A Vital Mind in a Vital Body: Integrating Yoga Practice into an Undergraduate Positive Education Course

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Preface

Prior to recruitment and data collection, ethical approval was received from the University of Ottawa's Research Ethics Board. Furthermore, three authors contributed to the present thesis: Sarah McAllister (Principal Investigator and M.A. Candidate) was responsible for co-conceptualizing the research questions and design, obtaining ethical approval, recruiting the participants, collecting and analyzing the data, and writing the entire thesis (i.e., creating and revising the original drafts of all chapters including the article). The thesis topic was perfectly aligned with Sarah's passion for positive psychology, which arose from taking the positive education course under investigation during her undergraduate studies. Positive education is actually what drove Sarah to conduct this thesis and, ultimately, gain a better understanding of the synergistic interaction between yoga and positive psychology and its potential in promoting mental health. Moreover, Dr. Michelle Fortier (Full Professor) was responsible for co-conceptualizing the research questions and design and thoroughly reviewing the original drafts of all chapters including the article. Dr. Fortier was also the professor of the positive education course and supervised all phases of the research process, which entailed meeting 2-4 times monthly with the co-authors and participating in multiple rounds of revisions of the entire thesis. Finally, Olivia Lena Pastore (PhD Candidate under the supervision of Dr. Fortier) contributed to the co-conceptualization of the research questions and design, obtainment of ethical approval, and revision of the original drafts of Chapters I-III. Olivia was also the certified Hatha yoga instructor who offered the synchronous yoga classes to the study participants.

Abstract

With the high prevalence of mental illnesses in university students worldwide, researchers are investigating the effectiveness of mental health practices geared toward this subpopulation. Two encouraging approaches to promote student well-being are positive education (i.e., the teaching of applied positive psychology) and yoga. Nonetheless, few researchers have studied the combined effect of positive education and yoga on mental health. Thus, the purpose of this study was to examine the immediate and prolonged impact of integrating a yoga program into a positive education course offered at the University of Ottawa on undergraduate students' mental health, affect, self-compassion, and vitality. In this mixed method single case experimental A_1BA_2 design, seven volunteer students completed a two-week baseline (A_1), followed by a six-week yoga program including two weekly virtual yoga classes (B), and another two-week baseline (A_2; post-yoga), all while taking the positive education course. Trait variables (i.e., mental health, trait self-compassion, and trait subjective vitality) were assessed via validated questionnaires during the baseline phases preceding and following the yoga program, while state variables (i.e., affect, state self-compassion, and state subjective vitality) were evaluated immediately before and after one of the weekly yoga sessions. Participants also completed diary entries guided by open-ended journal prompts related to the outcome variables following one of the weekly yoga sessions. Differences in trait and state quantitative variables pre- and post-yoga were compared by means of visual, stability, level, and trend analyses, while the qualitative data were analyzed using reflexive thematic analysis. Practicing yoga was found to improve all trait and state well-being outcomes, especially trait self-compassion and state subjective vitality, via greater pride, self-kindness, serenity, energy, and alertness. Results demonstrate that yoga and positive education mutually enhance university

students' mental health, affect, self-compassion, and vitality both immediately and prolongedly. This study addressed gaps in the literature and will help inform future implementation of yoga and positive education courses on university campuses.

Keywords: Mental health, positive education, positive psychology, yoga, self-compassion, subjective vitality

Chapter I: Introduction

Mental health is the coalescence of psychological, emotional, and social well-being (Keyes, 2002) and stands in contrast to mental illness, which encompasses any mental, emotional, or behavioural disorder (National Institute of Mental Health, 2017). While pre-pandemic mental illness rates were already significant around the globe, with an estimated incidence of 45.82 million international cases of anxiety disorders reported in 2019 (Yang et al., 2021), the Coronavirus disease (COVID-19) pandemic has only magnified them, especially for university students (Mohammed & Memmedova, 2023). Prone to substantially greater rates of mental illness than the general population (Limone & Toto, 2022), university students' mental health problems are rampant. For instance, a survey conducted by Lee et al. (2021) indicated that a large portion of students in a public research university in Kentucky (*n*= 2691) experienced moderate to severe stress (i.e., 88%) and anxiety (i.e., 44%). Furthermore, according to a 2021 cross-national study, more than one-third of university students worldwide suffered from depressive symptoms (Ochnik et al.). University students' vulnerability to mental illness only furthers their risk of being negatively affected by stressful life events and global crises, such as the COVID-19 pandemic (Chen & Lucock, 2022). Consequently, researchers and practitioners are now doubling their efforts to investigate potential strategies to counter the detrimental effects of mental illness and promote mental health in this subpopulation.

One strategy that is gaining traction is positive education (i.e., the teaching of applied positive psychology; Green et al., 2011) whereby evidence-based techniques (e.g., random acts of kindness and gratitude journaling) are taught to help students improve their mental health and prosper in life (Norrish et al., 2013). Another promising strategy is yoga practice, which is occasionally discussed in relation to positive psychology (Ivtzan & Papantoniou, 2014). Due to

the myriad therapeutic benefits it affords (Liu et al., 2023), yoga practice could suitably supplement positive education courses rooted in positive psychology. While two studies have appraised the student health and well-being benefits of a program comprising positive psychology principles and yoga (Bartos et al., 2021; Dagar et al., 2022), research examining their combined use in the university setting is still in its infancy. Therefore, we sought to evaluate the immediate and prolonged impact of integrating a yoga program into a positive education course offered at the University of Ottawa on undergraduate students' mental health, affect, self-compassion, and vitality by using a mixed method single case experimental design**.**

Chapter II: Literature Review, Purpose, and Hypothesis

University students sustain a plethora of academic and personal struggles during their studies that compromise their mental health and increase their risk of mental illness (Reddy et al., 2018). This has ignited an interest in evidence-based practices and interventions for improving well-being among university students. The following review will encompass trends in mental health in university students and reveal how positive education and yoga practice may serve as a pathway to enhanced mental health in this subpopulation.

University Students and Mental Health

Keyes' (2002) dual-continua model, according to which mental health and mental illness are not mutually exclusive, offers a comprehensive perspective of mental health. This model portrays mental health and mental illness as related yet distinct phenomena that reside on separate continua (rather than opposite ends of a single measurement continuum) and contribute to overall human functioning. While individuals can be flourishing (i.e., presence of mental health) without mental illness or languishing (i.e., absence of mental health) with mental illness, they can also be languishing without mental illness or flourishing with mental illness (Keyes, 2002). In other words, an absence of mental illness is not the equivalent of good mental health, nor does the presence of mental illness signify poor mental health. Indeed, mental health reflects the sum of psychological (i.e., self-realization), emotional (i.e., happiness and satisfaction with one's life), and social (i.e., positive functioning in society) well-being (Keyes, 2002), and has been the object of growing empirical scrutiny (Wortzel et al., 2020).

Numerous publications show that mental health is deteriorating in postsecondary students. In 2013, a national survey indicated that 89.3% of university students from 34 Canadian postsecondary institutions felt overwhelmed by all they had to do in the last year

(American College Health Association, 2013) and a provincial survey reported a rise in depression, anxiety, and suicidality between 2013 and 2016 among university and college students in Ontario (Ontario University and College Health Association, 2016). The educational and personal pressures university students endure may trigger their first onset or intensify current psychopathology such as anxiety (Pedrelli et al., 2015), especially in undergraduates (Adamson et al., 2020; Aristovnik et al., 2020; Kavčič et al., 2021). As a matter of fact, 35% of first-year university students in a world mental health survey screened positive for at least one lifetime mental illness (Auerbach et al., 2018). Among university students seeking psychological services across over 380 American college and university counseling centers in 2015, anxiety and depression were the primary mental health concerns (Locke et al., 2016). Additionally, a 2018 meta-analysis showed that one in four university students worldwide had experienced some form of suicidal ideation, of which nearly 65% reported experiencing it in the year preceding the survey (Mortier et al.).

The COVID-19 pandemic and the major lifestyle disruptions it provoked only worsened the mental health crisis on university campuses. In fact, a recent systematic review revealed that university students are feeling more depressed, anxious, fatigued, and distressed than before the pandemic (Elharake et al., 2022). For example, 44% of 95 860 university students across 133 campuses in the United States screened positive for moderate or severe depression in the 2021-2022 academic year (Eisenberg et al., 2023). Further, Li and colleagues (2022) reported in their systematic review and meta-analysis that the global prevalence of anxiety symptoms among university students is 39%, with the highest prevalence found in North America (i.e., 48%). Prior to the pandemic, factors such as excessive academic demands and poor school-work-life balancing skills were mainly responsible for university students' propensity towards mental

health problems (Pedrelli et al., 2015; Reddy et al., 2018). At present, adaptations to virtual learning coupled with inadequate social support are aggravating university students' pre-existing mental health issues (Elharake et al., 2022). Arguably, another factor that further undermines university students' mental health is their notable physical inactivity levels.

University Students and Physical Activity

As the transition from secondary school to university is marked by sharp reductions in physical activity and increases in sedentary behaviour, pre-pandemic physical inactivity levels in university students were already considerable (Calestine et al., 2017; Small et al., 2013). According to a systematic review and meta-analysis published before the outbreak of the pandemic, an appreciable portion of university students were more sedentary than the general young adult population (Castro et al., 2020). Moreover, the majority of university students were not meeting the physical activity guidelines in many studies conducted across the globe (Ghrouz et al., 2019; Plotnikoff et al., 2015), and these trends have worsened sizeably as a result of the pandemic (Giuntella et al., 2021).

On a global scale, startling declines in physical activity and surges in sedentary behaviour became apparent in university student populations at the onset of the COVID-19 pandemic (Gallè et al., 2020; Gallo et al., 2020; Stockwell et al., 2021). For instance, daily steps fell by 50% in American university students (Giuntella et al., 2021) and weekly energy expenditure dropped by 628 metabolic equivalent minutes (i.e., oxygen uptake while sitting at rest; Jetté et al., 1990) in Italian medicine students (Luciano et al., 2020), which denote the dramatic decrease in physical activity among university students internationally. Reduced motivation to be physically active, facility closures, and lack of social interaction when engaging in physical

activity are all factors that contributed to university students' significant physical inactivity levels during the pandemic (Ashadi et al., 2020).

Multiple meta-analyses and systematic reviews have provided solid empirical evidence of physical activity's positive effects on mental health (Clemente-Suárez et al., 2022; White et al., 2017), happiness (Zhang & Chen, 2019), depression (Hasson et al., 2022), and anxiety (McDowell et al., 2019), which provides further credence to the importance of physical activity for university students. In line with these findings, physically active university students tend to be healthier and happier than those who are physically inactive (Murphy et al., 2018). These results point to a relationship between university students' insufficient physical activity levels and declining mental health, both of which were further exacerbated by the pandemic-induced disruptions. Fortunately, efforts are underway to find non-pharmacologic interventions to promote mental health in students, one of which is positive education.

Positive Education and Mental Health

Two models exist to address mental health concerns in the field of psychology: the traditional illness model in which emphasis is placed on treating the negative, and the wellness model in which building the positive is prioritized (Marini & Chacon, 2002). While these approaches seem mutually exclusive, they coexist in a field known as positive psychology. This scientific study of human flourishing (Linley et al., 2006) targets both the treatment of mental illness and the promotion of mental health to improve overall quality of life and help individuals thrive (Csikszentmihalyi & Seligman, 2000; Slade, 2010). Put differently, positive psychology offers a balanced view of human functioning, wherein individual strengths and weaknesses are considered equally (Lopez et al., 2018). Experts in the field also assert that mental health is more than the absence of mental illness (Keyes, 2002; Slade, 2010) and encourage the implementation

of positive education in educational institutions. Positive education applies positive psychology research to educational settings to promote student flourishing (Noble & McGrath, 2015). An example of a positive education course is Harvard's *Positive Psychology 1504*, which was deemed the most popular course at the university in the Spring of 2006 (Russo-Netzer & Ben-Shahar, 2011). With an enrollment of over 855 students (i.e., ≈1 in 7 undergraduate students at the university) and the largest attendance in the history of Harvard's Department of Psychology (Russo-Netzer & Ben-Shahar, 2011), the course's popularity underscored university students' need for positive education.

This new shift in perspective gave rise to a surge in research on positive education's effectiveness in mitigating mental illness-related symptoms and enhancing mental health in individuals. Indeed, the literature has demonstrated positive education's ability to support, among other things, student mental health (Seligman et al., 2009; Waters, 2012), positive affect (i.e., positive emotions; Laakso et al., 2021), social relationships (White & Kern, 2018), life satisfaction (Khanna & Singh, 2019), and mindfulness (Maybury, 2013), which refers to one's non-judgemental awareness of moment-to-moment experiences (Germer, 2004). While these findings are compelling, positive education's application in the university setting remains poorly investigated. Furthermore, one of the founders of positive psychology, Dr. Seligman, acknowledged vitality (i.e., a marker of mental and physical well-being that is characterized by a positive psychological experience of aliveness, energy, and enthusiasm; Ryan & Frederick; 1997) to be a missing pathway in his PERMA model of human flourishing (Zhivotovskaya, 2016). That is to say, interventions aimed at improving one's vitality are not typically included within positive education, despite vitality's strong association with greater mental health and

positive affect (Ryan & Deci, 2000), as well as physical self-efficacy and physical functioning (Imayama et al., 2013).

As physical activity interventions are positively related to vitality both directly (Ju, 2017; Molina-García et al., 2011; Özkara et al., 2017) and indirectly via enhanced positive affect (Rodrigues et al., 2022), they could be employed to bridge this gap in positive education. One physical activity intervention that may be suitable to promote vitality and address the downward trend in university students' mental health and physical activity is yoga practice.

Yoga and Overall Health

Known to be one of the most frequently used mind-body interventions (Cramer et al., 2013), yoga is purported to promote both physical and mental health. This multifaceted practice comprises asanas (i.e., physical postures), pranayama (i.e., regulated breathing), and meditative practices to optimize its health benefits (Govindaraj et al., 2016; Khalsa, 2013). Accordingly, yoga practice has been the focus of a number of studies (Büssing et al., 2012; Jeter et al., 2015), resulting in various important findings on its therapeutic effects. On the one hand, there is substantial evidence that yoga practice supports physical health indicators such as respiratory function (Cramer et al., 2014; Tyagi & Cohen, 2014), muscular strength (Buttichak et al., 2019), as well as balance and flexibility (Shin, 2021). On the other hand, yoga has a strong evidence base for its effectiveness in not only mitigating stress (Phansikar et al., 2023) and mental illness (Kumar et al., 2022), but also promoting mental health (Syed et al., 2022). In addition, a 2023 mega-analysis of meta-analyses by Carr et al. demonstrated that, compared to other positive psychology interventions, mind-body practices such as yoga offer greater well-being benefits.

While physical activity in general yields a significant antidepressant and mental health enhancing effect (Schuch et al., 2016; Teychenne et al., 2020), yoga appears to provide

additional psychological benefits compared to pure exercise and leisure physical activities (Szabolcs et al., 2021). Through the union of mindfulness, deep breathing, and movement, yoga has been shown to enhance energy (Ross et al., 2013) and vitality (Pandey et al., 2017). Moreover, it has been demonstrated in prior work that yoga practice increases mindfulness (Kishida et al., 2019; Szabolcs et al., 2021) and self-compassion (Brennan et al., 2020), a strong predictor of mental health (Kotera & Ting, 2021; Zessin et al., 2015) that entails extending kindness to oneself and being mindful of one's suffering while recognizing it as part of the human experience (Neff, 2011). Notwithstanding, as is the case for positive education, further research is needed to vouch for these findings in the university context.

Yoga interventions geared toward university students in nursing and medical school, both of which are known to be stressful programs (Kumar et al., 2019; Labrague et al., 2017), have been shown to ameliorate positive affect (Craighead, 2015), as well as mindfulness and self-compassion (Mathad et al., 2017). Unfortunately, despite its potential for providing valuable insight into yoga's immediate impact on well-being outcomes, the aforementioned inquiries failed to appraise the students' state variables (i.e., feelings and behaviours that are experienced for a short period of time; Schmitt & Blum, 2020) before and after the yoga sessions. In fact, the overall yoga literature favours the collection and analysis of trait variables (i.e., feelings and behaviours that are relatively stable across time; Schmitt & Blum, 2020), thereby preventing us from grasping yoga's momentary effects on well-being outcomes.

Drawing on this growing body of research, yoga appears to be a powerful form of physical activity to improve mental health. However, this practice has been studied mostly in relation to mental illness as opposed to mental health (Wieland et al., 2021) and as an individual

practice. We argue that combining yoga with positive education would mutually enhance both mental health promotion strategies.

Positive Education and Yoga

Considerable attention has been devoted to yoga and positive education's effectiveness in promoting mental health as separate strategies. Conversely, research in which these two areas have been merged is scarce. To our knowledge, two quantitative studies established that participating in a course comprising positive psychology principles and yoga fosters university students' health and well-being: Bartos et al. (2021) reported that a program grounded in mindfulness, yoga, positive psychology, and emotional intelligence helped university students cope with COVID-19 related health and well-being concerns—particularly through the implementation of yoga/meditation practices—whereas Dagar et al. (2022) determined that a self-management course supplemented by yoga-based practices was effective in building university students' altruistic behaviour, subjective vitality, and self-transcendence. The present research built on these studies by quantitatively and qualitatively assessing yoga's impact on various state and trait variables and collecting data at 20 different time points.

In sum, the benefits of positive psychology and yoga are manifold. The findings outlined in this review offer encouraging evidence that these two areas can significantly augment mental health in university students. They may even form a potent dyad and work in concert to mitigate the double burden of poor mental health and physical inactivity present in this subpopulation. Nevertheless, despite positive education and yoga's potential in promoting mental health and complementing one another in this regard, few empirical efforts have been made to study their combined effect on mental health. In light of the valuable knowledge that would be generated from appraising and differentiating between the immediate and prolonged effects of yoga

practice, the purpose of this thesis was to determine the impact of integrating a yoga program into a positive education course offered at the University of Ottawa on undergraduate students' trait (i.e., mental health, self-compassion, and subjective vitality) and state (i.e., affect, self-compassion, and subjective vitality) well-being variables by employing a mixed method single case experimental design. It was hypothesized that the added yoga program would augment the benefits of the positive education course by further improving students' mental health (Syed et al., 2022), affect (Adhikary, 2022), self-compassion (Muehlenkamp & Wagner, 2022), and vitality (Dagar et al., 2022) both momentarily and prolongedly.

Chapter III: Journal Article

The following journal article presents the quantitative results of the participants' changes in mental health, self-compassion, and vitality. In addition to providing evidence that yoga and positive education increase all three of these well-being variables, results also specify the immediate vs prolonged benefits of participating in the yoga program and positive education course. At the end of the article, several practical recommendations can be found. Finally, the article has been submitted to the *Archives of Psychiatric Nursing* for publication.

Effects of Integrating Yoga Practice into an Undergraduate Positive Education Course on Student Mental Health, Self-compassion, and Vitality

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Abstract

With growing demand to mitigate the mental health crisis on university campuses, researchers worldwide are seeking to determine effective student mental health promotion strategies, such as positive education (i.e., the teaching of applied positive psychology) and yoga. Nevertheless, there is a paucity of research appraising the effects of merging positive education and yoga for mental health. Therefore, the purpose of this study was to investigate the immediate and prolonged impact of integrating a yoga program into a positive education course offered at a large university on undergraduate students' mental health, self-compassion, and vitality. In this single case experimental A_1BA_2 design, seven volunteer students enrolled in the positive education course completed a 2-week baseline (A_1), followed by a 6-week yoga program including two 45-minute weekly virtual yoga classes (B), and another 2-week baseline (A_2; post-yoga), all while taking the positive education course. Trait variables (i.e., mental health, trait self-compassion, and trait subjective vitality) were assessed via validated questionnaires during the baseline phases preceding and following the yoga program, while state variables (i.e., state self-compassion and state subjective vitality) were assessed immediately before and after one of the weekly yoga sessions. Visual, stability, level, and trend analyses revealed that yoga practice globally improved participants' trait and state well-being outcomes. This research provides evidence for yoga and positive education courses as a means of increasing university students' mental health, self-compassion, and vitality both in an immediate and prolonged manner. Suggestions for yoga program implementation and future research are discussed.

Keywords: Mental health, positive education, positive psychology, yoga, self-compassion, vitality

Introduction

Mental health is a holistic construct that includes psychological, emotional, and social well-being (Keyes, 2002) and is distinct from mental illness, which comprises any mental, emotional, or behavioural disorder (National Institute of Mental Health, 2017). Keyes' (2002) dual-continua model portrays mental health and mental illness as related yet distinct phenomena that contribute to overall human functioning. Although 264 million people worldwide were already suffering from depression in 2017 (James et al., 2018), the prevalence of mental illness continues to escalate (World Health Organization, 2022). As a result of the Coronavirus disease (COVID-19) pandemic, cases of major depressive and anxiety disorders have increased internationally by 25% (World Health Organization, 2022), which is perturbing in many respects.

Mental illness is particularly prevalent in university students (Clapham et al., 2012; Liu et al., 2019). Over the course of their studies, university students undergo innumerable stressors (Reddy et al., 2018), such as adulthood responsibilities (e.g., financial independence) and academic pressure (Pedrelli et al., 2015). The widespread mental health crisis across university campuses is not improving with the recent COVID-19 outbreak (Cao et al., 2020; Grubic et al., 2020; Savage et al., 2020). In fact, a meta-analysis conducted by Chang et al. (2021) revealed that 31% of university students worldwide suffer from anxiety symptoms. Further, according to recent international and cross-national studies, the prevalence of high stress and depressive symptoms among university students was 61.3% and 40.3% respectively (Ochnik et al., 2021), compared to 11% and 25% among adults (Gloster et al., 2020). In addition to placing an unprecedented mental health burden on a subpopulation with heightened pre-existing levels of mental illness, the COVID-19 pandemic also poses a threat to university students' physical

activity levels (Giuntella et al., 2021; Savage et al., 2020). This is concerning because physical inactivity jeopardizes not only one's physical health, but also one's mental health (Lewis et al., 2021; Reyes-Molina et al., 2022; Werneck et al., 2021). While university students were already failing to meet the physical activity guidelines prior to the pandemic (Ghrouz et al., 2019; Plotnikoff et al., 2015), alarming reductions in walking time (e.g., 365.5 minutes less per week; Gallè et al., 2020) and overall physical activity (e.g., 90 minutes less per day; Giuntella et al., 2021) were reported in university student populations across the globe as a result of the COVID-19 lockdowns.

These worrisome trends among university students have ignited an interest in mental and physical approaches intended to promote mental health and mitigate mental illness in this subpopulation. One such approach is the teaching of positive psychology (i.e., the scientific study of human flourishing; Linley et al., 2006), otherwise known as positive education (Green et al., 2011). This approach to education seeks to improve students' well-being[1] (Smith et al., 2021) and, more specifically, mental health (Norrish et al., 2013) through evidence-based techniques (e.g., gratitude journaling, meditation). Multiple publications support the effectiveness of positive education in alleviating symptoms of depression and anxiety (Krifa et al., 2022; Seligman et al., 2009), as well as promoting student mental health (Norrish, 2015; Shoshani & Steinmetz, 2014; Waters, 2012). One multifaceted practice that some educators discuss in positive education courses is yoga, which has been used for centuries to foster an optimal state of health and mind-body functioning (Khalsa, 2013). Encompassing asanas (i.e., physical postures), pranayama (i.e., regulated breathing), and meditation (Govindaraj et al.,

[1] "[M]ultidimensional construct incorporating mental/psychological, physical, and social dimensions" (Columbo, 1986, as cited in Yarcheski et al., 1994, p. 288).

2016; Khalsa, 2013), yoga practice has been shown to improve physical outcomes, including muscular endurance (Buttichak et al., 2019; Shiraishi & Bezerra, 2016), cardiorespiratory fitness (Satin et al., 2014; Sovová et al., 2015), and physical flexibility (Buttichak et al., 2019; Khalsa & Butzer, 2016). Furthermore, yoga has a strong evidence base for its effectiveness in ameliorating mental health (Büssing et al., 2012; Shroff & Asgarpour, 2017) and relieving stress (Sharma, 2014; Trent et al., 2018), depression (Falsafi, 2016; Kinser et al., 2014) and anxiety symptoms (Zoogman et al., 2019). The literature also supports this ancient practice's ability to improve self-compassion (Brennan et al., 2020; Cox et al., 2019), which involves treating oneself with kindness, recognizing one's shared humanity, and being mindful of one's painful thoughts and feelings (Neff, 2003a; Neff, 2011). Finally, yoga has been found to increase energy (Ross et al., 2013) and vitality (Pandey et al., 2017), a positive psychological experience of aliveness, energy, enthusiasm, and spirit (Ryan & Frederick; 1997). As self-compassion and vitality are indicators of mental health (Kotera & Ting, 2021; Shinohara et al., 2020), yoga classes could be offered on university campuses to enhance students' mental health directly and indirectly via increased self-compassion and vitality. However, more studies are required to corroborate yoga's positive effects on university students' self-compassion and vitality.

Yoga has been slowly gaining traction across university campuses (Adams & Puig, 2008; Browning, 2014) and thus far, its impact on university students' mental health seems promising. In fact, yoga interventions for medical and nursing students—who experience particularly high levels of stress (Bartlett et al., 2016)—have been proven successful in improving psychological well-being (Mehta & Taneja, 2013), stress levels (Prasad et al., 2016), and self-compassion (Mathad et al., 2017). While yoga is an encouraging solution for the double burden of poor mental health and insufficient physical activity in university students on its own, an extensive

review of comparative yoga studies and meta-analyses indicated that fusing yoga with other well-being interventions bolsters the effectiveness of the practice (Matko et al., 2021). It is therefore logical to presume that basic yoga interventions would be enriched by positive education, and vice-versa. Thus, the present study merged yoga practice and positive education to examine the potential mental health benefits they jointly afford for undergraduate students. Although two studies to our knowledge have explored the effects of a yoga and positive psychology inspired program on student health and well-being (Bartos et al., 2021; Dagar et al., 2022), data were collected only at one and three time point(s), respectively. In fact, none of the abovementioned studies assessed the participants' variables immediately before and after the yoga sessions (i.e., state variables). Rather, the appraisal of trait variables (i.e., feelings and behaviours that remain somewhat stable across time; Schmitt & Blum, 2020) appears to be favoured in the yoga literature, which limits our understanding of yoga's immediate impact on well-being outcomes. Additionally, few studies have appraised the effects of yoga practice on self-compassion and vitality in a university setting, none of which measured both variables within the same inquiry. Consequently, the purpose of the present research was to expand on the current literature by determining the immediate and prolonged impact of integrating a yoga program into a positive education course offered at a large university on undergraduate students' mental health, self-compassion, and vitality. It was hypothesized that the added yoga program would augment students' mental health (Shroff & Asgarpour, 2017), self-compassion (Beck et al., 2017; Wong et al., 2021), and vitality (Pandey et al., 2017), both in an immediate and prolonged manner.

Methods

Research Design

A single case experimental design (Onghena et al., 2019) was adopted to answer the research questions. Namely, a reversal design following an A_1BA_2 format was implemented, with each letter representing a phase (Engel & Schutt, 2016; Jhangiani et al., 2015). All participants first underwent two-week baseline assessments (A_1), followed by a six-week yoga program including two weekly sessions (B), and lastly a second two-week baseline phase (A_2). In the absence of an empirically validated minimum and optimal effective yoga dose (Avery et al., 2020; de Manincor et al., 2016; Sherman, 2012), the duration of the yoga program was chosen based on a recent randomized controlled trial and a case-control study in which practicing approximately two hours of yoga per week for six weeks was sufficient to improve well-being measures (Hilcove et al., 2021; Prasad et al., 2016). Further, two weeks appears to be the minimum time required to achieve stability with single-case experimental designs (Farrell et al., 2018; Naim et al., 2021; Peterson et al., 2021), during which data are collected a minimum of three to five times before introducing the intervention (Horner et al., 2005).

Participants and Sampling

Upon receiving ethical approval from the university's Research Ethics Board, participants were recruited via volunteer sampling (Mujere, 2016). Inclusion criteria for participants were as follows: 1) student at the university under investigation enrolled in the Quality of Life course, 2) over the age of 18, and 3) anglophone or francophone. Two weeks prior to the positive education course in January 2022, students received an e-mail providing an overview of the study and inviting those who were interested in participating to contact the principal investigator by e-mail. The students who expressed interest were briefed about the nature of the investigation and informed of their rights to confidentiality and anonymity. So as not to produce biased results, students were excluded if they had been practicing yoga or

meditation more than once a week in the six months preceding the study. A total of ten candidate participants were screened and nine were eligible to participate in the study.

Two participants withdrew from the study during phases A_1 and B, resulting in an attrition rate of 22%. One student resigned due to school-related stress, while the other did not provide a reason for discontinuing participation. The final seven participants' individual characteristics are displayed in Table 1. To ensure anonymity, each participant was provided a number (i.e., P1-P7).

Table 1

Participant Demographic Information

Participant (N = 7)	**Age**	**Gender**	**Academic Year**	**Months of Yoga or Meditation Experience in the Six Months preceding the Study**	***Mental Illness**
P1	23	F	4	2 months (once per week)	Yes
P2	20	F	3	N/A	No
P3	21	F	4	N/A	No
P4	21	F	4	N/A	No
P5	23	M	4	N/A	No
P6	21	F	4	2 months (once per week)	No
P7	22	F	4	N/A	No

*Close-ended question.

Table 2

List of Abbreviations Used in the Present Study

Abbreviation	**Full Form**
Phase A_1	First baseline (pre-yoga)
Phase B	Yoga program
Phase A_2	Second baseline (post-yoga)
TSC	Trait self-compassion
SSC	State self-compassion
TSV	Trait subjective vitality
SSV	State subjective vitality
SD	Standard Deviation

Procedure

After providing written consent, all participants began phase A_1, during which they completed the normal course activities without doing any yoga. At the beginning and end of each week for the two-week period, the participants filled out an online survey including trait measures for the study's three dependant variables: mental health, self-compassion, and subjective vitality. The first of the four surveys also contained demographic questions (e.g., age, gender).

Following the two-week baseline, the participants began the online yoga program (phase B). This six-week yoga intervention involved one live instructor-led class and one asynchronous class per week, both of which were delivered via Zoom/YouTube due to the COVID-19 restrictions. The live class consisted of a low-to-moderate intensity 45-minute yoga session offered by a certified Hatha yoga instructor. Before and after each yoga session, participants completed an online survey via a survey platform (i.e., Survey Monkey), which included the state measures for self-compassion and subjective vitality. To account for confounding variables, the participants were also asked to mention in their post-yoga questionnaires whether, in the last seven days, they had done anything in addition to class activities to enhance their mental health or if anything had significantly negatively impacted their mental health. With regard to the asynchronous classes, participants completed 45-minute YouTube yoga videos that were pre-approved by the certified yoga instructor. Every Tuesday morning of phase B, participants received the link to the video and had until Sunday to complete it on their own time. So as not to overburden the participants, no survey was to be completed after this weekly session. However, participants were required to send the principal investigator a picture of themselves or their yoga

mat after their session as a proof of completion. Upon completing the yoga program, participants began phase A_2 and filled out the same online survey as administered in Baseline 1 at the beginning and end of each week to assess changes in the trait variables.

Measures

Demographic Variables

During phase A_1, participants provided their age, gender, academic year, and presence/absence of mental illness in the Baseline 1 questionnaire. Participants also specified their past yoga/meditation experience in months and frequency of practice.

Mental Health

The Mental Health Continuum–Short Form (MHC-SF; Keyes et al., 2008) was employed to assess participants' mental health during both baseline phases. This 14-item questionnaire measures the frequency (i.e., never to every day) with which certain feelings (e.g., happiness) and beliefs (e.g., goodness of others) occur within an individual. The questionnaire provides a holistic view of individuals' overall mental health with 3 items measuring emotional well-being (e.g., being interested in life), 5 items measuring social well-being (e.g., contributing to society), and 6 items measuring psychological well-being (e.g., feeling that one's life has meaning). In the present study, the internal consistency of the MHC-SF was considered good with a Cronbach's alpha of .88 for the scale and of .68-.83 for the subscales. Previous studies have also confirmed the MHC-SF questionnaire to be internally consistent (Luijten et al., 2019), as well as valid and reliable in a student and adult population (Keyes, 2005; Lamers et al., 2012).

Self-Compassion

Trait. The Self-Compassion Scale (SCS; Neff, 2003b) is a widespread 26-item questionnaire that was utilized to assess total and individual subcomponent scores of trait self-

compassion (TSC) during both baseline phases. The 6 subscales of self-compassion (i.e., self-kindness, self-judgement, mindfulness, over-identification, common humanity, and isolation) were measured on a 5-point Likert scale ranging from 1 (almost never) to 5 (almost always). With a Cronbach's alpha of .95 for the scale and ranging between .80 and .90 for the subscales, the internal consistency of the SCS in the present study was interpreted as excellent. Moreover, the SCS has shown good test-retest reliability, discriminant and concurrent validity, as well as good internal consistency in previous research (Neff, 2003b).

State. Before and after the instructor-led yoga sessions, participants' global state self-compassion (SSC) was assessed via the 6-item State Self-Compassion Scale–Short Form (SSCS-S; Neff et al., 2021). On a scale ranging from 1 (not at all true for me) to 5 (very true for me), participants were asked to indicate how well each statement applied to how they were feeling toward themselves in that moment as they reflected on a difficult situation. A sample item is "I'm giving myself the caring and tenderness I need." In the present study, the internal consistency of the SSCS-S was considered acceptable with a Cronbach's alpha of .77. The scale-S has also been shown to have high internal consistency in prior work (Neff et al., 2021).

Subjective Vitality

Trait. To evaluate the effectiveness of regular yoga practice in fostering trait changes in subjective vitality, the 6-item Subjective Vitality Scale (SVS; Bostic et al., 2000)—a revised instrument of Ryan and Frederick's (1997) SVS with more desirable psychometric properties—was used to measure participants' trait subjective vitality (TSV) during both baseline phases. This instrument includes the 6 positively worded energy-related items of the original SVS (e.g., "I feel alive and vital") on a 7-point Likert scale ranging from 1 (not at all true) to 7 (very true). The use of confirmatory factor analyses proved the 6-item version of the SVS to be the most

efficient and valid instrument to measure vitality (Bostic et al., 2000). Indeed, the 6-item SVS shows good internal consistency both in the present study (Cronbach's alpha = .82) and in previous work (Bostic et al., 2000). Further, the scale has demonstrated a good reliability and validity in student populations (Reshvanloo et al., 2019; Mavilidi et al., 2021).

State. The 6-item SVS also has a state-level scale (i.e., one's subjective vitality at a specific moment), which was administered before and after the instructor-led yoga sessions to measure participants' state subjective vitality (SSV). An example of an item in the state-level SVS is "*At this moment*, I feel alive and vital." With a Cronbach's alpha of .63, the internal consistency of the state-level 6-item SVS in the present study was reasonable.

Data Analysis

All data were coded on SPSS© 28.0.1.1. To verify whether the data had missing values, the entire dataset was analyzed using Little's (1988) Missing Completely at Random Test. Out of the 6468 data points, 9 were missing. Therefore, 0.14% of the values were imputed using Expectation-Maximization in SPSS. While there is no empirically recognized threshold beyond which missing data in a dataset would not allow for valid statistical inferences, it has been posited that missing less than 5% of the values is negligible (Schafer, 1999). All data were then plotted on graphs sorted by variable on Microsoft Excel. Linear trendlines were added to each graph using the Excel TREND function to portray the direction of the data (i.e., accelerating, decelerating, or zero-celerating in a therapeutic or contra-therapeutic direction; Lane & Gast, 2014). Subsequently, visual analyses (Parsonson & Baer, 1986) were conducted to investigate individual- and group-level changes in mental health, self-compassion, and subjective vitality over the course of the study.

Individual-level

Between-phase. To visually appraise changes in each participant's mental health, TSC, and TSV between phases A_1 and A_2, level and trend analyses were conducted. Foremost, the relative score change of each variable was calculated by subtracting the average of the phase A_1 scores from the average of the phase A_2 scores and dividing the total by the average of the phase A_1 scores. The quotient was then used to corroborate the visual analysis of the corresponding variable's trendline.

Within-phase. To visually examine changes in each participant's scores, stability, level, and trend analyses were performed. To verify whether all trait-level scores were stable during both baseline phases, the median was identified and used to calculate a stability envelope. When a minimum of 80% of the data points were within ±25% of the median, the data were considered stable (Lane & Gast, 2014). For phase B, state variables' score changes before and after the instructor-led yoga sessions were assessed. The average relative score change after each yoga session for each state variable was then computed to confirm the visual analysis of the trendline.

Group-level

All participants' trendlines were visually analyzed. After combining them in one graph for each variable, trendlines were categorized by trend direction and counted to determine the total number of participants whose scores improved or deteriorated over the course of the study for a given variable. Averages of all participants' relative score change in trait variables between phases A_1 and A_2 and mean relative score change in state variables after each yoga session were then calculated, along with the standard deviations, to determine whether the yoga program was globally therapeutic or contra-therapeutic regarding a given variable. Further, the average number of yoga sessions that brought forth a therapeutic effect in a given variable was computed to provide insight into the yoga program's effectiveness in enhancing state variables.

Results

Individual-level

As it is not possible to present all outcome variables visually in the scope of this article, individual-level graphs are not displayed. Accordingly, participants' visual analyses are summarized in the following paragraphs and Tables 3-8.

Between-phase

Between phase A_1 and phase A_2 means (first and second baseline), relative trait score increases were apparent in P1, P3, P6, and P7's mental health, TSC, and TSV. P2 and P4's relative scores in mental health and TSC also increased; however, TSV slightly decreased between both baseline phases (by 3.27% and 2.52%, respectively). Relative score increases were also evident in P5's TSC and TSV; however, mental health slightly decreased between both baseline phases (by 1.45%).

Within-phase

Within the yoga program (phase B), average relative state score change in SSC and SSV after each yoga session were positive for all participants. Nonetheless, P7's SSC relative score change was rather stable (x = 0.04%). Moreover, with 100% of the data points located within each variable's stability envelope, all participants' trait-level data were stable during both baseline phases.

Table 3

Changes in Mental Health Within Phases A_1 and A_2

Phase	Participant	Stability[2]
A_1	P1	Stable (51.00 ± 12.75)
	P2	Stable (72.50 ± 18.13)
	P3	Stable (40.00 ± 10.00)

[2] Criterion: 80% of data points are within stability envelope (±25% median)

	P4	Stable (54.00 ± 13.50)
	P5	Stable (69.00 ± 17.25)
	P6	Stable (44.50 ± 11.13)
	P7	Stable (64.00 ± 16.00)
A_2	P1	Stable (58.50 ± 14.63)
	P2	Stable (77.00 ± 19.25)
	P3	Stable (59.00 ± 14.75)
	P4	Stable (61.50 ± 15.38)
	P5	Stable (68.00 ± 17.00)
	P6	Stable (60.00 ± 15.00)
	P7	Stable (71.50 ± 17.88)

Table 4

Changes in TSC and SSC Within Phases A_1, B, and A_2

Phase	**Participant**	**Stability[2]**	**Level[3]**
A_1	P1	Stable (1.88 ± 0.47)	/
	P2	Stable (4.12 ± 1.03)	/
	P3	Stable (2.92 ± 0.73)	/
	P4	Stable (2.90 ± 0.73)	/
	P5	Stable (3.77 ± 0.94)	/
	P6	Stable (1.85 ± 0.46)	/
	P7	Stable (2.77 ± 0.69)	/
B	P1	/	+15.77% improving
	P2	/	+3.23% improving
	P3	/	+32.53% improving
	P4	/	+7.28% improving
	P5	/	+7.23% improving
	P6	/	+11.05% improving
	P7	/	+0.04% improving
A_2	P1	Stable (2.94 ± 0.74)	/
	P2	Stable (4.27 ± 1.07)	/
	P3	Stable (3.58 ± 0.90)	/
	P4	Stable (3.33 ± 0.83)	/
	P5	Stable (4.42 ± 1.12)	/
	P6	Stable (2.81 ± 0.70)	/
	P7	Stable (3.1 ± 0.78)	/

[3] Average relative score change

Table 5

Changes in TSV and SSV Within Phases A_1, B, and A_2

Phase	Participant	Stability[2]	Level[3]
A_1	P1	Stable (19.50 ± 4.88)	/
	P2	Stable (38.50 ± 9.63)	/
	P3	Stable (21.50 ± 5.38)	/
	P4	Stable (29.00 ± 7.25)	/
	P5	Stable (30.50 ± 7.63)	/
	P6	Stable (23.00 ± 5.75)	/
	P7	Stable (33.50 ± 8.38)	/
B	P1	/	+34.16% improving
	P2	/	+22.24% improving
	P3	/	+37.90% improving
	P4	/	+19.39% improving
	P5	/	+4.06% improving
	P6	/	+7.54% improving
	P7	/	+26.76% improving
A_2	P1	Stable (25.00 ± 6.25)	/
	P2	Stable (37.00 ± 9.25)	/
	P3	Stable (30.50 ± 7.63)	/
	P4	Stable (29.00 ± 7.25)	/
	P5	Stable (33.50 ± 8.38)	/
	P6	Stable (28.50 ± 7.13)	/
	P7	Stable (35.50 ± 8.88)	/

Table 6

Changes in Mental Health Between Phases A_1 and A_2

Participant	Level[4]
P1	+13.66% improving
P2	+5.56% improving
P3	+42.77% improving
P4	+13.02% improving
P5	–1.45% deteriorating

[4] Relative score change

P6	+32.77% improving
P7	+12.55% improving

Table 7

Changes in TSC Between Phases A_1 and A_2

Participant	Level[4]
P1	+57.45% improving
P2	+3.17% improving
P3	+20.82% improving
P4	+11.78% improving
P5	+19.24% improving
P6	+57.22% improving
P7	+7.29% improving

Table 8

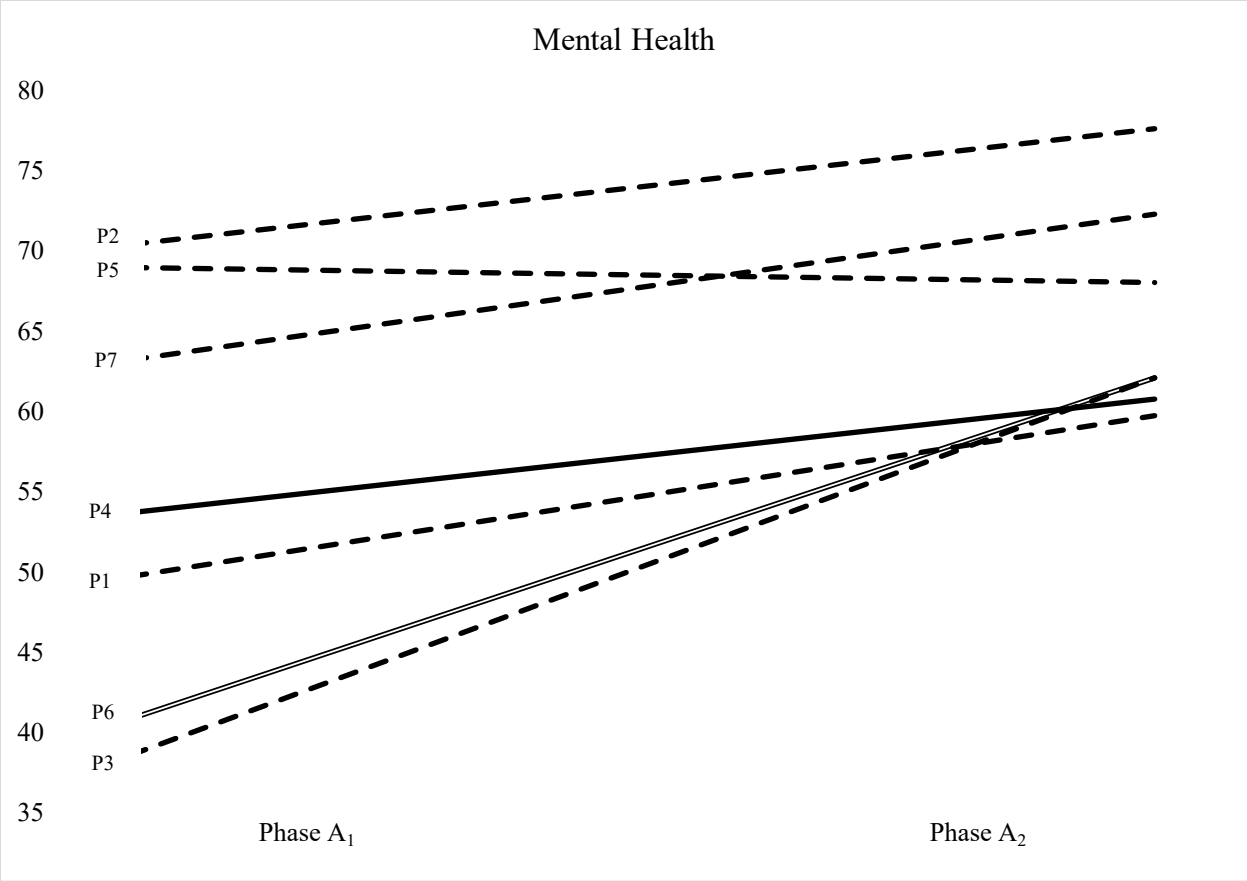
Changes in TSV Between Phases A_1 and A_2

Participant	Level[4]
P1	+25.64% improving
P2	–3.27% deteriorating
P3	+38.20% improving
P4	–2.52% deteriorating
P5	+5.51% improving
P6	+25.27% improving
P7	+6.72% improving

Group-level

Combined participant scores are visually displayed in Figures 1-3, numerically presented in Table 9, and verbally explained in the paragraphs below.

Figure 1: P1-P7 Chart with Mental Health Trendlines from Phase A_1 to A_2

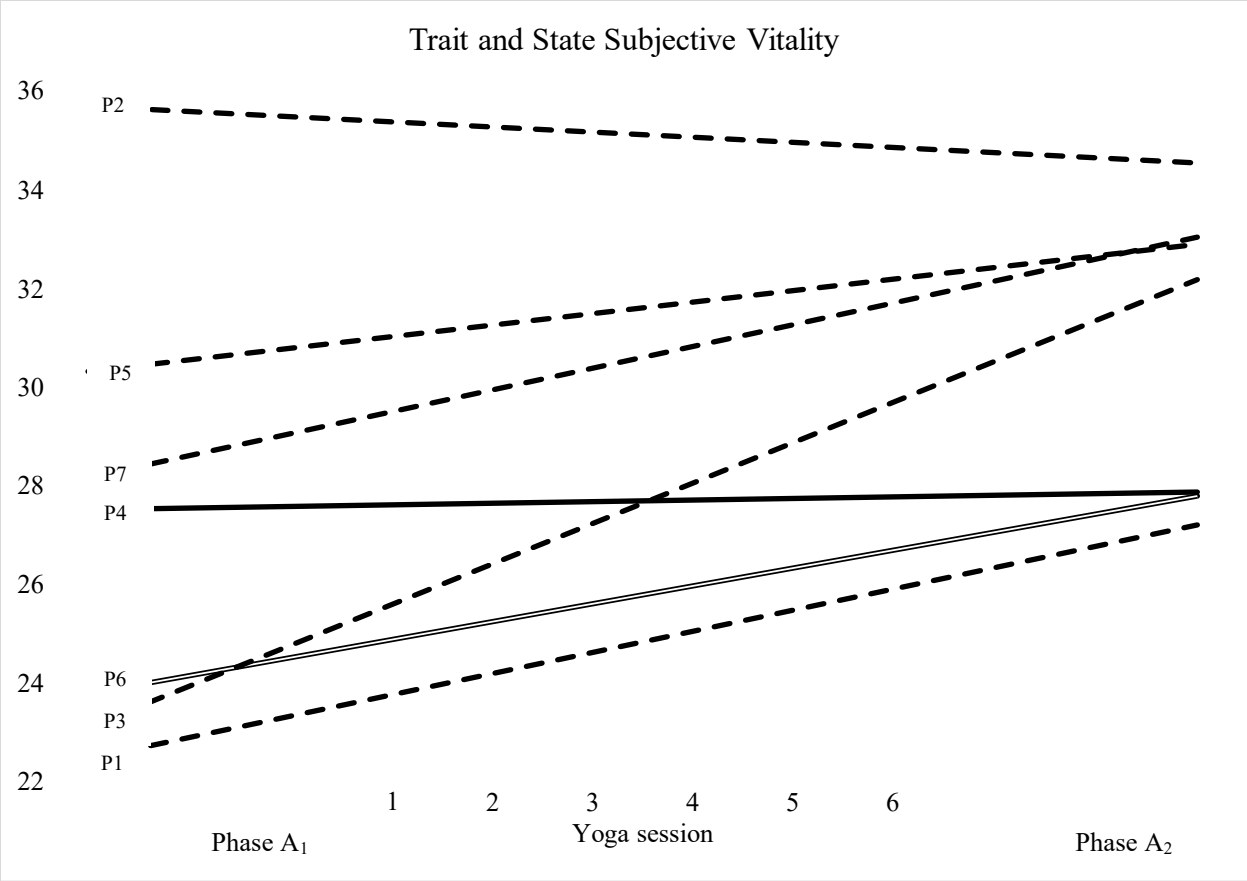


As made evident by the trendlines in Figure 1, upward trends are apparent in all participants' mental health but one (i.e., P5). Calculations demonstrate that participants' mental health after the yoga program increased on average by 16.98% (SD = 14.30).

Figure 2: P1-P7 Chart with Self-compassion Trendlines from Phase A_1 to A_2

As shown by the seven trendlines in Figure 2, upward trends are apparent in all participants' TSC and SSC. Calculations demonstrate that participants' TSC after the yoga program increased on average by 25.28% (SD = 21.07) and mean relative score in participants' SSC after yoga sessions increased on average by 11.02%, with a lower dispersion around the mean (SD = 9.96). Additionally, the average number of sessions that resulted in an improvement in participants' SSC was 3.86 out of 6.

Figure 3: P1-P7 Chart with Subjective Vitality Trendlines from Phase A_1 to A_2



As made clear by the seven trendlines in Figure 3, upward trends are apparent in all but two participants' (i.e., P2 & P4) TSV and SSV. Calculations reveal that participants' TSV after the yoga program increased on average by 13.65% (SD = 14.85) and mean relative score in participants' SSV after yoga sessions increased on average by 21.72%, with a lower dispersion around the mean (SD = 11.71). Further, the average number of yoga sessions that brought about a therapeutic effect in participants' SSV was 5.29 out of 6.

Table 9

Average Relative Score Changes and Standard Deviations for all Participants by Variable and Average Number of Yoga Sessions that Resulted in an Improvement in Participants' State Variables

Variable	x Relative Score Change	Standard Deviation (SD)	x Number of Yoga Sessions (out of 6)
Mental Health	+16.98% improving	14.30	/
TSC	+25.28% improving	21.07	/
SSC	+11.02% improving	9.96	3.86
TSV	+13.65% improving	14.85	/
SSV	+21.72% improving	11.71	5.29

Discussion

The current study examined the immediate and prolonged impact of a positive education-integrated yoga program on undergraduate students' mental health, self-compassion, and vitality. Aligned with our hypothesis, and with previous research on yoga interventions for mental health (Pascoe et al., 2021), participation in our six-week yoga program generally improved university students' trait and state well-being outcomes. The present study offers valuable insights into the effectiveness of merging positive psychology and yoga to promote undergraduate students' mental health and extends previous research by comparing the well-being benefits of yoga after one session versus an entire program.

Mental Health

Consistent with prior work (Gaur, 2022; Shroff & Asgarpour, 2017), yoga practice was globally therapeutic for participants' mental health. Namely, practicing yoga led to a mean relative mental health score increase of 16.98% (SD = 14.30) from phase A_1 to A_2 for the participant group. A number of mechanisms have been suggested in the literature to underlie the mental health benefits of yoga. In a narrative review including scoping reviews, systematic reviews, and meta-analyses of yoga-based interventions (Pascoe et al., 2021), it was found that practicing yoga contributes to greater mental health by increasing self-compassion and reducing rumination. Furthermore, yoga practice has been shown to support mental health through the

calming effects of breathing and stretching exercises (Mehta & Taneja, 2013). The deep relaxation induced by the yogic breathing and stretching may be responsible for not only enhancing mental health, but also reducing stress (Mehta & Taneja, 2013). As the use of stress management techniques to relax one's mind and body is linked with better mental health (Chinaveh et al., 2010), the stress relief engendered by the yoga practice likely improved the participants' mental health. It is also probable that the positive education course complemented the yoga program in generating these benefits, as positive education has also been shown to promote mental health (Norrish, 2015; Shoshani & Steinmetz, 2014). Thus, as empirically supported mental health approaches, yoga and positive education hold promise for fostering university students' mental health and furthering their positive effect in conjunction.

Contrary to our hypothesis, one of the seven participants (i.e., P5) experienced a minor decrease in mental health (i.e., –1.45%) from phase A_1 to A_2. According to P5's post-yoga questionnaires, their mental health during the first few weeks of the yoga program had been adversely affected by the Russia-Ukraine war (which caused insomnia). P5 later reported that they had caught COVID-19, which is another element that they claimed negatively impacted their mental health. Finally, after completing the yoga program, P5 willingly contacted the principal investigator and expressed that "the study encouraged [them] to pursue meditation and helped [them] realize that yoga may not be the type of meditation that suits [them] most." These factors may have counteracted the mental health benefits of the yoga program for P5, which would explain their practically neutral change in mental health during the study.

Self-compassion

The yoga program increased the participants' self-compassion. First, TSC increased on average by 25.28% (SD = 21.07) from phase A_1 to A_2 for the participant group, which is aligned

with previous studies indicating that practicing yoga promotes TSC (Erkin & Şenuzun Aykar, 2021; Pascoe et al., 2021). According to a systematic review and meta-analysis (Wong et al., 2021), a mechanism through which yoga may lead to improved self-compassion is mindfulness. Strengthened via yogic breathwork and body stretches (Wong et al., 2021), mindfulness is reciprocally related with self-compassion (Neff, 2003a), both of which have been shown to support university students' mental health (González-García et al., 2021). Yoga, or "mindfulness in motion" (Salmon et al., 2009, p. 63), not only enhances self-compassion, but also reduces stress via increased self-compassion (Riley & Park, 2015). Therefore, improved self-compassion is both an outcome and a mediator of yoga's other positive well-being outcomes.

While there is growing evidence of yoga's effects on TSC, there is a scarcity of research on yoga's association with SSC. In fact, to our knowledge, this study is the first one to appraise the immediate effects of yoga practice on self-compassion, which illuminates yoga's ability to promote state changes in self-compassion. Our findings reveal that participants' SSC generally increased after yoga sessions ($x = 11.02\%$; $SD = 9.96$); however, the average relative score change for all participants in TSC surpassed that of SSC by 14.26%. As a matter of fact, TSC is the outcome variable that increased most during the study.

Conversely, one of the seven participants (i.e., P7) did not experience significant changes in SSC ($x = 0.04\%$) during phase B, which challenges our original hypothesis. Specifically, their SSC slightly increased after the first 2 yoga sessions, decreased after the third and fourth yoga sessions, and remained stable after the last 2 yoga sessions. Upon further inspection of the post-yoga questionnaire P7 completed after their fourth session, the participant mentioned that they "[weren't] in the best headspace to do yoga", were "interrupted during [their] class" which "really distracted [them]", and had "tested positive for COVID-19" that week. Accordingly, we

could speculate that these hindrances may have prevented P7 from reaping the full benefits of the fourth yoga class and prompted them to judge themselves for their poor performance; thus, negatively impacting their SSC score.

Vitality

Our results show that practicing yoga enhanced the participants' subjective vitality, as also stated in the literature (Dagar et al., 2022; Danucalov et al., 2017; Moliver, 2010; Moliver et al., 2013, Pandey et al., 2017). Foremost, practicing yoga brought about a grouped mean relative TSV score increase of 13.65% (SD = 14.85) from phase A_1 to A_2. It is conceivable that yoga calls forth feelings of vitality through movement and breath regulation (i.e., pranayama) which, as previously mentioned, is a fundamental element of yoga. In Sanskrit, pranayama means vital energy (i.e., prana) and expansion (i.e., ayama; Wood, 1993). Therefore, yoga is naturally linked with vitality through its intention to expand one's vital energy. This would explain why, as per a national cross-sectional survey of yoga practitioners (Ross et al., 2013), improved energy is among the numerous health benefits of yoga practice. Moreover, in a recent exploratory qualitative study (Pizzanello, 2021), yoga was found to ignite feelings of aliveness, which the author had defined as a sense of inner vitality regarding aspects of one's life. Nevertheless, only trait-level descriptions of vitality were reflected in this study's participants' accounts. In fact, the handful of inquiries evaluating the associations between yoga and subjective vitality in the literature only assessed TSV; thus, neglecting yoga's instant effects on vitality.

The effectiveness of yoga in generating feelings of vitality in the moment is important to investigate because it clarifies whether this practice can be used to immediately enhance one's vitality. In this study, participants' average relative SSV score (21.72%; SD = 11.71) increased 8.07% more than their average relative TSV score, implying that practicing yoga yields greater

immediate than prolonged effects on subjective vitality. While the absence of research directed towards yoga's impact on SSV prevents us from corroborating these findings, we can assert that they are rational because 1) an average of 5.29 out of 6 yoga sessions led to improvements in SSV, 2) the surges in SSV after the sessions were considerable, and 3) SSV is closely related to TSV, which increased in most participants from phase A_1 to A_2 and is fostered by yoga practice, as per the research cited above. Thus, we feel confident concluding that the yoga program promoted the participants' momentary vitality.

In contradiction to our hypothesis, two of the seven participants (i.e., P2 & P4) experienced a slight decrease in TSV (–3.27% and –2.52%, respectively) from phase A_1 to A_2. According to P2 and P4's post-yoga questionnaires, academic pressures may have been responsible for the slight decrease found between both baseline phases. Indeed, during the final weeks of the yoga program, both participants reported their school workload and the stress of final exams having deleterious effects on their mental health. Since vitality is associated with mental health (Shinohara et al., 2020), it is plausible that these factors also negatively affected their vitality. In addition to enduring these academic stressors, P4 caught a cold during the final week of the yoga program, which likely also had a detrimental impact on their vitality (Eccles, 2009). Another important remark to make is the ceiling effect that potentially lies at the origin of P2's lack of increase in TSV. P2 not only had the highest TSV scores out of all participants during both baseline phases, but also nearly reached the highest possible score on the SVS at each time point. Consequently, there was little leeway for the yoga program to significantly increase P2's TSV.

Overall, the study findings support that yoga augments university students' mental health, TSC, SSC, TSV, and SSV, suggesting that yoga can provide instant and lasting well-being

benefits. These increases are likely due to large augmentations in TSC and SSV. Such positive outcomes are particularly important for university students, who undergo stressful time periods (Campbell et al., 2018) and could benefit from immediate and prolonged improvements in their self-compassion and vitality. While four participants did not experience benefits in one of the five outcome variables, it should be emphasized that the changes were minor and that the vast majority of the findings were favourable. Out of the 21 relative score changes in trait variables reported in this study, only 3 were negative (i.e., –1.45%, –2.52%, and –3.27%). Likewise, out of the 14 average relative score changes in state variables, only 1 was insignificant (i.e., +0.04%). Therefore, 31 of the 35 score changes (88.6%) were therapeutic, especially for the participants who scored lowest in all three well-being outcomes during Phase A_1 (i.e., P1, P3, & P6).

These findings may warrant the implementation of yoga practice within positive education courses. Results may encourage other universities to begin offering positive education courses and yoga classes or, ideally, supplement their positive education courses with yoga practice to optimize their students' mental health. Specifically, two weekly 45-minute yoga classes for six consecutive weeks appeared to be a sufficient amount of sessions to embed within a positive education course to improve university students' mental health, self-compassion, and vitality. Although further research is required to confirm and extend these findings, yoga and positive education make for an auspicious mental health promotion strategy for university students.

Significance

Among the appreciable strengths of the present study is its contribution to the growth of knowledge in mental health research. First, this study combines fields and constructs that are seldom included within the same inquiry (e.g., yoga and positive education; self-compassion and

vitality), which establishes novel associations that can be further researched and applied in practice. Second, this study is set in a university, an educational institution that is often neglected in positive education research, and therefore provides unique insights into university students' responsiveness to yoga-enhanced positive education courses. Third, this study hones in on yoga's effectiveness in promoting well-being variables rather than merely mitigating mental illness which, according to a recent bibliometric analysis of systematic reviews, is a favoured approach in the yoga literature (Wieland et al., 2021). Setting forth that yoga can enhance well-being may encourage educators and health professionals to recommend this practice to individuals with and without mental illness. Finally, yoga's impact on both state and trait well-being outcomes are appraised in this study, which sheds light on yoga's ability to not only induce a vital and self-compassionate mindstate, but also foster trait changes in both of these well-being outcomes with regular practice. Comparing yoga's benefits after one session versus an entire program will help educators and health professionals understand how much yoga is needed to yield the desired results (i.e., one session is enough to enhance one's vitality whereas an entire program is required to increase one's self-compassion).

In addition to addressing many gaps in the literature and fostering the advancement of knowledge in the field of yoga and positive education, this inquiry employed a single case experimental design, which allowed for a thorough investigation of the research problem via an in-depth analysis of each participant (Jacobs & Mosco, 2008). Indeed, single case experimental studies generate extensive data about intervention effectiveness and suitability of outcomes within the case studied by verifying hypotheses through the repeated measurement of variables over time (Kwasnicka & Naughton, 2020). Such repeated observations allowed the researchers to

detect patterns within the data, explore potential changes in the variables throughout the study (Paterson, 2010), and achieve power (Brysbaert, 2019; Kwasnicka et al., 2019).

Limitations and Future Directions

Notwithstanding its strengths and significant contributions to the literature, the present study also has its limitations. First, the participant group comprised human kinetics students, which generates external validity concerns as it may limit the generalizability of the findings to a single cohort of students. Also, the participants were likely more motivated to complete a positive education course and yoga program than the typical university student, as participation in both were non-compulsory. Future studies should include a greater diversity of students to examine whether factors such as study program and motivation influence the effectiveness of a yoga program. Another noteworthy limitation of the present study is the structure of the yoga program. Although they were meant to be offered in-person, all yoga classes were delivered virtually due to the upsurge of COVID-19 cases. While there are advantages to practicing yoga online (e.g., protection from COVID-19 contamination, convenience, privacy, and accessibility), carrying out virtual yoga sessions also has its drawbacks. For instance, it was reported in a recent cross-sectional survey that in-person yoga led to significantly superior mental health and mood benefits, satisfaction, social connection, focus, and energy than online yoga (Brinsley et al., 2021). If COVID restrictions allow, researchers ought to implement their yoga intervention in-person to mitigate these nuisances while optimizing the participants' well-being outcomes.

It would also be valuable for future research to further investigate the relationship between yoga and positive education to elucidate the mechanisms that underpin this therapeutic duality. Indeed, determining why positive education and yoga produce such sizeable mental health benefits when combined may lay the foundation for and help inform the development of

mental health promotion initiatives for university students. Another avenue that was not pursued in the current work is the role spirituality plays in yoga's mental health outcomes, which is a limitation that could be addressed in future studies. Finally, future researchers are encouraged to explore strategies to help their participants maintain yoga practice beyond the end of the intervention. For example, researchers may consider 1) using motivational interviewing[5] techniques to assist participants in identifying how to incorporate yoga practice into their schedules or 2) creating an intervention protocol in which participants are integrated into community-based yoga classes after the program.

Conclusion

In seeking to determine the impact of integrating a yoga program into a positive education course on undergraduate students' mental health, the results presented here reveal that practicing yoga improved the participants' mental health, self-compassion (esp. in a prolonged manner), and vitality (esp. in an immediate manner). These findings provide further credence to the importance of offering mental health practices, such as positive education courses and yoga, in universities. This study also demonstrates that the fusion of positive education and yoga classes may outperform the separate delivery of these two mental health approaches. As such, yoga and positive education courses should have a prominent place in the educational system to optimize student mental health. Practitioners and educators are encouraged to put forward tactics to increase the accessibility of yoga-enriched positive education courses across university campuses.

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[5] Counseling approach aimed at helping individuals resolve ambivalence to promote behaviour change (Miller & Rollnick, 2012).

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Chapter IV: Supplemental Results

In this chapter, qualitative methods, data analysis, and findings, along with quantitative measures and results for participants' affect[6] throughout the yoga program are presented.

Researcher Positionality

In the spirit of self-reflexivity, I acknowledge my stance as a 24-year-old educated Canadian woman. I hold an Honours Bachelor in Human Kinetics with a Minor in Psychology, as well as a Certificate in Applied Positive Psychology. I also took the positive education course under investigation during my undergraduate studies and enjoy practicing yoga in my spare time. I now have the privilege to merge my fields of interest in a Master's research project in Human Kinetics and recognize that my positionality shaped this project to some extent. As a researcher, I bring the experience of both my academic background and personal interests to my work and strive to be cognizant of my own biases and how they may influence my research.

Qualitative Methods

To triangulate the collected quantitative data and provide valuable insight into the participants' affect, state self-compassion (SSC), and state subjective vitality (SSV), qualitative data were gathered via personal diaries guided by open-ended journal prompts after the instructor-led yoga sessions during phase B. Open-ended qualitative questions have been recurrently used in research to generate rich data and better grasp participants' internal processes and personal experiences (Labuschagne, 2003; Mangels et al., 2020; Swendeman et al., 2015). Our participants answered five open-ended journal prompts online via Survey Monkey after these yoga sessions. The prompts were (followed by the construct they intended to assess): "In a

[6] Affect, an indicator of mental health (Gross et al., 2019), was used as a state measure for mental health in this study.

few words, describe your mood before, during, and after the yoga practice" (affect), "Did you experience any difficulties during your practice (e.g., discomfort, instability/imbalance, pain)? If so, how did you react to them in the moment?" (SSC), and "Describe your energy levels before, during, and after the yoga practice" (SSV). The fourth prompt (i.e., "Has anything significantly negatively impacted your mental health in the last seven days?") intended to determine the presence of confounding variables and the last prompt ("Is there anything else you would like to add?") allowed the participants to provide any additional information.

Qualitative Data Analysis

To unravel the participants' thoughts and feelings towards the yoga practice and elucidate variances in the quantitative findings, Thematic Analysis (TA; Braun & Clarke, 2021) was conducted. The type of TA that was most suitable for the current study was Reflexive TA (Braun & Clarke, 2021), a thorough analytical process that embraces the researcher's subjectivity and reflexivity throughout the coding and theme development. As I engaged with the data and identified, analyzed, and interpreted themes embedded in them, I jotted down my preconceptions and positionings in a personal journal while reflecting on their role in the data construction (Trainor & Bundon, 2021; Braun & Clarke, 2020). Rather than bracketing my research values, skills, and experiences, I capitalized on them and acknowledged them as a fundamental component of the analysis (Braun & Clarke, 2020).

The analysis was guided by a constructionist epistemological stance, according to which language is implicit in the social production of experience (Burr, 1995) and participants' experiences and the meaning they are given are unraveled through interpretation (Schwandt, 1998). Consequently, a critical orientation to data was adopted, whereby discourse is perceived as constitutive of participants' personal states and socially embedded patterns of meaning are

interrogated (Clarke & Braun, 2014). Rather than merely reflecting the participants' experiences, the meaning they gave to their experiences was interpreted further than what was explicitly communicated by them (Byrne, 2021). Due to the interpretative nature of this inquiry, latent coding was prioritized as I engaged with the data. Although meaningful descriptive data were considered throughout the analysis, efforts were made to identify implicit meanings behind the participants' descriptions by venturing beyond the semantic content of the data (Byrne, 2021). Finally, the analysis was conducted both deductively and inductively, and therefore adhered to an abductive approach (Timmermans & Tavory, 2012). Commonly used in mixed methods research, abductive TA (Rambaree, 2018) involves the identification of unexpected empirical findings against a theoretical background (Timmermans & Tavory, 2012). Concomitantly, data were coded deductively in light of the study's outcome variables and ideas of potential relevance to the research questions were coded inductively to represent meaning as communicated by the participants. Engaging in this recursive and iterative process enabled me to provide a more complete portrait of the data by moving back and forth between deduction (i.e., generating codes that reflected Keyes' (2002) conceptual framework) and induction (i.e., representing the content of the data in the codes). In sum, a constructionist, critical, latent, and abductive approach was appropriate to answering the research questions as it allowed for the exploration and interpretation of the meanings underlying the participants' experiences on and off the yoga mat.

In accordance with Braun and Clarke's (2021) six phases of reflexive TA, analysis commenced by reading the personal diary entries several times. Working systematically through the entire data corpus and monitoring my subjectivity along the process, I became intimately familiar with the data, which allowed me to obtain a clear understanding of my participants' experiences. I highlighted passages relevant to the research topic, combined them in a table on

Microsoft Word, and sorted them by timepoint (i.e., post-yoga 1-6, and before, during, or after the session), and construct represented (i.e., affect, SSC, and SSV). I then typed keywords that pertained to the research topic in the margins and generated preliminary codes from meaningful ideas discussed by the participants. Given the study's constructionist epistemological stance, meaningfulness (rather than recurrence) was prioritized throughout the analysis. While I did look for ideas that were present repeatedly within the data, I paid greater attention to the ones that would be potentially informative in developing themes.

Once I coded all pertinent data items and confirmed that each was brief yet offered sufficient detail to be able to stand alone and inform the research aim, similar codes and their respective data items were combined in another table. The codes that formed a higher-level pattern were then divided into subthemes, themes, and overarching themes, and organized visually in a preliminary thematic map. Subsequently, all candidate themes were examined with respect to the entire data corpus and their internal homogeneity (i.e., the coherence among data items within a theme) and external heterogeneity (i.e., the distinction among themes; Chen et al., 2018) were verified. After ensuring that each theme was unique and that their data items held together in a meaningful way, the themes were refined (by categorizing each of them based on their relatedness to one of the three outcome variables), defined (by identifying the essence and capturing the scope and boundary of each theme), and named. A final thematic map portraying the relationships between each theme was then created (Figure 6).

Quality of Research

In conjunction with practicing and maintaining reflexivity throughout the analytical process, additional strategies were put in place to foster the qualitative data's legitimation, which is the equivalent of validity in quantitative research and trustworthiness, credibility, plausibility,

and dependability in qualitative research (Onwuegbuzie & Johnson, 2006). To start, I met with my participants before obtaining their informed consent to partake in the study to explain all study procedures and answer any questions they had. This face-to-face interaction allowed me to build rapport and gain my participants' trust at the outset to ultimately bolster the research data (Tillmann-Healy, 2003). Furthermore, as per Smith and McGannon's (2018) recommendations, critical friends and member reflections were used as a means to enhance rigour and quality in the present research. First, having critical friends with whom multiple truths were critically discussed played an imperative role in the qualitative data analysis process. After analyzing the personal diary entries while questioning my subjectivity and noticing how it guided my interpretations (Callary et al., 2015), I presented my interpretations of the data to my research team to ensure a degree of confidence in my preliminary findings. This dialogue fueled further reflexivity by allowing all members of the research team to voice their perspectives and challenge one another's construction of knowledge (Smith & McGannon, 2018). Finally, member reflections were employed to generate additional insights and promote more collaborative data collection and analysis. Indeed, I engaged in a reflexive ethics of sharing my perspectives of the personal diary entries with the participants who wrote them to identify similarities and/or disparities that were present in the data (Schinke et al., 2013). Engaging participants in the analytical process provided them with the opportunity to question the interpretations and offer alternative descriptions. This co-participatory process allowed me to unearth contradictions in the findings and derive further interpretations that were more nuanced, thus fostering a robust, meticulous, and intellectually enriched understanding of the research (Smith & McGannon, 2018).

Qualitative Findings

All seven participants' journal entries attest to the benefits they obtained from the yoga program, which include enhanced pride, self-kindness, serenity, energy, and alertness.

Affect: Pride

After each yoga session, at least one participant reported feeling satisfied, accomplished, and/or proud. For instance, P1 mentioned that "it was a good feeling to get through the hard poses" and that "[they felt] proud of [themselves] for not quitting when it was uncomfortable." The strong sense of pride that emerged from completing the yoga practice seemed to have stemmed from the participants' tenacity during the sessions. In fact, most participants persevered in the face of obstacles in their yoga sessions via breathwork and positive self-talk. For example, P3 wrote that they "took it slow, practiced [their] breathing, and tried to stay relax[ed] to help [with muscular fatigue]" and P1 reported that they "breathed through [harder poses], let the muscle shake because [they] knew [they] wouldn't be in the position for too long, and repeated a mantra to [themselves] that said 'you can do hard things.'" Moreover, P2 embraced their discomfort and instability and "pushed through the pain" while P4 contracted their core to increase their balance and harnessed their breath to manage pain during their practice. This notable ability to persist in spite of difficulty throughout the yoga sessions apparently gave rise to feelings of pride upon completion. Nevertheless, participants also learned to be gentle with themselves and surrender when the yoga sequence was too challenging.

Self-compassion: Self-kindness

While the participants embraced the intensity of the yoga practice and leveraged their tenacity to withstand discomfort, they did so while respecting their limits. Through body awareness, participants also prevailed over difficult moments by gently honouring their body's

needs and modifying challenging yoga postures as required. For example, after four of their yoga sessions, P7 described "adapting poses so as to maintain them and move on with the session" and "listen[ing] to [their] body and adjust[ing] [themselves] during uncomfortable moments or when attempting to do a pose that require[d] more flexibility than [they] possess[ed]." Likewise, P6 took short breaks when they experienced poor circulation in their limbs, P3 "was patient towards [themselves] and gave [themselves] the care [they] needed so [they could] continue" notwithstanding their shoulder pain, and P1 "did modified versions [of yoga poses] and didn't push [themselves] too hard" when the positions were difficult to hold. The latter even mentioned not judging themselves for being unstable, not "do[ing] anything that [they were] not capable of", and "giving [themselves] space to not be perfect" when they chose to adjust challenging yoga positions. Although advanced poses occasionally brought about impatience and irritability in some participants, they overcame these challenges by offering themselves compassion. When lacking mobility or stability in certain positions, P4 "repositioned [themselves] and was patient with [themselves]", P5 did not blame themselves as they perceived those instances as personal growth opportunities, and P3 laughed it off rather than taking their moments of failure too seriously.

The participants' journal entries depict their ability to be kind to themselves as they strived to complete their yoga sessions via body awareness and adaptability. Rather than judging themselves when yoga postures were not accessible to them, the participants respected their body and resorted to alternative options. Modifying the yoga sequence to suit their needs appeared to be an act of self-kindness, whereby they approached their difficulties from a gentle, flexible viewpoint. Coupled with tenacity, this adaptability apparently allowed the participants to move through difficult poses by enduring the discomfort and, when needed, letting go of control and

surrendering on their yoga mat. Whether the participants were tenacious or adaptable, their practice would often comprise or culminate in feelings of calmness.

Affect: Serenity

Throughout the yoga program, the participants on average reported being in a state of composure during and/or after the majority of the yoga sessions. As shown by the recurrent use of the words “calm”, “relaxed”, “serene”, “loose”, “peaceful”, “tranquil”, and “relieved”, participants often found the yoga sessions both pleasant and soothing. For instance, despite feeling tired and unmotivated prior to one of the yoga sessions, P7 came to feel a sense of relaxation during the practice. Similarly, P2 indicated that “the yoga practice allowed [them] to clear [their] thoughts and be a bit less stressed about an upcoming midterm.” Practicing yoga helped these two participants cope with their negative feelings by fostering a sense of serenity, as was the case for P1:

> I feel very emotional today. I was very stressed and sad before the session, and during the session I was a bit impatient. By the end I was crying because I think I was releasing all those emotions that I had at the beginning of the session. I feel very calm and loving towards myself now.

As portrayed in the abovementioned account, in addition to enhancing P1’s self-kindness, the yoga session alleviated their negative emotions when they were in low spirits. Nonetheless, participants did not have to be in a negative headspace before the practice in order to reap the yoga sessions’ soothing effects. For example, P4 typically felt “neutral” or “well” before starting their practice and reported feeling either “in peace”, “calm”, “well”, or “relaxed” during each of their yoga sessions. Thus, practicing yoga promoted calmness within the participants regardless of their initial state. Indeed, the yoga sessions either called forth a newfound sense of quietude or

reinforced one that was already present within the participants. Those who were not feeling at ease before the yoga sessions, conversely, seemed to have benefited from an additional therapeutic component: emotional release. As P1, P2, and P7's journal entries suggest, the yoga practice helped mitigate the tiredness, amotivation, sadness, and/or stress they felt prior to their sessions. Just like the participants learned to loosen their grip on control during physically taxing moments in their yoga sessions, they also learned to let go of their negative emotions as they practiced. Once they let the tension they were holding melt away, the participants could finally take in the calming properties of the yoga practice. In doing so, the participants would leave their practice enveloped in serene energy.

Vitality: Energy

Participants' levels and types of energy were a recurring topic in the journal entries, as they would appear to have been altered by the yoga practice. Comments such as "during [the yoga], my energy levels were excellent", "afterwards I had much more energy" and "I am feeling more energized" confirm the rise in the participants' energy levels as a result of the yoga sessions. Indeed, the vast majority of the journal responses to the prompt "Describe your energy levels before, during, and after the yoga practice" denoted an increase in energy during or after their sessions. For example, P1 wrote "my energy was low before the practice, but it picked up during the practice. I now feel a lot more energetic." Additionally, there seemed to be a correlation between the participants' energy levels and positive affective states: The four participants who expressed feeling "happy" and "in a good mood" following their yoga sessions also reported moderate to high levels of energy during and after the same sessions.

Practicing yoga also influenced the type of energy the participants were feeling at the time of the session. In fact, it was found that the participants experienced either serene or zestful

energy by virtue of the yoga sessions. While participants frequently mentioned feeling calm during and/or after their practice, some described feeling a blend of serenity and energy. For instance, P7 began their yoga session feeling tired and stated feeling "relaxed but also active" during the yoga. This dichotomy was also reflected in P3's journal entry revealing that they felt "less jittery, more calm energy" after one of their sessions, despite their stable energy levels throughout. As P3 engaged in the yoga session, feelings of nervousness were replaced by the familiar serene energy conveyed in P7's response.

If the participants' energy was not serene, it was zestful. Characterized by animation, exuberance, and motivation, this zestful energy was showcased in many of the participants' accounts. Indeed, numerous participants used words such as "energized", "awake", and "excited" when describing their mood and energy after their yoga practice. For example, P2 stated that despite being tired prior to their yoga session, they felt "as though [they had] just woke[n] up even if [they] ha[d] been awake for hours." This aliveness appeared to motivate the participants to go about their day and conquer their to-do lists after the yoga. Several journal entries imbued with determination and alacrity support this upsurge in motivation. For instance, P7 wrote: "I feel like I have enough energy for the rest of my evening", "[I am] determined to face the rest of my day", and "I feel ready to face the rest of my evening" after three of their yoga sessions. In parallel, P2 expressed both having "more energy" and being "ready to tackle the rest of the day" after two of their yoga sessions. P5 similarly reported having a "greater desire to be active" following one of their yoga sessions even though their energy levels remained moderate throughout. These feelings of readiness and motivation were made evident by nearly all of the participants' journal entries. Intimately related to this zestful energy is the notion of alertness, which was just as ubiquitous in the participants' accounts.

Affect: Alertness

Another common phenomenon among the participants that appeared to arise from the yoga practice was a state of alertness marked by enhanced awareness and concentration. As a matter of fact, all participants alluded to the increased attentiveness they observed during or after at least one of their yoga sessions. P1, for example, explained that they felt "a lot more alert" after one of their energizing yoga practices, suggesting that their energy boost was responsible for elevating their alertness. In contrast, P4's energy levels did not change throughout one of their yoga sessions; yet, they reported being more alert afterwards. Lastly, P1's journal entry indicated that they felt "mellow but more alert" following one of their invigorating sessions. Hence, regardless of their energy levels during and after the yoga, participants seemed to have benefited from improved alertness.

This heightened attentiveness appeared to have resulted in greater present moment and body awareness while practicing yoga. For instance, during their practice, P1 wrote "I felt very present" and P6 expressed feeling "captivated", and following their session, both reported having energy and spirit. Further, P7 wrote: "during [the yoga], I felt awake and aware of my body", which similarly suggested that alertness and body awareness go hand in hand. Relatedly, P2's account regarding the grounding effects of yoga implied a relationship between one's energy levels and present moment awareness: "The yoga session made me feel more present and I now feel like I am more energized." While present moment awareness was a recurring theme among the journal entries, not all participants could stay in the here-and-now throughout their entire practice. When P6's mind would wander, they made an effort to return their attention to the present moment: "I lost my attention sometimes; I tried my best to bring myself back." As they

pulled their wandering mind back into the present, participants not only deepened their awareness, but also strengthened their focus.

The participants' alertness also seemed to translate into greater concentration during and after the yoga sessions. Indeed, multiple participants described feeling "focused" and "concentrated" when they engaged in or finished their yoga practice. As is the case for awareness and energy, noteworthy associations can be made between the participants' concentration and energy as well. For example, P2 wrote that "the yoga allowed [them] to be more focused while also staying energized." In a similar vein, P7 reported feeling both "motivated and concentrated" during and "a lot better in [their] body and mind" after one of their yoga sessions. Finally, after spending their yoga session refocusing their attention on their present moment experience, P6's account emanated a similar zestful energy wherein they felt "ready to face the day" after completing their practice. Therefore, there appears to be a relationship between concentration and not only energy, but also present moment awareness. P2's entry also supports this relationship: "The yoga session allowed me to feel more present and focused afterwards." In sum, as made evident by the journal entries above, practicing yoga fostered a state of alertness in which participants were more aware (of the present moment and their body), energized, and concentrated.

Quantitative Measures: Affect

In addition to mental health, self-compassion, and vitality, affect was measured in this study. To appraise participants' affective states, the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988) was administered before and after the instructor-led yoga sessions. The PANAS includes two 10-item mood scales that measure positive affect (i.e., the extent to which one feels enthusiastic, alert, engaged, and energetic) and negative affect (i.e.,

distress and unpleasurable engagement; Watson et al., 1988). Participants were instructed to indicate to what extent they felt a certain way in that moment for each of the 20 adjectives (10 positive and 10 negative) using a 5-point Likert scale ranging from 1 (very slightly or not at all) to 5 (extremely). Prior research has confirmed both scales to be highly internally consistent (Cronbach's alpha = .88 for the positive affect scale and .87 for the negative affect scale; Watson et al., 1988). The PANAS has also been frequently utilized as a valid and reliable measure of affective states in the field of human kinetics (Guérin et al., 2013; Reed & Ones, 2006).

Quantitative Results: Affect

Individual-level

Within the yoga program (phase B), average relative score change in positive affect after each yoga session was favourable for all participants but P5, whose relative score remained stable (x = –2.10%) on average after each yoga session. Conversely, average relative score change in negative affect after each yoga session was favourable for all participants but P7, whose relative score remained stable (x = 0.28%) on average after each yoga session.

Table 10

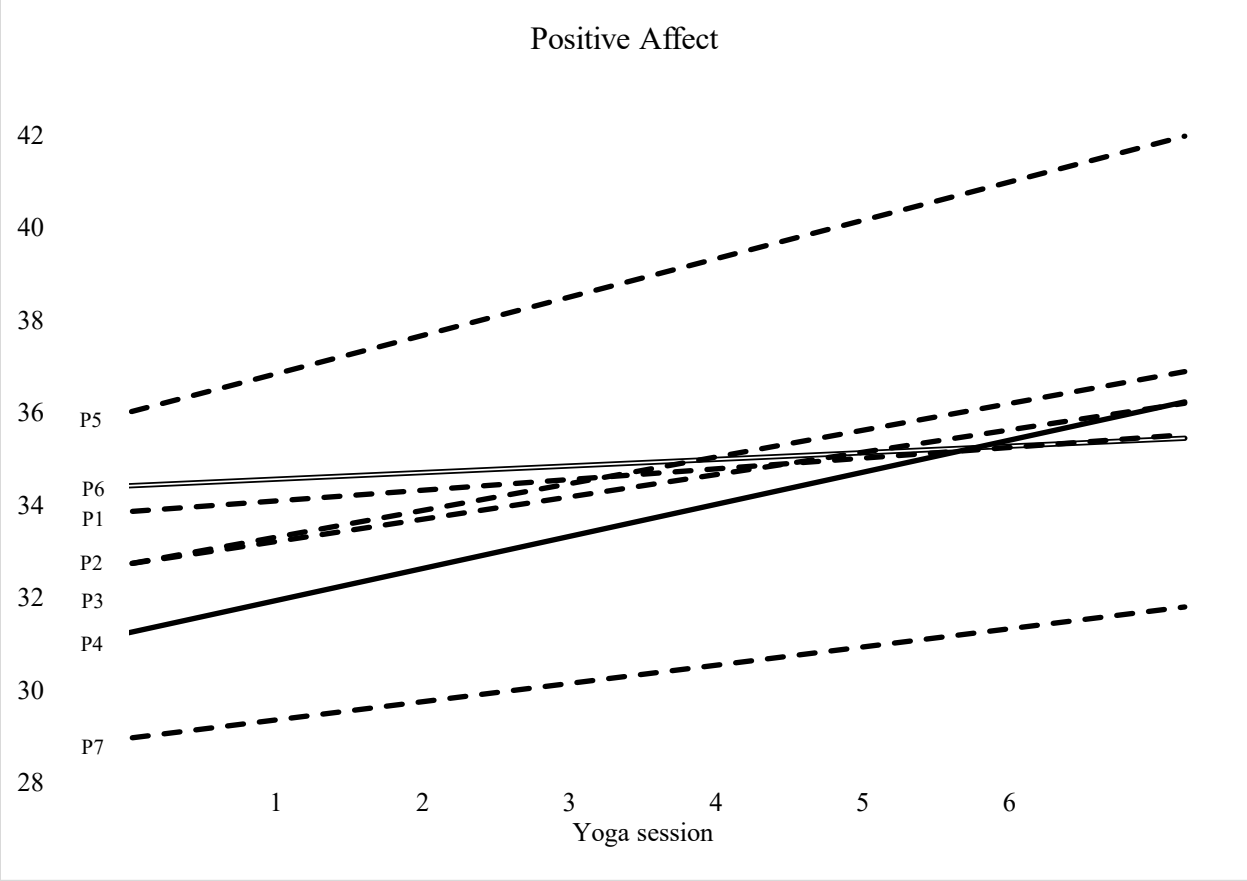
Changes in Affect Within Phase B

Participant	**Level**[7]	
	Positive affect	Negative affect
P1	+20.36% improving	–14.22% improving
P2	+39.15% improving	–10.64% improving
P3	+32.28% improving	–11.83% improving
P4	+3.19% improving	–18.55% improving
P5	–2.10% deteriorating	–4.42% improving
P6	+14.25% improving	–9.09% improving
P7	+15.09% improving	+0.28% deteriorating

[7] Average relative score change

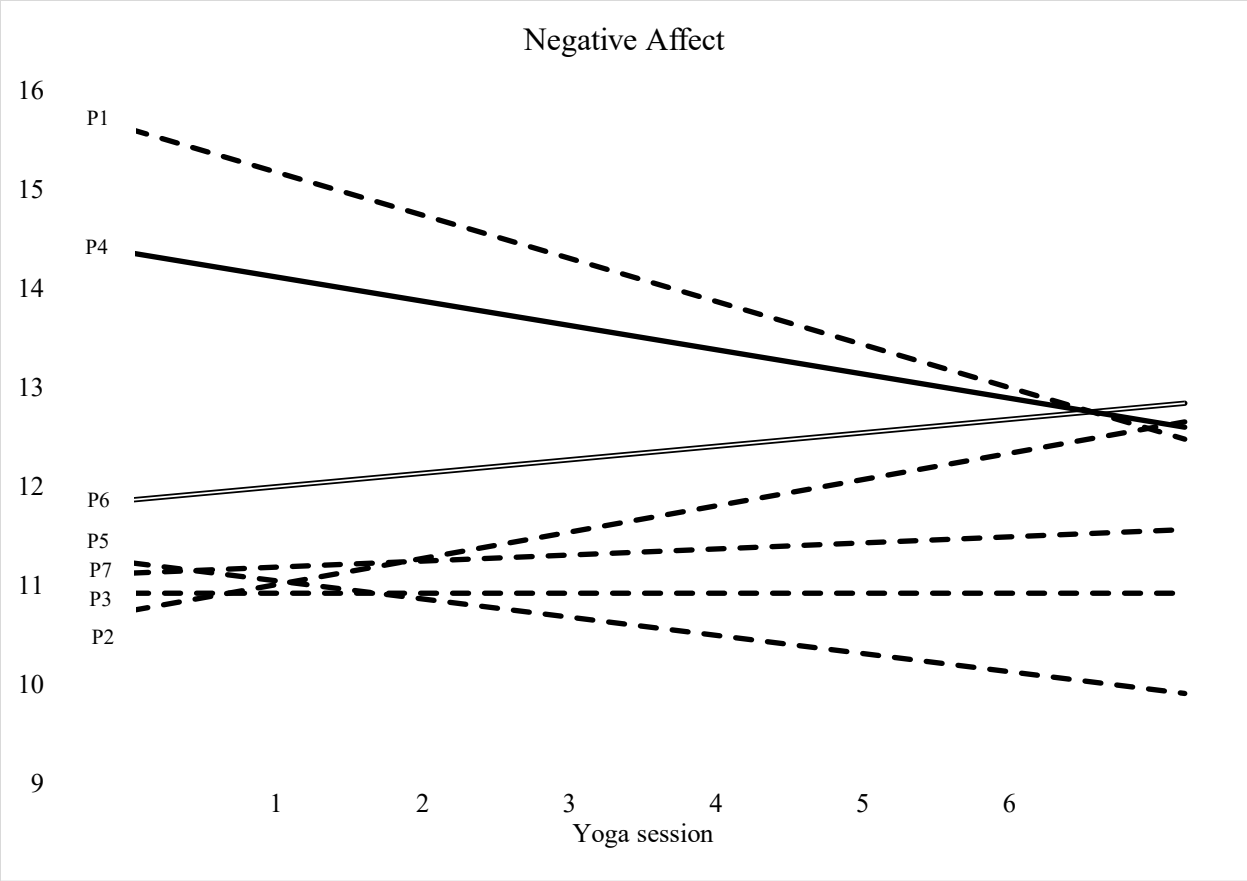
Group-level

Figure 4: P1-P7 Chart with Positive Affect Trendlines from Yoga Session 1 to 6



As portrayed by the seven trendlines in Figure 4, upward trends are apparent in all participants' positive affect. Calculations reveal that mean relative score in participants' positive affect after yoga sessions increased on average by 17.46%. Furthermore, the average number of sessions that resulted in an improvement in participants' positive affect was 5 out of 6.

Figure 5: P1-P7 Chart with Negative Affect Trendlines from Yoga Session 1 to 6



A blend of upward, downward, and stable trends are made evident by the seven trendlines in Figure 5. Over the study, negative affect decreased in three participants (i.e., P1, P4, and P5), increased in one participant (i.e., P2), and remained the same in three participants (i.e., P3, P6, and P7). Calculations indicate that mean relative score in participants' negative affect after yoga sessions decreased on average 9.78%. Moreover, the average number of yoga sessions that brought about a therapeutic effect in participants' negative affect was 3.57 out of 6.

Table 11

Average Relative Score Changes and Standard Deviations for All Participants by Variable and Average Number of Yoga Sessions that Resulted in an Improvement in Participants' State Variables

Variable	x Relative Score Change	Standard Deviation (SD)	x Number of Yoga Sessions (out of 6)
Mental Health	+16.98% improving	14.30	/
TSC	+25.28% improving	21.07	/
SSC	+11.02% improving	9.96	3.86
TSV	+13.65% improving	14.85	/
SSV	+21.72% improving	11.71	5.29
Positive Affect	+17.46% improving	13.63	5.00
Negative Affect	–9.78% improving	5.76	3.57

Chapter V: General Discussion

The purpose of this thesis was to examine the immediate and prolonged impact of integrating a yoga program into a positive education course offered at the University of Ottawa on undergraduate students' mental health, affect, self-compassion, and vitality. A novelty that this thesis offers is the revelation of yoga's ability to produce state- vs trait-level changes in these well-being variables. Our results give promise to future yoga classes within university settings, given that all well-being variables under investigation were positively affected by the yoga program. Indeed, 18 of the 21 relative score changes in trait variables reported in this thesis were therapeutic, as were 25 of the 28 average relative score changes in state variables. Therefore, 43/49 (88%) score changes in participants' variables indicated a favourable response to the yoga program. The three most influenced outcomes were TSC (i.e., trait self-compassion), SSV (i.e., state subjective vitality), and positive affect, followed by mental health, TSV (i.e., trait subjective vitality), SSC (i.e., state self-compassion), and negative affect.

Yoga and Mental Health

As hypothesized and demonstrated in prior work (Domingues, 2018; Kulkarni et al., 2022), yoga practice promoted the participants' mental health. The participant group's mean relative mental health score increased by 16.98% from phase A_1 to A_2, as mentioned in Chapter III. Since no other researchers to our knowledge have assessed yoga's impact on their participants' mental health using the Mental Health Continuum, it is not possible to compare our results to previous studies. Nonetheless, the mental health benefits reported in this study are more than twofold those of a similar study, wherein first-year medical students experienced a 7.07% relative score increase in mental health after engaging in a five-week mindfulness-based lifestyle course (Kakoschke et al., 2021). Furthermore, this study's mean relative mental health

score increased 7.88% more than the one reported in a previous quantitative study from our lab evaluating the effectiveness of this 13-week positive education course without the yoga program (Pastore & Fortier, 2022). Therefore, it is fair to conclude that the yoga program doubled the mental health benefits of the positive education course.

Various mechanisms underpinning the mental health benefits of yoga can explain our findings. First, yoga has been shown to foster mental health via a gained sense of control over one's cognitive processes and emotional reactions during yoga, thereby resulting in more efficient mental health management (Posadzki et al., 2010). Relatedly, the participants' journal entries foreground the many cognitive and emotional tools they acquired through their yoga sessions, including present moment awareness and self-kindness, which will be discussed in the following sections of this chapter. Further, the breath practices and stretching exercises that characterize yoga have been established to support mental health as well as alleviate stress (Mehta & Taneja, 2013), which was a recurring theme in the journal entries submitted by the participants after the yoga sessions. As described in Chapter IV, on average, the participants reported being in a state of calm during and/or after most of the yoga sessions. According to their journal entries, the yoga program helped them release their emotions and, in turn, attenuate any stress they were carrying. Thus, it is likely that the serenity brought forth by the yoga classes contributed to their mental health improvements. Considering yoga's mood-enhancing qualities (Craighead, 2015), participants' improvements in affect (i.e., this study's state measure for mental health) may also have been responsible for their increases in mental health.

Yoga and Affect

Affect was appraised in this thesis to better comprehend yoga's momentary impact on mental health. Aligned with our hypothesis and previous research (Chang et al., 2022), practicing

yoga generally improved the participants' affect immediately. First, the yoga program was globally therapeutic for participants' positive affect, leading to a mean relative score increase of 17.46% after the yoga sessions. The calculations of the mean number of yoga sessions that produced a therapeutic effect in positive affect uphold this finding: On average, 5 out of 6 yoga sessions ($x = 83.33\%$) increased participants' positive affect. This is the first study to our knowledge to calculate such a statistic, which provides additional insight into yoga's effectiveness in ameliorating positive affect. In a similar vein, practicing yoga on average lowered the participants' negative affect after the yoga sessions ($x = –9.78\%$). Notwithstanding, as can be observed, the impact was less significant than that of positive affect. In fact, negative affect was the least positively influenced well-being variable by the yoga program. In comparison with positive affect, 3.57 out of 6 yoga sessions ($x = 59.5\%$) decreased the participants' negative affect on average. A factor that could explain this small mean relative score decrease in negative affect is the presence of a ceiling effect: Participants tended to score low in negative affect prior to their yoga sessions and, consequently, there was little to no leeway for the practice to significantly decrease their negative affect. While our negative affect results are in conformity with those of a similar pretest-posttest study (Craighead, 2015), wherein undergraduate students practiced yoga for six weeks and experienced a mean relative negative affect score decrease of 11.06%, our positive affect increases were lower than those reported in the same study (17.46% vs 32.06%). However, it should be noted that the data in Craighead's (2015) study were obtained merely on the first and last day of the intervention and are therefore not representative of the participants' fluctuating affective states.

In parallel with the quantitative data, participants' journal entries often depicted increases in positive affect post-yoga, while changes in negative affect were rather rare. According to the

literature, positive affect refers to positively toned emotions such as alertness (Miller, 2011), pride (Folkman & Lazarus, 1985), and excitement (Folkman & Moskowitz, 2000), which were all represented in the journal entries. While the participants reported feeling a wide array of positive emotions during and after the yoga sessions (seven of which are positive emotions used in the PANAS), the most common ones fell into the categories of pride, serenity, and alertness. Foremost, the participants often mentioned feeling proud after their yoga sessions, which is consistent with a qualitative inquiry indicating that pride is a perceived benefit of yoga practice (Greysen et al., 2017). The participants' pride seemed to have emanated from the tenacity they exhibited when they encountered (and subsequently overcame) challenges during the practice. This ability to persevere in the face of difficulties may be ascribable to a rise in willpower, a skill that has been shown to be developed through yoga practice (Park et al., 2018).

The two other positive emotions that were ubiquitous in the journal entries and that are commonly prompted by yoga practice are serenity (Syed et al., 2022) and alertness (Kochupillai, 2015). The neuroscience behind yoga explains why the classes inculcated this dichotomous serene energy within the majority of the participants. Indeed, yoga's effect on brainwaves, whose frequencies change according to one's state of consciousness (Hima et al., 2020), may lie at the origin of these two elicited positive emotions (i.e., serenity and alertness). According to a recent systematic review for brain function improvement (De & Mondal, 2020), yogic practices are known to increase Alpha brainwaves, which are associated with a relaxed yet conscious state, as well as Beta brainwaves, which reflect a heightened state of awareness and concentration. In other words, yoga promotes serenity and awareness concurrently, ergo facilitating a state of relaxation in which one's alertness to the external world is amplified (Kochupillai, 2015). Additionally, the participants' alertness was often paired with increased 1) focus, 2) present

moment awareness, and 3) body awareness, three skills that have been shown to be enhanced by yoga practice (Capon et al., 2021). It has been documented that this gain in psychological skills is one of the mechanisms by which yoga induces positive emotions (Park et al., 2020).

In contrast to positive affect, changes in negative affect were seldom reflected in the journal entries. A few exceptions were the increases in negative affect demonstrated by P1, P5, and P7's rise in irritability during one of their yoga sessions, as well as the decreases in negative affect reported by P2, P3, and P6, who described feeling "less stressed", "less jittery", and "less nervous" after one of their yoga sessions, respectively. Therefore, the only two negative emotions from the PANAS that were communicated in the journal entries were irritability and nervousness, contrarily to the seven utilized positive emotions from the PANAS. Like nature therapy (McMahan & Estes, 2015), yoga appears to be a better positive affect enhancer than negative affect diminisher. To engender negative affect improvements, supplementing yoga with mindfulness-based stress reduction (La Torre et al., 2020) or cognitive behavioural therapy (Bock et al., 2012) may be required. In short, on average, participants' positive affect increased both to a greater degree and more frequently than their negative affect decreased. The yoga program occasioned these benefits both directly and through the promotion of skills that, in turn, fueled their positive emotions. These skills included being tenacious, aware of the present moment, and compassionate with oneself.

Yoga and Self-compassion

Partaking in the yoga program increased the participants' self-compassion, which corresponds with our hypothesis and findings of previous inquiries (Muehlenkamp & Wagner, 2022). As stated in Chapter III, mean relative score increases in TSC (25.28%) were identified in the participant group. These significant gains are greater than those of previous yoga and positive

education studies with university students: Erkin and Şenuzun Aykar (2021) and Mathad and colleagues (2017) found 11.49% and 5% mean increases in their yoga participants' TSC, respectively, while Pastore and Fortier (2022) found a 17.3% mean increase in their students' TSC after having participated in this positive education course. The same applies to other studies with non-student populations (e.g., an eight-week yoga and compassion meditation program resulted in a 6.67% mean increase in participants' TSC; Danucalov et al., 2017). A mechanism that could explain the beneficial effects of yoga practice on TSC is mindfulness, which is deepened through breathwork and stretching (Wong et al., 2021). Enhanced TSC not only contributes to greater mental health in university students (González-García et al., 2021), but also alleviates stress (Riley & Park, 2015), which is logical given the prominent feelings of calmness reported in the participants' journal entries.

As for SSC, the participant group's mean relative score increased on average by 11.02%, and a grouped average of 3.86 out of 6 yoga sessions ($x = 64.33\%$) generated increases in this variable. Although yoga's effects on TSC is an area of emerging research, no studies to our knowledge have appraised the associations between yoga practice and SSC. Accordingly, the present study would be the first one to evaluate yoga's effects on SSC and ultimately elucidate yoga's ability to support immediate changes in self-compassion. Our participants' general increases in SSC after yoga sessions are conceivable because SSC is positively correlated with positive affect and negatively correlated with negative affect through the perception of less stress and engagement in healthier coping mechanisms (Ewert et al., 2022). These outcome and mediator variable changes are in accordance with our results that the yoga program generally promoted positive affect, serenity, and coping skills, such as tenacity and adaptive emotional responses to failure.

Associated with SSC (Conway, 2020), adaptive emotional responses to failure during the yoga sessions were made evident by the participants' journal entries. When the yoga sequence became too challenging, the participants often disclosed extending kindness to themselves, which is both a positive response to the self (Miyagawa et al., 2020) and an adaptive way of responding to failure (Neff, 2016). Acts of self-kindness in which multiple participants engaged during difficult yogic moments included approaching their practice with patience, honouring their body's needs, adapting their poses, and allowing themselves to be imperfect. Participants also often exhibited behaviours that denoted their release of control (i.e., slowing down and/or pausing during difficult poses), which was another form of self-kindness that was cultivated by the group. By adopting a tender approach and allowing themselves to go at their own pace, the participants offered themselves the gentleness and non-judgmental understanding they needed to proceed with their session. Therefore, the participants' self-kindness, which represents one of the three elements of self-compassion (Neff, 2003a), is an acquired coping skill that would explain their increases in SSC and, ultimately, TSC.

In summary, the yoga program contributed to a considerable improvement in the participants' self-compassion, especially TSC (i.e., the well-being variable that augmented most in the study). These results indicate that yoga practice is more apt to bring about prolonged than instant self-compassion benefits, a finding that has yet to be reported in the literature. Interestingly, the opposite trend was observed in the participants' vitality scores, wherein yoga brought about superior state-level benefits.

Yoga and Vitality

As discussed in Chapter III, it would appear that a mere handful of studies explored the associations between yoga and subjective vitality (Dagar et al., 2022; Danucalov et al., 2017;

Moliver, 2010; Moliver et al., 2013, Pandey et al., 2017), all of which demonstrated that practicing yoga promotes TSV specifically. Consistent with these publications and our hypothesis, yoga practice enhanced the participants' TSV (13.65%). These improvements are similar to those reported in Dagar and colleagues' (2022) study, in which university students experienced a 17.22% relative score increase in TSV after participating in an eight-week self-management course supplemented by yoga-based practices. However, no previous studies to our knowledge examined yoga's effects on SSV. Our findings indicate that increases in SSV after the yoga sessions were even more significant (21.72%) than those of TSV, suggesting that yoga practice is more suitable for providing immediate than lasting vitality benefits. In fact, SSV is the state variable that increased most in the study.

With the absence of evidence documenting yoga's impact on SSV, it is difficult to interpret the significance of our findings. Nevertheless, they are rational for numerous reasons. First, SSV is inextricably linked to TSV, which increased in most participants from phase A_1 to A_2 and is fostered by yoga practice, as per the five publications cited above. Second, subjective vitality is positively correlated with positive affect (Ryan & Frederick; 1997), a variable that also measurably increased in our participants during and/or after the yoga sessions. Along the same vein, it was documented in a recent publication that "[t]he energy activated through yoga-based practices stimulates a sense of exuberance and positive affect, such as subjective vitality" (Dagar et al., 2022, p. 194). Finally, since the surges in SSV after the yoga sessions were so significant and an average of 5.29 out of 6 sessions ($x = 88.17\%$) led to improvements, it is plausible that the yoga program was responsible for the increases in participants' SSV. A factor that may explain why changes in SSV were more significant than those of TSV include yoga's ability to

heighten one's energy through the marriage of meditative breathing (Zouch et al., 2021) and body movement (Liao et al., 2017).

In keeping with the quantitative results, the participants often expressed in their journals feeling more energetic during and/or after the yoga sessions. As explained in Chapter IV, the large majority of their responses to the prompt "Describe your energy levels before, during, and after the yoga practice" indicated an increase in SSV during and/or after the sessions. Furthermore, the yoga program altered the type of energy the participants reported feeling. In fact, the participants' journal entries revealed that they either experienced a serene energy (i.e., a dichotomy that would appear to characterize yoga, given the practice's profound effect on brainwave activity) or a zestful energy (i.e., a feeling that is marked by animation, exuberance, and motivation). As is the case for serene energy, the participants' zestful energy is congruent with evidence showing that yoga leads to higher enthusiasm and energy levels to tackle everyday challenges (Laxman, 2021). Given that enthusiasm and determination constitute positive affective states, and that SSV and positive affect are the second and third most positively influenced variables by the yoga program, respectively, it is logical to conclude that the yoga program was responsible for these gains. In brief, participants' detailed descriptions of their energy levels and types throughout the yoga sessions provided clear insight into their SSV.

Strengths and Significance

This thesis contributes to the modest body of knowledge vis-à-vis yoga practice, positive education, and university students' mental health by unearthing the synergistic benefits of yoga and positive education. These two emerging research fields are rarely studied in tandem, let alone applied together in the university context. As the mental health and self-compassion benefits reported in this study are greater than those reported in our previous quantitative study

on this positive education course's effectiveness without the yoga program (Pastore & Fortier, 2022), it is likely that practicing yoga expands the benefits of positive education. This is in line with the findings of Carr and colleagues' mega-analysis of meta-analyses (2023): Relative to other positive psychology interventions, mind-body practices such as yoga further promote well-being. The favourable effects of the yoga-enhanced positive education course under investigation on students' well-being variables has important practical implications for university students, a subpopulation marked by a high prevalence of mental health problems (Dessauvagie et al., 2022). These results may encourage other schools within and outside the University of Ottawa to not only offer positive education courses, but also integrate yoga within them to maximize their students' well-being. Namely, incorporating two 45-minute yoga classes per week for six consecutive weeks within a positive education course was adequate to yield significant improvements in mental health, positive affect, self-compassion, and vitality.

This thesis also reveals yoga's effectiveness in producing state- vs trait-level improvements in well-being variables which, to our knowledge, has never been assessed nor discussed in the literature. Comparing yoga's benefits after one session versus an entire program casted light on yoga's ability to 1) increase positive and reduce negative emotions, 2) elicit a vital and self-compassionate mindstate, and 3) engender prolonged changes in mental health, self-compassion, and vitality with regular practice. One of our most important findings consists of yoga's ability to promote lasting self-compassion and immediate vitality benefits, demonstrating that regular yoga practice may be required to increase self-compassion, whereas one yoga session may be sufficient to increase vitality. Given the stressful time periods university students regularly endure (Campbell et al., 2018), this subpopulation can derive advantage from such instant and prolonged well-being benefits. Thus, our results further

underscore the value of increasing yoga's accessibility on university campuses. Another valuable finding in this study is that some students are more responsive to yoga than others. In fact, P1 (who reported having a mental illness), P3, and P6 scored lowest in all trait variables (i.e., mental health, TSC, and TSV) during Phase A_1 and experienced the greatest increases in those well-being variables (along with SSC). This suggests that yoga, especially when used as a means to enhance well-being in a prolonged manner, may have greater value for students who score lower in trait well-being variables and/or report having a mental illness. Conversely, when used as an immediate well-being enhancer, yoga practice appears to be suitable for students with a range of trait well-being variable scores.

In addition to providing grounds for future research in yoga and positive education, this thesis emphasizes the positive mental health outcomes of engaging in yoga practice, which is an uncommon approach in the yoga literature. Indeed, according to a systematic review and meta-analysis, yoga interventions are almost entirely geared towards mental illness mitigation as opposed to mental health promotion (Hendriks et al., 2017). Therefore, our research evinces that yoga is a mental health promoting practice that is not reserved to individuals with mental illness and, as such, can also be suitable for those without mental illness. Moreover, rather than merely measuring our participants' well-being variables, we also qualitatively assessed them through the use of journals. The ensuing rich qualitative data helped inform the quantitative results and vice-versa, thereby allowing for a more thorough analysis of the research problem than using the traditional qualitative and quantitative research approaches separately (Creswell & Plano Clark, 2007; Greene et al., 1989; Tashakkori & Teddlie, 2010). Pairing the in-depth nature of qualitative data with the rigour of quantitative data also neutralized the limitations of separate qualitative and quantitative approaches and drew on the strengths of both to provide stronger

inferences (Bryman, 2006; Creswell et al., 2003). Further, mixed methods research fosters validity through triangulation, which seeks corroboration between qualitative and quantitative data (Bryman, 2006). In this thesis, having the participants describe how they felt before, during, and after their yoga sessions enabled us to not only elucidate the quantitative results, but also get a grasp of the participants' experiences during the yoga program. That is to say, the participants' journal entries provided additional insight into the affective, self-compassion, and vitality benefits of yoga practice, which expands on the literature wherein mainly quantitative methods are employed. The qualitative data also clarified the means by which the participants benefited from the yoga program (e.g., greater pride and serene energy), which helps researchers understand the mechanisms of yoga on well-being and could assist practitioners in optimizing the design of yoga programs. In closing, this thesis deepens the waters of yoga and positive education research by triangulating quantitative and qualitative data as well as uniting fields and constructs that heretofore were not appraised concurrently within the same study. The resulting practical implications can help inform the separate or combined implementation of yoga and positive education courses on university campuses.

Limitations and Future Directions

All studies have limitations, and this one is no exception. Being a single case experimental design, this study had a limited number of participants, which is often a major challenge in research. Due to the individualized nature of the research design (Privitera & Ahlgrim-Delzell, 2018), single case experimental studies require small sample sizes (Krasny-Pacini & Evans, 2018) and tend to generate external validity concerns (Alnahdi, 2015; Engel & Schutt, 2016). While the modest sample size (n=7) was compensated with the rigour of the quantitative design and the richness of the qualitative data, it did not provide satisfactory power

to analyze subgroups (e.g., age and gender) nor generalize our findings to the general university student population. Future studies should adopt a study design (e.g., randomized controlled trial) that allows for a greater amount and diversity of participants (e.g., students outside a school of human kinetics) and, in turn, more sophisticated analyses (e.g., mediation and moderation). An additional ramification of the small sample size is the lack of multiple baselines, which would have separated the intervention effects from those of experience, maturation, and learning (Lobo et al., 2017). Since the yoga program was not introduced in a staggered fashion across time, the causal relations among the study variables could not be confirmed. Hence, the reported changes in well-being outcomes could have been due to factors other than the intervention, such as skill improvement, weather changes, and timing of exams. Future investigations ought to implement multiple baselines to account for the impact of such factors on participants' well-being outcomes.

The data collection methods used in the current study also posed some limitations. First, to accommodate the francophone participants, the questionnaires were translated from English to French. As some English words have no French equivalent, there may have been slight linguistic differences between the original and translated questionnaires, which may have affected the resulting data. Moreover, the short forms of the MHC and SSCS were used in this study to measure participants' mental health and state self-compassion. While these scales were more practical and less time-consuming for the participants to fill out than their extended versions, the latter may have provided more accurate scores. To offset this limitation, researchers may want to analyze the subscales of the MHC (i.e., emotional, psychological, and social well-being) and SSCS (i.e., self-kindness, common humanity, and mindfulness) to determine which of the subcomponents are most responsible for the changes elicited by the yoga program.

Another limitation of this thesis is the online delivery of the yoga program. Although the classes were intended to be delivered in-person, they had to be offered virtually due to the upsurge of COVID-19 cases. A recent cross-sectional survey reported that, compared to online yoga, in-person yoga generates significantly greater mental health and mood benefits, focus, and energy (Brinsley et al., 2021). This survey also showed that at-home yoga practice is hindered by improper equipment, distractions, interruptions, technological difficulties, and lack of alignment cues and hands-on assistance from the yoga practitioner (Brinsley et al., 2021). To minimize these nuisances and maximize the intervention outcomes, researchers are encouraged to deliver their yoga program in-person. Further, there are methodological limitations associated with the virtual yoga classes. Since the participants completed asynchronous and live yoga classes (during which they were not required to have their camera on), it was not possible to monitor the participants as they practiced their yoga. Therefore, it could not be guaranteed that the participants truthfully completed their sessions and post-yoga questionnaires immediately after the yoga. We attempted to mitigate this by having the participants send us a picture of their yoga mat after their sessions as a proof of completion.

In light of university students' substantial stress levels, the participants were not required to fill out a questionnaire before and after their asynchronous yoga sessions. While this eased the burden on the participants, it prevented inferences of the phase B results to be drawn from the biweekly practice of yoga. An area open for further exploration is the role yoga plays on university students' life satisfaction and meaning in life. Not only are these variables associated with mental health (Lombardo et al., 2018; Mohammadi et al., 2018), but they are also measured with shorter scales (i.e., the Satisfaction with Life Scale and Meaning in Life Questionnaire), thereby allowing researchers to obtain data before and after each yoga session without taxing

their participants. Another route that was not explored in this thesis is whether different types of yoga (e.g., Hatha vs Vinyasa vs Restorative) offer distinct student well-being benefits. Future researchers are therefore invited to conduct a multi-arm trial to compare the impact of various types of yoga on university students' well-being variables. Lastly, future investigators should seek to confirm whether yoga practice is in fact 1) more effective in increasing trait variables in individuals with poorer well-being variable scores and 2) equally effective in increasing state variables in individuals with low, moderate, and high well-being variable scores. We hope that these future directions help inform the implementation of yoga and/or positive education courses on campuses within and outside the University of Ottawa.

Conclusion

In this thesis, the student mental health, affect, self-compassion, and vitality effects of integrating a yoga program into a positive education course are presented. In line with our hypothesis, practicing yoga was proven fruitful in yielding immediate and lasting well-being benefits, particularly in TSC (i.e., trait self-compassion), SSV (i.e., state subjective vitality), and positive affect. Our findings not only replicate previous studies examining the positive outcomes of positive education and yoga on mental health as separate interventions, but also extend these studies by showcasing 1) the added benefits of fusing both approaches, 2) the immediate vs prolonged impact of engaging in yoga and/or positive education courses on diverse well-being variables, and 3) some mechanisms that rest at the core of the ensuing benefits. Discovered mechanisms include enhanced calmness, alertness, exuberance, and motivation, as well as acquired coping skills such as tenacity, focus, and self-kindness. Another gap in the literature that this thesis bridges is the paucity of research employing mixed methods to assess the effects of yoga and positive education on university students' well-being. By expanding knowledge

around yoga and positive education's effectiveness in promoting student well-being, we are one step closer to mitigating the mental health crisis across university campuses and optimizing students' personal growth. We strongly advocate that curriculum developers, program evaluators, and faculty members consider rendering yoga and/or positive education courses accessible to their university students.

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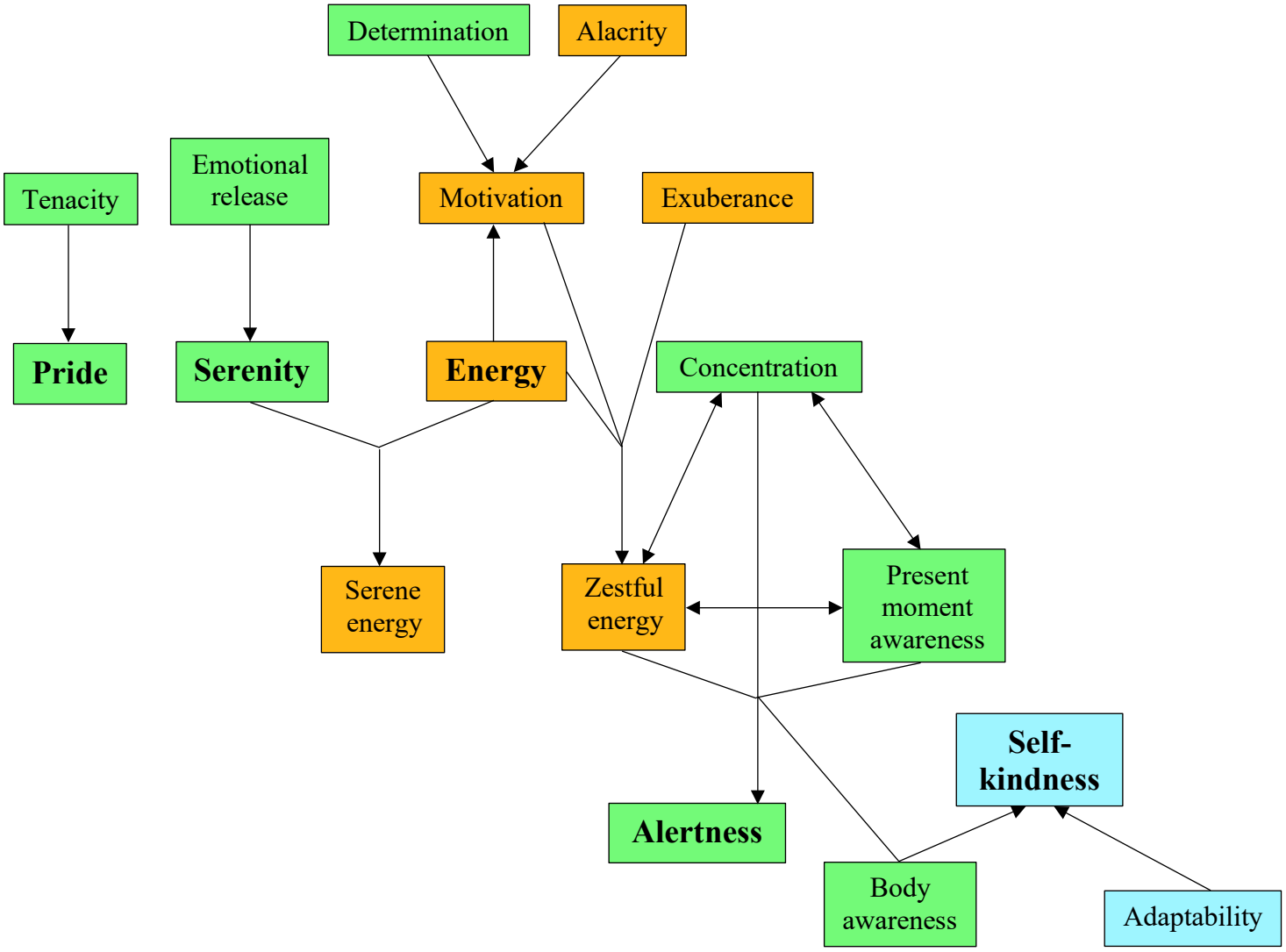
Figure 6

Thematic Map

Overarching themes: Affect, State Self-compassion (SSC), and State Subjective Vitality (SSV)



Appendix A

Certificate of Ethics Approval

13/01/2022

Université d'Ottawa
Bureau d'éthique et d'intégrité de la recherche

University of Ottawa
Office of Research Ethics and Integrity

CERTIFICAT D'APPROBATION ÉTHIQUE | CERTIFICATE OF ETHICS APPROVAL

Numéro du dossier / Ethics File Number	H-10-21-7454
Titre du projet / Project Title	A Vital Mind in a Vital Body: Integrating Yoga Practice into an Undergraduate Quality of Life Course
Type de projet / Project Type	Thèse de maîtrise / Master's thesis
Statut du projet / Project Status	Approuvé / Approved
Date d'approbation (jj/mm/aaaa) / Approval Date (dd/mm/yyyy)	13/01/2022
Date d'expiration (jj/mm/aaaa) / Expiry Date (dd/mm/yyyy)	12/01/2023

Équipe de recherche / Research Team

Chercheur / Researcher	Affiliation	Role
Sarah MCALLISTER	École des sciences de l'activité physique / School of Human Kinetics	Chercheur Principal / Principal Investigator
Michelle FORTIER	École des sciences de l'activité physique / School of Human Kinetics	Superviseur / Supervisor
Olivia PASTORE	École des sciences de l'activité physique / School of Human Kinetics	Co-chercheur principal / Co-principal investigator

Conditions spéciales ou commentaires / Special conditions or comments

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www.recherche.uottawa.ca/deontologie | www.recherche.uottawa.ca/ethics

13/01/2022

Université d'Ottawa
Bureau d'éthique et d'intégrité de la recherche

University of Ottawa
Office of Research Ethics and Integrity

Le Comité d'éthique de la recherche (CÉR) de l'Université d'Ottawa, opérant conformément à l'*Énoncé de politique des Trois conseils* (2014) et toutes autres lois et tous règlements applicables, a examiné et approuvé la demande d'éthique du projet de recherche ci-nommé.

L'approbation est valide pour la durée indiquée plus haut et est sujette aux conditions énumérées dans la section intitulée "Conditions Spéciales ou Commentaires". Le formulaire « Renouvellement ou Fermeture de Projet » doit être complété quatre semaines avant la date d'échéance indiquée ci-haut afin de demander un renouvellement de cette approbation éthique ou afin de fermer le dossier.

Toutes modifications apportées au projet doivent être approuvées par le CÉR avant leur mise en place, sauf si le participant doit être retiré en raison d'un danger immédiat ou s'il s'agit d'un changement ayant trait à des éléments administratifs ou logistiques du projet. Les chercheurs doivent aviser le CÉR dans les plus brefs délais de tout changement pouvant augmenter le niveau de risque aux participants ou pouvant affecter considérablement le déroulement du projet, rapporter tout évènement imprévu ou indésirable et soumettre toute nouvelle information pouvant nuire à la conduite du projet ou à la sécurité des participants.

The University of Ottawa Research Ethics Board, which operates in accordance with the *Tri-Council Policy Statement* (2014) and other applicable laws and regulations, has examined and approved the ethics application for the above-named research project.

Ethics approval is valid for the period indicated above and is subject to the conditions listed in the section entitled "Special Conditions or Comments". The "Renewal/Project Closure" form must be completedfour weeks before the above-referenced expiry date to request a renewal of this ethics approval or closure of the file.

Any changes made to the project must be approved by the REB before being implemented, except when necessary to remove participants from immediate endangerment or when the modification(s) only pertain to administrative or logistical components of the project. Investigators must also promptly alert the REB of any changes that increase the risk to participant(s), any changes that considerably affect the conduct of the project, all unanticipated and harmful events that occur, and new information that may negatively affect the conduct of the project or the safety of the participant(s).

Germain ZONGO
Responsable d'éthique en recherche / Protocol Officer
Pour/For **Daniel LAGAREC** Président(e) du/ Chair of the **Comité d'éthique de la recherche en sciences de la santé et sciences / Health Sciences and Sciences Research Ethics Board**

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Appendix B

Participant Recruitment E-mail

Recruitment E-mail

An English message follows

Bonjour les étudiant(e)s de Qualité de vie ! Nous espérons que vous avez profité de votre temps des fêtes et que vous avez pris le temps de vous reposer.

Je m'appelle Sarah McAllister et je suis une étudiante de première année à la maîtrise en Sciences de l'activité physique sous la supervision de Dre Fortier ici à l'Université d'Ottawa. Comme vous êtes actuellement inscrit(e) au cours Qualité de vie avec Dre Fortier ce trimestre d'hiver, j'aimerais vous offrir l'opportunité de participer à une étude que je mène avec l'aide d'Olivia Pastore, une doctorante de deuxième année en Sciences de l'activité physique également sous la supervision de Dre Fortier à l'Université d'Ottawa.

L'objectif principal de l'étude est d'examiner l'impact de l'intégration d'une composante de yoga dans les cours de Qualité de vie (APA 4117/4517) sur la santé mentale des étudiant(e)s de premier cycle.

Si vous choisissez de participer à l'étude, celle-ci durera 10 semaines au total et se déroulera pendant le trimestre d'hiver (janvier 2022 - avril 2022). L'étude comprendra trois phases :

1. Base de référence (2 semaines): Phase durant laquelle vous remplirez deux sondages par semaine. Chaque sondage prendra jusqu'à 20 minutes à remplir.
2. Yoga (6 semaines): Phase durant laquelle vous participerez à **deux séances hebdomadaires de yoga de 45 minutes d'intensité légère à domicile**. Vous remplirez également un sondage avant et après une des sessions hebdomadaires de yoga. Chaque sondage prendra jusqu'à 10 minutes à remplir.
3. Base de référence (2 semaines): Phase durant laquelle vous remplirez deux sondages par semaine. Chaque sondage prendra jusqu'à 20 minutes à remplir.

Il n'y a **pas d'obligation** de participer à cette étude, et si vous choisissez de participer, vous pouvez vous retirer de l'étude à tout moment et/ou refuser de répondre aux questions, sans en subir de conséquences négatives. Votre choix de participer ou non à cette étude **ne sera pas** partagé avec Dre Fortier et n'affectera pas votre note dans le cours.

Si vous souhaitez participer à cette étude, et n'avez pas pratiqué le yoga ou la méditation plus d'une fois par semaine au cours des six derniers mois, veuillez répondre directement à ce courriel. **Notez que les participants seront choisis selon le principe du premier arrivé, premier servi, et que nous acceptons 15 participants**. Si vous êtes intéressé(e)s à participer, nous vous contacterons pour fixer une réunion Zoom avec vous afin de discuter de l'étude plus en détail.

N'hésitez pas à nous contacter si vous avez des questions !

Hello Quality of Life students! We hope you enjoyed your holiday season and took some time to rest.

My name is Sarah McAllister, and I am a first-year Human Kinetics Master's student under the supervision of Dr. Fortier here at the University of Ottawa. As you are currently enrolled in the Quality of Life course with Dr. Fortier this Winter term, I would like to provide you with the opportunity to participate in a study that I am conducting with the help of Olivia Pastore, a second-year Human Kinetics PhD Candidate also under the supervision of Dr. Fortier at the University of Ottawa.

The primary purpose of the study is to examine the impact of integrating a yoga component into the Quality of Life courses (APA 4117/4517) on undergraduate students' mental health.

If you choose to participate in the study, it will be 10 weeks total for you and will occur during the Winter term (January 2022 – April 2022). The study will involve three phases:

1. Baseline (2 weeks): Phase during which you will fill out two surveys per week. Each survey will take up to 20 minutes to complete.
2. Yoga (6 weeks): Phase during which you will participate in **two weekly 45-minute light-intensity yoga sessions at home**. You will also fill out a survey before and after one of the weekly yoga sessions. Each survey will take up to 10 minutes to complete.
3. Baseline (2 weeks): Phase during which you will fill out two surveys per week. Each survey will take up to 20 minutes to complete.

There is **no obligation** to participate in this study, and if you choose to participate, you can withdraw from the study at any time and/or refuse to answer any questions, without suffering any negative consequences. Your choice to participate or not in this study **will not** be shared with Dr. Fortier nor will it affect your grade in the course.

If you would like to participate in this study, and have not been practicing yoga or meditation more than once a week over the last six months, please answer this email directly. **Note that participants will be chosen on a first-come-first-serve basis, and that we are accepting 15 participants**. If you express interest, we will be in touch to schedule a Zoom meeting with you to further discuss the details of the study.

Do not hesitate to contact us if you have any questions!

Appendix C

Participant Consent Form

Université d'Ottawa
Faculté des sciences de la santé

École des sciences de l'activité physique

University of Ottawa
Faculty of Health Sciences

School of Human Kinetics

Formulaire de consentement

Titre de l'étude : *Un esprit vital dans un corps vital : Intégrer la pratique du yoga dans un cours de qualité de vie de premier cycle*

Chercheure principale : Sarah McAllister[1] Étudiante à la maîtrise
Superviseure : Dre Michelle Fortier[1]
Co-chercheure : Olivia Pastore[1] Candidate au doctorat

[1]*Affiliation : École des sciences de l'activité physique, Faculté des sciences de la santé, Université d'Ottawa*

Invitation à participer : Je suis invité(e) à participer à l'étude de recherche susmentionnée menée par Sarah McAllister, Dre Michelle Fortier, et Olivia Pastore. Cette étude est le projet de thèse de Maîtrise de Sarah.

Objectif de l'étude : L'objectif global de l'étude est d'examiner l'impact de l'intégration d'une composante de yoga dans les cours de Qualité de vie (APA 4117/4517) sur la santé mentale des étudiant(e)s de premier cycle.

Participation: Cette étude se déroulera sur une période de quatorze semaines au total (dix semaines pour chaque participant) pendant le trimestre d'hiver (janvier 2022 – avril 2022) et contiendra trois phases : A_1 (base de référence 1), B (composante de yoga), and A_2 (base de référence 2). Au début et à la fin de chaque semaine de mes bases de référence de deux semaines, je serai demandé de compléter un sondage en ligne incluant des mesures de santé mentale, d'auto-compassion, et de vitalité. Donc, il y aura quatre sondages en tout, et le premier contiendra également des questions démographiques (p.ex. : âge, genre), ainsi que les critères d'inclusion et d'exclusion. Après avoir complété ma base de référence de deux semaines, je commencerai la phase B, la composante de yoga.

Cette intervention de yoga de six semaines comprendra une séance en direct dirigée par une instructrice et une séance préenregistrée par semaine, tous deux livrées en ligne. La séance en direct sera une séance de yoga à faible intensité de 45 minutes offerte par un instructrice de yoga certifiée via *Zoom* tous les lundis à midi pendant la phase B. Chaque séance sera enregistrée pour les étudiants en Qualité de vie qui ne sont pas sélectionnés pour l'étude mais souhaitent quand même pratiquer le yoga par eux-mêmes après l'étude. Avant et après chaque séance de yoga, dix minutes me seront allouées pour répondre à un sondage en ligne via *Survey Monkey* comprenant des mesures pour la santé mentale, l'auto-compassion, et la vitalité, ainsi qu'un journal personnel qui sera guidé par quatre questions ouvertes. Par conséquent, la durée totale de la séance sera d'environ soixante minutes. Comme preuve de complétion, je devrai avoir ma caméra allumée pendant toute la séance ou envoyer une photo de moi sur mon tapis de yoga (ou simplement mon tapis de yoga) à la

chercheure principale après la séance de yoga. Si je choisis de laisser ma caméra allumée pendant la séance de yoga, je n'apparaîtrai pas dans l'enregistrement. Si je choisis d'envoyer une photo, elle sera téléchargée dans un dossier *OneDrive* privé partagé. Une fois que la chercheure principale aura déterminé que j'ai complété la séance de yoga, ma photo sera définitivement supprimée de *OneDrive*.

La séance préenregistrée sera une vidéo de yoga *YouTube* de 45 minutes. Chaque mardi matin de la phase B, je recevrai le lien de la vidéo et j'aurai jusqu'au dimanche pour la terminer selon mon horaire. Il n'y aura pas de sondage ni de questions de journal à remplir après la session hebdomadaire à domicile. Cependant, je devrai envoyer une photo de moi sur mon tapis de yoga (ou simplement mon tapis de yoga) à la chercheure principale après ma séance de yoga à des fins de vérification.

À mi-chemin de la phase B (le vendredi de la troisième semaine), je remplirai le même sondage en ligne que celui administré durant la base de référence 1 (sans les questions démographiques). Une fois que j'aurai terminé la composante de yoga de six semaines, la base de référence 2 commencera et je remplirai le même sondage que celui administré durant la base de référence 1 (sans les questions démographiques) le lundi et le vendredi des deux semaines.

Risques : Je pourrais éprouver un léger inconfort psychologique ou émotionnel à la suite des questions de sondage ou de journal. J'ai reçu l'assurance de la chercheure que tous les efforts seront faits pour minimiser ces risques. J'ai également reçu une copie des services d'urgence offerts sur et hors campus, qui est fournie à la fin de ce formulaire. On m'a assuré que si je ressens un malaise psychologique ou émotionnel pendant la complétion du sondage ou du journal, je peux arrêter à tout moment sans subir de conséquences négatives. De plus, bien que les séances de yoga soient très légères et de faible intensité, je pourrais ressentir des douleurs musculaires ou de l'inconfort en m'étirant et en bougeant de nouvelles façons. J'ai été informé que l'instructrice de yoga certifiée des cours en direct prendra toutes les précautions pour assurer la sécurité des participants. Des modifications seront apportées à toutes les postures de yoga et je serai invité(e) à faire ce qui est le mieux pour mon corps. Enfin, le yoga est une expérience émotionnelle/spirituelle qui permet aux individus de ressentir leurs émotions. Par conséquent, je pourrais ressentir un inconfort psychologique ou émotionnel, selon mon état émotionnel. On m'a assuré que je pourrai quitter les séances de yoga à tout moment sans subir de conséquences négatives.

Avantages : La participation à cette étude pourrait améliorer l'efficacité d'une composante de yoga dans le cours de Qualité de vie offert à l'Université d'Ottawa. Ma participation à cette étude contribuera potentiellement à l'avancement des connaissances dans le domaine actuel de l'éducation positive et aidera à reconnaître le cours de Qualité de vie en tant que méthode d'accroître la santé mentale. De plus, participer à cette étude pourrait améliorer les avantages du cours de Qualité de vie en favorisant davantage ma santé mentale. Les effets positifs du yoga sur la santé mentale et physique furent bien établis dans la littérature, et cette composante de yoga me fournit une ressource supplémentaire à utiliser tout au long de ma vie pour maintenir ma santé mentale.

Confidentialité et anonymat : J'ai reçu l'assurance de la chercheure que les informations que je partage au cours de l'étude resteront strictement confidentielles. Cependant, les informations que je partage dans le journal personnel pourraient être citées dans l'analyse sans que mon nom ne soit révélé. On m'a garanti que mon identité sera protégée grâce à l'utilisation de codes de numéro d'identification pour identifier les participants sur toutes les transcriptions des journaux. On m'a également assuré que Dre Fortier n'aura pas accès aux données avant que les notes finales du semestre ne soient entrées et recevra seulement des transcriptions anonymisées des sondages et des entrées de journal. Finalement, on m'a assuré que toutes les données d'identification seront supprimées et détruites après la sélection, et que mon nom ne sera révélé dans aucun document ou publication à l'avenir.

Conservation des données : Je comprends que toutes les données de sondage et du journal personnel seront sur un ordinateur verrouillé avec un mot de passe protégé et des copies papier seront conservées dans le bureau verrouillé de la chercheure principale à l'Université d'Ottawa avec un accès limité. Les données seront conservées pendant 5 ans après la fin de la collecte des données et seront ensuite détruites en toute sécurité.

Compensation: Aucune compensation se sera accordée pour la participation à cette étude. Cependant, je recevrai six séances de yoga en direct gratuites pendant l'étude.

Participation volontaire: Il n'y a **aucune** obligation de participer à cette étude, et si je choisis de participer, je peux me retirer de l'étude à **tout moment** et/ou refuser de répondre à toute question, **sans** subir de conséquences négatives. Si je décide de me retirer de l'étude, mes données seront détruites à moins que la chercheure n'obtienne mon consentement pour les conserver.

Ressources de santé mentale
Sur le campus: 613-562-5411
Hors-campus: *Allo J'écoute, ligne d'assistance pour les étudiants des collèges et des universités* – 24 heures sur 24, 7 jours sur 7 (bilingue) : appelez au 1-866-925-5454 ou textez ALLOJECOUTEON au 686868

Acceptation: Je,_____, accepte de participer à l'étude de recherche ci-dessus menée par Sarah McAllister, Dre Michelle Fortier, et Olivia Pastore.

Si j'ai des questions concernant l'étude, je peux contacter les chercheures. Si j'ai des questions concernant la conduite éthique de cette étude, je peux communiquer avec le responsable du protocole pour l'éthique en recherche, Université d'Ottawa, Pavillon Tabaret, 550, rue Cumberland, pièce 154, Ottawa, ON K1N 6N5

Téléphone: (613) 562-5387 **Courriel**: ethique@uottawa.ca

*Il y a deux copies du formulaire de consentement, dont l'une est la mienne à conserver.

Participant(e):

_____ _____ _____

Université d'Ottawa
Faculté des sciences de la santé

École des sciences de l'activité physique

University of Ottawa
Faculty of Health Sciences

School of Human Kinetics

Consent Form

Title of the study: *A Vital Mind in a Vital Body: Integrating Yoga Practice into an Undergraduate Quality of Life Course*

Principal Investigator: Sarah McAllister[1] MA Student
Supervisor: Dr. Michelle Fortier[1]
Co-Investigator: Olivia Pastore[1] PhD Candidate

[1]*Affiliation : School of Human Kinetics, Faculty of Health Sciences, University of Ottawa*

Invitation to Participate: I am invited to participate in the abovementioned research study conducted by Sarah McAllister, Dr. Michelle Fortier, and Olivia Pastore. This study is Sarah's Master's thesis project.

Purpose of the Study: The overall purpose of the study is to examine the impact of integrating a yoga component into the Quality of Life courses (APA 4117/4517) on undergraduate students' mental health.

Participation: The study will occur over fourteen weeks total (ten weeks for each participant) during the Winter session (January 2022 – April 2022) and contain three phases: A_1 (Baseline 1), B (Yoga Component), and A_2 (Baseline 2). At the beginning and end of each week of my two-week baseline, I will be asked to fill out an online survey including trait measures for mental health, self-compassion, and vitality. Thus, there will be four surveys total, and the first of the four will also contain demographic questions (e.g., age, gender), along with the inclusion and exclusion criteria. After completing my two-week baseline, I will begin phase B, the yoga component.

This six-week yoga intervention will involve one live instructor-led class and one pre-recorded class per week, both of which will be delivered online. The live class will be a low-intensity 45-minute yoga session offered by a certified yoga instructor via *Zoom* every Monday at noon during phase B. Each session will be recorded for the Quality of Life students who are not selected for the study but still wish to practice yoga on their own after the study. Before and after each yoga session, I will be allotted ten minutes to complete an online survey via *Survey Monkey* including state measures for mental health, self-compassion, and vitality, along with a personal diary that will be guided by four open-ended journal prompts. Consequently, the total duration of the session will be approximately sixty minutes. As a proof of completion, I will be required to have my camera on for the entirety of the session or send the principal investigator a picture of myself on my yoga mat (or simply my yoga mat) after the yoga session. If I choose to leave my camera on during the yoga session, I will not appear in the recording. If I choose to send a picture, it will

be uploaded to a shared private *OneDrive* folder. Once the principal investigator has determined that I have attended the yoga class, my picture will be permanently deleted from *OneDrive*.

The pre-recorded class will be a 45-minute *YouTube* yoga video. Every Tuesday morning of phase B, I will receive the link to the video and have until Sunday to complete it on my own time. There will be no survey or journal prompts to be completed after the weekly home session. However, I will be required to send the principal investigator a picture of myself on my yoga mat (or simply my yoga mat) after my yoga session for tracking purposes.

Halfway through phase B (the Friday of the third week), I will fill out the same online survey as administered in Baseline 1 (without the demographic questions). Once I complete the 6-week yoga component, Baseline 2 will begin, and I will fill out the same online survey as administered in Baseline 1 (without the demographic questions) on the Monday and Friday of both weeks.

Risks: I might experience minor psychological or emotional discomfort as a result of questionnaire or journal questions. I have received assurance from the researcher that every effort will be made to minimize these risks. I have also been provided with a copy of emergency services offered both on and off campus, which is provided at the end of this form. I have been assured that if I am experiencing any psychological or emotional discomfort during the questionnaires or journals, I may stop it at any time without suffering any negative consequences. Furthermore, though the yoga sessions will be very mild and low intensity, I may experience some muscle pain or discomfort from stretching and moving in new ways. I have been informed that the certified yoga instructor of the live classes will take all precautions to ensure the safety of the participants. Modifications will be provided for all yoga postures, and I will be prompted to do what is best for my body. Finally, yoga is an emotional/spiritual experience that allows individuals the space to feel their emotions. Therefore, I may experience psychological or emotional discomfort, depending on my emotional state. I have been assured that I may leave the yoga sessions at any time without suffering any negative consequences.

Benefits: Participation in this study may help support the effectiveness of a yoga component in the Quality of Life course offered at the University of Ottawa. My participation in this study will potentially contribute to the advancement of knowledge in the current field of positive education as well as help recognize the Quality of Life course as a method of increasing mental health in university students. Moreover, participating in this study may enhance the benefits of the Quality of life course by further promoting my mental health. Yoga's positive effects on both mental and physical health have been well established in the literature, and this yoga component provides me with an additional resource to use throughout the rest of my life to maintain my mental health.

Confidentiality and anonymity: I have received assurance from the researcher that the information I share during the study will remain strictly confidential. However, the information I share in the journal reflections may be cited in the analysis without my name being revealed. I have been guaranteed that my identity will be protected through the use of ID number codes to identify participants on all journal transcripts. I have also been informed that professor Fortier will not have access to the data before the final marks of the semester are submitted and will only receive anonymized transcripts from the surveys and journals. Lastly, I have been assured that all

of the identifying data will be removed and destroyed after selection takes place, and that my name will not be revealed in any future documents or publications.

Conservation of data: I understand that all survey and journal data will be on a locked computer with a protected passcode and hard copies will be kept in the principal investigator's locked office at the University of Ottawa with limited access. The data will be conserved for five years following the end of data collection and will then be safely destroyed.

Compensation: No compensation will be given for participating in this study. However, I will receive six free live yoga sessions throughout the study.

Voluntary Participation: There is **no** obligation to participate in this study, and if I choose to participate, I can withdraw from the study at **any time** and/or refuse to answer any questions, **without** suffering any negative consequences. If I decide to withdraw from the study, my data will be destroyed unless the researcher obtains my consent to keep them.

Mental Health Resources
On campus: 613-562-5411
Off campus: *Good2talk, the Post-Secondary Student Helpline* – 24/7 (bilingual): call 1-866-925-5454 or text GOOD2TALKON to 686868

Acceptance: I,_____, agree to participate in the above research study conducted by Sarah McAllister, Dr. Michelle Fortier, and Olivia Pastore.

If I have any questions about the study, I may contact the researchers.

If I have any questions regarding the ethical conduct of this study, I may contact the Protocol Officer for Ethics in Research, University of Ottawa, Tabaret Hall, 550 Cumberland Street, Room 154, Ottawa, ON K1N 6N5

Telephone: (613) 562-5387 **Email**: ethics@uottawa.ca

*There are two copies of the consent form, one of which is mine to keep.

Participant:

_____	_____	_____
(Print name)	(Signature)	(Date)

Appendix D

Mental Health Continuum–Short Form (Keyes et al., 2008)

Adult MHC-SF (ages 18 or older)

Please answer the following questions about how you have been feeling during the past month. Place a check mark in the box that best represents how often you have experienced or felt the following:

During the past month, how often did you feel …	NEVER	ONCE OR TWICE	ABOUT ONCE A WEEK	ABOUT 2 OR 3 TIMES A WEEK	ALMOST EVERY DAY	EVERY DAY
1. happy						
2. interested in life						
3. satisfied						
4. that you had something important to contribute to society						
5. that you belonged to a community (like a social group, or your neighborhood)						
6. that our society is becoming a better place for people like you						
7. that people are basically good						
8. that the way our society works makes sense to you						
9. that you liked most parts of your personality						
10. good at managing the responsibilities of your daily life						
11. that you had warm and trusting relationships with others						
12. that you had experiences that challenged you to grow and become a better person						
13. confident to think or express your own ideas and opinions						
14. that your life has a sense of direction or meaning to it						

Appendix E

Positive and Negative Affect Schedule (Watson et al., 1988)

This scale consists of a number of words that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you feel this way right now, that is, at the present moment.

1	2	3	4	5
very slightly or not at all	a little	moderately	quite a bit	extremely

_____ interested	_____ irritable
_____ distressed	_____ alert
_____ excited	_____ ashamed
_____ upset	_____ inspired
_____ strong	_____ nervous
_____ guilty	_____ determined
_____ scared	_____ attentive
_____ hostile	_____ jittery
_____ enthusiastic	_____ active
_____ proud	_____ afraid

Appendix F

Self-Compassion Scale (Neff, 2003b)

Self-Compassion Scale (SCS)

HOW I TYPICALLY ACT TOWARDS MYSELF IN DIFFICULT TIMES

Please read each statement carefully before answering. For each item, indicate how often you behave in the stated manner, using the following 1-5 scale. Please answer according to what really reflects your experience rather than what you think your experience should be.

Almost never				Almost always
1	2	3	4	5

1. I'm disapproving and judgmental about my own flaws and inadequacies.
2. When I'm feeling down I tend to obsess and fixate on everything that's wrong.
3. When things are going badly for me, I see the difficulties as part of life that everyone goes through.
4. When I think about my inadequacies, it tends to make me feel more separate and cut off from the rest of the world.
5. I try to be loving towards myself when I'm feeling emotional pain.
6. When I fail at something important to me I become consumed by feelings of inadequacy.
7. When I'm down, I remind myself that there are lots of other people in the world feeling like I am.
8. When times are really difficult, I tend to be tough on myself.
9. When something upsets me I try to keep my emotions in balance.
10. When I feel inadequate in some way, I try to remind myself that feelings of inadequacy are shared by most people.
11. I'm intolerant and impatient towards those aspects of my personality I don't like.
12. When I'm going through a very hard time, I give myself the caring and tenderness I need.
13. When I'm feeling down, I tend to feel like most other people are probably happier than I am.
14. When something painful happens I try to take a balanced view of the situation.
15. I try to see my failings as part of the human condition
16. When I see aspects of myself that I don't like, I get down on myself.
17. When I fail at something important to me I try to keep things in perspective.
18. When I'm really struggling, I tend to feel like other people must be having an easier time of it.
19. I'm kind to myself when I'm experiencing suffering.
20. When something upsets me I get carried away with my feelings.
21. I can be a bit cold-hearted towards myself when I'm experiencing suffering.
22. When I'm feeling down I try to approach my feelings with curiosity and openness.
23. I'm tolerant of my own flaws and inadequacies.
24. When something painful happens I tend to blow the incident out of proportion.
25. When I fail at something that's important to me, I tend to feel alone in my failure.
26. I try to be understanding and patient towards those aspects of my personality I don't like.

Appendix G

State Self-Compassion Scale–Short Form (Neff et al., 2021)

The State Self-Compassion Scale Short Form (SSCS-S)

Think about a situation you are experiencing right now that is painful or difficult. It could be some challenge in your life, or perhaps you are feeling inadequate in some way. Please indicate how well each statement applies to how you are feeling toward yourself right now as you think about this situation, using the following scale:

Not at all true for me				**Very true for me**
1	**2**	**3**	**4**	**5**

1. I'm giving myself the caring and tenderness I need.
2. I'm obsessing and fixating on everything that's wrong.
3. I'm remembering that there are lots of others in the world feeling like I am.
4. I feel intolerant and impatient toward myself.
5. I'm keeping things in perspective.
6. I feel like I'm struggling more than others right now.

Appendix H

Trait-Level Subjective Vitality Scale (Bostic et al., 2000)

Please respond to each of the following statements by indicating the degree to which the statement is true for you in general in your life, using the following scale:

1	2	3	4	5	6	7
not at all true			somewhat true			very true

1. I feel alive and vital.

2. Sometimes I am so alive I just want to burst.

3. I have energy and spirit.

4. I look forward to each new day.

5. I nearly always feel awake and alert.

6. I feel energized.

Appendix I

State-Level Subjective Vitality Scale (Bostic et al., 2000)

Please respond to each of the following statements by indicating the degree to which the statement is true for you right now, using the following scale:

1	2	3	4	5	6	7
not at all true			somewhat true			very true

1. At this moment, I feel alive and vital.
2. Currently I feel so alive I just want to burst.
3. At this time, I have energy and spirit.
4. I am looking forward to each new day.
5. At this moment, I feel alert and awake.
6. I feel energized right now.