstandardized  $Beta=.581$ ,  $SE = .185$ ,  $p < .01$  (a pathway). The change in mindfulness states did not significantly predict life satisfaction at follow-up, unstandardized  $Beta = .716$ ,  $SE = .854$ ,  $p > .05$  (b pathway). Thus, the indirect effect was non-significant, unstandardized  $Beta = .415$ ,  $SE=.516$ , bootstrap 95%  $CI = [-.513, 1.353]$ . The direct effect of the predictor on the outcome (with mediator included) dropped to a marginally significant level, unstandardized  $Beta = 2.388$ ,  $SE = 1.249$ ,  $p < .01$ . We can conclude that the effect of the mindfulness intervention on life satisfaction at 3-month follow-up was not mediated by the change in mindfulness states.

Figure 8 Estimated mediation model of mindfulness intervention effects on life satisfaction using change in mindfulness states as a mediator



*Note:* The outcome analysis included covariates of baseline variable, gender, and attendance of therapy prior to college. \*  $p < .05$ , +  $p < .1$ .

### 3. The mediating role of “the use of mindfulness practice between post-test and follow-up”

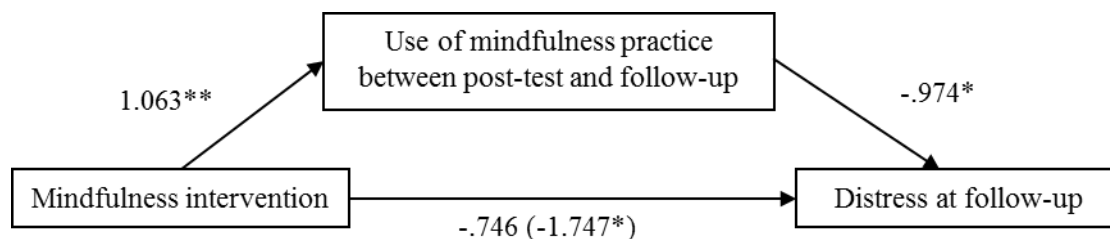
**Distress.** Prior to making inferences about the mediation results, the mediational model fit (Figure 9) was evaluated using chi-square statistic and the CFI (Bentler, 1990), TLI (Tucker & Lewis, 1973), and RMSEA (Browne & Cudeck, 1993; Steiger & Lind, 1980). The  $X^2$  value of model fit was not statistically significant ( $X^2=1.317$ ,  $df=3$ ,  $p > 0.05$ ), thus suggesting that the model is consistent with the observed data. The remaining model fit indices also suggested a

satisfactory model fit to the data based on conventionally used standards (CFI=1.00, TLI=1.11, and RMSEA = 0.000).

Next, the effect of the mediator - use of mindfulness skills between post-test and follow-up – was examined in mediating the effect of mindfulness intervention (the predictor) on distress at 3-month follow-up (the outcome). Mindfulness intervention significantly predicted an increase in using mindfulness skills after the end of the intervention, unstandardized  $Beta= 1.063$ ,  $SE = .247$ ,  $p < .01$  (a pathway), and the greater practice of mindfulness skills after the intervention significantly predicted a decrease in distress at follow-up, unstandardized  $Beta = -.974$ ,  $SE = .441$ ,  $p < .05$  (b pathway). Taken together, mindfulness intervention was found to have a statistically significant negative indirect effect (unstandardized  $Beta = -1.035$ ,  $SE = .539$ , bootstrap 95%  $CI = [-2.452, -0.219]$ ) on the level of distress at 3-month follow up.

The mediation analysis also indicated that, after an inclusion of the mediator, the direct effect of the predictor on the outcome decreased to a non-significant level, unstandardized  $Beta = -.746$ ,  $SE = 1.028$ ,  $p > .05$ . Based on these findings, we can conclude that the effect of the mindfulness intervention on distress at 3-month follow-up was fully mediated by the use of mindfulness practice after the intervention.

Figure 9 Estimated mediation model of mindfulness intervention effects on life satisfaction with the use of mindfulness practice as a mediator



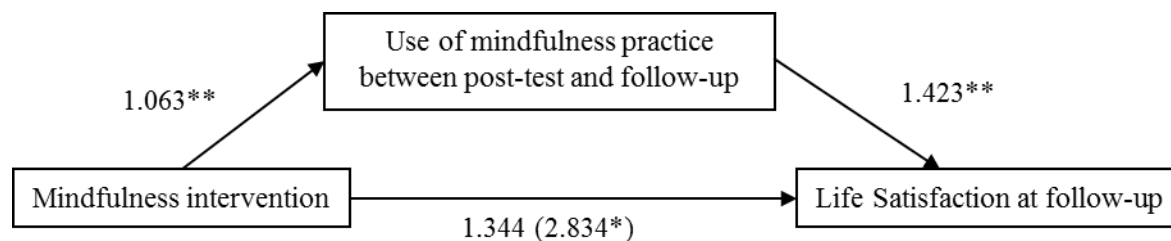
*Note:* The outcome analysis included covariates of baseline variable, gender, and attendance of therapy prior to college. \*  $p < .05$ .

***Life Satisfaction.*** Figure 10 depicts the estimated mediation model. The model fit was found satisfactory based on the non-significant chi-square statistic ( $X^2=0.502$ ,  $df=3$ ,  $p > 0.05$ ) and the practical fit indices (CFI=1.00, TLI=1.097, and RMSEA = 0.00).

In the next step we examined the role of the mediator, use of mindfulness practice between post-test and follow-up, in the effects of the mindfulness intervention on life satisfaction at 3-month follow-up. Mindfulness intervention positively predicted an increase in the use of mindfulness practice, unstandardized  $Beta=1.063$ ,  $SE = .247$ ,  $p < .01$  (a pathway) and the use of mindfulness practice significantly predicted life satisfaction at follow-up, unstandardized  $Beta = 1.423$ ,  $SE = .531$ ,  $p < .01$  (b pathway). Therefore, mindfulness intervention was found to have a statistically significant positive indirect effect (unstandardized  $Beta = 1.513$ ,  $SE = .584$ , bootstrap 95% CI = [.584, 3.044]) on life satisfaction at 3-month follow up.

Furthermore, the mediation analysis showed that the direct effect of the predictor on the outcome (when mediator was included) decreased to a non-significant level, unstandardized  $Beta = 1.344$ ,  $SE = 1.252$ ,  $p > .05$ . These findings suggest that the effect of the mindfulness intervention on life satisfaction at 3-month follow-up was fully mediated by the use of mindfulness practice after the intervention.

Figure 10 Estimated mediation model of mindfulness intervention effects on life satisfaction with the use of mindfulness practice as a mediator



*Note:* The outcome analysis included covariates of baseline variable, gender, and attendance of therapy prior to college. \*  $p < .05$ .

### Discussion

This study reports on the findings of a 3-month follow-up from a pilot randomized trial of the L2B mindfulness intervention with first-year college students and the mediating role of mindfulness states and practice on the outcomes at follow-up. The results showed that the mindfulness intervention effects on distress and life satisfaction at the 3-month follow-up were sustained, controlling for baseline levels, gender, and attendance of therapy before college. Furthermore, we found that an increase in mindfulness states (measured by the MAAS) between post-test and follow-up mediated the effects of the intervention on distress, but not on life satisfaction. The use of mindfulness practices after the L2B intervention (between post-test and follow-up) mediated the intervention effects on both distress and life satisfaction at follow-up. These findings support the notion that mindfulness as a state or practice can be increased and this shift may mediate the outcomes of mindfulness interventions. The sustained follow-up effects are promising, suggesting that first-year college students can benefit from learning a variety of mindfulness skills and their levels of distress and life satisfaction can be changed and sustained into the second semester of their first year through these practices. It has been hypothesized that by practicing mindfulness and compassion skills, college students may be better equipped for challenging situations and more effectively cope and recover from stressors associated with the transition to college (Dvorakova, Chapter 2 of this dissertation). In particular, the mindfulness

skills of paying attention, affective openness, and curiosity may augment students' general set of socioemotional resources and foster proactive and anticipatory coping to better prepare for demanding life situations. Similarly, the enhanced set of mindfulness skills may strengthen students' ability to productively respond to stressors and meaningfully reflect after a stressful situation. In future studies, the specific coping processes need to be measured explicitly to evaluate the hypothesized mindfulness mechanisms.

The mediation results provide interesting findings that necessitate further cross-validation in future studies. The MAAS self-report intends to measure how frequently students are reporting the occurrence of mindfulness states in everyday experiences (Brown & Ryan, 2003). The mindful abilities of perceptual clarity and attention may refer to the general preparedness for life events and promote proactive and anticipatory coping (Dvorakova, Chapter 2 of this dissertation). Reverse-coded statements like "I find it difficult to stay focused on what's happening in the present" or "I could be experiencing some emotion and not be conscious of it until sometime later" provide an insight into how often college students notice being mindful and mindless in their daily life. We have reported in the second paper of this dissertation (Dvořáková et al., 2017) that MAAS did not significantly increase at post-test as a result of the L2B intervention. In fact, the control group showed a larger mean increase and intervention group showed a small mean decrease, albeit non-significant. Since the L2B mindfulness interventions aimed to identify mindlessness habits (such as being on autopilot during daily tasks) and introduce more awareness into participants' lives, it is likely that at post-test intervention students actually reported being aware of their "lack of mindfulness". Davidson & Kaszniak (2015) note that by instructing mindfulness participants to introspect, they may begin to notice the mental turmoil in their minds and initially report more mindlessness or agitation. This

phenomenon of reporting lower or no improvements in mindfulness has been reported in some studies and not others (Davidson & Kasniak, 2015; Roeser et al., 2014). Thus it points out to both the need to providing mindfulness interventions over several weeks to address the potential discomfort of noticing the “wandering mind” and to measure results across time, including post-intervention follow-ups, in order to examine mindfulness trajectories. Interestingly, in our study this effect was reversed at follow-up, possibly because intervention participants continued to practice mindfulness principles and began to notice more frequent mindfulness states.

As hypothesized, the intervention students reported an increase in mindfulness states between post-test and follow-up, which is consistent with other mindfulness studies (Shapiro, Oman, et al., 2008). However, although this shift mediated the decrease in distress it did not “explain” the longer-term effect of L2B on life satisfaction. Similarly, Shapiro et al. (2008) found significant association between mindfulness scores (measured by MAAS) and a decrease in stress and rumination from pretest to follow-up. Mediation associations with life satisfaction or other positive wellbeing constructs were not reported in Shapiro et al.’s study, therefore, it is difficult to hypothesize if they were to find similar mediation phenomena as found here. Other studies showed mediating effects of mindfulness on a variety of life quality measures (Bränström, Kvillemo, Brandberg, & Moskowitz, 2010; Carmody & Baer, 2008; Nyklíček & Kuijpers, 2008; Roeser et al., 2013), however we are not aware of a college intervention study that showed mediating effect of changes in mindfulness on overall satisfaction.

A possible explanation for the different mediated effects on life satisfaction vs. distress is that they measure different constructs that may be influenced by different factors (D Watson, Clark, & Harkness, 1994; David Watson et al., 1988). Here, the distress variable may have measured more nuanced aspects of students’ daily life by summing up students’ anxiety and

depression symptoms in the last two weeks. Students may have utilized mindfulness skills to productively prepare, respond and reflect on daily hassles and stressful situations (Dvorakova, Chapter 2 of this dissertation). As such, this construct may have been more sensitive to subtle changes in mindfulness states in daily life. Life satisfaction, as a broader construct of overall wellbeing, may be less influenced by perceptions of awareness or these perceptions may affect wellbeing at a different time frame. More studies are needed to untangle the distinct relationship of mindfulness and wellbeing measures.

As we hypothesized, the greater continued use of mindfulness practices after the L2B intervention mediated both outcomes of distress and life satisfaction at follow-up. Distinct from the MAAS construct, this variable intended to measure the specific behaviors of engaging in mindfulness practices, such as meditation and mindful movement. As found in previous studies, the behavioral rehearsal of positive skillsets may foster students' socioemotional and self-regulatory skills and globally improve students' wellbeing (Bamber, Kraenzle Schneider, & Schneider, 2016; Conley, Durlak, & Kirsch, 2015; Regehr, Glancy, & Pitts, 2013). The positive changes may be partially influenced by the adaptive stress and coping processes associated with mindfulness skills (Dvorakova, Chapter 2 of this dissertation). One previous report found that the amount of meditation practice during an intervention predicted an improvement in executive functioning (Helber et al., 2012). In contrast, another study found that the amount of meditation practice during an MBSR intervention was only associated with mindfulness levels at follow-up and not with any other follow-up outcomes (Shapiro et al., 2012). The current study was distinct since it reported on the amount of practice after the end of intervention. A recent review of compassion-based interventions suggested that the regular repetition and exposure to meditation practices after an intervention enhances participants' ability to translate these skills into their

daily life (Zeng, Chio, Oei, Leung, & Liu, 2017). Our findings also suggest that both being mindful in everyday experiences and the regular use of mindfulness practices are necessary for sustained positive outcomes.

Future studies should examine the mechanisms of mindfulness practice by inquiring into the relationships of mindfulness skills and practice and the stress and coping processes (Dvorakova, Chapter 2 of this dissertation). It has been hypothesized that students who pay attention to their physical, emotional, and mental states (mindfulness *trait*) and/or practice mindfulness skills (mindfulness *practice*) may be better prepared for stressful situations before, during, and after a stressful event. Through the increased attention and practice, students may proactively prevent stressful situations from happening (preparedness to cope). In stressful situations, students may appraise or reappraise stressors (such as roommate or academics-related issues) as learning opportunities and/or more skillfully use their coping resources (productive stress response). Finally, students who are more mindful and/or use mindfulness skills after stressful situations may engage in less rumination and self-criticism (post-coping reflections) and experience faster recovery. Therefore, these adaptive socioemotional processes may positively contribute to lower levels of distress and higher levels of life satisfaction. However, the actual adaptive stress and coping processes need to be measured explicitly to shed more light on mindfulness mechanisms during transition to college.

Given the rising levels of mental health issues in college students, there is a need to provide access to effective prevention techniques to the college population (Kadison & DiGeronimo, 2004; The American College Health Association, 2014). Since the first year of college represents a time of turmoil as well as a developmental window of opportunity to intervene (Masten et al., 2004; Schulenberg & Zarrett, 2006), effective prevention techniques



that include supervised rehearsal of positive skills (Conley et al., 2015) should be employed across colleges (Hunt & Eisenberg, 2010). As the Developmental Contemplative Science (DCS) points out, youth and emerging/young adulthood can be considered a greenhouse where positive skills and prosocial behaviors can be effectively cultivated (Roeser & Pinela, 2014). During the transition to college, the skills of paying attention, openness to affective states, psychological flexibility, and compassionate and caring attitude may positively enhance the stress and coping processes (Dvorakova, Chapter 2 of this dissertation). The foundation of mindful and compassionate “being” can give a rise to mindful and compassionate “acting” as a way to purposefully and ethically engage with one’s surroundings and society as a whole (Greenberg & Mitra, 2015). More practice-oriented studies with universal populations and longer follow-up would provide further insight how these practices might also influence longer-term outcomes of academic performance, dropout rates, and young adulthood outcomes.

### **Limitations**

Our study had several limitations that need to be addressed. Although we recruited from a universal population, students volunteering for mindfulness and stress management classes may be significantly more motivated and interested in improving their wellbeing and health. One possible design for a future study would be to routinely offered freshmen seminar and randomize students to seminar sections that did and did not include mindfulness as part of the curriculum. This strategy would also provide the opportunity to compare the intervention to an active control group, an important aspect of quality randomized controlled trial (Davidson & Kaszniak, 2015). Another issue of our data lies in the amount of missing data. We reported 25% of missing data at follow-up that was handled by full information maximum likelihood method. If mindfulness

instruction was included in a freshmen course, answering surveys could be naturally included in the course requirements and provide higher response rates.

Furthermore, we recognize the issues with self-reports of mindfulness (Brown et al., 2011; Davidson & Kaszniak, 2015; Grossman, 2008). Our study intended to provide an opportunity for further discussion of measuring mindfulness states and practice following an intervention. The issues with measuring mindfulness need to be addressed by creating other alternatives that are feasible and cost-effective. Intensive data collection, such as EMA, can provide more fine-grained insight into the fluctuations of mindfulness in daily life. Students may also report on how they respond to challenging situations closer to the time of activation and how the potential mindfulness benefits may influence their day-to-day student life. Finally, longer-term follow-ups are needed to examine potentially mediating mechanisms and key facets of mindfulness practice (Shapiro, Brown, et al., 2008; Shapiro et al., 2006). It is important to examine what happens after the end of a mindfulness-based intervention in terms of students' practices, their understanding of the key principles, and their adoption of the practices into daily life. Longer-term follow-up, such as at the end of each school year, would allow us to better examine if mindfulness practices continue to positively influence young students' personal, academic, and professional lives.

### **Conclusion**

Although mindfulness research is rapidly growing, there continues to be a lack of high-quality evidence of mindfulness benefits for young people (Davidson et al., 2012; Greenberg & Harris, 2012). In particular, randomized controlled trials with universal populations are needed to examine the benefits of these interventions during developmentally challenging times (Davidson & Kaszniak, 2015; Goyal, Singh, Sibinga, & Gould, 2014). Our study provides promising results

suggesting that mindfulness intervention benefits can be sustained in short-term and the increase in mindfulness states and practice may mediate the positive outcomes. The first year of college can be considered a particularly fruitful developmental period when prevention-based intervention efforts may prevent a decline in mental health and promote students' wellbeing.

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## Chapter 5: Final Discussion

The purpose of this dissertation was to examine the developmental and socioemotional factors impacting transition and adjustment to college and the potential of contemplative practices to enhance first year college students' health and wellbeing during this time period. First, I theoretically analyzed the stress and coping processes during transition to college and proposed a conceptual model of how mindfulness and compassion skills may strengthen college students' coping processes before, during, and after a challenging encounter. Second, I presented the post-test outcomes of a randomized controlled trial that aimed to evaluate the Learning to BREATHE (L2B) mindfulness-based intervention in a convenience sample of first-year college students. Third, I evaluated the 3-month follow-up data of the L2B intervention and examined hypothesized factors that might mediate the outcomes. I concluded that mindfulness-based practices may positively impact both prevention of students' mental health issues and promotion of their socioemotional competencies.

The first paper titled "Developmental and Socioemotional Processes during Transition to College and the Interplay with Contemplative Practices" drew on the revised version of the transactional stress model by Lazarus & Folkman (1984) to examine the personal and contextual factors impacting students' appraisal and coping resources. In particular, I described how person-related characteristics (socioeconomical and cultural factors, existing mental health, and attentional/cognitive/socioemotional competencies) in transaction with contextual characteristics (college environment, social supports) impact students' appraisal of life events and coping resources as they relate to mental health. For example, students with pre-existing mental health issues, deficient socioemotional competencies, or inadequate social supports may tend to evaluate challenging situations as threats rather than learning opportunities (primary appraisal)

and may be less adept at accessing appropriate coping resources available to them during stressful encounters (secondary appraisal). Data indicates that college students commonly employ coping resources that include engaging in risky behaviors and participating in unhealthy social environments (The American College Health Association, 2014; The Jed Foundation, The Jordan Matthew Porco Foundation, & The Partnership for Drug Free Kids, 2015) that may perpetuate their stress and negative consequences. One relatively new avenue to promote wellbeing in student population involves supporting the development of different forms of contemplative practices including mindfulness and compassion skills (MCS). At its core, mindfulness represents the ability to stay in the present moment with openness and curiosity while compassion represents the capacity to offer loving kindness and caring attitude to one's self and others (Goetz, Keltner, & Simon-Thomas, 2010; Kabat-Zinn, 2005; Neff, 2003). In particular, mindfulness and compassion may uniquely enhance healthy stress and coping process by enriching personal and interpersonal resources available to college students. As such, I hypothesized that MCS may provide an effective resource before, during, and after a potentially challenging situation. First, through MCS, students may better develop their overall attentional and socioemotional resources and enhance their preparedness to cope with daily hassles and difficult life events. Second, in stressful situations, MCS may allow students to have a productive stress response through more accurate appraisal and skillful use of coping skills, such as active regulation of attention and emotions. Finally, after a coping situation, MCS may provide an antidote to engaging in self-critical and ruminative thoughts and help students to evaluate the encountered demand in a meaningful way. The stress and coping process when enhanced by MCS may positively inform the next stress cycle and strengthen students' skills and competencies to face challenging life events. Therefore, I conclude that MCS may have the

potential to be a developmentally appropriate, prevention and promotion approach to the mental health needs of college students.

The second paper of this dissertation titled “Promoting Healthy Transition to College through Mindfulness Training with 1st year College Students: Pilot Randomized Controlled Trial” presented post-test results from a randomized controlled trial that was conducted with first-year college students using the evidence-based L2B mindfulness program that was adapted to fit the developmental needs and specific academic context of first-year college students. We recruited 109 students living in the freshman dormitories who were randomly assigned to the 8-session L2B intervention or wait-list control group. Students reported on intrapersonal and interpersonal measures at pre-test, post-test, and 3-month follow-up. The pre-post results showed that, compared to the control group, students in the intervention reported a significant decrease in depression and anxiety symptoms and increase in life satisfaction. Furthermore, we found a marginally significant decrease in sleep issues and alcohol consequences. This study is unique as it is the first published RCT that utilized a mindfulness-based intervention with first-year college students. The findings suggest that mindfulness-based programs may be an effective tool to prevent mental health issues in college students in their first year of college and buffer a decrease in mental health during the first semester of college.

The third paper of this dissertation titled “First-year College Students’ Well-being: The Effects of Mindfulness Intervention at 3-month Follow-up and Potential Mechanisms of Change” presented the 3-month follow-up data from the L2B intervention examined in paper 2. First, the RCT study outcomes of distress and life satisfaction were examined at the follow-up. Second, I examined the mediating role of “change in mindfulness states between post-test and follow-up” measured by Mindful Attention and Awareness (MAAS, Brown & Ryan, 2003) and the



mediating role of “the use of mindfulness practice between post-test and follow-up”. The findings showed that the assignment to the mindfulness intervention was predictive of a decrease in distress and an increase in life satisfaction at the 3-month follow-up. Furthermore, the increase in reported mindfulness states mediated the outcome of distress, but not life satisfaction. The greater use of mindfulness practices mediated both distress and life satisfaction outcomes at follow-up. I hypothesized that since distress and life satisfaction are different constructs, mindfulness states may have different relationship with each of them. I concluded that mindfulness intervention effects may be sustained in short-term and the change in mindfulness as a state or practice may explain some of this effect.

Taken together, the conceptual model in paper 1 and the empirical findings in paper 2 and 3 suggest that first-year college students’ mental health can be strengthened through mindfulness practices and the wellbeing effects may be sustained into the beginning of the second semester through the increased mindfulness as a state or practice. The conceptual model in paper 1 was developed after we conducted the randomized controlled study in paper 2, therefore it provides a more detailed account of the possible ways MCS may positively impact first year college students’ mental health. Future iterations of mindfulness programs for college students would benefit from including more explicit focus on using MCS in relationships and social interactions. For example, a mindfulness intervention for first-year college students could include a session focused on mindful communication, compassionate resolving of conflicts, or mindful relating to parents and peers. Practices and role plays of mindful listening, compassionate conversations, or healthy boundaries would give students tangible resources on how to bring MCS into their daily interactions with others. Furthermore, MCS practices could serve as the foundation for learning about the interdependence of all species and the different ways of creating and contributing to

mindful and caring communities and environments. The current state of worldwide affairs could be positively enhanced by educating young people how to lead a healthy, sustainable, and ecologically-smart lifestyle.

Our findings provide an evidence to the growing body of research that shows that mindfulness-based interventions may afford useful tools to improve young people's wellbeing. There are limitations of our studies that warrant the need for further empirical investigation of the potential mindfulness benefits for universal student populations. For example, our study drew from voluntary participants who may have been more motivated to improve their wellbeing than are the general college population. Furthermore, the RCT did not include an active control group and the self-report measures provide only a limited proxy of the socioemotional outcomes. There is a need for further research on the potential benefits of mindfulness programs in college students that will include larger sample sizes, long-term follow-ups, and integration with academic material. Intensive data collection, such as EMA, also might provide more fine grained insight into the fluctuations of mindfulness, how students respond to stress in daily life, and how the potential mindfulness benefits manifest in students' lives. Although there are some preliminary indications of the potential benefits of mindfulness to foster students' health and wellbeing, the evidence must be strengthened before universities are willing to adopt these programs on a wider scale.

### **Conclusion**

Our society's future and growth depends on high-quality education. Current mainstream educational system, designed over 200 years ago with an industrial framework in mind, is in need of a broader educational agenda that is able to fulfill the role of a "wholistic" preparatory training for a successful adulthood life. Every young person should have the opportunity to

develop practical and effective tools that would allow them to have a healthy relationship with one's self, others, and the world (Goleman & Senge, 2014). Given the current issues with immigration and worldwide instabilities, 21<sup>st</sup> century education needs to be multifaceted, providing youth with the necessary cognitive and socioemotional skills to face the increasingly more complex and fast-paced world (Davidson et al., 2012; Goleman & Senge, 2014). Academic success should be considered an important but not the sole criteria of a successful college career. For young adults to become engaged citizens of global society, essential aspects of their education need to include the development of clarity, compassion, and self-awareness (Zajonc, 2016). Building and strengthening young people's socioemotional capacities provides a foundation from which healthy adjustment, active engagement, positive relationships, and wellbeing can arise. Mindfulness and compassion practices and skills may offer a developmental resource for handling both daily hassles as well as major transitions and life events through the combined effect of paying attention, regulating thoughts and emotions, and utilizing effective coping tools. Creation of mindful and compassionate communities may be the next step in the broader contemplative agenda (Greenberg & Mitra, 2015) that will allow young people to have inner clarity, socioemotional competencies, and the desire to work together for the greater wellbeing of all. I look forward to that hopeful future.

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**EDUCATION**

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Dissertation: Using Contemplative Practices to Promote College Students' Socioemotional Competencies and Healthy Transition to College

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*Master of Arts in Developmental Psychology*, 2008 - 2010

Thesis: Factors Influencing Mental Health and Psychological Development: Perspective of Children's Experience, Advisor: Dr. Jeanne Brooks-Gunn

**University of Economics**, Prague, Czech Republic

*Master in Regional Aspects and Public Administration with focus on Business Psychology, accelerated undergraduate and graduate combined program*, 2002 - 2008

Thesis: Work Satisfaction and Motivation: An Analysis and Evaluation of Quality Management Methods in Czech Republic Public Administration

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**RESEARCH GRANTS**

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Principal Investigator, Mind & Life 1440 Foundation (2016), Project: *Heartfulness in education: The effects of mindful self-compassion training on teachers' wellbeing, student-teacher relationships, and school climate* (\$15,000).

Principal Investigator, Prague City Hall (2017), Project: *Continuing education and qualification of teachers in the Czech Republic: Educational research project aiming to reduce teachers' stress and burnout* (\$6,000)

Co-investigator, Clinical and Translational Science Institute (2014), Principal Investigator: Mark Greenberg, Project: *Using Innovative Methods to Study the Effect of Mindfulness Training on the Health and Well-Being of First Year College Students* (\$40,000).

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**RESEARCH EXPERIENCE**

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**The Bennett Pierce Prevention Research Center**, Penn State, University Park, PA

- *Co-investigator and Project Coordinator* (2014 - 2017), Study of College Students' Health and Wellbeing using Innovative Technologies (Learning to BREATHE for college students), PI Mark Greenberg
- *Pre-Doctoral Research Fellow* - National Institute on Drug Abuse (NIDA) Prevention and Methodology Training Program (T32-DA-017629), 2014 – 2016
- *Research Assistant - Data Collection and Qualitative Analysis* (2013 - 2014), Study of Teachers' Health and Wellbeing (Comprehensive Approach to Learning Mindfulness, CALM), Co-PIs Patricia Jennings and Mark Greenberg
- *Research Assistant - Fidelity Coder* (2013 - 2014), Study of Teachers' Health and Wellbeing Professional Development Program (Cultivating Awareness and Resilience in Education, CARE), PI Patricia Jennings

**The Rita Gold Early Childhood Center**, Teachers College, New York, NY

- *Graduate Fellow* (2009 – 2010), Study of Peer Relationships and the Effects of Transition on Social Behavior, PI Susan Recchia

**Mindfulness Project Lab, Teachers College, Columbia University**, New York, NY

- *Research Assistant - Grant Writing and Measurement Evaluation* (2009 - 2010), Mindfulness-based Stress Reduction Program as Classroom Intervention, PI Lisa Miller

**The National Center for Children and Families**, Teachers College, New York, NY

- *Research Assistant - Data Collection* (2008 - 2009), Study of the Patterns of Childcare Subsidy Use among Low-Income Families, PI Jeanne Brooks-Gunn