LEVERAGING LOCALIZED DATA TO FACILITATE THE SELECTION OF EVIDENCE-BASED PRACTICES TO IMPROVE STUDENT SUCCESS IN HIGHER EDUCATION

by

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DISSERTATION ABSTRACT

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Title: Leveraging Localized Data to Facilitate the Selection of Evidence-Based Practices to Improve Student Success in Higher Education

Health and well-being can no longer be overlooked as a critical factor for student success in higher education. Students perform better when they are well, and institutions of higher education (IHE) have programs and practices that support and encourage student health and well-being. Following an implementation science framework, prior to selection and adoption of evidence-based practices for health and well-being, IHEs must identify the needs of their student population and the specific malleable health risk factors that predict student success, accounting for general health, so that they may effectively select and implement evidence-based programs and practices that lead to supporting student success. Accordingly, I utilized localized health data (N = 1,148) from the most recent National College Health Assessment (NCHA-II, 2018) to understand, which risk factors (*stress, poor sleep quality, low physical activity, poor eating habits, psychological distress*) predict student success and general health, and for whom does this relationship exist or change. Logistic and ordinal regression analyses were performed. Findings from this study will provide IHE administrators and stakeholders with critical information required for selecting and implementing evidence-based practices for targeted groups of students. This dissertation contributes to the growing body of knowledge on best practices in higher

education using commonly collected health data to identify risk factors for student success and campus health disparities. Practice implications and recommendations for future research are discussed.

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DEDICATION

This dissertation is dedicated to my late husband, father of our children, Cali and Trevor Jr., baseball and football coach, and Duck fanatic, Trevor James Moore (1981 – 2020). Trevor should have been here to watch me graduate and defend this dissertation however his life was cut short at the age of 38. Trevor had struggled with depression and anxiety much of his life and like many of us, he was raised to not talk about it. The treatment – go outside and run around. We disagreed with this approach when it came to raising our own kids because of the negative long-term effects we observed in our family members and our friends. To us, it seemed so simple; raise kids with more social emotional skills, increase discussions about mental health, and support people when they reach out for help. Simultaneously this approach aligned with everything I was learning in school as a graduate student. We agreed to do everything we could to stop the generational cycle of trauma and hiding our mental health struggles. For the most part we were successful, particularly when it came to raising our kids. However, tragically, Trevor lost his life to a drug overdose in May 2020, just weeks before Father's Day, our son's 15th birthday, and the original date for this dissertation defense. A little over a year later, it is still difficult for me make sense of it. Here's what I know …. Trevor taught me many critical lessons about what it means to **be human**, **be happy**, and **be well**.

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CHAPTER I

INTRODUCTION

Health and well-being is critical to student success in higher education (American College Health Association [ACHA], 2018a). When students are well, they are more engaged, stay in school longer, graduate in a timely manner, and go on to lead more productive lives after college. However, student's health and well-being has been on the decline over the last decade and rate of stress, anxiety, and depression are on the rise (ACHA, 2018a). There are many factors that contribute to one's health and well-being including internal factors such as personal expectations, time management, and information overload, general behavioral factors such as stress management, sleep quality, and physical activity, and less controllable external factors such as academic demands, living arrangements, and social pressures (Wood et al., 2018). At any given point in time, the dynamic interplay of these factors can either increase risk or promote resilience which ultimately plays a role in determining one's ability to actively engage in the college experience, juggle the ever-changing academic and social demands, and complete their degree. Despite our best efforts to support student's well-being only 62% of enrolled undergraduate students will finish in six years (U.S. Department of Education National Center for Education Statistics, 2020), and on average 50% or less of students in graduate and professional programs will complete their program (Golde, 2005; Walker et al, 2008). Although retention and graduation rates are slightly up from previous years, they are still discouraging for higher education professionals, and concerning for tuition-paying families and students. National calls to action have been made to address this growing issue.

In 2019, 11 national professional organizations in higher education united in a complimentary shared vision, *Health and Well-being in Higher Education: A Commitment to Student Success,* establishing their commitment to address well-being in higher education with an integrated and strategic approach (National Intramural-Recreational Association of Student Personnel Administrators [NIRSA], 2018). The Healthy Campus initiative (ACHA, 2018a) sees institutions of higher education (IHEs) as communities and promotes long-term sustainable efforts of comprehensive health programs which serve a continuum of need. To ensure that students perform well, we must ensure that students are well. Thus, IHEs must understand the diverse health experiences and needs of all students to properly select and implement evidence-based practices that will result in optimal health and well-being, and ultimately, academic performance, retention, and graduation. These decisions require examination of localized data to understand the needs of their population, and more specifically, in order to determine which health risk factors hinder student success, and for what groups of students.

Student Success

Student success is commonly defined as academic achievement, engagement in educationally purposeful activities, satisfaction, acquisition of desired knowledge, skills, and competencies, persistence, attainment of educational objectives, and post-college performance (National Postsecondary Education Cooperative, 2006). One of several indices of student success is grade point average (GPA) along with rates for retention (e.g., term-to-term, year-to-year) and graduation. Typically, GPA is documented on a 4-point scale where A is worth 4 points, B is worth 3 points, C is worth 2 points, and D is

worth 1 point. GPA is a metric that students and higher education professionals can quickly reference and communicate about, however it is a gross measurement of academic potential. GPA can and is often used to identify students at-risk for academic failure, or to identify those who are high-achievers and eligible for scholarships. According to the National Association of Colleges and Employers (2010) college GPA is often used as a tool in job screening, providing evidence of its value to those outside IHEs. Undoubtedly using GPA as the only metric for student success has its limitations, however it is widely accepted in the higher education literature and the majority of IHEs standardize grading in this way so that student performance and potential can be compared across time and settings. GPA is used in this study as the key metric for student success, as it has been demonstrated to be a practical metric for research and practice.

Simply having a low GPA does not indicate a student has poor health just as having a high GPA may not indicate good health. This relationship is complicated and requires a deeper more nuanced understanding of the factors that contribute to well-being. Rather than solely relying on GPA to indicate risk, we must also consider perceptions of general health and well-being and psychological distress, as well as common risk factors such as stress, sleep quality, poor nutrition, and lack of physical activity.

"Student success hinges on a student's ability to implement healthy practices, coping mechanisms, and self-care in times of need. Access and exposure to health and well-being programs, services, and facilities may be the most impactful co-curricular resources an institution can provide" (NIRSA, 2018). When students can't establish and maintain healthy behaviors, they may be more at risk for poor academic performance.

Because there are individual and group differences in health and academic behaviors, it is critical that IHEs gain an understanding to best support their student population. It is in the best interest of IHEs to support student's health and well-being, in large part because student success has financial incentives for the institution (e.g., students that perform well academically go on to graduate, gain employment opportunities, and become alumni donors). The next section will first clarify what is meant by health and well-being before moving into which specific risk factors disrupt student success.

Defining Well-being

Since the research on well-being is vast and conducted by scientists in many fields, including (and not limited to) psychology, neuroscience, medicine, public health, and education, the following review will attempt to provide an explicit focus on college student populations when possible. Historically, well-being efforts in higher education began with a focus on substance abuse and depression (2002-2005), followed by shifts in the agreement of how well-being was defined and presented from patterns of disengagement (2006), mental health and well-being (2007-2010), psychosocial well-being (2010-2012), to the current (2012 – present) understanding of well-being which includes the whole-person and the concept of flourishing (Bringing Theory to Practice, 2013), and this understanding will likely continue to evolve (Travia et al., 2019).

More specifically our current agreement of what well-being means in higher education underscores my intention to include multiple dimensions of health in this dissertation study. Albeit a complicating factor worth mentioning is the use of different terms to represent the same thing. The terms "health", "wellness", and "well-being" are often used separately or together. To complicate things even further, the World Health

Organization's definition of "mental health" is often used interchangeably with "well-being". Along with the confusion between "mental health" and "mental illness", "mental health" and "psychological distress" are often used interchangeably in the literature, particularly in the college health literature. However, since my goal for this dissertation is to focus on identifying and understanding risk, I will use "psychological distress" for clarity when measuring and assessing mental health.

This dissertation will align with the emerging body of work on well-being efforts in higher education where well-being of college students includes prevention of illness as well as maximization of health behaviors (Travia et al., 2019). The term "well-being" is used from here forth to indicate health and well-being from the current holistic conceptualization. Next, I will attempt to explain how the factors of well-being are situated in multi-level systems of influence before moving on to discuss which specific factors are examined in this study as major impediments to student success.

Risk Factors for Student Success

Through the lens of prevention science (Coie et al., 1993), risk factors are defined as variables associated with a high probability of onset, greater severity, and/or longer duration of a health problem or unwanted outcome. Therefore, in this framework, in order to increase student success (or prevent drop out) we must understand the variables "upstream" associated with greater student success. To accomplish this goal internal assessments and surveys from external entities such as the National College Health Assessment (ACHA, 2018b) are given on a regular basis. Not surprisingly results from these assessments often find that the key impediments to student success are related to well-being (ACHA, 2018a; ACHA, 2019).

Specifically, the risk factors (i.e., upstream variables) can include various dimensions of mental and/or physical health. A subset of these health risk factors are commonly referred to as lifestyle behaviors, habits, or choices, and are all self-initiated behaviors central to promoting well-being. Lifestyle behaviors often include stress management, sleep, physical activity, and eating habits (Myers et al., 2012) and there are strong links between lifestyle behaviors and psychological well-being (Velten et al., 2014), and long-term prevention of disease and disability (Grant et al., 2019) when risk is absent or minimized.

Conversely, when risk increases (e.g., maladaptive stress management and coping, lack of sleep, being sedentary for long periods, over- or under-eating) there is potential for decreases in performance and well-being. In an analysis of the 16,095 college students from 40 different IHEs, Wald and colleagues (2014) found higher GPA for students who met public health recommendations for sleep, physical activity, and fruit and vegetable intake (i.e., less risk). Minimizing these risks are the foundation that allows students to perform their best in and out of the classroom (Moses et al., 2016). Unlike other determinants of health (e.g., genetics, neighborhood), upstream risk factors such as stress, poor sleep quality, low physical activity, poor eating habits, and psychological distress, are more feasible targets for intervention, and are particularly common risks within higher education settings. Before covering the literature on stress, physical activity, eating habits, psychological distress, and sleep quality, I will first cover a broader variable called general health.

General Health

"How are you?", a phrase we hear often, requesting an individual to provide a brief snapshot response of their well-being at a given moment in time. The information we receive from this question is valuable for interpersonal communication and relationships, as well as public health. Said another way, *How would you rate your general health?*, is a commonly used metric in epidemiologic and intervention research and has shown to have accuracy of estimating a respondent's current and future health and well-being, even after accounting for covariates such as cognitive function and socioeconomic status (DeSalvo, Bloser, Reynolds, He, & Munter, 2006). Although there are inherit issues with self-reported single-item data, this item remains to be widely acceptable and collected often as a broad measure of health. In their meta-analysis, DeSalvo and colleagues (2006) recommend this item be used in conjunction with other key health measures to assess for risk, as general health serves as a proxy for other health and resource needs.

In college populations, understanding general health broadly is difficult without looking at more specific factors. Weissman and colleagues (2016) found interesting associations with student success such that students with GPAs below 2.0 reported missing more classes because of "physical or psychological reasons" compared to their higher achieving counterparts. However, while poorer psychological health was associated with seriously considering dropping out of college and missing more classes, poorer physical health was found to be associated with enrollment in more credit hours. Clearly, there are more nuanced indicators of risk that we need to examine, in addition to the "general health" construct.

I argue that it is critical that we understand which specific upstream, malleable risk factors predict student success, accounting for general health, so that we may effectively select and implement evidence-based programs and practices that lead to supporting student success, and particularly for student groups that may be vulnerable. General health will be examined however it is primarily included to serve as a controlling variable and I will cover the first of several specific risk factors of student success, stress, in the next section.

Stress

Stress has been called the "Health Epidemic of the 21st Century" by the World Health Organization (see Fink, 2017). College students are not excluded from this risk. In fact, the 2019 National College Health Assessment indicated that stress is the number one factor (out of 31) that negatively affects academic performance for undergraduate students, graduate students, and other professional students (ACHA, 2019). Accordingly, students who report more stress also tend to have lower GPAs, and lower coping self-efficacy, resilience, and social support (Frazier et al., 2019).

It is important to clarify that how we experience stress varies between individuals and the negative effect of stress is more nuanced than one might think and the problem is not merely the occasional activation of our sympathetic nervous system (i.e., fight or flight response) from acute stressors such as frantically finishing an assignment to meet a class deadline, but rather the chronic activation of the stress response that has deleterious effects on our well-being. Also, not all stress is bad. To be clear, eustress, stress that is happy, joyous, and motivating, such as moving into a new dorm room or finding out you aced an important exam, does not seem to negatively affect health and well-being. And

most importantly, individuals vary in their response to stressful situations and one's perception and ability to downregulate their stress response (e.g., using deep breathing technique) or re-appraise a situation (e.g., recognize a negative response and reinterpret the situation as more positive).

Negative consequences of stress on health and well-being have been widely studied beginning with the seminal work from Hans Selye, who first described the physiological effects of stress on the body (Selye, 1955), to Robert Sapolsky's discoveries from observing hierarchies in animal social systems (Sapolsky, 2004), to research testing interventions to reduce stress such as Aaron Beck's cognitive therapy which helps clients challenge dysfunctional thoughts (Beck, 1979), and Jon Kabat-Zinn's mindfulness-based stress reduction which teaches non-judgmental awareness of one's thought in the present moment (Kabat-Zinn, 2003). In terms of how stress affects health of students, a review by Shankar & Park (2016) describe how these effects can manifest both through direct (e.g., endocrine) and indirect (i.e., lifestyle behaviors) pathways.

The importance of having adaptive and effective stress management strategies cannot be emphasized enough, given that college students, like other similar-aged adult populations may engage in maladaptive coping strategies such as periods of sedentary behavior, binge eating, drinking alcohol, and substance use/abuse if they lack more adaptive coping strategies. Adequate stress management has shown to prevent negative effects of information overload on student performance (Maraiamdaran & Veloo, 2017), and learned resourcefulness eliminates the association between academic stress and performance (Akgun & Ciarrochi, 2010). Furthermore, Li and Lindsey (2013) found that compared with their higher stressed counterparts, lower stressed students engage in more

health promotion practices and cognitive strategies such as, "*I accept those things in my life which I cannot change",* and "*I look forward to the future*". These types of thoughts are indicative of adaptive stress management, and these studies demonstrate the importance of screening and identifying students who are at elevated stress to provide adequate resources and supports for them.

Stress has been researched extensively and is likely not to go away soon as a major problem in the population. Stress can be seen as a discrete risk factor however the reality is that the pathways for which stress manifests within individuals is complex and involves multiple systems. Therefore, is also not surprising that students with lower stress (less risk) are more likely to engage in more health promotion practices than those who have higher levels of stress (Li & Lindsey, 2013). Verlander and colleagues (1999) suggest that college student's emotional response to stress is the strongest predictor of sleep difficulties, and excessive sleepiness in the daytime along with poor sleep quality can put one at risk for common mental health disorders, such as anxiety and depression (Concepcion et al., 2014). Thus, stress is undoubtedly important to examine, but because of its potential effect on other lifestyle behaviors, a comprehensive approach including stress as one of several risk factors is critical to understanding student success. The next risk factor for student success I will discuss is sleep quality.

Sleep Quality

A good night's sleep can go a long way to promote productivity and success in one's life, and particularly in college, yet it is widely accepted that the college years can be riddled with late night study sessions, pulling "all-nighters", and campuses sprinkled with coffee-carrying, yawning students. It is well established that sleep quality (broadly

defined) is correlated with daily health and well-being levels (Pilcher & Ott, 1998, Orzech et al., 2011), depressive symptoms (Dinis & Braganca, 2018), and common mental health disorders (Concepcion et al., 2014) in college populations. Given that high quality sleep is often seen as foundational to cognitive performance (Buboltz et al., 2006), it is not surprising that low-quality sleep of college students is related to increased stress and substance use, and decreased general health (Valerio et al., 2016). And this problem is only exacerbated by later bedtimes and rise times on weekends which are common in undergraduate and graduate populations (Forquer et al., 2008).

Along with understanding the sleep patterns and consequences for college students, it must be highlighted that work has been done to understand the direct and indirect (via mood) relationships between sleep and student success (Wong et al., 2013). In their structural equation model, Wong and colleagues (2013) found that sleep duration on school days, sleep disturbances, and daytime dysfunction were the strongest predictors for GPA. The authors point to Stickgold's (2005) sleep-dependent memory consolidation research which, alongside more recent neuroscience research (e.g., Poe, 2010), provides strong evidence for encouraging students to get adequate sleep to create an optimal brain state for memory consolidation and integration.

To extend our understanding of the relationship between sleep and student success, Okano and colleagues (2019) used multiple objective measures, including utilizing wearable devices, to track sleep patterns of undergraduate students at MIT. The authors found that longer sleep duration, better sleep quality, and greater sleep consistency were associated with better grades on coursework. There is also emerging evidence that sleep can be improved with light-touch, low-resource interventions efforts.

In one intervention, college students received 8 weeks of PDFs of a cognitive behavioral self-help program via email. Participants with low sleep quality at baseline showed improvements in sleep quality and reductions in depressive symptoms (Trockel et al., 2011).

In sum, sleep quality is a broad construct and can be measured and addressed in a variety of ways in college populations. The current study is aligned with the approach taken by Etopio, Devereux, and Crowder (2019) where sleep quality (also called sleep disturbance) was measured with a variety of items asking students to report on; sleepiness during daytime activities, not getting enough sleep, awakening too early, feeling tired and dragged out, having difficulty staying awake, and having a hard time falling sleep. Since sleep quality is complex and involves multiple behaviors, this approach seems to accurately capture student sleep as a risk factor and is in alignment with previous examinations in college populations. In the next section I will pivot to discuss physical activity as a risk factor for student success.

Physical Activity

The findings from studies on the mental and physical benefits of physical activity are clear; students feel better when they get regular doses of physical movement and when students exercise more frequently, they are happier and less anxious (Kroencke et al., 2019). Do you know that feeling you get after a 20-minute burst of high-intensity activity like jogging? The science behind what many call a “runner’s high” does not stop at the sense of calm and euphoria from the immediate surge of endorphins following that jog. Regular physical activity is related to positive mental health (Hassmén et al., 2000; Penedo & Dahn, 2005), more specifically to reductions in levels of anxiety, stress, &

depression (Ströhle, 2009). Importantly, the association between physical activity and other healthy lifestyle behaviors provided additional evidence that physical activity is important to examine in multiple lifestyle behaviors together when looking at student well-being. In the next session I will discuss another lifestyle behavior, eating habits.

Eating Habits

Akin to physical activity, eating habits are lifestyle behaviors that are amenable to interventions in college populations (Plotnikoff et al., 2015; Worthy, 2016). A pattern of eating that is characterized by consumption of fruits and vegetables, lean meats, fish, and wholegrains, has been recommended as a targeted universal prevention approach to health and well-being (Jacka et al., 2012). College students appear to have the knowledge of nutritional requirements however they do not eat sufficient amounts of fruits and vegetables (Abraham et al., 2018). In fact, less than 5% meet the daily recommendation (ACHA, 2019). Unfortunately, poor eating habits are also the norm in college (Leventhal et al., 1985; Wardle et al., 1997). Poor eating habits may be due to lack of access or be influenced by self-efficacy, one's belief that they can perform the advocated behavior (Bandura, 1977; Deshpande et al., 2009), and can be influenced by stress (Kandiah et al., 2006).

The literature on eating behaviors in college populations paints a picture that students simply make poor choices and if we can provide educational interventions then we can solve the problem - but that is not the whole story. Although it is beyond the scope of this study, I must emphasize that eating habits are likely affected by access to healthy and nutrient-dense food. Food insecurity, the disruption of food intake or eating patterns because of lack of money and other resources (Nord, Andrews, & Carlson, 2005)

is a growing concern among IHEs. The current rate of food insecurity for U.S. students in college is staggering at 43.5%. In other words, almost half of the current student population across the country is struggling to gain access to food and notably this is significantly higher than the prevalence of U.S. households (13%), making food insecurity a new public health priority (Nazmi et al., 2019).

College student's eating habits, specifically their daily intake of fruits and vegetables are influenced by multiple factors including (and not limited to) access, self-efficacy, cultural norms, and stress, and given the average low levels of fruit and vegetable intake this behavior is viable for targeting with intervention efforts. In the next section, I will introduce the final behavioral risk factor in this study, psychological distress. Psychological distress in college students has been extensively researched in the literature (see Sharp & Theiler, 2018) however to stay within the scope of this study, epidemiologic data is the focus, rather than the interventions to reduce psychological distress.

Psychological Distress

The World Health Organization (WHO, 2005) defines mental health as "a state of well-being in which the individual realizes his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community". It follows that when one is unable to cope with stresses in their life that their mental health suffers, or they are in a state of psychological distress. Given the significant number of stressors in college (e.g., rigorous course load, exams, deadlines) and the intersection of the age of emergence of psychological disorders (Kessler et al., 2007) it is not surprising that there is growing concern amongst higher

education professional that psychological distress impedes student success (Gallagher, 2015).

Over the last several decades severity of symptoms has increased along with rates of mental health services utilization (Rubley, 2017). In a 2014 survey, out of the 275 counseling center directors at IHEs, 94% reported that there is an increasing trend of students with severe psychological problems coming in for services (Gallagher, 2015). This growing concern has led to several national and international efforts. National assessments by Healthy Minds (Lipson et al., 2019) and the American College Health Association indicate that anxiety, depression, and suicidal ideation is on the rise (ACHA, 2019). Suicide, a devastating and preventable outcome of psychological distress, has become the second leading cause of death among college students (CDC WISQARS, 2019). And it's worth noting that although the majority of studies are with U.S. populations, this problem is worldwide. Data from the World Health Organization's World Mental Health International College Student Initiative found that one-third of students screened positive for at least one of six mental health disorders in an eight-country study with nearly 14,000 respondents (Auerbach et al., 2018).

It appears that in general student success outcomes are better when psychological distress is low. However, this relationship may be more complicated by other lifestyle behaviors and coping mechanisms and differences may exist between student populations. Thus, a holistic, comprehensive approach to examine student well-being is used.

Towards a Comprehensive Approach

Specific lifestyle behaviors and health risk factors that are known have been examined in large part independently (i.e., without including other factors) in the literature, however more comprehensive approaches are needed to understand the relations with student success. One approach to this is using a cluster analysis. Simply put, it is a statistical method to group things that are more similar than different. Cluster analysis in the literature have shed light on patters of lifestyle behaviors that are closely related in college student populations.

A cluster analysis by Dodd, Al-Nakeeb, Nevill, and Forshaw (2010) demonstrated patterns of unhealthy lifestyle behaviors that emerge in college students and relate to other constructs such as general health and psychological distress. More specifically, in their study with British college students, two key findings emerged that are relevant here. A clustering of psychological distress with multiple health factors was found, and the "unhealthy/high risk group" cluster was the largest group of students (46% of sample). This unhealthy/risk group did not meet the recommended guidelines for physical activity, did not consume enough fruits and vegetables, and reported binge drinking. Although this study does not examine binge drinking, it is an interesting finding that is worth noting.

In a similar study, Deasy and colleagues (2014) found two clusters emerge (i.e., risk behaviors and positive health behaviors) in which the group with risk behaviors (less physical activity, less fruit and vegetable consumption, more substance use) had high psychological distress and more escape-oriented coping strategies (e.g., smoking and alcohol use). The authors call for "comprehensive health promotion programmes to tackle multiple behaviours" (Deasy et al., 2014), a sentiment echoed in national efforts (e.g.,

ACHA Healthy Campus, 2018a) and other publications. For example, a recent chapter in *Promoting Behavioral Health and Reducing Risk Among College Students,* advocates for a comprehensive behavioral health model and recommends adopting intervention of life skills and behaviors, rather than solely focusing on academic skills and supports (Schwartz & Davar, 2019).

However, what is not yet clear from previous studies in college populations are whether patterns of health factors are consistent across different populations. Most studies rely solely on the aggregate level data to determine patterns in health behaviors and risk, but this approach does not tell the whole story and may be inadvertently missing opportunities to address campus health disparities. To understand the needs of students in the local context IHEs must apply the current body of scientific literature to their examination of both campus-level aggregate patterns of risk factors (e.g., psychological distress) and group-level data to identify differences between groups for particular risk factors. In practice, the student groups selected can be informed by the literature but should also derive from input from stakeholders and students in the local context (see Sogari, Velez-Argumedo, Gómez, & Mora, 2018). In line with a research-practice-partnership approach the specific groups selected for the current study were identified a priori by the University of Oregon stakeholders. In the next section, these student groups are referred to as "vulnerable populations" because of the potential increased risk for psychological distress and lower levels of healthy behaviors as seen by stakeholders.

Vulnerable Student Populations

Populations which face significant social, cultural, and/or systemic challenges to adjusting to and thriving in higher education settings are referred to here as vulnerable

populations. These groups have demonstrated a need for prevention and intervention efforts in the literature and the earlier we can intervene and support these students, the more likely they are to have positive outcomes. Along with arriving to college struggling with a mental health concern, college students have significant adjustment to go through and may be disconnected from their family and support network. For interventions to be properly identified and adopted in the local setting by first-year undergraduates, high-achieving undergraduates, and graduate and professional student, we must first identify the needs of each of these populations separately. The following is an overview to provide context for selecting these groups as vulnerable populations.

First-Year Undergraduate Students

Each year approximately 20 million American students begin their journey in higher education (National Center for Educational Statistics, 2018). Students are identified as first-year undergraduate students by attending the first year of formal higher education, not including any previously completed college credit taken during high school. Often first-year students move away from their communities, family structures, support networks, social and health resources, as many institutions require first year students to reside on campus. Although these stressors are an inevitable part of the college experience, over last several decades IHEs see an increasing number of incoming first-year students reporting anxiety, depression, & sleep problems (American Council on Education blog article, Stolzenberg, 2018). For example, on a measure of physical health from The Freshman Survey, the longest running survey in higher education (Eagan et al., 2016; Stolzenberg, 2018), approximately 64% reported “above average” physical health in 1985 and dropped to 54% when measured in 2015, and perhaps more concerning, 64%

reported “above average” emotional health in 1985 and dropped to 47% in 2017. We must also take into consideration that at least one in three students are coming into higher education with at least one mental health concern (Eisenberg et al., 2018). However, it also appears that psychological well-being levels fluctuate during the first year and importantly, all students experience more pressure throughout the first year compared to pre-entry regardless of risk (normal vs. clinical groups) at college entry (Cooke et al., 2006).

Researchers have attempted to shed light on some of the predictors of student success and the mechanisms involved in the relationship between first-year students health and well-being and student success. In one study, first-year GPA mediated the relationship between academic self-efficacy, organization, and attention to study, and end-of-year GPA (Krumrei-Mancuso, Newton, Kim, & Wilcox, 2013). Time management, involvement with college activities, and emotional satisfaction with academics were also predictive of life satisfaction in this study. In another student focused on mental health, Villate, Marcotte, and Potvin (2017) recently found that the absence of personal goals, high level of anxiety, dysfunctional thoughts regarding success and lack of emotional adjustment to college are the top four variables that uniquely contribute to depressive symptoms in first-year students. Alongside research that has helped us understand the difficulties faced in the first-year student population, we have promising intervention literature to draw from. For example, Harmening and Jacob (2015) identified the factors that have greatest positive impact on well-being included; being involved with peers, faculty, and resident assistants; being included in diverse community and learning from diverse others’ beliefs and worldviews; and taking part in

dynamic classrooms and learning experiences that build a sense of community. In a different study, Vuckovic, Floyd, and Riley (2019) found that having a course designed to address well-being and a safe space for students during first semester, was critical for them to succeed and thrive their first year.

In theory, first-year students have increased opportunities for prevention and early intervention compared to other student populations because they often reside on campus, giving them more access to spaces on campus and increased opportunities for interactions with a variety of higher education professionals (i.e., residential assistants, housing staff, faculty). Of the two and a half million students in the U.S. that enroll as a first-year undergraduate student, 2 million (76%) will return their second year (National Student Clearinghouse Research Center, 2021). Locally, that number is slightly higher than average at 84% (UO Office of Institutional Research, 2020). For students that return to college after the first year, health risk appears to look different for those who excel academically as described in the next section.

High-Achieving Undergraduate Students

Broadly defined, high achieving students perform much better academically than their peers. High-achievers have been defined as students who earn a GPA above 3.0 (on a 4 point scale) (see Albali, 1997) and maintaining this GPA is often a requirement for scholarship eligibility (Pryor et al., 2007). High-achievers consistently perform above average and maintain excellent grades which requires certain intrinsic qualities; strong time-management, decision-making, and self-regulatory skills, but this doesn't come without a cost.

A national survey of students with a 3.4 or higher GPA by the National Society of Collegiate Scholars found 91% of students felt overwhelmed by all they had to do, a metric commonly used in surveys of college student health (Active Minds, 2019). Notably, this was higher than the national average of 87% found on the National College Health Assessment (NCHA, 2019). Also, the Robert Wood Johnson Foundation (Geisz & Nakashian, 2018) found "excessive pressure to excel" may put high-achievers at risk for chronically high stress. In 2019, "high achieving schools" (e.g., Ivy League IHE) were added to the "at risk" list due to the high rates of behavioral and mental health problems compared with national norms, along with students who are recent immigrants and students with incarcerated parents (National Academies of Sciences, Engineering, and Medicine, 2019). Findings from a recent meta-analysis, an examination of effect sizes from 47 independent studies on subjective well-being in high-achieving students, indicated that academic performance and well-being are statistically significantly related however low-achieving students do not necessarily have low levels of well-being and high-achieving students do necessarily have high levels of well-being (Bücker, Nuraydin, Simonsmeier, Schneider, & Luhmann, 2018). This large rigorous study provides evidence to counter the assumption that having a high GPA indicates better health, an attitude possibly held by those who may only look at aggregate level health data of students.

From the literature it seems there are current and increasing health risk factors in high-achieving undergraduate students, however in practice, this group of students tends to get overlooked because of their academic performance and achievements, along with the next vulnerable group I will review, graduate students.

Graduate Students

Following an article published in 2018 in the journal Nature Biotechnology titled, "Evidence for a mental health crisis in graduate education", national headlines started conversations and brought awareness to the issue of well-being of graduate students (see Evans, Bira, Gastelum, Weiss, & Vanderford, 2018). Even though this is a highly stigmatized topic, this was not the first time a study has tried to draw attention to this problem. A measurement tool called the Graduate Stress Inventory was developed nearly 30 years ago (Rocha-Singh, 1994). And many studies since then have found that stress and mental health is a growing concern in this population. Compared with undergraduate students, graduate students report higher levels of stress, attributed to balancing schoolwork, graduate assistantships, career planning, finances, and family (Wyatt & Oswald, 2013).

In 2014, the Graduate Assembly at UC Berkeley conducted a survey study on graduate student happiness and well-being. They reported that sleep, overall health, and academic engagement were the top predictors of depression, while living conditions, career prospects, and financial confidence were the top predictors of satisfaction with life (a validated measure of positive function, happiness and well-being). Cowie and colleagues (2018) found that perfectionism, the same key factor high-achieving undergraduate students, uniquely predicted academic difficulties in graduate students. This finding is perhaps not all that surprising since the applicant pool of incoming graduate students consists of individuals who were likely high-achieving undergraduates. And finally, Barreira and colleagues (2018) investigated mental health in graduate student within a specific discipline and found that PhD students in the field of Economics had

greater feelings of loneliness compared to the average retired American, were more likely than three times the national average for experiencing moderate or severe symptoms of anxiety and depression, and 11% reported suicidal ideation, notably higher than the 8% national average for graduate students on the whole (NCHA, 2018). This begs the question whether there are differences by discipline and region (Flaherty, 2018), however, this area of research is highly stigmatized and many unanswered questions remain.

Research of graduate student well-being has moved to investigating more specific modifiable risk factors, in addition to stress, that could help explain these findings. Specifically, recent work by Van Berkel and Reeves (2017) found an inverse relationship between health behaviors and stress, such that higher reports of daily reports of stress was related to lower levels of physical activity and sleep quality. Along with understanding these relationships better and acknowledging the reality that stress is part of the graduate student experience, learning how to manage stress becomes the next obvious step. Thus far, interventions such as mindfulness-based stress reduction (Stillwell, Vermeesch, & Scott, 2017) have shown promise in graduate student populations.

In graduate school, students typically must maintain grades above a B- to remain eligible for programs and thus the focus shifts from GPA to larger projects such as completing a thesis, capstone project, or dissertation, thereby successfully graduating. Surprisingly only about half of PhD students finish (Cassuto, 2013) and roughly a third of attrition is accounted for in the first year (Golde, 1998). In 2000, Lovitts and Nelson pointed at attrition as the “Hidden crisis in graduate education” and indicated that the problem is with the program or culture of the program, not a problem with the student. This is an unfortunate but common attribution made by faculty, staff, and university

stakeholders, which assumes that students have flaws (e.g., motivation) that prevent them from succeeding, as opposed to looking at the environment and determining what barriers exist. Thus, attitudes about causes of student success, and failure, in graduate school remains embedded in the archaic system of academe. However, thanks to splashy headlines from the Evans et al. (2018) article there may be increasing awareness of health and well-being in the graduate student population. This dissertation study adds to this nascent body of work and provides a model to identify the needs of the local graduate student population so that decisions can be made about how to best intervene and support these students.

Summary

When a particular type of health difference is closely linked with social, economic, and/or environmental disadvantage, it is called a health disparity (USDHHS, 2008). Health disparities, by definition, adversely affect groups of individuals who have greater obstacles and barriers based on racial or ethnic group; religion; socioeconomic status; gender; age; mental health; disability; sexual or gender orientation; or other characteristic historically linked to discrimination and exclusion. In line with the Healthy People 2020 definition of "health disparities", there is increasing evidence from the reviewed literature that there may be health disparities within first-year undergraduate, high-achieving undergraduate, and graduate student populations. Accordingly, these groups are considered "vulnerable populations", those at a higher risk for poor health are a result of the barriers they experience to social, economic, political, and environmental resources, as well as limitations due to illness or disability (NCCDH, 2020). Critically, identifying local health disparities will inform decisions for adopting new programs or re-

evaluating current practices and as a critical step in strategic action planning, the systematic approaches recommended for addressing health and student success in higher education. In the next section, I will introduce strategic action planning to improve student success places emphasis on putting these recommendations into practice in the local context.

Strategic Action Planning to Improve Student Success

In line with Healthy People initiatives from the Office of Disease Prevention and Health Promotion (USDHHS, 2020), the American College Health Association (2020) developed the Healthy Campus framework, a set of guiding principles to empower campus communities to improve health and well-being. The recommended approach to carry out these initiatives includes the MAP-IT framework; Mobilize, Assess, Plan, Implement, and Track (McLeroy et al., 1988; USDHHS, 2008; USDHHS, 2010), which aims to address determinants of health in order to reduce impediments to academic performance. Along with other related strategic action planning frameworks such as Jed Foundation's Campus Mental Health Action Planning (The Jed Foundation & Education Development Center, 2011), the Substance Abuse and Mental Health Services Administration (SAMHSA) Strategic Prevention Framework (SAMHSA, 2019), or Community Prevention and Wellness Initiative Planning Framework from the Division of Behavioral Health and Recovery (The Jed Foundation & Education Development Center, 2011), there are several common recommendations including; need for coordination across multiple entities; focus on prevention, health equity, and reduction of health disparities; identification of the needs in the local setting/community; selection and

implementation of evidence-based practices; and collection of data for ongoing quality improvement.

Importantly, the integrated and strategic approach required to carry out the vision of Healthy Campus and other similar frameworks, may be met with resistance by campus stakeholders. You don't need to have read the decades of published scientific article on behavior change (e.g., Bandura, 1971; Ajzen, 1985; Prochaska & Velicer, 1997) or hold a degree in psychology to know that changing our own behavior is difficult. Changing someone else's behavior is even harder. But changing a system, which includes groups of individuals with different sets of values and beliefs, and behavioral patterns that are reinforced in the structure of their current environment, may feel next to impossible.

What is less obvious is that the lack of integration amongst colleagues may stem from the "silo mentality". Highly pervasive in higher education, the silo mentality is the mindset present when certain departments or sectors do not wish to share information with others in the same company or organization. The silo mentality can create large divides between units resulting in reduced creativity and failed cross-departmental projects in higher education settings (Friedman & Friedman, 2018). Therefore, in order to effectively improve student well-being we must make more concerted efforts to abandon the siloed approach and move toward a collaborative, holistic model that doesn't rely on any one campus entity to solve the problem. An integrated and strategic approach is how we abandon the silo mentality.

Ideally an integrated and strategic approach leads to increased knowledge and resource sharing, decreased duplicity of programming efforts, and adoption of sustainable, cost-efficient programming. We must consider innovative strategies to

redefine how stakeholders in IHEs operate in order to maximize resources and improve collaboration. In an era of reduced state and federal funding to public universities with approximately 20 million new students attending each year (National Center for Educational Statistics, 2018), it is more critical than ever that IHEs check their silo mindset at the door and adopt an integrated approach. No matter the magnitude of the problem, national calls to action will just remain unobtainable, aspirational targets if IHEs are unable to change systemic practices that perpetuate silos and territorial attitudes to health promotion, prevention, and well-being. The national calls to action may be the light at the end of the tunnel that stakeholders have been waiting for, but *implementation science* is the railroad track that provides the dependable structure for getting us there.

Implementation Science

Borne out of the need to reduce the well-established 17-year gap between research and practice (Morris et al., 2011), implementation science aims to promote the systematic uptake of research findings and other evidence-based practices (EBPs) into routine practice, and hence, improve the quality and effectiveness of health services (Eccles & Mittman, 2006). Implementation science is both a scientific discipline and a theory-based approach to practice. There are several models, theories, and frameworks to draw from within implementation science. The Active Implementation Frameworks (AIF; Fixsen et al., 2005) is used to frame this study because it provides the ideal structure for IHEs to carry out these national calls to action.

AIF is a multi-level implementation model which has been used extensively in the fields of health and education (Durlak and DuPre, 2008; Metz, 2015; Sims & Melcher, 2017), and includes five separate but intertwined frameworks; Usable Innovations,

Implementation Drivers, Implementation Stages, Implementation Teams, and Improvement Cycles. While functionally different, each of the five frameworks contributes to creating a foundation for putting EBPs and evidence-informed innovations into practice. The Usable Innovations framework is used to evaluate a potential program or practice (i.e., innovation) for implementation. Implementation Stages framework provides a systematic structure of activities for implementing an innovation. Implementation Drivers refers to the infrastructure and capacity features within a local context that influence readiness for, adoption of, and sustainability of innovations, including competency, organization, and leadership drivers. Implementation Teams are groups of stakeholders that play an active role in supporting implementation of an innovation.

Improvement Cycles, also referred to as Plan, Do, Study, Act and PDSA cycles, aim to promote quality improvement by iteratively collecting information, evaluating and modifying, and implementing change to improve outcomes. To understand the needs within the local population to inform the selection of EBPs, the Implementation Stages framework will be elaborated on below, however, please also refer to Sims and Melcher (2017) or the Active Implementation Hub (https://nirn.fpg.unc.edu/ai-hub), an online comprehensive set of resources for applying the AIF.

It is critical to understand that implementation is not a static even but rather a specified set of activities designed to put into practice an activity or program of known dimensions (Fixsen et al., 2005; Fixsen et al., 2015). As such, implementation is a process which involves multiple actions, decisions, and corrections to make full use of effective innovations, and this does not likely occur all at once. Achieving full implementation of

an EBP typically takes two to four years, which begins when an organization considers changing the current set of programs and practices, and ends when the change is fully in place and producing the intended outcomes.

There are four clearly articulated stages, Exploration, Installation, Initial Implementation, and Full Implementation, and it is possible to be in multiple stages at once or even move back and forth between stages. The following activities are accomplished at each stage; 1) **Exploration**: assess needs, examine intervention components, consider implementation drivers, assess fit, and build sustainability; 2) **Installation**: acquire resources, prepare organization, prepare implementation drivers, prepare staff, build sustainability; 3) **Initial Implementation**: adjust implementation drivers, manage change, deploy data systems, initiate improvement cycles, build sustainability; and 4) **Full Implementation**: monitor and manage implementation drivers, achieve fidelity and outcome benchmarks, further improve fidelity and outcomes, and ultimately, achieve sustainability.

The Exploration phase of AIF is critical for improving long-term outcomes and recent tools, resources, and trainings have been developed to support practitioners working in systems which require an integrated and strategic approach (see Active Implementation Hub, 2020). Within the Exploration Stage, the aim is to understand the local context in order to select appropriate EBPs that meet the needs of the target population (Saldana et al., 2012; Slavin et al., 2010), which I will review in the next section.

Local Implementation Context

The University of Oregon (UO) is a large 4-year public university in the Pacific Northwest with approximately 23,000 students (undergraduate and graduate combined). There has been an observed decline in student's health and well-being over the last decade, as measured in the National College Health Assessment bi-annual survey at the University of Oregon, from 92.3% in 2010 to 85.2% in 2018. University of Oregon faculty, staff, and administrators have grown increasingly concerned for the well-being of students because of a steady increase in self-reported rates of stress that is so burdensome it negatively affects academic performance, rising 8.5% since 2010, and is currently 38%, meaning UO students are nearly 5% above the national average (ACHA-NCHA II, 2018). Like stress, the percentage of students reporting that their academic performance is hindered by other health factors has continued to increase and is notably higher than the national average. In 2018, 24% of UO students report their academic performance was adversely affected by sleep difficulties (3% above national average, 3% increase since 2010), 33% by anxiety (5% above national average, 10% increase since 2010), and 38% by depression (6% above national average, 10% increase since 2010). To address this the University currently offers comprehensive counseling and health services, and recently has expanded health promotion efforts to include programming for decreasing stress and other behavioral health risks (e.g., yoga, meditation, cooking classes).

However, the problem remains that the current resources alone are not sufficient to meet the needs of the students and to effectively address this gap we need a more nuanced picture of student health and we need to know if health looks the same across different student groups. Simply put, we must not rely solely on using aggregate level

data to answer the question, How are our students doing? To ensure health equity for all University of Oregon students, it is critical to examine whether student health varies so that institutions can make data-based decisions and select evidence-based practices that will ultimately result in students feeling well, performing better, staying in school, and graduating in a timely manner.

Study Purpose

The University of Oregon is increasing "upstream" prevention programming to promote healthy lifestyle behaviors and habits, specifically with a focus on mental health, stress management, sleeping, eating, and physical activity. To ensure health equity for all University of Oregon students, it is critical to examine whether student health data varies so that the institution can make data-based decisions and select evidence-based practices (see Soicher, Becker-Blease, & Bostwick, 2020) that will ultimately result in students feeling well, performing better, staying in school, and graduating in a timely manner. Accordingly, the following research questions will be addressed;

1) **What specific health risk factors (stress, poor sleep quality, low physical activity, poor eating habits, psychological distress) predict student success?**

   Hypothesis: Aligned with previous work showing the relations among stress and other health indicators in this population (Li & Lindsey, 2013; Concepcion et al., 2014), I anticipate stress, poor sleep quality and psychological distress will predict poor student success, accounting for all other variables.

2) **What specific health risk factors (stress, poor sleep quality, low physical activity, poor eating habits, psychological distress) predict student success after controlling for perceived general health?**

Hypothesis: If stress, poor sleep quality, and psychological distress predict general health (RQ 2), then I expect those risk factors will no longer be significant predictors of student success after accounting for general health.

3) **What specific health risk factors (stress, poor sleep quality, low physical activity, poor eating habits, psychological distress) predict general health?**

Hypothesis: Given the relations between health factors and general health, I anticipate stress, poor sleep quality and psychological distress will predict general health, accounting for all other variables.

4) **Does being a member of a vulnerable population (first-year undergraduate students, high-achieving undergraduate students, graduate/professional students) moderate the direct effect of risk (stress, poor sleep quality, low physical activity, poor eating habits, psychological distress) on student success?**

Hypothesis: I expect that there will be difference among risk variables and the relationship with student success, however this research question is exploratory, and no specific hypotheses will be tested. For this reason, health profiles for each vulnerable population will be created in addition to moderation analyses.

Although outside the scope of this dissertation study, it is important to note that with these methods, health profiles can be created for other student groups, for example, historically underrepresented race or ethnic minority group in higher education, as there is substantial evidence on minority status stress and negative health outcomes (Jochman et al., 2019; McClain et al., 2016). In addition to contributions to the extant research literature, this dissertation provides an exemplar for the broader higher education community of how to use readily available campus health data at other institutions for

health promotion and prevention program selection and improvement as well as policy efforts.

CHAPTER II

METHODS

Participants

A random selection of 10,000 currently enrolled undergraduate and graduate students at the University of Oregon were invited to complete an anonymous, bi-annual online student health survey. Of the 1,148 students that participated (11% response rate), 69.2% self-identified as female, 3.4% as non-binary. With regard to external validity, the percentage of female-identifying students is higher for this sample compared with the institution as a whole (53.3%), however the sample is congruent with the national ACHA-NCHA-II comparison sample (68.5% female, 3.0 % non-binary, $N = 88,178$; American College Health Association, 2018).

Procedures

In spring 2018, students were invited to participate via email with a link to the survey. Participation was incentivized with an opt-in random drawing for gift card. The survey takes 30 - 40 minutes to complete.

Measures

The American College Health Association National College Health Assessment (ACHA-NCHA-II) is a 66-item survey of health and well-being of college students that is based on the original ACHA-NCHA launched in 2000. The ACHA-NCHA-II was updated to include new items to gather data on emerging health issues such as un-prescribed drug use, birth control drugs/devices, and mental health. The five primary health area that are covered in the survey are a) alcohol, tobacco, and other drug use, b)

sexual health, c) weight, nutrition, and exercise, d) mental health, and e) personal safety and violence. See Appendix A for specific items used in this study.

The ACHA-NCHA-II was developed and validated in a series of studies (American College Health Association, 2013). Two pilot studies were conducted at eight IHEs (N = 8,458) in spring 2007 and seven IHEs (N = 7,681) in spring 2008, and differences were found between the original ACHA-NCHA and the ACHA-NCHA-II, however the magnitude of the effect was not large. Analyses were conducted again with IHEs that randomized student sampling; spring 2009 with 117 IHEs (N = 87,105) and spring 2010 with 139 IHEs (N = 95,712). Reference group data was used to conduct principal components analyses and reliability analyses were conducted.

Reliability analyses demonstrated moderate to strong results in the evaluation of grouped items with strong consistency after repeated reliability analyses. Principal components analyses and reliability analyses provide some confidence of using scales rather than individual items for hypotheses testing (standardized Alpha over .7) and inter-item correlation (mean over .4). Consistency was found in magnitude and direction of the Kendall's tau b over the two survey periods and various IHEs demonstrating construct validity.

Student success

Self-reported average grade point average will be used to indicate student success. Students reported their approximate cumulative grade point (average GPA) on a multiple-choice item with five options (A, B, C, D/F, N/A). Out of 1,137 students that responded, 46.9% indicated A average GPA, 44.9% indicated B average GPA, and 7.2% indicated C average GPA. Only 4 students indicated D/F average GPA and 7 indicated N/A. The lack

of variability in grades C and lower necessitated the recoding of the variable into B's versus A's.

General Health

Students reported their general health on a multiple-choice item with six options (excellent, very good, good, fair, poor, don't know). Out of 1,136 students that responded, 51.4% indicated their health was very good or excellent. The percentage increased to 85.2% after adding in those who indicated their health was good. Consistent with previous use of this item (see Etopio, Devereux, & Crowder, 2018), the variable was recoded as an ordinal variable where higher scores indicate better health; excellent [5] to poor [1]. The two don't know responses will not be included.

Stress

Students reported their overall level of stress in the last 12 months on a multiple-choice item with five options (no stress, less than average stress, average stress, more than average stress, tremendous stress). Notably, out of 1,139 students that responded, only 25 students (1.4%) indicated experiencing no stress, and 55 students (4.8%) indicated less than average stress, while 28.9% indicated experiencing average stress, 48.6% indicated experiencing more than average stress, and 16.3% indicated experiencing tremendous stress. This item will be recoded as an ordinal variable in alignment with previous studies (e.g., Martinez et al., 2018); with a range from no stress [0] to tremendous stress [5]. Higher scores indicate more stress and increased health risk.

Poor Sleep Quality

Students responded to a set of six items asking about their sleep in the past seven days. All items started with "In the past 7 days …", and ended with different indicators of

poor sleep quality; a) did you get enough sleep so that you felt rested when you woke up in the morning? (reverse coded), b) how often have you awaken too early in the morning and couldn't get back to sleep?, c) how often have you felt tired, dragged out, or sleepy during the day?, d) how often have you gone to bed because you could not stay awake any longer?, e) how often have you had an extremely hard time falling asleep?. Each item contained eight possible responses with a range from zero [1] to seven days [8]. One item asks, "how much of a problem have you had with sleepiness during your daytime activities?" with a 5-point Likert scale; no problem at all [1], a little problem [2], more than a little problem, [3], a big problem [4], and a very big problem [5]. A sum score was computed for the proposed study, consistent with recent analyses of these data using the national dataset (see Etopio, Devereux, & Crowder, 2018), with total scores ranging from 6 to 45. Higher scores indicate poor sleep quality and increased health risk. Reliability analysis of these items by Etopio, Devereux, & Crowder (2018) indicate good internal consistency for this approach and good internal consistency was found in the current study (alpha = .80).

Low Physical Activity

Students responded to a set of three items that assessed the number of days engaged in different aspects of physical activity. The items all asked "On how many of the past 7 days did you …" and followed with; a) do moderate intensity cardio or aerobic exercise for at least 30 minutes?, b) do vigorous intensity cardio or aerobic exercise for at least 20 minutes?, and c) do 8-10 strength training exercises for 8-12 repetitions each?. Students indicated how many days from zero to seven. In order to determine health risk (low physical activity) a cutoff will be used following current federal recommendations

for physical activity. In line with recommendations for adults from the American College of Sports Medicine and the American Heart Association Physical Activity (Haskell et al., 2007) and Physical Activity Guidelines for Americans (Piercy et al., 2018), adults should do; a) at least 30 minutes of moderate-intensity cardio or aerobic exercise on five or more days per week, or 20 minutes of vigorous-intensity cardio or aerobic exercise on three or more days, and b) muscle-strengthening activities of moderate or greater intensity and that involve all major muscle groups on two or more days a week. A dichotomous categorical variable was created for this study to determine if "guidelines met" [0] (must meet both cardio/aerobic and strength-training recommendations), or "guidelines not met" [1]. Guidelines not met will indicate low physical activity and increased health risk. Previous analyses (ACHA, 2018b) have treated cardio/aerobic exercise and strength training separately. Accordingly, out of 1,134 students, 41.8% did not meet guidelines for cardio/aerobic exercise and 44.2% did not meet guidelines for strength training. The proposed study will combine these items to be in line with current federal guidelines.

Poor Eating Habits

Students responded to "How many servings of fruits and vegetables do you usually have per day? (1 serving = medium piece of fruit, frozen, or canned fruits/vegetables; ¾ cup fruit/vegetable juice; 1 cup salad greens; or ¼ cup dried fruit)" on a four-point Likert scale; 0 servings per day, 1-2 servings per day, 3-4 servings per day, or 5 or more servings per day. In order to determine health risk, a cutoff was created following 2015-2020 Dietary Guidelines for Americans (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015), which recommend that adults eat two cups of fruit and two and a half cups of vegetables each day. A

dichotomous categorical variable was created for this study to determine if "guidelines met" [0] (5 or more servings per day) or "guidelines not met" [1] (0 – 4 servings per day). "Guidelines not met" will indicate poor eating habits and increased health risk. Out of 1,139 students, more than 90% did not meet guidelines with only 72 students (6.3%) indicated consuming five or more servings per day.

Psychological Distress

Students responded to a set of eight items that assessed different symptoms of psychological distress. The items all started with "Have you ever felt …", and ended with different indicators of psychological distress; a) things were hopeless?, b) overwhelmed by all you had to do?, c) exhausted (not from physical activity)?, d) very lonely?, e) very sad?, f) so depressed that is was difficult to function?, g) overwhelming anxiety?, and h) overwhelming anger?. Each item contained five possible responses (never, not in the last 12 months, in the last 2 weeks, in the last 30 days, in the last 12 months). For the purposes of this study, this item will be recoded as a dichotomous categorical variable where responses are either "no occurrence of the symptom" [1] for never or not in the last 12 months, or "occurrence of the symptom in the last 12 months" [2] for all other responses. This is consistent with other recent analyses of these data (see Etopio, Devereux, & Crowder, 2018; Martinez et al., 2018), where total scores range from 8 to 16. Higher scores indicate more psychological distress and increased health risk. Reliability analysis of these items by Etopio and colleagues (2018) indicate good internal consistency for this approach. Excellent internal consistency was found in the current study (alpha = .90).

Data Analyses

Preliminary analyses included examination of the demographic characteristics of the sample, a descriptive summary of the study outcomes and predictors, a post-hoc power analysis performed with G*Power (version 3.1), and summary of missing data. To accommodate the dichotomous and ordinal nature of the outcome data, multivariate logistic regression for models were created predicting GPA (research questions 1 & 3) and multivariable ordinal regression for the model predicting perceived general health (research question 2). Logistic and ordinal regression models were estimated with a logit link function using SPSS (version 26) and we provide odds ratios with 95% confidence intervals to interpret significant findings. For the ordinal regression model, we evaluated the proportional odds assumption to test whether the predictors had the same effect at each cumulative split of the ordinal perceived general health outcome. For tests of moderation (research question 4), we added the main effect of student group, and its multiplicative interaction term with the risk indicators, to the logistic regression models predicting student GPA. Unlike research questions 1-3 where all predictors were entered simultaneously, for test of moderation we tested each risk factor separately. To interpret significant interaction terms, we examined simple slopes for each student group's effect of the risk indicator on student GPA. To protect against Type-I errors for research questions 1-3, the study used a Bonferroni adjusted p-value <.01, to correct for the five predictors.

Power Analysis

A post-hoc power analysis, estimated with a logit regression model and two-tailed alpha of .01, was computed while differing the distribution of the study predictors. For continuous predictors, the study sample has adequate power (>.83) to detect odds ratios as small as 1.30 or greater. For dichotomous predictors, the study sample has adequate power (>.85) to detect odds ratios a small as 1.65 or greater.

CHAPTER III

RESULTS

Missing Data

Rates of missing data were minimal for both the outcomes and predictors (1-2%) and the correlations between amount of data provided by students with outcomes and predictors were all small in effect size (all *r*'s less than .11) Missing data was deemed ignorable for the current study given the rate was minimal, missing data was not meaningfully associated with any variables of interest, and the study was adequately powered. Inferential statistics were calculated after excluding cases that had missing data.

Descriptive Statistics

The sample of 1,148 students self-identified as mostly female (72%), White (74%), on average 23.3 (*SD* = 5.8) years old and enrolled as full-time students (93%). Table 1 provides a more complete description of the sample and comparison against the local IHE demographics in 2018 (Office of Institutional Research, 2021).

Table 2 shows descriptive summary of the study outcome variables. Table 3 shows descriptive summary of predictor variables. In Table 2 and 3, reference categories are shown with a superscript (e.g., ^{1}B).

GPA was analyzed as a dichotomous outcome due to limited endorsement of the lower grade categories (92% of sample endorsed having an A or B average GPA). Perceived general health showed lower levels of endorsement at the ends of the response options with "very good" as the highest endorsed category. A similar pattern, low endorsement at the lower and upper end of the response options, was also realized for the

ordinal predictor stress. Examination of measure of skew and kurtosis, along with visual inspection of histograms and Q-Q plots, showed stress approximated a normal distribution. Since stress approximates a normal distribution, it was treated as a continuous predictor in the analytic model to facilitate interpretation. Similar descriptive and visual analyses confirmed poor sleep quality and psychological distress also approximated a normal distribution. A large majority of students did not meet the guidelines for physical activity or eating habits, the two dichotomous predictors. Table 4 shows the correlations among predictors and outcomes.

Predictors of Student Success

To address research question 1; ***What specific health risk factors (stress, poor sleep quality, low physical activity, poor eating habits, psychological distress) predict student success?,*** a multivariable binomial logistic regression models predicting GPAs of B versus A was conducted; results are shown in Table 5. Two significant predictors were found including stress and poor sleep quality. For each one unit increase in stress, a student had 38% greater odds of reporting an average GPA of an A, relative to a B. For each one unit increase in poor sleep quality a student had significantly lower odds of reporting an average GPA of an A, relative to a B. For example, the average poor sleep quality score was 24.0 with a $SD = 9.35$. Thus, a student one standard deviation above the mean had approximately three-quarters the odds ($OR = 0.72$) of reporting a grade of an A relative to a B.

Table 1

Comparison of Demographic Characteristics of Participants Study Sample versus Local IHE

Demographic variable	Study Sample (N = 1,148)		University of Oregon (N = 22,760)	
	n	%	n	%
Gender				
Female	819	72	12,224	54
Male	310	26	10,536	46
Non-binary	19	2	N/A	N/A
Race or Ethnicity				
White	849	74	13,458	59
Black	24	2	515	2
Hispanic or Latinx	108	9	2,591	11
Asian or Pacific Islander	165	14	1,364	6
American Indian or Alaskan Native	34	3	143	1
Biracial	78	7	1,549	7
Other	24	2	392	2
LGBTQIA+	242	21	N/A	N/A
Demographic variable	n	%	n	
Enrollment status*				
Full-time	1058	93	20,892	91
Part-time	65	6	2,088	9
Other	16	1	670	< 1
Student group				
First-year undergraduate students	168	15	3,938	17
Graduate and professional students	287	25	3,629	16
Transfer student	159	14	1,246	5
International student	62	5	242	1

Note. N = 1,148; Participant's ages: 18-20 years (37%), 21-24 years (37%), 25-29 years (14%), and 30+ years (12%). *Institutional comparison data was collected during AY 17-18 (N = 22,980; Fall 2017 – Spring 2018).

Table 2

Descriptive Summary of Outcome Variables

Outcomes	Percentage
Average GPA	
A	46.9
[1]B	44.9
C	7.2
D/F	0.4
N/A or did not report	1.6
Perceived general health	
Poor	1.8
Fair	12.9
Good	33.9
Very good	38.2
[1]Excellent	13.3
Did not report	1.2

Note. [1]Reference category in analytic models.

To address the second research question, ***What specific health risk factors (stress, poor sleep quality, low physical activity, poor eating habits, psychological distress) predict student success after controlling for perceived general health?,*** another multivariable logistic regression model was estimated with the addition of adjusting for the effects of perceived general health. Results were similar to models reported in Table 4 in that the same health risk factors remained significant.

For each one unit increase in stress, adjusting for the effects of perceived general health (estimate = 0.27, *SE* = 0.61, *p*-value =.001, *OR* = 1.31, 95% *CI* = [1.12 – 1.52]), a student had 31% greater odds of reporting an average GPA of an A, relative to a B. For

each one unit increase in poor sleep quality, adjusting for the effects of perceived general health, a student was significantly less likely to report an average GPA of an A, relative to a B (estimate = -0.03, *SE* = 0.01, *p*-value <.001, *OR* = 0.97, 95% *CI* = [0.95 – 0.99]).

Table 3

Descriptive Summary of Predictor Variables

Predictors		Percentage
Stress		
No stress		1.4
Less than average		4.8
Average		28.7
Above average		48.2
Tremendous		16.2
Did not report		0.8
Poor sleep quality [*Mean*, (*SD*)]	24.0	(9.35)
Low physical activity		
[1]Guidelines met		28.0
Guidelines not met		70.0
Did not report		2.0
Poor eating habits		
[1]Guidelines met		6.3
Guidelines not met		92.9
Psychological distress [*Mean, (SD*)]	13.2	(2.5)

Note. [1]Reference category in analytic models. *SD* = standard deviation

Table 4

Pearson, Tetrachoric, and Polychoric Correlations Among Outcomes and Risk Factors

	1	2	3	4	5	6	7
1. GPA	1.0						
2. General health	.17	1.0					
3. Stress	.08	-.26	1.0				
4. Poor sleep quality	-.15	-.34	.46	1.0			
5. Low physical activity	.00***	-.29	.12	-.01**	1.0		
6. Poor eating habits	-.24	-.29	-.03*	.18	.21	1.0	
7. Psychological distress	-.02*	-.24	.59	.47	.09	.05*	1.0

Note. *$p \leq .05$, **$p < .01$, ***$p < .001$

Table 5

Results of Multivariable Binomial Logistic Regression Models Predicting GPA

Predictor	Estimate	*SE*	*p*-value	*OR*	95% *CI*
Stress	.32	.10	**<.001**	**1.38**	**1.14-1.66**
Poor sleep quality	-.04	.01	**<.001**	**0.96**	**0.95-0.98**
Low physical activity	-.04	.14	.758	0.96	0.72-1.27
Poor eating habits	-.65	.28	.020	0.52	0.31-0.90
Psychological distress	-.01	.03	.973	1.00	0.94-1.06

Note. *SE* = standard error, *OR* = odds ratio, *CI* = confidence interval. Bolded entries are statistically significant at *p*-value <.01.

Predictors of Perceived General Health

To address research question 3; ***What specific health risk factors (stress, poor sleep quality, low physical activity, poor eating habits, psychological distress) predict general health?,*** a multivariable ordinal logistic regression model was conducted predicting general health; results are shown in Table 6. The model met the proportional hazard assumption as evidenced by the failure to reject the hull hypothesis that the location parameters were the same across response categories (χ^2 [15,1148] = 14.50, *p*-value = 4.88). All predictors, except for psychological distress, were statistically significant at p <.01.

For each one unit increase in the dichotomous risk factors, low physical activity and poor eating habits, a student had approximately one-third to half the odds of reporting higher levels general perceived health. For a one unit increase in the ordinal risk factor, stress, a student had approximately 20% lower odds of reporting higher levels of perceived health. For a one unit increase in the continuous risk factors poor sleep quality, a student was less likely to report higher level of perceived risk. For example, the mean poor sleep quality score was 24.0 with a *SD* = 9.35. Thus, a student one standard deviation above the mean had approximately half the odds (*OR* = 0.44) of reporting higher levels of perceived general health.

Moderators of Risk on Student Success

To address research question 4; ***Does being a member of a vulnerable population (first-year undergraduate students, high-achieving undergraduate students, graduate/professional students) moderate the direct effect of risk (stress, poor sleep quality, low physical activity, poor eating habits, psychological distress) on student***

***success?*, t**he test of moderation, described above in the data analyses section, was adjusted for perceived general health, since this variable was shown to be significantly related to student success when addressing the third research question. No statistically significant moderating effects of risk on student success were found for first-year undergraduates (all *p*-values > .222). However, two significant moderating effects were found for graduate and professional students.

The interaction of graduate and professional student status and poor sleep quality was a significant moderator of student success (estimate = 0.04, *SE* = 0.20, *p*-value = .024) as was the interaction of graduate and professional student status and low physical activity (estimate = -0.98, *SE* = 0.41, *p*-value = .023).

Decomposition of the significant graduate and professional student status and poor sleep quality interaction showed the effect of poor sleep quality had a significant detriment on average GPA for undergraduate students (estimate = -0.02, *SE* = 0.01, *p*-value = .015, *OR* = 0.98, 95% *CI* [0.96-0.99]), but not for graduate or professional students (estimate = 0.03, *SE* = 0.02, *p*-value = .110, *OR* = 1.03, 95% *CI* [0.99-1.07]). Neither test of simple slopes for the effects of low physical activity on student success as a function of graduate and professional student status were statistically significant at *p* <.05, however, trend-level differences did emerge. The effect of low physical activity showed near significant decrement on average GPA for graduate and professional students (estimate = -0.71, *SE* = 0.38, *p*-value = .065, *OR* = 0.49, 95% *CI* [0.23-1.04]), but not for non-graduate and professional students (estimate = 0.25, *SE* = 0.17, *p*-value = .148, *OR* = 1.27, 95% *CI* [0.92-1.78]).

Table 6

Results of Multivariable Ordinal Logistic Regression Models Predicting Perceived General Health

Predictor	Estimate	*SE*	*p*-value	*OR*	95% *CI*
Stress	-0.22	0.08	**.008**	**0.80**	**0.68-0.94**
Poor sleep quality	-0.57	0.01	**<.001**	**0.94**	**0.93-0.96**
Low physical activity	-0.89	0.13	**<.001**	**0.41**	**0.32-0.53**
Poor eating habits	-0.73	0.24	**.002**	**0.48**	**0.30-0.77**
Psychological distress	-0.04	0.03	.200	0.97	0.91-1.02

Note. *SE* = standard error, *OR* = odds ratio, *CI* = confidence interval. Bolded entries are statistically significant at *p*-value <.01.

CHAPTER IV

DISCUSSION

The purpose of this study was to examine specific health risk factors related to student success; general health, stress, sleep quality, physical activity, eating habits, and psychological distress with a sample of University of Oregon students. Vulnerable student populations were identified a priori and examined for patterns of health risk (i.e., first-year undergraduate students, high-achieving undergraduate students, graduate, and professional students) to facilitate the selection of evidence-based practices. I hypothesized that high levels of stress, poor sleep quality and psychological distress would be related to lower GPA and lower perceived general health but would not remain significant after controlling for general health. Health risk in vulnerable student groups were also explored.

Results from multivariable logistic and ordinal regression analyses indicated that high levels of stress and poor sleep quality were significant predictors of higher GPA and high levels of stress, poor sleep quality, low physical activity and poor eating habits were significant predictors of general health, before and after controlling for perceived general health. Moderation analyses indicated poor sleep quality significantly increased the odds of reporting a lower GPA for undergraduate students and a trend was indicated such that low physical activity increased the odds of reporting a lower GPA for graduate and professional students.

Predictors of Student Success

The hypothesis that high stress, poor sleep quality and psychological distress predicted lower GPA was not supported by the data. Interestingly, only high stress and

poor sleep quality predicted GPA, that is, higher levels of stress and poor sleep quality predicted higher GPA. This finding is similar to recent national survey data showing 91% of more than 9,000 high-achieving students (3.4 GPA or higher) felt overwhelmed by all they had to do in the last year and two out of three reported needing mental health services (Active Minds, 2019).

Many early studies found that high-achievers had higher levels of stress than their same-age counterparts (Crystal et al, 1994; Myers & Pace, 1986; Supe, 1998) and so researchers have sought to identify the individual factors that contribute to this. The one factor that has remained central to understanding high achievers is perfectionism, understood as a multi-dimensional construct where individuals set high personal standards for themselves and are highly critical of their own work (Frost et al., 1990; Burns & Evans, 2009). Perfectionist tendencies are accompanied by internal and external pressures that can increase stress, headaches, eating disorders, substance abuse, depression, anxiety, and suicide (Flett & Hewitt, 2002; Owens & Giazzoni, 2010; Rise, Leever, Christopher, & Porter, 2006), and are related to neuroticism, a trait which relates to long-term moodiness and psychological distress (Flett, Hewitt, & Dyck, 1989; Miller & Speirs Neumeister, 2017). Risk for drop out among high-achievers is not unlike their non-high-achieving peers, as they also struggle with selecting a major and career, and need supportive environments to make the most out of their college experience (Greene, 2003; Cuevas, Schreiner, Kim & Bloom, 2017). Ultimately, this finding may help add evidence to counter the common misconception that student success is indicative of well-being.

Predictors of Perceived General Health

The hypothesis that higher levels of stress, poor sleep quality and psychological distress predicted lower perceived general health were partially supported by the results. Higher levels of stress, poor sleep quality, low physical activity, and poor eating habits predicted perceived lower general health. This is not surprising given that we use one's appraisal of their own general health as a proxy for other more nuanced facets of well-being. (DeSalvo et al., 2006).

Moderators of Risk on Student Success

Moderation analyses were exploratory and no specific hypotheses were made. Given that preliminary analyses revealed much of the sample was high-achieving undergraduate students, no specific moderation was performed for this group. After controlling for perceived general health, moderation analyses revealed an interesting pattern that indicated poor sleep quality seems to negatively effect student success for undergraduate students. Also interestingly, low physical activity may negatively affect student success for graduate students. In other words, sleep seems to be a most important health behavior for undergraduate students while physical activity appears to be most important for graduate and professional students. Another interpretation is that there may be specific health behaviors that become stronger patterns over time. From a developmental standpoint, this indicates a possible crystallization of behaviors over time (i.e., sleep, physical activity) and opportunities for intervention. Although this is a cross-sectional study, the findings in this study help to identity future directions for longitudinal work, specifically we should examine how specific health behaviors change over time in college populations and if these changes effect student success.

Implications for Practice

For IHEs to select and implement evidence-based practices for student's health and well-being, stakeholders need to understand the needs of all student populations so the institution can make data-based decisions and select evidence-based practices (see Soicher, Becker-Blease, & Bostwick, 2020) that will ultimately result in students feeling well, performing better, staying in school, and graduating in a timely manner. The one-size-fits-all approach to supporting students might not be the best approach, especially as we consider the needs of undergraduate students, graduate students, and professional students. This is especially important because we want students to engage with and utilize our programming efforts, and we want a decent return-on-investment for the time, money, and human resources that are put into campus public health programming.

This study is the first to examine health risk in a college population with an implementation science framework approach, specifically AIF (Fixsen et al., 2005). As part of a research-practice-partnership, stakeholders at the University of Oregon were consulted with and selected the vulnerable populations studied. Findings from this study are part of the Exploration phase of AIF and are part of understanding the local context in order to select evidence-based interventions that meet the needs of the population as suggested in the literature (see Saldana et al., 2012; Slavin et al., 2010). Thus, the findings will be shared with campus stakeholders to inform the next steps. Notably, in addition to assessing needs, the exploration phase (step 1 of 4) requires that IHEs also examine intervention components and consider implementation drivers, assess fit, build sustainability before moving into the next step, Installation (step 2 of 4).

The findings from this study will add to the emerging body of literature on prevention efforts in IHEs, specifically with a comprehensive approach where lifestyle behaviors and health risk behaviors are the focus (e.g., Whatnall et al., 2019). This study was intentionally focused on supporting efforts to increase "upstream" prevention programming and will serve as an example of what is possible using commonly collected health data (e.g., ACHA-NCHA-II). As IHEs adopt more prevention-oriented approaches to campus-wide health initiatives and move away from the traditional reactive health service model, this study will support future groups who want to adopt a research-practice-partnership or work at the intersection of research and practice.

Limitations

There are two major limitations with regard to external validity and sample characteristics. First, this sample is primarily White and female, and is not necessarily representative of the institution or national demographics. Although it is representative of the region from which the data were drawn, a predominantly White institution in the pacific northwest, it does not change the fact that the findings should be interpreted with caution and the demographics of the sample must be taken into consideration. Second, it turned out that the vast majority of students in this study (92%) had a B average or above, which classifies them as high-achieving in the extant literature (e.g., Pryor et al., 2007). A limitation for survey research in general is the issue of bias from self-selection; in this case, more high-achieving students self-selected to participate which could be a function of some other variable not yet considered. Thus, the findings of this study may apply to high-achieving students more than other students.

There are also two limitations worth noting with regard to methodology and study design. First, this study used a cross-sectional dataset which means I am not able to report on changes over time nor test intervention effects, both of which would be ideal for future work. Second, measuring student success can be complicated and determined in multiple ways. This study utilized GPA because it is the only student success metric available, however it is a crude measurement of student success. Other student success metrics such as retention from term-to-term and year-to-year, as well as graduation, or engagement in high-impact practices could provide more robust indicators of student success, especially if combined.

Recommendations for Future Research

Future research should align with current efforts in other areas of the institution to improve health and retention. A major drawback is that institutions are slow to change and break down silos that have existed for centuries (Friedman & Friedman, 2018). In order for this work and future research to contribute to real change we must ensure it is actually communicated to and applied with work by faculty and staff. A research-practice-partnership approach may help with this and is worth examining in a more systematic way. Once findings are shared with an audience of practitioners and change makers on college campuses so that it can be added to their knowledge bank and used to shape and create programs that are a better fit, evaluations should be done to assess for engagement and satisfaction throughout the implementation process.

Findings from this study also call attention to the need for intervention research for high-achieving undergraduate and graduate student populations. There is a pervasive belief that high-achieving students are not as “at-risk” as other students. From a

traditional higher education lens of student success, in which retention and graduation rates are typically the focus. With the growing numbers of student suicides on campus colleges and rising mental health concern from faculty and staff, I urge us to think about student success from a more holistic perspective, a new perspective. Future research should continue to examine the risk and resilience factors for different populations of students and make attempts to examine more diverse samples and regions.

Summary and Conclusion

The purpose of this study was to examine specific health risk factors related to student success; general health, stress, sleep quality, physical activity, eating habits, and psychological distress using data from the ACHA-NCHA-II with a sample of University of Oregon students in Spring 2018. Findings revealed high levels of stress and poor sleep quality were significant predictors of higher GPA and high levels of stress, poor sleep quality, low physical activity and poor eating habits were significant predictors of general health, before and after controlling for perceived general health.

It is noteworthy that these data were collected pre-COVID19 which means that there may be changes to some of the health behaviors and risk-factors given the significant changes in living and attending school during the global pandemic. Since 2018, there has been an increased concern within student populations, such that over 60% reported an increase in anxiety, 54% reported increased depression, 60% reported increased feelings of loneliness, 50% reported gaining weight due to increased eating, and 20% are concerned about the health of a loved ones, school/education, and lack productivity, with an increase for those closer to graduating (Lee et al., 2021). Other recent studies have shown similar results with increases in stressor contributing to lower

well-being (e.g., Son et al., 2020) providing evidence that the results from this study with 2018 data may serve as a baseline measure of student well-being. Moreover, these findings may be used to examine differences over time with the next national college health assessment.

APPENDIX A

Items from National College Health Assessment-II (ACHA-NCHA, 2018)

Dependent Variable

Student Success

What is your approximate cumulative grade point average?

- A
- B
- C
- D/F
- N/A

Independent Variables

General Health

How would you describe your general health?

- Excellent
- Very Good
- Good
- Fair
- Poor
- Don't Know

Stress

Within the last 12 months, how would you rate the overall level of stress you have experienced?

- No stress
- Less than average stress
- Average stress
- More than average stress
- Tremendous stress

Sleep Quality (6 items)

On how many of the past 7 days did you get enough sleep so that you felt rested when you woke up in the morning?

- 0 days
- 1 day
- 2 days
- 3 days
- 4 days
- 5 days
- 6 days
- 7 days

In the past 7 days, how much of a problem have you had with sleepiness during your daytime activities?

- No problem at all
- A little problem
- More than a little problem
- A big problem
- A very big problem

In the past 7 days, how often have you awaken too early in the morning and couldn't get back to sleep?

- 0 days
- 1 day
- 2 days
- 3 days
- 4 days
- 5 days
- 6 days
- 7 days

In the past 7 days, how often have you felt tired, dragged out, or sleepy during the day?

- 0 days
- 1 day
- 2 days
- 3 days
- 4 days
- 5 days
- 6 days
- 7 days

In the past 7 days, how often have you gone to bed because you could not stay awake any longer?

- 0 days
- 1 day
- 2 days
- 3 days
- 4 days
- 5 days
- 6 days
- 7 days

In the past 7 days, how often have you had an extremely hard time falling asleep?

- 0 days
- 1 day
- 2 days
- 3 days
- 4 days
- 5 days
- 6 days
- 7 days

Within the last 12 months, have any of the following affected your academic performance?

- This did not happen to me, N/A
- Experienced, academics not affected
- Received lower grade on exam
- Received lower grade in course
- Received incomplete/dropped course
- Significant disruption in thesis

Physical Activity

On how many of the past 7 days did you: Do moderate intensity cardio or aerobic exercise for at least 30 minutes?

- 0 days
- 1 day
- 2 days
- 3 days
- 4 days
- 5 days
- 6 days
- 7 days

On how many of the past 7 days did you: Do vigorous intensity cardio or aerobic exercise for at least 20 minutes?

- 0 days
- 1 day
- 2 days
- 3 days
- 4 days
- 5 days
- 6 days
- 7 days

On how many of the past 7 days did you: Do 8-10 strength training exercises for 8-12 repetitions each?

- 0 days
- 1 day
- 2 days
- 3 days
- 4 days
- 5 days
- 6 days
- 7 days

Eating Habits

How many servings of fruits and vegetables do you usually have per day?

- 0 servings per day
- 1-2 servings per day
- 3-4 servings per day
- 5 or more servings per day

Psychological Distress (8 items)

Have you ever felt things were hopeless?

- Never
- Not in the last 12 months
- In the last 2 weeks
- In the last 30 days
- In the last 12 months

Have you ever felt overwhelmed by all you had to do?

- Never
- Not in the last 12 months
- In the last 2 weeks
- In the last 30 days
- In the last 12 months

Have you ever felt exhausted (not from physical activity)?

- Never
- Not in the last 12 months
- In the last 2 weeks
- In the last 30 days
- In the last 12 months

Have you ever felt very lonely?

- Never
- Not in the last 12 months
- In the last 2 weeks
- In the last 30 days

- In the last 12 months

Have you ever felt very sad?

- Never
- Not in the last 12 months
- In the last 2 weeks
- In the last 30 days
- In the last 12 months

Have you ever felt so depressed that is was difficult to function?

- Never
- Not in the last 12 months
- In the last 2 weeks
- In the last 30 days
- In the last 12 months

Have you ever felt overwhelming anxiety?

- Never
- Not in the last 12 months
- In the last 2 weeks
- In the last 30 days
- In the last 12 months

Have you ever felt overwhelming anger?

- Never
- Not in the last 12 months
- In the last 2 weeks
- In the last 30 days
- In the last 12 months

Student Status

What is your year in school?

- 1st year undergraduate
- 2nd year undergraduate
- 3rd year undergraduate
- 4th year undergraduate
- 5th year or more undergraduate
- Graduate or professional
- Not seeking a degree
- Other

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