

**Doing Well and Feeling Well: Investigating the Contributions of Two Stress Related
Appraisals and Regulatory Practices on Student Success Outcomes**

by

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A Dissertation submitted in the partial fulfillment of the requirements for the degree of

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We acknowledge and respect the Lək̓ʷəŋən (Songhees and Esquimalt) Peoples on whose territory the university stands, and the Lək̓ʷəŋən and W̱SÁNEĆ Peoples whose historical relationships with the land continue to this day

Supervisory Committee

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Abstract

Student success is facilitated by effectively navigating academic demands and the inevitable stress that is experienced in the academic context. Appraisals and beliefs about stress impact coping, however they have been underexamined in academic settings. Stress Optimization and Self-Regulated Learning (SRL) theory inform the understanding of stress responses and learning processes respectively. Despite the importance for student success of managing both stress and academic demands, there is a paucity of research examining their combined contributions. This two study dissertation examined: (a) the predictive capacity of two stress appraisals, coping self-efficacy (CSE) and stress mindset (SM), on student success outcomes which were comprised of student academic experiences (e.g., academic wellbeing, motivation challenges, social emotional challenges) and performance (GPA) and (b) the mediating role of regulatory practices (e.g., metacognitive monitoring and adapting, academic social engagement) on the relationship between stress appraisals and student success. First, a case is made for an integrated theoretical framework that incorporates stress optimization and SRL. Second, a literature review delineates research expectations. Third, paper one utilizes regression to examine CSE and SM as predictors of student success outcomes. Fourth, paper two utilizes structural equation modeling to examine associations between stress appraisals, regulatory practices, and student success outcomes. Findings show: (a) CSE and SM predicted student success outcomes directly, (b) CSE was a stronger predictor of student success than stress mindset, and (c) regulatory practices can promote student success beyond what is provided by stress appraisals alone. This research is important for understanding adaptive responses to stress in academic contexts.

Keywords: academic wellbeing, academic challenges, coping self-efficacy, self-regulated learning, stress appraisal, stress optimization, stress mindset, student success.

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List of Original Manuscripts

This dissertation comprises two manuscripts as referenced below by author and year:

Kapil, M., Hadwin, A., & Rostampour, R. (2024a). *Coping self-efficacy and stress mindset as predictors of social emotional and academic student success outcomes*. Manuscript submitted to Journal of Postsecondary Student Success.

Kapil, M., Hadwin, A., & Rostampour, R. (2024b). *Investigating the contribution of stress appraisals and self-regulated learning practices on student success experiences and outcomes*. Manuscript in preparation for submission.

Dedication

“Every aspect of our daily experience comes to us filtered by hidden webs of prediction – the brain’s best expectations rooted in our own past histories”

(Clark, 2023, p. xv)

This dissertation is dedicated to my family, my 3 R’s, whose support and encouragement is woven into my history and shaped my positive predictions, interest and determination, and inspired this inquiry.

I also extend gratitude to the children, youth, adults, and families I have had the privilege to support. Your histories, resilience, and capacity for growth and change also shaped the hidden webs of prediction that inspired this research.

Further gratitude to Allyson and Ramin for the opportunity to experience research as a team sport.

Chapter One: Making A Case for an Integrated Model of Stress Regulation and Self-Regulated Learning in Student Success

Introduction

“Sam recently started their University studies and was excited about the academic program. They had some previous challenges with getting assignments done on time but mostly had good grades in high school. They have been experiencing high levels of stress at university, noticing their heart pounding and rapid breathing when they think about assignments, reporting that they are not used to less structured classes and minimal oversight by instructors. They have been wondering if they are able to complete the unfamiliar assignments in their classes and if they can deal with how stressed they are feeling. Struggling to manage their stress, they are starting to think they are not capable of coping with university and that the stress they are feeling is making it hard to get their work done. They have started thinking that dealing with the demands of university is “too much”. Sam started to avoid going to class, is not studying, has stopped asking for help from instructors, and didn’t fare as well as expected on midterm assignments. Sam notices their motivation has dropped and their overall wellbeing is negatively impacted by their current struggles with school.”

The example above portrays an all-too-common struggle for students that involves appraisals and beliefs related to stress, regulation of learning, and social emotional and academic performance outcomes. These associations contribute to student success and are the focus of this dissertation research. First, a case will be made for an integrated theoretical framework that includes stress optimization and self-regulated learning perspectives, thereby addressing academic stress and demands together. Second, a review of the literature examines information about, and delineates expectations for, the relevant variables. Third, research questions and methodological considerations are presented for the two studies included in the dissertation.

Fourth, study one utilizes regression to test whether two stress appraisals, coping self-efficacy and stress mindset, predict student success outcomes. Fifth, study two utilizes structural equation modeling to examine associations between stress appraisals, self-regulated learning practices, and student success outcomes. Sixth, the discussion presents the interpretation of key findings, limitations, and implications of the research. The dissertation is exploratory in two primary areas. Specifically, this dissertation proposes: (a) an integrated theoretical framework to examine stress, self-regulated learning, and student success, and (b) the utility of coping self-efficacy in educational settings.

Students face a range of challenges related to social emotional and academic experiences that have the potential to interfere with student success including facing increased stress from academic demands (American College Health Association (ACHA), 2016; Barbayannis et al., 2022; Keyes, 2005; Organization for Economic Co-Operation and Development (OECD), 2017) and mental health issues (Jaworska et al., 2016; Roberts & Zelenyanski, 2002). The ongoing Covid-19 global pandemic added additional challenges with a shift to mandatory online learning, increased social isolation, and elevated levels of stress and anxiety for students (Barbayannis et al., 2022; Cockerham et al., 2021; Elmer et al., 2020). The academic context is expected to include stress, which has the capacity to help or hinder student success (Jenkins et al., 2021).

With the challenging post-secondary academic context in mind, this research considers how to help students thrive over merely survive. Consistent with this perspective, current approaches to student success consider thriving and include: (a) student experiences, and (b) academic performance components (Louis & Schreiner, 2012). Student experiences and performance are integral to student success and flourishing (Keyes & Haidt, 2003; Kuh et al., 2005; Suldo et al., 2006).

An important component of student success is stress, and student appraisals of stress that shape how the expected academic stress and demands are managed. Stress is influential in student success and has the potential to impact outcomes positively (Denovan & Macaskill, 2017; Rudland et al., 2020) or negatively (Chou et al., 2011; Pascoe et al., 2020). While undergraduate university students in particular report high levels of stress, an emphasis on eliminating stress for students is: (a) not possible or practical and (b) counterproductive (Jenkins et al., 2021). When managed well, stress in academic settings is important for achieving goals (Brooks, 2014; Jamieson et al., 2018) that are important for both academic (Jenkins et al., 2021) and social emotional outcomes (Ng et al., 2009).

In keeping with suggestions from DeBrouwere & Rosseel (2021) regarding psychological sciences, this research pursues an inductive theoretical approach by drawing from and integrating research and theory from across relevant research areas, namely: (a) self-regulated learning (SRL) (Winne & Hadwin, 2008) and (b) stress optimization (Jamieson et al., 2018). SRL is synergistic with stress optimization theory in several ways with both perspectives including: (a) metacognition, (b) recursive and multifaceted variables, (c) goals, (d) a focus on enhancing resources, (e) the inclusion of both beliefs and corresponding responses that interact recursively, and (f) recognition of the potential benefits of stress and challenges in motivated performance contexts like education (Hadwin et al., 2021; Jamieson et al., 2018).

Framed by SRL and stress optimization theory, this research recognizes that students will experience stress, and this can be good or bad depending on how they appraise both stress in general and their capacity to cope with academic demands. The general and specific appraisals about stress and academic demands are expected to be associated with student success outcomes. In addition, what students actually do to meet academic demands, self-regulated learning

practices for example, are expected to contribute to this association between stress appraisals and student success outcomes.

Despite theory and evidence that student success includes student experiences and performance (Chou et al., 2011; de la Fuente et al., 2020; Denovan & Macaskill, 2017; Pascoe et al., 2020; Vogel & Schwabe, 2016), student success research frequently examines these outcomes in isolation. Further, it is established that stress is an expected and variable component of student success (Brooks, 2014; Jamieson et al., 2018; Jenkins et al., 2021). However, student appraisals of stress are underrepresented in student success literature. This is especially true when considering both student experiences and performance outcomes together. In addition, what students actually do to manage academic demands or stressors (e.g., learning practices and behaviours), is minimally addressed in the stress literature. Further, when learning practices are included in stress research (e.g., goal orientation), they are not considered within a comprehensive framework that addresses regulation of learning in addition to academic performance.

This research examines appraisals about stress in general and beliefs about coping with academic demands and the impact this has on student success outcomes. Findings are important for facilitating student success by identifying directions for interventions that can help students to cope more productively with the stress they are expected to encounter in academic contexts. In addition, by integrating SRL and stress optimization perspectives, this research takes a practical approach recognizing that: (a) student success is likely to include stress, and (b) student experiences of, and expectations about, stress matter for both social emotional and academic outcomes. Toward this end, this research moves away from impractical attempts to eliminate stress for students, and towards promoting adaptive and strategic engagement with stress and

learning by: (a) proposing a theoretical framework that integrates stress optimization and self-regulated learning theory and (b) examining associations between stress appraisals, self-regulated learning practices, and student success outcomes.

Importantly, this research focuses on stress in acute motivated performance contexts like academic settings. This is distinct from experiences of chronic stress or traumatic experiences. Individuals who are exposed to very difficult life experiences (e.g., trauma, war, poverty, abuse, lack of social support, neglect, racism, systemic oppression), especially at key developmental stages, can experience distressing consequences in terms of both mental and physical health. These circumstances are not considered adaptive or enhancing, rather evidence is accumulating regarding detrimental impacts of such experiences. Chronically imbalanced body budgets resulting from chronic stress and adversity lead to physiological changes and corresponding problematic changes in regulatory capacity (Barrett, 2017a, 2017b). For example, consider the research on adverse child experiences (ACES) for a more thorough discussion (e.g., Center for Disease Control (CDC), 2020; Bellis et al., 2019; Houtepen et al., 2020; Hughes et al., 2017).

In contrast, stress in motivated performance contexts is a complex process and can have both enhancing and debilitating effects. Stress mindsets and stress appraisals can simplify and orient individuals to a set of expectations and motivations that increase the chance that a person will experience the enhancing effects of stress, especially in performance situations (e.g., exams). Even for students where there was a relationship between adverse life events and perceived distress and lack of control, this relationship was weakened for students who understood and experienced the enhancing capacities of stress (Park et al., 2017). Indeed, equipping individuals with an accurate understanding of: (a) stress and stress optimization and (b) the impact of self-regulated learning on student success outcomes, has the potential to

facilitate agency, situational control, and competence in counteracting the myriad of adverse experiences people encounter (Park et al., 2017). The interactions between the individual, life experiences, and the context within which they experience this are complex and only partially addressed here. I will return now to the focus on stress optimization and student success.

Five key assumptions underlay this dissertation research. The academic context: (1) is a motivated performance context, (2) requires a learner who can self-regulate and be strategic, (3) benefits from optimization of the stress that is inevitable in this setting, (4) includes attending to regulation of both stress and learning as components of student experiences and academic student success outcomes, and (5) includes reciprocal associations between stress and academic demands. The next section will discuss stress optimization and self-regulated learning perspectives, what each approach adds to the understanding of stress and student success, and the inherent gaps that can be remedied with an integrated approach. Table 1 will provide a summary of stress optimization and self-regulated learning.

Theoretical Considerations for an Integrated Approach to Stress and Student Success

The selection of theory to examine student success is framed by an orientation toward the mind, within which mental health, performance, and learning processes are occurring. According to the interdisciplinary approach of Interpersonal Neurobiology (IPNB), the mind is defined as an embodied, emergent, and relational process that regulates the flow of energy and information (Siegel, 2020). In other words, the mind emerges from complex interactions between the brain and body, which occur within social and cultural environments (Siegel, 2020). The mind further includes: (a) personal and subjective experience, (b) awareness, (c) information processing, and (d) a regulatory capacity that is emergent, embodied, relational, and self-organizing (Siegel, 2020). The IPNB perspective of the mind informs assumptions about the students who are the

subjects in this research. These assumptions are relevant in developing theory regarding mental processes such as regulation of stress, mental health, and learning. These key assumptions include: (a) **the mind is embodied**; The mind includes the brain and the body which are engaged in reciprocal feedback and sharing of energy and information; (b) **the mind is experience dependent**; Experience shapes how both brains and minds develop with early experiences having particular influence on later development; (c) **the mind is emergent**; Brain, mind, and body can change over the lifespan in response to internal and external experiences (e.g., neuroplasticity) (see Appendix A for additional information regarding neurodevelopment and IPNB assumptions); (d) **the mind is multifaceted**; The mind includes multiple interconnected dimensions and processes including cognitive, emotional, social, relational; and (e) **the mind is relational**; Humans are considered to be social organisms thus social interactions are not just important for well-being and learning but integral in shaping the brain and mind, in this way experience is socially situated (e.g., includes socio-historical context) (see Siegel, 2020 for full review of these assumptions).

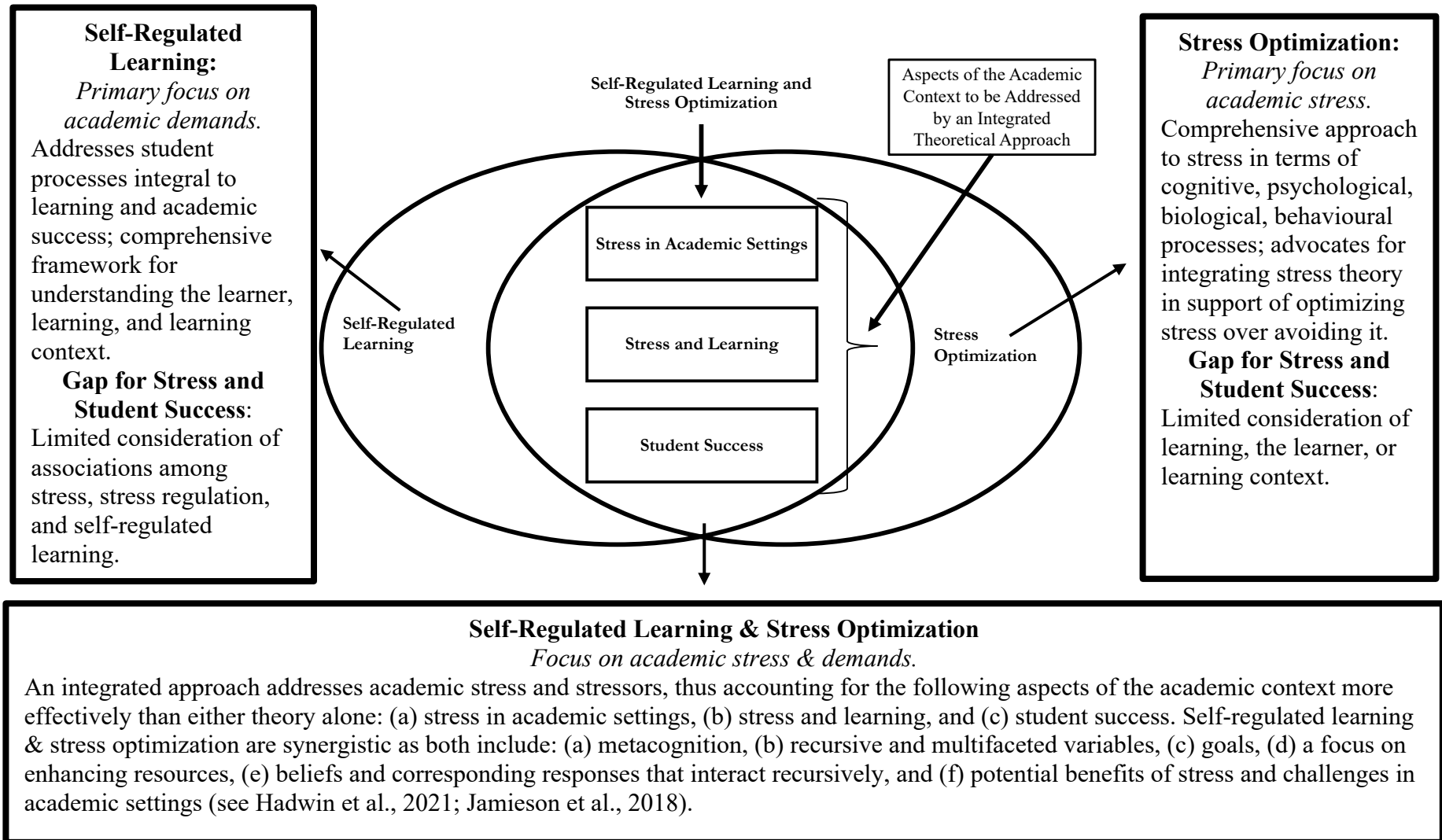
With respect to informing the integrated theory proposed in this research, the IPNB perspective regarding the mind aligns with theory that recognizes the mind and mental processes as embodied, emergent, experience dependent, adaptable, relational, and comprised of multiple interconnected and recursive dimensions. Both self-regulated learning and stress optimization perspectives are consistent with these assumptions regarding the mind.

An integrated approach is needed to fully address the puzzle pieces of stress, self-regulated learning, and student success which together contribute to adaptive coping in academic settings. Together, SRL and stress optimization approaches contribute to a more robust solution in terms of research, theory, and practice than either approach alone. Further, the proposed

integrated approach supports student success in terms of both student experiences and academic outcomes. In the following section, the case for an integrated solution to stress and student success will be discussed including key aspects of the academic context including: (a) stress in academic settings, (b) stress and learning, and (c) student success. Then, SRL and stress optimization will be discussed with respect to contributions to understanding stress and student success as well as gaps within each that necessitate an integrated approach. Refer to Figure 1 for a visual representation of: (a) SRL and stress optimization, (b) gaps within each approach for research on stress and students success, and (c) the key aspects of the academic context that will be addressed by an integrated approach. The remainder of the dissertation will address; (1) establishing the associations between stress, SRL, and the social emotional and academic outcomes (literature review), (2) methodology and overview of the two studies (paper one and paper two), and (3) discussion.

Figure 1.

Theoretical Considerations for an Integrated Approach to Stress and Student Success



Stress in Academic Settings

Integral to student success is the capacity to manage academic stress and demands. As noted previously, stress is expected in academic settings where students are pursuing personally relevant goals (Park et al., 2017) and the context is evaluative, goal-oriented, and performance based (Brooks, 2014; Jamieson et al., 2018). Responding to stress adaptively is integral to wellbeing (Barbayannis et al., 2022; Denovan & Macaskill, 2017; Slimmen et al., 2022) and adaptive learning (Vogel & Schwabe, 2016). When not managed well academic related stress can: (a) reduce academic achievement, (b) decrease motivation, and (c) increase risk of dropout (Pascoe et al., 2020). Stress responses can also interfere with behavioural, cognitive and motivational processes during learning and studying (Chou et al., 2011) as well as memory, attention, and information recall (de la Fuente et al., 2020). Stress is present at all levels of education and emerges when people are pursuing goals that are important to them (Park et al., 2017). Student responses to stress have the potential to impact both learning processes and academic outcomes (de la Fuente et al., 2020; Vogel & Schwabe, 2016). Thus, a student's capacity to regulate stress is a critical component of adaptive learning and student success, especially in the university context where stress is expected.

While stress is essentially non-specific (Selye, 1936), it is often further distinguished as either; (a) distress (negative stress responses) and (b) eustress (positive stress responses) (Branson et al., 2019). Effectively, stress is neither good nor bad, it is the stressor and the individual's perception and ability to regulate the stress that is important (Bienertova-Vasku et al., 2020; Keller et al., 2012). Consistent with this perspective, a stressor is anything that places a demand on the body (including the brain or mind), whether pleasant or unpleasant (Selye, 1936, 1976). Stressors are then aspects of a person's life, events or contexts, that cause stress (Crum et al., 2013). As such, both academic demands and the academic context can be stressors.

The dominant view has long been that stress is bad for you and has only negative consequences for your physical and mental health (Barrett, 2017a). Fortunately, this is not the whole picture. Stress can enhance performance and promote coping, is present when goals are pursued (Brooks, 2014), and is positively associated with psychological wellbeing (Ng et al., 2009). In this way, stress is not solely negative and is a necessary component of both flourishing mental health and achieving goals.

Stress and Learning

How students understand stress and what they believe about stress has an impact on whether stress is adaptive or distressing for them at university (Jenkins et al., 2021). Stress that is experienced during the pursuit of valued goals facilitates achieving growth and higher levels of competence (Brooks, 2014; Ng et al., 2009; Park et al., 2017). This is especially true in academic settings when learners can employ adaptive coping strategies and monitor the effectiveness of learning practices (Hadwin et al., 2022; Jenkins et al., 2021). For example, it is expected that academic demands, such as an exam or presentation, are important for learning and growth and a necessary part of achieving academic goals. In inherently and acutely stressful situations and motivated performance contexts such as academic settings, stress has the capacity to be: (a) functional, or (b) debilitating, and (c) an important component of academic pressures and challenges (Brooks, 2014).

Regulation of stress is critical for student success with perceptions of high stress potentially disrupting learning. High levels of stress, or stress that is not adaptively regulated, is associated with altered cognitive functioning and decision making (Lupien et al., 2007; Starcke & Brand, 2012) and impairs metacognitive accuracy (Reyes et al., 2015). Under conditions of high stress, individuals show less flexible cognitive processing (Otto et al., 2013), a loss of

cognitive abilities, and altered feedback processing (Arnsten, 2009). Chronic stress promotes a switch from a flexible and contextualized goal directed system of responses to a rigid habit-based system (Dias-Ferreira et al., 2009). Further, high arousal states like stress disrupt spatial and sequence learning, which reflects an incapacitated flexible cognitive system that is required for integrating contextual details (Maran et al., 2017).

According to control-value theory, an appraisal perspective of emotion, emotions like stress influence students' cognitive resources, motivation to learn, use of learning strategies and ultimately academic achievement (e.g., see Pekrun & Linnenbink-Garcia, 2012). Emotions are often categorized according to valence (positive/negative) and activation (activating/deactivating) although current neuroimaging data suggests a more nuanced categorization system may be needed (Venkatraman et al., 2017). In this tradition, stress is a negative activating emotion. Negative activating emotions are thought to reduce cognitive resources by facilitating irrelevant thinking (e.g., stress about test performance) which can undermine intrinsic motivation (Pekrun et al., 2017). However, these emotions may also boost extrinsic motivation to avoid failure by increasing effort and may be associated with rigid and less effective learning strategies like rote memorization. Overall, the influence of negative activating emotions on achievement is expected to be negative (Pekrun et al., 2017). Excessive stress induces a deficit in memory retrieval and updating, will bias students towards rigid forms of learning that includes poor knowledge transfer and reduced cognitive flexibility in problem solving (Vogel & Schwabe, 2016). Higher self-reported levels of stress are associated with low wellbeing (Ribeiro, 2018) and low academic achievement (Reschley et al., 2008). Thus, managing stress effectively is critical for learning and student success.

Student Success

Historically, student success research was motivated by concerns about attrition and was therefore measured primarily by rate of graduation (Louis & Schreiner, 2012). Moving away from a sole focus on outcome markers (e.g., grades, degree completion, and student retention), student success increasingly includes processes that support success (e.g., persistence, high levels of effective learning and personal development) (Kuh et al., 2005). This approach takes a holistic view of student development centering around thriving and optimizing potential that includes healthy relationships, maximizing potential, and managing challenges effectively (Louis & Schreiner, 2012; Tinto, 2017). Thriving is informed by research on psychological processes involved in shaping beliefs and behaviours that facilitate student success, distinguishing students that merely survive and those who flourish (Keyes & Haidt, 2003). Thriving extends student success beyond grades and graduation to include regulation of learning and psychosocial elements (Louis & Schreiner, 2012). For example, Shreiner (2010) showed that despite entry characteristics, students who had strong relationships and invested in their learning experience achieved higher grades and had greater learning gains than similar peers. Student success, thriving and optimizing potential in this dissertation is informed by SRL and stress optimization and includes measures of both social emotional and academic outcomes. Stress optimization addresses perceptions of being able to cope effectively with academic stress and demands (Crum et al., 2013; Jamieson et al., 2018) and SRL addresses the adaptive student processes integral to academic success (e.g., Winne & Hadwin, 2008).

Self-Regulated Learning

Self-regulated learning (SRL) provides a robust framework for studying the dynamic, multifaceted, and situated processes involved in student success. SRL is a framework for

understanding how people learn (Efklides et al., 2018) and includes cognitive, metacognitive, behavioural, motivational, and emotional/affective components of learning (Panadero, 2018). SRL theory has origins in information processing theory as well as the social-cognitive perspective that shapes incremental beliefs (Green & Azevedo, 2007; Hoyle & Dent, 2018) and self-efficacy (Bandura, 1997, 2001, 2012; Schunk & Pajares, 2002). Social cognitive theory is a prominent perspective in attempting to explain the processes that drive and regulate behaviour in student success (Honicke & Broadbent, 2016) and purports that a combination of external social systems (e.g., academic context) and internal self-influence factors (e.g., stress mindset, coping self-efficacy) combine to motivate and regulate behaviour (Bandura, 2012; Schunk & Pajares, 2002). In this way, SRL theory emphasizes reciprocal associations between social cognitive appraisals or beliefs, that can be implicit, and strategic actions learners enact to meet academic goals. In this dissertation research, the focus is on appraisals (e.g., coping self-efficacy, stress mindset) regarding stress in the academic context, and how these appraisals shape specific SRL practices that combine to impact student success outcomes.

Current SRL theory includes non-academic processes such as affect and motivation (Efklides et al., 2018; Ben-Eliyahu & Linnenbrink-Garcia, 2015; Winne, 2018) that previously existed as separate research areas (Dinsmore et al., 2008). SRL is viewed as socially and historically situated (Järvelä & Hadwin, 2013), and internal conditions that contribute to learning are incorporated (e.g., Davis, 2020; Greene & Azavedo, 2007; Winne & Hadwin, 2008; Webster, 2019). Conditions encompass the context for student learning including external conditions or environmental factors (e.g., stressful academic context) and internal conditions or self-factors (e.g., mental health, cognition, motivation, self-efficacy beliefs, stress mindset).

Both SRL and emotions are goal based, with distinct goal pathways implicated for perceptions of threat (that a student may avoid) versus a challenge (that a student can approach) (Barrett, 2017a; Boekaerts & Corno, 2005; Winne & Hadwin, 2008). Emotions, like stress, are recognized as critical in this approach and the signal that can shift the learner away from adaptive regulation of learning (Boekaerts & Corno, 2005). For example, high perceptions of stress can interrupt regulation of emotion and learning and prime a student for negative appraisals and attributions (Kim & Cicchetti, 2010; Panlilio et al., 2019), which leads to subsequent disruption in regulation of behaviour, emotion, and cognition (Panilio et al., 2019). This provides an explanation for the mechanism in play when an academic stressor is perceived as a threat, demands exceed resources, and adaptive regulation of learning breaks down (Boekaerts & Corno, 2005; Boekaerts & Niemivirta, 2000). It follows that SRL is well positioned to incorporate stress optimization theory and research as an essential internal condition or product (e.g., see COPEs from Winne & Hadwin, 2008) and part of what signals whether a learner engages with adaptive learning (e.g., see Boekaerts & Cascallar, 2006).

Instead of a narrow focus on academic outcomes alone, the emphasis in SRL on the underlying processes of effective learning equips students with understanding as well as practical strategies to learn well, shifting control of learning and success to the individual learners. This perspective is consistent with current approaches to student success and stress optimization. For this research, *SRL is defined as individual learners taking metacognitive control of cognitive, behavioural, motivational, and emotional conditions or states through iterative processes involving reflection and adaptation within the situated socio-historical context of each learner (Hadwin et al., 2011).*

While SRL provides an in-depth framework for understanding the processes and practical strategies involved in student success, including motivation and emotion, there are some notable gaps in SRL theory when considering the role of stress in student success. First, emotion in SRL literature is primarily viewed through the lens of appraisal approaches to emotion (e.g., Pekrun et al., 2017). While this perspective has generated considerable research contributions, SRL would benefit from also including an embodied approach to emotion that includes the physiological, biological (e.g., allostasis) and memory components that are relevant in stress and stress related avoidance behaviours (e.g., see Barrett, 2009, 2017a, 2017b; Jamieson et al., 2018). Second, turning to stress optimization research also increases potential to understand stress as an important internal condition or product that impacts learning, including how stress and stress regulation is associated with: (a) the phases of the SRL cycle, (b) engagement with SRL practices, and (c) social emotional and academic student success outcomes (e.g., see Table 2 for an example of stress and the SRL cycle). Third, SRL is fueled by metacognitive monitoring and control. While metacognition is also an element of stress optimization (Crum et al., 2013), stress optimization also includes automatic physiological responses and implicit prior experience (e.g., memory) that may not be part of metacognitive awareness. These implicit and automatic responses can nonetheless drive avoidance behaviour and be associated with poor performance, health, and well-being outcomes (Jamieson et al., 2018; Jamieson et al., 2022). Thus, there is space in SRL theory to include a more extensive understanding of stress and stress regulation in student success, especially in terms of an important internal condition that can impact each phase of the SRL cycle. Refer to Figure 1 and Table 2 for an example of how stress can impact the phases of the SRL cycle.

Figure 2.

Self-Regulated Learning Cycle (Winne & Hadwin, 1998, 2008)

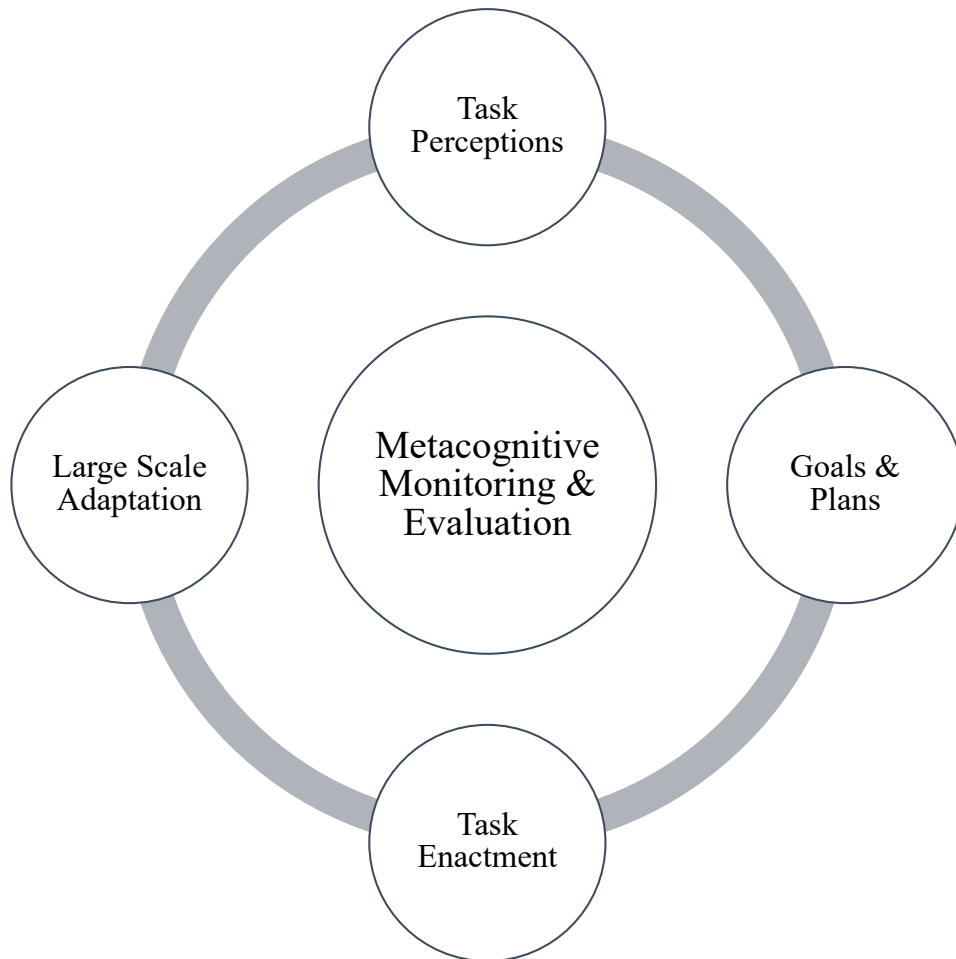


Table 1.*Stress and the SRL Cycle*

SRL Phase	Stress and the SRL Phase
Task	Uncertainty about tasks and expectations is unsettling. It can make
Understanding	students feel anxious or incompetent. It may lead to working in isolation or feeling like you don't fit. It also leads to a whole range of maladaptive behaviours such as putting things off, skipping class, missing deadlines. Once students are caught up in this vicious circle, it is hard to tease apart whether socio-emotional challenges and stress regulation challenges cause learning and behaviour challenges or vice versa. We expect there is a lot more interplay between these things than is often acknowledged.
Goal Setting & Planning	Setting clear and specific goals can help learners to develop a sense of control of tasks, outcomes, and feelings. This can address uncertainty about tasks and reduce wasted effort that can add to stress perceptions. Being strategic and using effective SRL strategies can boost resources for students in terms of skills, knowledge, & ability. For example, when I am feeling anxious about a test, it helps me to focus on what I know, my strategy for taking the test, and capacity and attributes as a student.
Task Enactment	Fear, rumination, and negative emotions like stress can all get in the way of constructive work and meaningful cognitive and behavioural engagement. An experience of excess stress can occupy cognitive resources that you need for effective learning. Putting into practice what you are learning about SRL are excellent resources that can contribute to

better regulation of stress in academic contexts. For example, having students use SRL-focused strategies when they are experiencing stress recognizes that students (a) can control how they interpret tasks, and (b) may need to choose SRL strategies boost their resources and reduce the demands of the academic task. Developing a repertoire of strategies is especially important so students have experience knowing what strategies are effective for different situations.

Adaptation

Adaptation is about leveraging feedback from metacognitive monitoring to take control of stress experiences and outcomes. It is about leveraging past experiences to make small changes in the future and realizing that although perceptions of stress varies across time, people, and situations, being aware of significant changes is essential for all students. This awareness will help you feel in control of regulating stress.

(Kapil & Hadwin, 2021)

Stress Optimization Theory

A stress optimization approach advocates for integrating stress theories in support of optimizing acute stress experiences over avoiding them (Jamieson et al., 2018). Foundational to the stress optimization perspective is the central idea that stress is often unavoidable, and the dominant narrative that stress is only harmful and should be avoided is challenged. An integrated stress optimization approach aims to facilitate thriving, resilience, and adaptive coping in times of pressure and uncertainty, which are often inevitable in motivated performance settings (Jamieson et al., 2018). Stress optimization encompasses both stress appraisal and stress mindset research, both are informed by the idea that stressful experiences can: (a) lead to physiological

and psychological thriving and (b) enhance performance and wellbeing when stressors are perceived as opportunities for growth, and (c) be appraised as functional and adaptive in acute motivated performance contexts. Stress mindset addresses domain general or broad beliefs about the nature of stress itself, while stress appraisal and reappraisal addresses domain specific perspectives.

Stress Mindsets. Stress mindsets address how a person perceives the experience of stress, such as whether stress is believed to have enhancing or debilitating consequences, and is thought to a kind of cognitive heuristic (Crum et al, 2013). The *stress-is enhancing mindset* refers to belief that stress has *enhancing* effects of performance, health, & wellbeing. The *stress-is-debilitating mindset* refers to the belief that stress has *debilitating* effects on performance, health, and wellbeing. Stress mindset can influence physiological, attentional, motivational, and affective processes. That is, stress-is-enhancing mindset is associated with more optimal neuroendocrine responses, positive affect, reduced bias for negative faces, improved cognitive flexibility, increased desire for social feedback, and greater self-control (e.g., Crum et al., 2013, 2017; Park et al., 2017; Yaeger et al., 2022). Improvements in performance, well-being and health from adopting a stress-is-enhancing mindset appear to last for weeks and even months after learning about this (Crum et al., 2017). Additional information about stress mindsets will be provided in Chapter Two.

Stress Appraisal and Reappraisal. The origins of appraisal and reappraisal research is interwoven with the study of psychological stress and coping (e.g., Lazarus, 1966, 1991). Appraisals are a person's evaluative judgment of the situation that is shaped by individual and contextual factors and are a key component of responses to stressful events or stimuli (Epel et al., 2018). Appraisal perspectives suggest that it is not solely the situation that generates an emotion,

rather it is what the situation means with respect to motivation concerns (Uusberg et al., 2019). The term ‘reappraisal’ was introduced to denote updates to an initial appraisal that could occur as either the situation or the interpretation was unfolding as a dynamic process and was considered either intentional or unintentional (Lazarus, 1991). The stress and coping literature established that reappraisal works through a change of appraisal (Uusberg et al., 2019). Typically reappraisal in experimental studies denotes shifting to a more adaptive appraisal that impacts emotion and is correlated with higher levels of well-being (Uusberg et al., 2019) and action tendencies on behavioural (Roseman, 2013) and cognitive levels (Uusberg et al., 2018).

Stress appraisal and reappraisal research is informed by the biopsychosocial model of challenge and threat (Lazarus, 1991), constructed theory of emotion (Barrett, 2017b), and the process model of emotion regulation (Gross, 2015). Reappraisal refers to cognitive reframing of a situation to adjust emotions (Gross & John, 2003). The biopsychosocial model (BPS) of challenge and threat (Lazarus, 1991) is a framework for understanding the processes shaping stress responses in contexts that require individuals to respond strategically to acute demands (Jamieson, 2017; Mendes & Park, 2014). Based initially on an appraisal theory of emotions, the BPS model is extended by the theory of constructed emotion that suggests that emotional or stress experiences and responses are processes derived from perceptions of bodily sensations, past experience, and situational factors (Barrett, 2017b). This approach recognizes that emotional processes are malleable, and cognitive appraisals (e.g., your perception or judgment of stress as adaptive or distressing) play a critical role in regulating emotion and stress (Barrett, 2017b). Appraisals are involved in transforming internal states into emotions (or stress responses) by integrating bodily responses with external sensory information and context information to shape behavioural response patterns (Barrett, 2006). Finally, the extended process model of emotion

regulation contributes a valuation system (Gross, 2015). This includes social and external environments, perceptions of internal and external states, valuations of perceptions, and goal-directed actions (Gross, 2015). In this perspective, stress appraisal can be viewed as a perceptual process that shapes valuations with the goal of modifying actions (e.g., approach or avoidance behaviour).

Thus, stress responses can be impacted by how each person perceives both internal (e.g., heart rate) and external (e.g., the situation) cues. In effect, any internal or external factor, positive or negative, can impact homeostasis and elicit sympathetic activation (the experience of stress). For example, a student's experience of stress regarding a test will depend on: (a) their previous experience with tests and corresponding expectations for this one, (b) their physiological reaction and what they think that means based on prior experience, (c) whether they see the test as an opportunity or an upsetting event, and (d) their perception of available resources and demands. These factors combine to determine whether the experience is appraised as debilitating or facilitating for the student. Sam, from the example at the beginning of this chapter: (a) had some previous struggles to manage academic demands, (b) was noticing sympathetic stress activation and assigned meaning to this physiological experience as 'feeling stressed', and (c) was seeing their academic demands as 'too much' and distressing. The example of Sam highlights the gap in the stress optimization approach for understanding stress in academic settings; stress optimization lacks specificity regarding reducing demands and increasing resources (e.g., SRL practices) in academic settings.

In particular, the specific contributions of prior experiences and corresponding future expectations that shape stress appraisals in stress optimization lack the comprehensive understanding provided by SRL regarding regulation of learning and managing academic

demands. Refer back to Table 2 for an example of how stress impacts each phase of SRL. In addition, SRL facilitates awareness of and information about: (a) understanding the task, (b) a range of SRL practices to strategically approach the goal, and (c) recursive metacognitive reflection and adaption to facilitate adaptive learning. In this way, SRL provides more information than current stress optimization theory for students about leveraging resources and reducing demands that will promote a challenge over a threat stress response (more about this in the next section). Without the contributions from SRL, the student's assessment within stress optimization of stress as being debilitating or facilitating, or the balance of resources and demands, will be missing critical information that is provided by integrating SRL. For example, SRL informs what Sam should do to enhance their potential resources to manage their academic demands, fare better on the next midterm, and feel more in control of their learning and academic challenges.

Challenge and Threat Stress Responses. Stress appraisals can vary considerably across time, situations, and people. How each of us cognitively appraises a situation in terms of demands and resources determines whether the stress response will be challenge or threat type (Jamieson et al., 2018; Lazarus & Folkman, 1984; Mendes & Park, 2014). *Demand* appraisals may include uncertainty, danger, and effort. *Resource* appraisals may include familiarity, knowledge, skills/ability, dispositional factors, and social support. *Challenge* is experienced when resources are appraised as exceeding perceived situation demands. *Threat* is experienced with perceived demands are appraised as exceeding resources. Consider challenge and threat as occupying opposite ends of a continuum, thus promoting challenge responses will reduce threat. As the ratio of perceived resources to demands increases, individuals move along the continuum from threat to challenge (Jamieson et al., 2018). As a point of clarification, the challenge

response in stress optimization literature is considered adaptive and denotes the individual perceives more resources than demands. This is distinct from academic challenges that are later discussed within SRL literature. Increased academic challenges can interfere with student success, assuming the student is unable to respond to that challenge productively, while a challenge stress response is supportive of student success.

Challenge and threat responses are relevant for student success as they impact motivation, cognition, performance, and behaviour differently. Threat is associated with avoidance motivation and debilitated cognitive performance while challenge is associated with approach motivation and facilitates performance (Blascovich et al., 1999). Thus, cognitive appraisals have direct consequences for the biological, psychological, and behavioural responses. This suggests an effective intervention to facilitate adaptive responses to stress is to modify attributes of cognitive appraisals of resources and demands (Jamieson et al., 2018). In other words, how you think about the stressful situation makes a difference in terms of your experience of a stressor as a challenge or a threat. In addition, enhancing your resources could also increase the chance of the stressor being experienced as a challenge instead of a threat. This is another opportunity within stress optimization for SRL to add knowledge regarding leveraging resources and subsequently reducing demands resulting in challenge over threat stress responses. For example, when preparing for an exam in a difficult course, studying can draw from several aspects of both resource and demand appraisals in the exam. I propose that a student who has strong task understanding, strategic goals that enhance conceptual understanding and mastery, effective study and learning practices, and utilizes metacognitive reflection and adaptation will be better prepared with increased knowledge and skills (resources) which decreases perceptions of uncertainty and effort (demands) during the exam (e.g., Kapil & Hadwin, 2021).

Stress Appraisal and SRL. Stress appraisal and reappraisal are only effective with a certain level of engagement, in other words the individual needs to care about the outcome for challenge and threat responses to emerge. Stress reappraisal is not effective when the individual is completely avoidant as there is no longer any situational demand, no stressor to reappraise (Jamieson et al., 2018). SRL facilitates increased engagement with adaptive practices that facilitate student success (e.g., Winne & Hadwin, 2008), which I propose supports reduced avoidance of the academic demands and therefore promotes conditions conducive to reappraisal.

Stress appraisals and stress mindset are both experience dependent (Crum et al., 2013; Jamieson et al., 2018) and will be impacted by how the student is managing their academic demands. I propose that adaptive SRL processes in the academic context increase student resources, decrease academic challenges, and facilitate experiences of academic success that can subsequently impact appraisals over time.

As mentioned, a key component in stress reappraisal is the resource component. Students effective at reappraisal on exams tend to out-perform other students (e.g., see Jamieson et al., 2010). In some research, the stress response itself is presented as an active coping resource (Jamieson, 2017). For example, most university students will need to take exams which are relevant for course grades, future admissions, and career goals. The exam is often considered stressful, but the exam is hard to change without changing the whole education system. A more effective approach is to reframe the stress response as functional and as a skill which can help improve performance on exams and to focus on boosting your resources (e.g., Jamieson et al., 2010, 2021). SRL provides extensive information and a framework regarding how to do just that. Within stress optimization, stress reappraisal intends to increase the perception of perceived resources to demands by framing the stress response as part of adaptive coping (e.g., see

Jamieson et al., 2018; Jamieson & Hangen, 2020). Again, SRL adds considerable value to stress optimization approaches. SRL practices provide adaptive responses to specific academic demands thus increasing resources in learning contexts. This approach supports individuals to appraise physiological and cognitive responses to stress as resources, moving them away from effortful avoidance processes like ignoring, suppressing, or dampening the stress response which tends to be costly metabolically (e.g., drains available physiological and cognitive resources) and is ineffective (Jamieson et al., 2018, 2022).

Memory and Stress Optimization. With the inclusion of Barrett's theory of constructed emotion in stress optimization (2017b), the integrated approach in this research recognizes the role of prior experience and memory in the construction of all emotion, stress included. The theory of constructed emotion posits that the brain runs an internal model informed by concepts of past experiences, which are a collection of embodied representations that predict what will happen and the best corresponding action (Barrett, 2017b; Clark, 2023). This model is stored without awareness, and often without words (Buchanan, 2007). The brain then uses this model of previous experience to anticipate similar experiences about what will happen in the future (Barrett, 2017b; Clark, 2023). In this way, emotional memory converts the past into a prediction of the future. Thus, within stress optimization, learning and memory are interrelated as: (a) memories are learned and (b) learning requires memory (Tryon & McKay, 2009). For example, remember that Sam from the example at the beginning was really feeling stressed and didn't perform well on midterm assignments, the 'stress memory' from this would likely be activated the next time the Sam prepares for an assignment, and may shape their expectation of the next academic task (especially if it a similar task) going poorly, subsequently eliciting avoidance behaviour. Without awareness of the expectation that comes from an emotional memory, results

can be both good and bad. The good is that we can process situations relatively quickly based on internal models, a type of shortcut that is metabolically efficient (Barrett, 2017b). The bad is that emotional implicit memory makes the worst of past experiences persist in the present and future (Buchanan, 2007). In this way, emotions like stress are constructions of the world as opposed to mere reactions to it (Barrett, 2017b).

A person's memory of the experience of stress plays a role in how stress is maintained (Tryon & McKay, 2009). Memories with high levels of emotional content contain the emotions that were experienced in the original experience (Buchanan, 2007). Given the role of prior experience and memory in experiences of stress, memory modification is a component of understanding stress and student success. Memory modification involves activating the memory, adding in new information that is dissonant with the old memory, and continuing to pay attention to the new information for a few hours afterwards (Ecker, 2012).

If we again reflect on Sam from the example, to facilitate memory modification Sam would first activate the memory by thinking about their prior stressful academic experiences and challenges. Sam would next add in new information that is dissonant with the prior experience such as: (a) stress is potentially adaptive and enhancing and not solely negative, (b) doing well matters to them so it makes sense they are feeling some stress, and (c) they are learning how to manage the emotion of stress and learning about self-regulated learning practices from a fantastic course called EDD 101 Skills for Academic Success. Finally, Sam would continue to notice and reflect on the adaptive information about managing the academic stress and demands for a few subsequent hours.

This is another point where integrating stress optimization and SRL is advantageous. Stress optimization informs how the experience of stress is constructed and SRL provides

extensive knowledge and resources regarding adding the new and dissonant (e.g., more adaptive) information to counter old memories and expectations related to perceptions of stress in the academic context. In this way, SRL can provide students with essential resources for student success and facilitate positive predictions about future academic experiences, thus contributing to adaptive responses to academic stress.

An Integrated Approach: Promoting Coping with Academic Stress and Demands in Student Success

A compelling case has been made for an integrated theoretical approach that includes self-regulated learning and stress optimization to fully understand associations between broad appraisals regarding the nature of stress (stress mindset), specific appraisals of coping with the academic stress and demands (coping self-efficacy), adaptive practices to manage the academic context (e.g., SRL), and how this impacts student success outcomes.

Within stress and coping theory, stress is considered a person-environment relationship with stress resulting when this relationship is evaluated as personally significant and exceeding a persons' resources for coping (Lazarus & Folkman, 1984). This evaluation is referred to as primary appraisal (Chesney et al., 2006). Secondary appraisal in coping theory refers to the appraisal of options for coping, in other words how a person responds to the question '*What can I do*'?. Central to secondary appraisal is the judgment regarding how much the individual can control the outcome of the situation. Secondary appraisal encompasses both how controllable is the outcome through coping and whether the individual believes he or she can carry out the coping strategy (Chesney et al., 2006). Self-efficacy contributes to this judgment which subsequently influences coping (Chesney et al., 2006; Park & Folkman, 1997). Adaptive coping refers to the fit between the controllability of the stressful situation and the choice of coping

strategy. Coping is central to the stress process (Folkman & Lazarus, 1985; Lazarus, 1991) and appraisal is considered important in understanding both stress and coping (Lazarus, 1991).

From the coping theoretical tradition, coping is considered a complex process that includes behavioural and cognitive responses to manage specific demands that are appraised as stressful (Lazarus & Folkman, 1984). Coping self-efficacy is uniquely suited for student success research in part due to the potential overlap with coping literature, especially in terms of delineating: (a) emotion focused, (b) problem focused, and (c) support sub-categories of coping. First, coping self-efficacy addresses the emotion of stress in the emotion-focused component. Second, coping self-efficacy addresses the stressor, academic demands for example, in the problem-focused category. Third, support has the potential to play a role in how both stress and demands are managed with potential implications for social support, social engagement, sense of belonging, and help seeking as potential components of stress regulation (e.g., O’Keefe, 2013; Porges, 2021; Taylor, 2012; Won et al., 2021).

Remember the example of Sam you were introduced to at the start of this chapter. Sam had perceptions of not being able to cope with the university context in terms of managing academic demands and the emotion of stress itself, which exemplifies low levels of coping self-efficacy. Sam showed: (a) low levels of problem focused coping by not feeling capable of addressing the academic stressor, (b) low levels of emotion focused coping by not feeling capable of managing the emotion of stress, and (c) low levels of support coping by not feeling capable of asking for help from instructors. In the example, the low coping self-efficacy was associated with a lack of adaptive SRL practices (e.g., Sam was avoiding classes and not studying) and subsequently lead to increased motivation challenges, a poor grade on a midterm assignment, and languishing wellbeing. Conversely, providing Sam with information and support

to manage the emotion of stress, academic demands, and seek support is expected to lead to flourishing mental health and reduced motivation challenges, and likely a better result on their next midterm.

Stress mindset is expected to contribute to student success although likely minimally, but this contribution is still noteworthy. A stress is enhancing mindset is expected to enhance approach coping and facilitate thriving in demanding situations (Crum et al., 2017; Jamieson, 2022). I hypothesize approach orientation may elicit engagement with an array of adaptive SRL practices and behaviours that in turn are associated with student success outcomes (Broadbent & Poon, 2015; Hadwin et al., 2022; Jansen et al., 2019; Theobald, 2021). Thus, although perhaps only contributing a small boost in approach and engagement, I propose stress mindset has the potential to impact student success outcomes through facilitating adaptive SRL practices.

An integrated approach further promotes extensive consideration of how a student is regulating academic demands. Self-regulated learning provides comprehensive information regarding the learner, learning processes, and the learning context to inform practices and behaviours associated with student success. Further, as both stress mindset and coping self-efficacy are experience dependent and impacted by controllability of the stressor (Jamieson, 2022; Jenkins et al., 2021), specific actions are expected to interact with appraisals over time.

In terms of coping with academic stress and demands, I propose SRL informs interactions between appraisals (e.g., stress mindset and coping self-efficacy) and specific processes such as enacting strategies to address academic demands, which potentially increases resources and reduces demands. This in turn can increase likelihood of a challenge over threat response thus impacting the experience of stress. An integrative perspective is further advantageous considering emotion regulation. For example, in Gross' extended process model of emotion

regulation (2015), the valuation layer can be shaped by self-regulated learning in terms of situation selection and modification (e.g., task understanding, prioritization of tasks).

SRL and stress optimization both provide valuable contributions for understanding stress and student success. For further rationale regarding an integrated approach as opposed to one theory alone, SRL and Stress Optimization will be compared with respect to: (a) key components, (b) mechanisms, (c) expected outcomes, and (d) gaps within each approach. Refer to Table 3 for an overview of this comparison.

Key Components of Self-Regulated Learning and Stress Optimization Theories

SRL theory centers on recursive metacognitive cycles of monitoring and control that move through loosely sequenced phases: (a) task understanding, (b) setting goals and plans, (c) enacting strategies and tactics to move towards the goal, and (c) evaluation and adaptation for future learning endeavors (e.g., Winne & Hadwin, 1998, 2008). Influenced by information processing theory, the Winne and Hadwin model includes within each phase a set of processes captured by the acronym COPES that are also open and recursive (Greene & Azevedo, 2007; Winne, 1996; Winne & Hadwin, 2008). COPES refers to (a) conditions, (b) operations, (c) products, (d) evaluations and (e) standards (Winne & Hadwin, 1998, 2008). Conditions encompass the context for student learning including external conditions or environmental factors and internal conditions or self-factors such as stress and mental health. Operations are student actions to create mental products. Products are the cognitive, affective, or motivational results of each phase of SRL and include learning as well as psychological processes like stress and mental health. Evaluations are the judgments students construct about the products they create in each phase and standards are the criteria for evaluating products (Winne & Hadwin, 1998).

Once again consider Sam from the example and the SRL cycle. Sam was uncertain about how to address their assignments and feeling stressed and not capable, thus low task understanding was associated with feeling stressed. They also were not sure how to set goals and make plans to address the academic demands, further adding to their feeling of stress and their perception of not being able to cope with the academic context. Sam was also starting to avoid going to class and was not enacting effective study practices to meet the academic demands and instead engaging in avoidance. Finally, in the example, Sam was not reflecting on their situation or adapting based on what they learned so far about what they need to succeed at university. In this example, Sam's experience of stress is likely both a condition and product exerting an influence across each of the SRL phases described in this example. Although SRL theory can support Sam to understand their current academic challenges and make effective changes within each phase of the SRL cycle, SRL does not fully address Sam's experience of stress, for that we turn to stress optimization. In particular, stress optimization adds to SRL for a student like Sam by providing theory to explain the impact of the emotion of stress on Sam across the phases of SRL and within the COPES architecture, Sam's stress related beliefs or appraisals for example.

Considering the impact of stress on SRL and student success, key components of stress optimization theory that add to SRL include: (a) stress is enhancing elements, (b) stress appraisal elements, and (c) and embodied approach to stress as an emotion. First, the conceptualization of stress as potentially enhancing recognizes that stress is often inevitable, especially in motivated performance contexts, and stress can be either enhancing or debilitating to performance and wellbeing (Brooks, 2014; Park et al., 2017). Second, stress reappraisal is involved in consciously identifying the aspects of stress that can be used as a resource towards obtaining a goal. For example, when a student like Sam from the example notices they are feeling stressed prior to a

presentation, they can reappraise this experience of stress from a perception that *'this is a negative and I can't deal with it'* to noting that stress is expected and *'the presentation matters and I'm excited to share what I have prepared'*. Third, stress optimization adds to the appraisal perspective of emotion (e.g., Gross, 2015) to include an embodied perspective informed by the psychological construction approach (e.g., Barrett, 2009, 2017b). Functionally, the embodied emotion approach extends the appraisal perspective to also include: (a) prior experience, (b) current sensory and context information, (c) interoception or awareness of internal body sensations, (d) action tendencies, and (e) the meaning each person ascribes to these components (Barrett, 2009, 2017b).

Information from the psychological construction perspective can help Sam understand how their prior experience at school has shaped their current experience of feeling stressed. Remember that Sam had struggled in high school to hand in their assignments and had variable grades. Thus, Sam likely had some confidence about their academic capacity as well as some other experiences of not doing well and corresponding lack of confidence regarding managing academic demands. Sam's prior experience of not managing their academic demands may inform how they are interpreting the current academic context and body sensations related to stress about schoolwork, which together informs Sam's avoidance and lack of adaptive regulation of their academic demands. Further, processes within stress optimization are not necessarily conscious or within metacognitive awareness (Barrett, 2017a; Gross, 1998) and can explain why a student like Sam may not be able to strategically enact aspects of SRL even in cases where they know what to do. Similarly, without the specific information from SRL, Sam may not know how to change their learning processes to be more effective in the university context. In this way, addressing both stress and demands together for Sam, as informed by SRL

and stress optimization, provides an integrated framework that supports success for Sam at university.

Mechanisms Within Self-Regulated Learning and Stress Optimization Theory

In addition to the phases of SRL and the COPES architecture, SRL theory includes additional mechanisms that underpin the regulation of learning such as: (a) SRL practices, (b) SRL challenges, (c) self-efficacy for SRL, (d) foundational academic behaviours, and (e) external and internal factors. Enacting adaptive **SRL practices** is associated with academic success, improved motivation, and fewer academic challenges (Broadbent & Poon, 2015; Hadwin et al., 2022; Jansen et al., 2019; Theobald, 2021). SRL practices include: (a) goal management, (b) task understanding, (c) task value, (d) motivation appraisal, (e) time management, (f) adaptation, (g) monitoring, and (h) academic social engagement. **SRL challenges** refer to the varied academic challenges students navigate en route to student success outcomes. Similar to stress, SRL challenges can provide opportunities for growth and to enact self-regulatory control by putting SRL practices into effect (Hadwin et al., 2022). Lower levels of academic challenges denotes the challenges are less problematic for the students and they are likely utilizing adaptive SRL practices. SRL challenges provide a metric of academic performance in addition to GPA and can be assessed in the following areas: (a) cognitive, (b) behavioural, (c) motivational, (d) socio-emotional, and (e) metacognitive (Hadwin et al., 2022). **Self-efficacy for SRL** denotes beliefs learners hold about their capacity to perform self-regulatory practices and whether those practices are important (Hadwin et al., 2022). Self-efficacy for SRL has been linked to higher grades and retention for students (Caprara et al., 2008). **Foundational academic behaviours** refer to a set of prerequisite behaviours for meaningful academic engagement such as attending class and meeting assignment deadlines that

are strong predictors of academic performance (e.g., Davis et al., 2020; Edwards et al., 2020; Kassarnig et al., 2018). **External factors** encompasses the situated socio-historical context of each learner (Ben-Eliyahu & Bernacki, 2015; Hadwin et al., 2011). For example, SRL also can attend to both the general rules and processes (e.g., domain general or etic) that govern learning as well as the culture specific, intra-individual or emic perspective in order to attend to between group and within group similarities and differences (McInerney, 2018). In this way, SRL encompasses culture and context to examine learning and success as situated and is able to address individual capacities that are also socioculturally determined (Kaplan et al., 2011; Parsons, 2003; McInerney, 2018). **Internal factors** may include conditions and products such as emotions and beliefs that shape a learner's interactions with each phase of SRL (e.g., Aizawa, 2010; Efklides et al., 2018).

Mechanisms that contribute to stress optimization include: (a) cognitive, (b) psychological, and (c) physiological factors (e.g., see Jamieson et al., 2018). First, low levels of stress or stress that is managed well is associated with lower attention for negative emotional stimuli, increased cognitive flexibility and working memory capacity (Jamieson et al., 2018; Mendes & Park, 2014). Second, psychological aspects of stress experiences that are optimized impact the ratio of resources to demand appraisals by supporting an increased ratio of resources to demands (Jamieson et al., 2018; Mendes & Park, 2014). Third, physiological mechanisms of stress optimization include increased sympathetic nervous system arousal, cardiac inefficiency, and increased levels of anabolic hormones (Jamieson et al., 2018; Mendes & Park, 2014).

Expected Outcomes for Self-Regulated Learning and Stress Optimization Theory

SRL theory proposes positive: (a) student experiences and (b) academic outcomes result from adaptive regulation of learning. Regarding social emotional outcomes, there is an

association between adaptive learning and psychosocial factors (e.g., Bucker et al., 2018; Howell, 2009; Linnebruck, 2007; Robbins et al., 2004; Webster & Hadwin, 2014). Adaptive SRL is also associated with academic success and decreased academic challenges (Bucker et al., 2018; Hadwin et al., 2021; Kern et al., 1998; Robbins et al., 2004). Expected outcomes for stress optimization when stress is managed well include: (a) increased cognitive performance and persistence (cognitive), (b) increased sense of purpose and wellbeing and fewer negative emotions (psychological), and (c) increased academic performance, improved health, and decreased negative active coping behaviours (behavioural and applied) (Jamieson et al., 2018).

Gaps for Self-Regulated Learning and Stress Optimization Theory

The primary gap within SRL for addressing stress and student success is the emphasis on addressing stress from an appraisal perspective of emotion (e.g., Harley et al., 2019; Pekrun et al., 2017). While this approach has advanced the field, there is a lot to gain from including an embodied approach to emotion, a psychological construction perspective for example, that includes additional components of emotion beyond appraisal alone. For example, the psychological construction perspective also includes prior experience, current sensory information, interoception, and action tendency in addition to appraisals (Barrett, 2017a, 2017b). I propose that these additional components of emotion incorporate physiological and nonconscious influences that are not explicitly present in the primarily cognitive and metacognitive tradition of SRL. The primary gap in a stress optimization approach for addressing stress and student success is the lack of a comprehensive framework for understanding the learner, learning, and the learning context. Variables related to academic success have been included in stress optimization research, goals management and grades for example (e.g., see Jamieson et al., 2018). The current stress optimization approach does not account for the

recursive and multifaceted variables and processes addressed in self-regulated learning, thus potentially providing an incomplete explanation of the research on stress and student success. I propose stress optimization will benefit from the integration of SRL for examining stress and student success by accessing current SRL extant research findings regarding key components, mechanisms, and expected outcomes.

Summary: An Integrated Approach to Stress and Student Success

A stress optimization approach to motivated performance contexts like academic settings accept that stress is not only expected but also harbours potential for growth and benefits. The stress optimization literature suggests that adaptive responses to stress promote approach-oriented responses that are associated with resilience and thriving (Crum et al., 2017) and positive motivational and affective responses (Crum et al., 2017; Jamieson et al., 2013, 2018, 2022). Approach motivated states predict numerous positive outcomes including greater wellbeing and improved cognitive and performance outcomes (Hempel et al., 2006; Jamieson et al., 2012). Evidence is growing that in motivated performance contexts like academic settings, modifying stress appraisals can benefit: (a) stress responses, (b) psychological processes, and (c) behavioural and performance outcomes (e.g., Brady et al., 2018; Jamieson et al., 2012, 2016; Rozek et al., 2019; Sammy et al., 2017).

Stress optimization includes: (a) stress is enhancing elements, (b) stress appraisal elements, and (c) stress as a resource for active coping. What is still missing from this emerging approach of stress optimization is additional information regarding managing academic demands, specific learning behaviours and practices for example. The lack of a comprehensive framework for understanding learning and academic performance in stress optimization research is a gap that can be filled by integrating SRL. This is critical as stress mindset and appraisals like coping self-efficacy are experience dependent (Crum et al., 2017; Usher & Pajares, 2009), and

will consequently be impacted over time by processes and actions enacted by students as they navigate academic demands. SRL theory has the potential to add capacity to the stress optimization literature in several areas including: (a) the assessment of resources and demands in academic contexts, (b) facilitating task understanding and engagement as part of the context for stress reappraisal, (c) providing accurate and adaptive information to learners in service of modification of maladaptive memories related to academic stressors, and (d) providing adaptive resources for students that facilitate positive predictions about future academic demands. This research attempts to fill in some of this gap by considering how specific learning practices and behaviours within SRL are associated with stress optimization and student success outcome.

Table 2

Key Components that Contribute to Understanding How Stress & Student Success Operate Together

SRL Theory	Stress Optimization Theory
Recursive cycles of monitoring and control (metacognitive)	<u>Stress-is-enhancing elements:</u>
Four loosely sequenced metacognitive phases:	Recognition of positive and negative aspects of stress
1. Task definition	Utilizing stress
2. Setting goals and plans	<u>Stress Reappraisal elements:</u>
3. Enacting work by engaging strategies and tactics	Stress is a resource and stress responses are functions of goal
4. Evaluation and adaptation for the future	pursuit
COPEs architecture for each phase:	Stress as part of active coping
Conditions, Operations, Products, Evaluation, Standards	<u>Embodied approach to stress as an emotion</u>
<i>Refer to Table 1 for an example of how stress is associated with each phase of the SRL cycle.</i>	Draws from both appraisal approaches (e.g., Gross, 2015) and psychological construction approach to emotion (e.g., Barrett, 2009, 2017b)

Table 3

What Mechanisms in Each of these Theories are Useful for Understanding How Stress & Student Success Operate Together?

SRL Theory	Stress Optimization Theory
SRL Practices	<u>Cognitive:</u>
Goal management, task understanding, task value, motivation	Lower attention for negative emotional stimuli
appraisal, time management, adaptation, monitoring, academic social engagement	Increased flexibility and working memory
SRL Challenges	<u>Psychological:</u>
Cognitive, behavioural, motivational, socio-emotional, metacognitive	Increased ratio of resource to demand appraisals
Self-efficacy for SRL and SRL Importance	<u>Physiological:</u>
Appraisal beliefs for planning, metacognitive beliefs, social engagement related to SRL	Increased SNS arousal, anabolic hormones, cardiac efficiency
Foundational Academic behaviours (e.g., going to class, completing your work)	
External (task, context) and Internal (conditions, products) factors	

Table 4

What Outcomes Have Been Associated With these Theories that Might Help Understand How Stress & Student Success Operate Together?

SRL Theory	Stress Optimization Theory
<u>Social emotional</u>	<u>Cognitive:</u>
Increased hedonic and eudaimonic wellbeing (psychological and social)	Increased cognitive performance and persistence
Decrease in social-emotional challenges	<u>Psychological:</u>
Increase in academic social engagement	Increased sense of purpose & wellbeing
<u>Academic</u>	Decreased negative emotions
Increased GPA	<u>Behavioural & Applied:</u>
Decreased academic challenges (cognitive, behavioural, motivational, socio-emotional, metacognitive)	Increased academic performance
Increased adaptive SRL practices (Goal management, task understanding, task value, motivation appraisal, time management, adaptation, monitoring, academic social engagement)	Decreased frequency of illness
Increased Foundational Academic Behaviours	Decreased negative active coping behaviours

Table 5

What Makes Each of These Theories Insufficient on Its Own for Understanding How Stress & Student Success Operate Together?

SRL Theory	Stress Optimization Theory
Limited recognition of stress as a potential internal condition	No comprehensive framework for understanding learning
Limited understanding of how stress and stress regulation is associated with:	beyond goals and goal management
<ul style="list-style-type: none"> • Phases of SRL cycle • Enacting SRL practices • Enacting foundational academic behaviours • Student success outcomes 	Key elements of regulation of learning not included:
Limited recognition of how stress, stress regulation, and SRL are associated	<ul style="list-style-type: none"> • Task understanding • Academic behaviours • A full array of strategic learning practices (e.g., goal management, task understanding, task value, motivation appraisal, time management, adaptation, monitoring, academic social engagement
Emotion typically viewed through lens of appraisal approaches to emotion (e.g., Pekrun et al., 2017)	<ul style="list-style-type: none"> • Large scale adaptation and reflection • Cognitive architecture (condition, operations, products, evaluation, standards)

Would benefit from an embodied approach to emotion that includes the physiological component of stress and stress related avoidance (e.g., Barrett, 2017a, 2017b)

- Acknowledgment of learning as open, recursive, and multifaceted

No recognition of association between stress, stress regulation, and components of self-regulated learning

Framework for mental health and well-being not included

Note: please refer to Hadwin et al., (2021); Jamieson et al. (2018); Winne & Hadwin (2008) for comprehensive review

Chapter Two: Establishing the Associations Between Stress Appraisals, Self-Regulated Learning, and Student Success Outcomes - A Review of the Literature

Framed by SRL and stress optimization theory, this research proposes that students will experience stress, and this can be good or bad depending on how they appraise both stress in general and their capacity to cope with academic stress and demands. The general and specific appraisals about stress and academic demands are expected to be associated student success outcomes. In addition, regulatory processes enacted to manage academic demands are expected to contribute to this association between appraisals for coping with academic demands and student success outcomes. The aforementioned constructs and corresponding associations will be delineated in this section.

Student Success Outcomes

This research considers both student experiences and performance outcomes within student success. Mental health and wellbeing, an important aspect of **student experiences** in student success, is related to: (a) superior psychosocial functioning, (b) work and academic performance (Howell, 2009; Keyes, 2007; Moulin et al., 2017), and (c) enacting adaptive strategies to manage challenges (Freire et al., 2016). Navigating academic challenges effectively is an important **student experience** in student success, and according to Hadwin et al., (2021) is: (a) a predictor of academic performance, (b) contributes to continued learning and growth, (c) creates opportunities for students to engage self-regulatory control by implementing adaptive SRL practices, and (d) functions as a metric of adaptive SRL by predicting academic success (see Hadwin et al., 2021; Koivuniemi et al., 2017). The next two sections will examine student experiences and performance outcomes that contribute to student success and are important in the context of stress and coping.

Academic Performance: GPA

A standard measure for capturing academic success is GPA (Robbins et al., 2004; Zollanvari et al., 2017). Although GPA is a useful and widely used metric of academic performance, GPA is a distal and static outcome measure. GPA does not explicitly identify academic difficulties or challenges that may have deleterious impacts on student success, from a self-regulatory perspective numerous factors contribute to academic performance (Hadwin et al., 2022). Extant research has demonstrated limited success in predicting GPA, with academic performance best predicted by an assessment of a variety of individual differences (Richardson et al., 2012; Robbins et al., 2004; Zollanvari et al., 2017). For example, GPA is correlated with previous academic performance, academic self-efficacy, academic engagement, SRL strategies, and conscientiousness (Pérez-González et al., 2022). Cognitions specific to academic performance (e.g., performance self-efficacy) is one of the strongest correlates with GPA (Richardson et al., 2012). Prior research is mixed regarding the impact of cognitive appraisals of stress on GPA. Jamieson et al., (2022) reported evidence that cognitive appraisals were predictive of GPA. The current study will again test the association between stress appraisals and GPA considering prior inconsistent evidence regarding this relationship. In addition, the degree to which students enact self-regulatory learning strategies may mediate the effect of psychosocial contextual influences (e.g., stress appraisals) on academic performance (Richardson et al., 2012). Whether self-regulatory practices mediate the association between stress appraisals and student success is addressed in this research.

Student Experiences

Academic Challenges. Given that the university context is challenging for students (ACHA, 2016; Keyes, 2005; OECD 2017), navigating academic challenges effectively is also

essential for student success and another metric for assessing academic outcomes. Academic challenges are defined as the difficulties and obstacles students face in their academic work (Hadwin et al., 2019) and can also provide opportunities for student to engage in self-regulated learning (Hadwin et al., 2011). Academic challenges can inhibit learning and lead to problems related to cognition, motivation, and emotion (Boekaerts, 2011; Zimmerman & Cleary, 2009). In addition, continuing to struggle potentially leaves students seeing themselves as a failure (Koivuniemi et al., 2017).

Prior research from SRL has indicated SRL and learning challenges are connected (Koivuniemi et al., 2017). SRL and learning challenges are connected with challenges providing an opportunity for students to regulate their learning and SRL skills helping students to achieve better learning results and handle challenges better (Hadwin et al., 2011; Pintrich, 2000; Zimmerman, 2000). Challenges are also important for continued learning and growth and create opportunities for students to engage self-regulatory control by implementing adaptive SRL strategies and practices for academic challenges (Hadwin et al., 2022; Koivuniemi et al., 2017; Pintrich, 2000; Zimmerman, 2000). For this to happen, students should engage metacognitive monitoring and adaptation to manage cognition, motivation, emotions, and behaviours relative to their goals and the learning context (Pintrich, 2000). Academic challenges are less problematic for students who engage adaptive SRL practices, thus the degree of SRL challenge is a metric of adaptive SRL (Hadwin et al., 2022; Koivuniemi et al., 2017).

Specifically, social-emotional, and motivational challenges will be assessed as outcomes in this research. Hadwin et al. (2019) examined challenges reported by students in their weekly study sessions over the course of an academic term, motivation and social-emotional challenges were consistently high and not necessarily linked to goal attainment. In collaborative learning

situations, motivational and emotional challenges were also most common (Koivuniemi et al., 2017). Further, both stress mindset and coping self-efficacy are hypothesized to impact motivation in this dissertation research. In this way, motivation challenges are consistently a relevant concern for students and prior research suggest stress mindset and self-efficacy will be influential constructs in shaping student motivation (Bandura & Locke, 2003; Bong, 2001; Crum et al., 2017; Schunk, 1991).

Mental Health and Wellbeing. Mental health and well-being is an important component of student success. A broad and multifaceted construct that refers to optimal functioning and experience (Diener et al., 2017; Ryan and Deci, 2001), mental health is associated with superior functioning related to; (a) psychosocial functioning, (b) work and academic performance (Kapil et al., 2024c), and (c) physical health (Howell, 2009; Keyes, 2007; Moulin et al., 2017). Mental health captures the degree to which students are flourishing emotionally, psychologically, and socially and aligns with current perspectives regarding student success (e.g., see Louis & Schreiner, 2012).

Mental health and wellbeing in this research is informed by a dual-continua model with mental illness and mental health differentiated as distinct and correlated axes (Keyes, 2005, 2013). The presence of mental health is described as flourishing and the absence of mental health as languishing (Keyes, 2002, 2005). The mental illness dimension identifies the presence or absence of psychopathology (e.g., DSM V; APA, 2013) while the mental health dimension considers to what extent well-being is present or absent (Howell, 2009; Keyes, 2005). Flourishing mental health represents elevated emotional, psychological and social well-being and languishing mental health represents reduction in these same three areas (Howell, 2009; Keyes, 2005).

Mental health and wellbeing, these terms will be used interchangeably here (e.g., mental health and academic wellbeing are synonymous), are comprised of two distinct and related dimensions, hedonic and eudaimonic. The (a) what, (b) when, (c) how, and (d) why of hedonic and eudaimonic dimensions is summarized in Table 4 and described below. First, regarding **what** is the hedonic dimension, it rests on a determination of well-being that is largely subjective and equates well-being with pleasure and happiness (Ryan and Deci, 2001; Trompeter et al., 2017). Hedonic wellbeing includes the presence of *positive affect* (e.g., happy, interested, satisfied) and *avowed quality of life* (e.g., satisfaction with overall life). Second, regarding the **when**, hedonic pursuits relate to more immediate outcomes (Huta & Ryan, 2010; Ryan et al., 2013) and are more impacted by recent events and hedonic influences on psychological functioning and tend to dissipate quickly (Steger et al., 2008; Suh et al., 1996). Third, regarding **how** this dimension is expected to exert influence or be influenced, positive emotional or hedonic well-being: (a) can contribute to adaptive functioning (Trompeter et al., 2017), (b) is associated with broad attention and cognition (e.g., more flexible) and with approach behaviour (Fredrickson, 2001), (c) enhances behavioural engagement (Linnebruck, 2007), and (d) fluctuates in positive association with academic engagement (Davis et al., 2019; Rostampour et al., 2020). Fourth, **why** the hedonic dimension exerts influence in this way is explained by the broaden and build theory, in particular that positive emotion has been correlated with more flexible cognition and attention (Fredrickson, 2001).

Regarding **what** is the eudaimonic dimension, the eudaimonic approach asks people to live in alignment with their *daimon* or true self, eudaimonic goals are shaped by both the individual and their context (Deci & Ryan, 2000; Diener et al., 2017). The eudaimonic tradition considers optimal psychological functioning in life and includes psychological and social well-

being, together these depict how much individuals see themselves as living up to internal standards and their potential (Deci & Ryan, 2008; Keyes, 2002; Lamers et al., 2012). Second, regarding **when** eudaimonic wellbeing is expected to impact outcomes, eudaimonic approaches are more likely to be good for the person in the long term, thus more enduring with respect to well-being (Huta & Ryan, 2010; Ryan et al., 2013, 2018; Steger et al., 2008). The impact of the eudaimonic dimension unfolds over a longer period of time, may be unrelated to positive affect in the short term but does relate to positive affect at longer term follow ups (Huta & Ryan, 2010). Third, regarding **how** the eudaimonic dimension exerts influence, the eudaimonic tradition considers optimal psychological functioning in life and includes psychological and social well-being, together these depict how much individuals see themselves as doing well in life (Keyes, 2002; Lamers et al., 2012). Eudaimonic wellbeing that is derived from fulfilling ways of living in alignment with personal and social virtues and values increases a person's level of competence, autonomy, and relatedness that facilitates wellbeing (Ryan & Deci, 2001). From a eudaimonic perspective, wellbeing includes self-actualization and personal growth at the individual level (Ryff, 1989) and commitment to socially shared goals and values at the social level with the content of goals and meanings differing across society and culture (Christopher, 1999; Diener & Suh, 2000). Fourth, **why** does the eudaimonic dimension work in this manner, pursuing eudaimonic goals and activities increases a person's level of competence, autonomy and relatedness which in turn increases well-being according to the self-determination theory (Ryan & Deci, 2017). The most effective manner of increasing feelings of wellbeing tends to be focusing on long-term self-improvement and connections with others (Sheldon & Lyubomirsky, 2019). The hedonic and eudaimonic dimensions are both important to psychological functioning or mental health and wellbeing (Ryan and Deci, 2001) and the current approach to understanding

mental health is increasingly less unilateral and moving away from a focus on either subjective (hedonic) or psychological (eudaimonic) well-being in favour of a more integrated framework (Diener et al., 2018; Keyes, 2002; Keyes & Annas, 2009; Seligman, 2002).

Mental health and wellbeing is more than the absence of mental illness, it is emergent and can be identified when a set of symptoms linked to cognitive and social functioning are present at a particular level for a specified duration (Keyes, 2002) and includes hedonic and eudaimonic dimensions (Keyes, 2002, 2013). As displayed in Figure 3, three dimension subcategories or factors related to mental health are outlined by Keyes (2002, 2005); (a) emotional well-being (hedonic), (b) psychological well-being (eudaimonic), and (c) social well-being (eudaimonic). Emotional well-being is the presence of *positive affect* (e.g., happy, interested) and *avowed quality of life* (e.g., life satisfaction) and represents hedonic aspects of well-being. Psychological well-being emphasizes positive self-evaluation such as satisfaction with accomplishments, viewing the self as growing, and positive self-evaluation. Social well-being captures the public and social criteria whereby people evaluate their life. Psychological and social wellbeing represent the eudaimonic dimension. Finally, mental health in this research is defined as *distinct from mental illness, a complete state in which individuals are flourishing (Keyes, 2002) with high level of emotional, psychological, and social well-being (Keyes, 2005) and is widely viewed as a state of well-being that supports individuals to cope with stressors, work productively, and function as a contributing member of society (WHO, 2016).*

Figure 3

Dimensions, Subcategories, and Components of Mental Health and Wellbeing

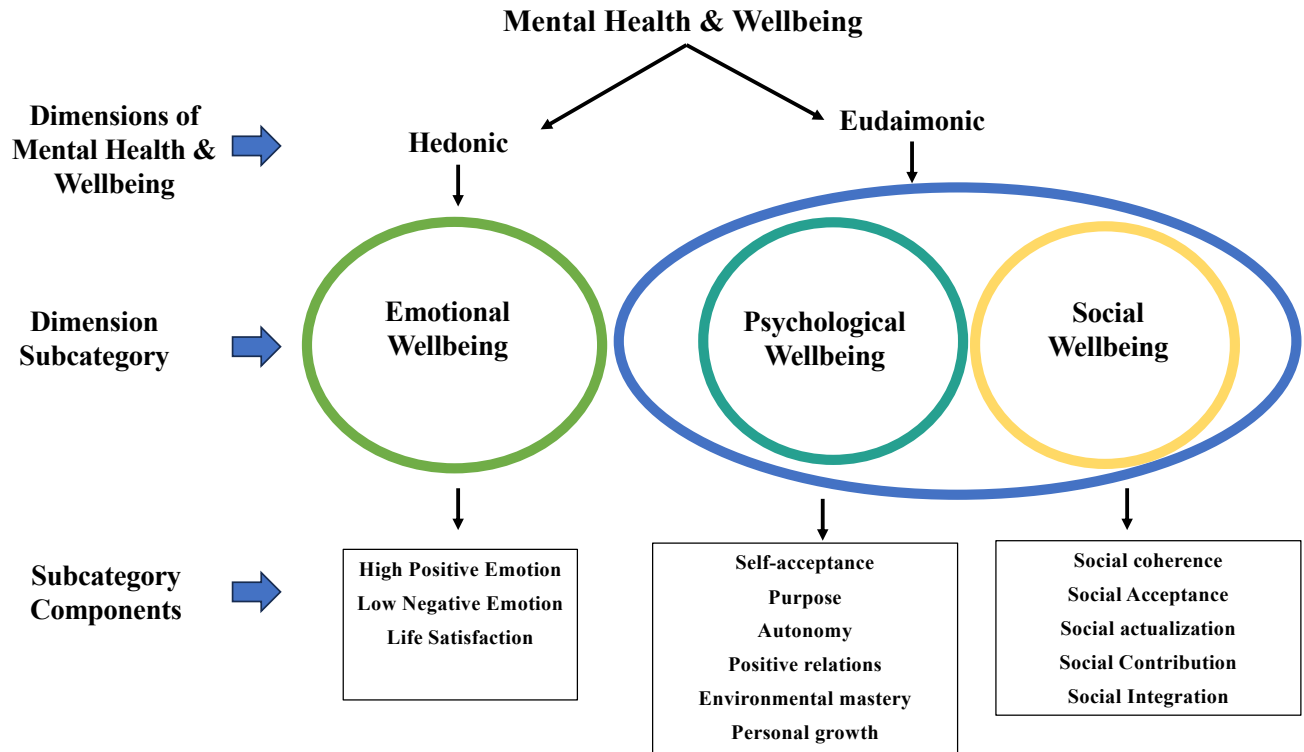


Table 6.

The What, When, How, and Why of Mental Health and Wellbeing and Student Success

Hedonic (Feeling Well)	Eudaimonic (Doing Well)
<p>What Equated with pleasure and happiness, positive emotion (Happy, Interested, Curious, Life Satisfaction) Absence of negative emotion (stress) Optimal feelings in life</p>	<p>Live in alignment with daimon (true self) Includes negative emotion if it is part of fully functioning (e.g., sadness from loss, stress about a test) Optimal functioning in life</p>
<p>When Short term influence, dissipates easily, influenced by proximal events Changes quickly</p>	<p>More enduring re well-being, longer term impact, influenced by distal events Changes slowly</p>
<p>How Not effective to pursue hedonic interests directly (hedonic adaptation) Positive outcomes include: success, physical and mental resilience, adaptive learning processes</p>	<p>Eudaimonic creates hedonic boosts, hedonic does not create eudaimonic boosts Wellbeing from, fulfilling ways of living, alignment with virtues and values Increases a person's level of competence, autonomy, and relatedness and subsequent well-being</p>
<p>Why Broaden and Build Theory (Fredrickson, 2001)</p>	<p>Self-determination Theory (Ryan & Deci, 2001)</p>

Student Stress Appraisals in the Academic Context: How a Student Perceives Their Environment

Coping Self-Efficacy

With the recognition that stress itself is neither good nor bad, attention shifts to the importance of how coping contributes to student success outcomes. An overarching goal for university student success is to feel more capable of: (a) learning effectively, (b) managing academic tasks, and (c) regulating academic stress. Confidence about being able to cope effectively when facing a broad range of challenges related to the academic context, also known as coping self-efficacy is related to regulating stress (Chesney et al., 2006). Coping self-efficacy, an appraisal, is comprised of three broad factors, including confidence in the ability to: (a) use problem focused coping, (b) get support from friends and family, and (c) stop unpleasant emotions or thoughts (e.g., emotion focused coping) (Chesney et al., 2006). Coping self-efficacy is distinct from the broader category of emotion regulation that includes practices that are performed, instead coping self-efficacy refers to the idea that a person needs to believe they can engage in adaptive regulatory actions to effectively do so (Chesney et al., 2006). Coping self-efficacy captures an individuals' belief in their ability to cope with emotions (e.g., stress), and stressful events (e.g., tests and other academic challenges) that are expected at university.

Within stress and coping theory, stress is considered a person-environment relationship that is evaluated as personally significant and as exceeding a person's resources for coping. Coping involves both *emotion-focused coping* (e.g., managing emotional responses to stressful events), and *problem-focused coping* (e.g., responses that alter aspects of the event itself) (Chesney et al., 2006; Lazarus & Folkman, 1986). Folkman (2008) further explains that problem-focused coping is utilized in situations when something could be done and emotion

focused coping to regulate distress when a situation had to be accepted, implementing both types of coping is most effective.

Coping self-efficacy has been primarily studied in other acute motivated performance contexts where stress is expected such as the military (e.g., Delahajj & Van Dam, 2017) and mental health settings (e.g., Benight & Harper, 2002; Melato et al., 2017; Midkiff et al., 2018; Singer, Humphreys, & Lee, 2016; Wissing et al., 2011). Given the expectation that students facing new academic demands and goals where stress is expected, coping self-efficacy has potential utility for educational and student success research.

Although coping self-efficacy is not tested in educational research, other types of self-efficacy have consistently proven to be important for student success. For example, academic self-efficacy has been found to play a significant role in motivation and performance across a range of contexts (Bandura & Locke, 2003), evidence continues to grow regarding the predictive role it plays in student success (Pajares, 2003), and it plays a role in shaping perceptions of stress as a challenge or a threat and mediates stress outcomes (Freire et al., 2020; Karademas & Kalantzi-Azizi, 2004). Self-efficacy is a self-referencing belief that; (a) contributes to the assessment of demands as challenges or threats (Bandura, 2008; Liu & Li, 2018), thus promoting adaptive coping (Freire et al., 2016; Karademas & Kalantzi-Azizi, 2017) and mental health (Kashdan et al., 2018), (b) is a positive significant predictor of coping with stress (Freire et al., 2016), (c) can mediate between psychological resources like positive emotions and engagement with academic tasks or challenges (Luberto et al., 2014; Ouweneel et al., 2011), and (d) has been associated with academic performance (Klassen & Klassen, 2018) and successfully enacting academic strategies (Bandura, 2001).

There is also empirical support for academic self-efficacy being associated with academic practices and behaviours. Academic self-efficacy is associated with: (a) enacting academic strategies (Bandura, 2001); (b) academic success (e.g., Kuo et al., 2021; Joo et al., 2013); (c) students' choices of learning activities, levels of effort, and persistence in the face of obstacles (Bandura, 1986; Bong & Skaalvik, 2003; Pajares, 1996; Schunk, 1991); and (d) motivation and performance across a range of contexts (Bandura & Locke, 2003). Indeed, it has proven to be one of the most powerful determinants of students' engaging in adaptive learning and academic achievement (see Robbins et al., 2004; Honicke & Broadbent, 2016; Richardson et al., 2012, for reviews). Further, from the stress optimization literature, reappraisal predicts adaptive coping (e.g., mastery performance goals and low procrastination mediated performance outcomes) and academic performance in college students (Jamieson et al., 2022). It follows then, that as an appraisal for being able to cope with academic stress, coping self-efficacy should be positively associated with SRL practices and with student success outcomes.

Coping Self-Efficacy and Student Experiences

Different types of self-efficacy have been positively associated with social emotional outcomes. For example: (a) emotional self-efficacy was linked to well-being and positive coping strategies during the pandemic (Cattelino et al., 2021) and high levels of positive thinking and happiness (Caprara et al., 2006), (b) academic self-efficacy was associated with psychological wellbeing (Freire et al., 2019; Melato et al., 2017), and (c) coping self-efficacy has functioned in a predictive capacity for emotional and psychological well-being (Melato et al., 2017).

Links have been established between different types of self-efficacy, including CSE, and social emotional outcomes in prior research (e.g., Caprara et al., 2006; Cattelino et al., 2021; Delahaij & VanDam, 2017; Freire et al., 2019; Melato et al., 2017). However, CSE is not

typically used in student success research. The assertion in this research is that CSE is overlooked in educational settings and well suited to student success research.

Coping Self-Efficacy and Academic Performance Outcomes

As noted in the prior section, self-efficacy is a self-referencing belief that contributes to the assessment of demands as challenges or threats (Bandura, 2008; Liu & Li, 2018), thus promoting adaptive coping (Freire et al., 2016; Karademas & Kalantzi-Azizi, 2017). This is consistent with Lazarus' (1991) appraisal theory, individuals appraise a stressful encounter by evaluating what is relevant for them. This encounter will be evaluated as either a threat or a challenge, depending on whether the individual can access adequate resources to meet the demands of the situation. Prior research has indeed found that self-efficacy predicted evaluations of a stressful situation as a challenge or a hindrance (e.g., Karademas & Kalantzi- Azizi, 2004). Self-efficacy beliefs are established motivation factors associated with performance and academic success (Hadwin et al., 2022; Robbins et al., 2004; Won et al., 2023).

Academic self-efficacy is well established as a strong predictor of GPA (Bandura, 1986; Bong & Skaalvik, 2003; Klassen & Klassen, 2018; Pajares, 1996, 2003; Schunk, 1991) and one of the most powerful determinants of students' academic achievement (see Honicke & Broadbent, 2016; Richardson et al., 2012; Robbins et al., 2004 for reviews). Similarly, reappraisal research from the stress optimization field (e.g., see Jamieson et al., 2022; Jamieson & Hangen, 2020) shows reappraisal predicts academic performance. Stress reappraisal, interventions that teach students stress can benefit them and they can manage stress, positively predicts students persisting in courses (Jamieson et al., 2022). Similarly, CSE is associated with adaptive coping in military personnel (Delahajj & Van Dam, 2017). In this way, CSE is consistent with broader coping appraisal perspectives that consider resources and demands

(Chesney et al., 2006; Jamieson et al., 2022; Lazarus & Folkman, 1986). Stress and coping theory define problem focused approaches as exerting direct change over the situation, and emotion-focused coping as coping when the situation has to be accepted (Folkman, 2008). CSE includes both problem and emotion focused coping thus capturing what students can directly impact (e.g., learning practices) and what they cannot (e.g., the academic tasks assigned to them).

To summarize, while academic self-efficacy has strong associations with academic outcomes, and coping self-efficacy and stress reappraisals are associated with coping with high stress situations (Delahajj & Van Dam, 2017) and persisting in academic contexts (Jamieson et al., 2022), CSE is underused as a predictor of GPA and academic challenges. It is hypothesized in this research that CSE will be positively associated with academic wellbeing and negatively associated with academic challenges.

An integrated approach including stress optimization and SRL has potential to explain which components of coping self-efficacy differentially predict the student success outcomes. Consistent with coping theory (Folkman, 2008), coping self-efficacy includes confidence in the ability to: (a) use problem focused coping, and (b) emotion focused coping (e.g., stop unpleasant emotions or thoughts) (Chesney et al., 2006). This refers to an individuals' belief in their ability to cope with the emotion of stress and the stressful events (e.g., tests and other academic challenges) that are expected at university. With this example in mind, SRL has potential to inform the stressful event in the academic context while stress optimization informs adaptive coping with the emotion of stress. Prior research has mixed findings regarding coping with some research showing balanced coping (e.g., utilizing both problem and emotion focused coping) as optimal (Freire et al., 2020) while other research purports problem-focused coping is preferred

(Jamieson et al, 2018; Yaeger et al., 2016). However, some research (e.g., Yaeger et al., 2016) that claims problem-focused coping is preferable, uses coping (e.g., emotional suppression) that is not adaptive long term to represent emotion focused coping, therefore conflating emotion focused coping with potentially maladaptive emotion regulation. Emotion and problem focused coping both predict student success outcomes, although differentially (e.g., Kapil et al., 2023).

Stress Mindset

In the challenging university context, this dissertation research turns to stress mindset as an important contributor to student success. Undergraduate students are a population that may greatly benefit from stress mindset interventions, this group typically experiences high levels of stress (Jenkins et al., 2021). Eliminating stress is not plausible and may even be counter to overall wellbeing. For example, attainment of personal goals and standards is important for eudaimonic wellbeing and stress is expected anytime a goal is pursued (e.g., see Ng et al., 2009; Ryff, 1989). Therefore, I propose that without stress, a person cannot attain flourishing eudaimonic wellbeing as they would not be able to attain the personally relevant goals that comprise eudaimonic wellbeing. Stress mindset is expected to facilitate motivation in a context where adaptive processes in student success can occur (Crum et al., 2013). Stress mindset is not a ‘panacea’ however (Crum et al., 2017).

Stress mindset captures general beliefs about the nature of stress itself, is distinct from both specific coping practices and the severity or frequency of the stressor, and proposes stress responses can be modified even in contexts where it is not possible to change situation demands (Crum et al., 2017), academic program requirements for example. Stress mindset is expected to shape subsequent outcomes linked to stress including behaviour, performance, and wellbeing, and is expected to inform coping practices by shaping the psychological and motivational contexts within which coping actions are chosen and enacted (Crum et al., 2017).

Prior to stress mindsets, general mindset theory was developed by Carol Dweck (Dweck, 2006; Dweck, Chiu & Hong, 1995) and proposes that students with growth mindsets tend to demonstrate more adaptive behaviours and psychological traits such as resilience when faced with failure, this in turn generates greater academic achievement. Fixed mindset, in contrast, refers to the personal perspective that traits such as intelligence cannot be improved with effort. According to mindset theory, students with a fixed mindset are more likely to avoid difficult tasks and assume any failure is the result of a deficit of ability and this is the cause of poor academic performance. Implicit theories focus on core assumptions people have about malleability of personally relevant qualities, such as intelligence. If you have an *entity theory*, you believe that your ability is fixed and unchangeable (fixed mindset). If you have an *incremental theory*, you believe you can improve your ability (growth mindset).

Implicit theories have also been studied during the postsecondary transition with a flexible mindset regarding emotions associated with higher psychological well-being and increased positive emotion (Tamir et al., 2007). A study of Canadian undergraduates' implicit theories regarding malleability of well-being showed incremental beliefs were associated with positive affect and positive functioning (Howell, 2017). Extant evidence shows that endorsing an incremental perspective of emotion (e.g., stress) is associated with more adaptive functioning than an entity view (Howell, 2017). A similar relationship is expected between stress mindset and mental health with a stress-is enhancing mindset associated with higher levels of mental health and more adaptive functioning (e.g., higher engagement with SRL practices, lower academic challenges).

Mindsets are operationalized as a 'lens' or 'frame of mind' that orients a person to a particular set of associations, expectations, and predictions (Dweck, 2006). Stress mindsets are

mindsets about how a person perceives the experience of stress, such as whether stress is believed to have enhancing or debilitating consequences (Crum et al, 2013). The *stress-is-enhancing mindset* refers to a belief that stress has *enhancing* effects of performance, health, and wellbeing (Crum et al, 2013). The *stress-is-debilitating mindset* refers to the belief that stress has *debilitating* effects on performance, health, and wellbeing. Stress is a complex process and can have both enhancing and debilitating effects, stress mindsets can simplify and orient individuals to a set of expectations, strategies, and motivations that increase that chance that a person will experience the enhancing effects of stress, especially in performance situations (e.g., exams, university context) (Crum et al., 2013; 2017).

Implicit theories about intelligence have been studied extensively in educational settings including how they: (a) relate to intelligence (Dweck, 1999), (b) facilitate challenge seeking (Yeager & Dweck, 2012), and (c) impact academic performance and physiological stress responses (Yeager et al., 2016; Yeager et al., 2022; Yeager & Dweck, 2012). However, implicit theories have also been criticized for having weak effect sizes. Sisk et al. (2018) reported weak effect sizes for growth mindsets in two meta-analyses, the authors concluded that mindset alone does not facilitate significant shifts in student academic performance. Other criticisms of mindset purport that growth mindset interventions have little to no impact on academic achievement (Burnette et al., 2023; McNamara & Burgoyne, 2023). In a recent meta-analysis (63 studies, $N=97,672$), issues with growth mindset research were uncovered regarding study design, analysis, and reporting including researcher and publication bias (McNamara & Burgoyne, 2023). These findings suggest that something else besides mindset may contribute to changes in academic achievement, effort encouragement for example, leaving room for additional mediating variables to be considered (McNamara & Burgoyne, 2023).

Extant research shows stress mindset functioning in a predictive role (Crum et al., 2013; 2017; Keech et al., 2018, Jenkins et al., 2021) and as a moderator (Huebshmann & Sheets, 2020; Park et al., 2018). Stress mindset is also implicated in a range of outcomes important to university students including: (a) mitigating the relationship between high levels of stress and depressive and anxiety symptoms in college students (Huebschmann & Sheets, 2020), (b) moderating impulsive actions in response to adverse life events in adolescents (Park et al., 2018), (c) predicting mental and physical health as mediated by approach coping and perceived distress in college students (Jenkins et al., 2021), (d) psychological wellbeing (Keech et al., 2018), (e) perceived stress (Keech et al., 2018), (f) physical wellbeing (Keech et al., 2018), (g) cortisol levels (Crum et al., 2013), (h) positive affect (Crum et al., 2017), (i) greater cognitive flexibility (Crum et al., 2017), (j) heightened attentional bias towards positive stimuli (Crum et al., 2017), (k) improved mental health (Khan & Shamama-tus-Sabah, 2020), and (l) improved academic performance (Keech et al., 2018).

The impact of stress mindset on outcome variables is often indirect (Keech et al., 2018; Jenkins et al., 2021) with outcome variables impacted by mediators such as proactive coping and perceived somatic symptoms (Keech et al., 2018), approach coping and perceived distress (Jenkins et al., 2021). Viewing stress as enhancing can provide a psychological buffer against the negative effect of stress and is associated with greater use of approach coping and lower perceived distress (Jenkins et al., 2021). Significant indirect effects have previously been found between stress mindset and psychological well-being through proactive coping behaviours and between stress mindset and GPA through somatic symptoms (Keech et al., 2018). In the academic setting, proactive or problem focused coping may involve behaviours such as planning,

task initiation, or acquiring resources (Carver & Connor-Smith, 2010). In this study, proactive and approach coping is represented by SRL practices.

Student Regulatory Responses to Stress Appraisals in the Academic Context: How a Student Manages Their Environment Through Self-Regulated Learning

Current research indicates that behaviours intended to proactively meet the demands of the stressor are important influences on performance related outcomes including physical and psychological health and academic performance (Keech et al., 2018). Further, negative emotions like stress vary in response to an individual exerting a direct influence over the situation (Helzer & Jayawickreme, 2005). Thus, engaging in effective SRL practices is expected to support direct influence over the academic situation and further mediate the relationship between coping self-efficacy, stress mindset and student success outcomes in this research.

Self-regulated learning practices have been associated with academic success (Broadbent & Poon, 2015) and motivation (Jansen et al., 2019; Theobald, 2021). Students who report engaging in effective SRL practices experience fewer academic challenges and perform better academically (Hadwin et al., 2022; Koivuniemi et al., 2017). Self-regulated learning challenges are inversely related to a student's capacity to engage in effective SRL practices (Hadwin et al., 2019; Hadwin et al., 2021; Koivuniemi et al., 2017).

A main source of self-efficacy is mastery experiences (e.g., Usher & Pajares, 2009). In an academic context, what you actually do to manage the academic demands and respond to academic challenges is relevant for student success. CSE is well suited to assess student capacity to navigate stressful academic demands with the inclusion of both emotion and problem focused coping. For example, I posit an individual with high coping self-efficacy is more likely to appraise the situation as a challenge and perceive they can access adequate resources, such as

adaptive SRL practices, to manage this challenge. Consider the example of Sam again, Sam was exhibiting low coping self-efficacy as evidenced by low engagement with emotion focused coping (the emotion of stress), problem focused coping (adaptive learning practices), and support (asking the instructor for help) which was associated with lower-than-expected assignment grades and wellbeing. Now imagine that Sam felt capable of (likely based on experience) managing their stress through reappraisal and physiological regulation, enacting adaptive SRL practices to meet the new academic demands, and seeking appropriate help. With Sam, the higher level of coping self-efficacy is expected to be associated with enacting adaptive SRL and subsequent improvement in student success outcomes (e.g., higher levels of mental health, lower levels of academic challenges, higher GPA).

In this research, I therefore hypothesize coping self-efficacy will be positively associated with SRL practices. Stress reappraisal intends to increase the perception of perceived resources to demands by framing the stress response as part of adaptive coping (see Jamieson et al., 2018). This is another point of synergy between stress optimization and SRL, SRL practices provide adaptive responses to specific academic demands thus increasing resources in learning contexts. This approach supports individuals to appraise physiological and cognitive responses to stress as resources, moving them away from effortful avoidance processes like ignoring, suppressing, or dampening the stress response which tends to be costly energetically and ineffective. Therefore, this research hypothesizes that there will be a positive association between coping self-efficacy and SRL practices.

Self-Regulated Learning and Student Success Outcomes

Adaptive SRL practices are also expected to be positively associated with student experience outcomes. Existing research has a linked student regulation of learning and mental

health to academic success (Lei et al., 2018; Robbins et al., 2004; Schunk & Greene, 2018; Zollanvari et al., 2017) and mental health scores and academic engagement shift in positive association over time (Davis, 2020; Rostampour et al., 2020). SRL and mental health are associated, adaptive regulatory practices and metacognition support effective regulation or learning, academic success, and mental health (e.g., Davis, 2020; Howell, 2009). Eudaimonic mental health is facilitated by measuring up to salient internal standards and achieving associated goals. In an academic context this will likely overlap with academic goals such as degree completion and GPA, which are facilitated by adaptive SRL practices (Broadbent & Poon, 2015). SRL and mental health are consistent with the current perspective of student success which endeavors to build student strengths, facilitate effective learning (e.g., SRL) and psychological processes (e.g., mental health) to maximize potential and thriving.

SRL practices are also expected to be associated with academic performance outcomes. Enacting effective SRL practices is expected to influence the academic situation and subsequently facilitate student success outcomes. Behaviours intended to proactively meet the demands of the stressor are important mediators on performance related outcomes including physical and psychological health and academic performance (Keech et al., 2018). SRL practices have been associated with academic success (Broadbent & Poon, 2015) and motivation (Jansen et al., 2019; Theobald, 2021). Students who engage in effective SRL practices experience fewer academic challenges and perform better academically (Hadwin et al., 2022). SRL challenges are inversely related to a student's capacity to engage in effective SRL practices (Hadwin et al., 2019; Hadwin et al., 2021; Koivuniemi et al., 2017). Students with more adaptive SRL practices and behaviours report lower academic challenges and higher academic achievement (Hadwin et al., 2022; Liu et al., 2014). SRL practices support students to manage motivational challenges

and predict higher GPA. In the challenging and stressful postsecondary context where challenges are expected, adaptive SRL practices are critical for *doing well* at school.

While it is established that SRL practices mediate academic outcomes (Jansen et al., 2019), it remains unclear how specific SRL practices will be impacted by coping self-efficacy. Hadwin et al. (2022) examined how SRL competencies mediated the relationship between Covid distress and academic success and how SRL competencies and academic challenges differ with students who receive SRL instruction and interventions. This study used the SRL Practices Scale that measures students' perceptions about their engagement in practices that foster SRL (e.g., subscales are: task understanding, goal management, motivation: task value, motivation: appraisal, time management, metacognitive monitoring, metacognitive adaptation, social engagement; SRL-P; Hadwin et al., 2021). Findings indicated the semester long SRL intervention buffered the impact of COVID distress on academic challenges. In other words, students who engaged in more effective SRL practices reported lower academic challenges, performed better academically (e.g., GPA), and were less impacted by COVID related stress (Hadwin et al., 2022). In this dissertation, metacognitive monitoring, metacognitive adapting, and academic social engagement are expected to have a significant association with the social emotional and academic outcome variables.

Metacognition

Across most models of SRL (e.g., Efklides, 2011; Winne & Hadwin, 2008; Zimmerman, 2000), metacognition is a central mechanism supporting regulation of learning and psychological processes. In particular, metacognition supports iterative self-regulatory processes for learning (Dunlosky & Hertzog, 1998; Thiede & Dunlosky, 1999). Central to metacognition, SRL, and student success is the agentic perspective that the individual actively monitors and regulates

cognitive and affective processes towards the achievement of goals through processes of **monitoring** (e.g., observing and reflecting on experience, cognitive and affective processes such as mental health) and control or **adaptation** (e.g., conscious and non-conscious decisions we make based on the output of monitoring, also referred to as adapting) (Nelson & Narens, 1990; Perfect & Schwartz, 2002; Thiede & Dunlosky, 1999).

The traditional definition for metacognition is the experiences and knowledge we have about our own cognitive processes that are governed by the interaction between monitoring and control (Flavell, 1979). *Metacognitive monitoring* is the process that allows an individual to observe, reflect on, or experience his or her own cognitive processes relative to a certain goal and *metacognitive control* is the conscious and non-conscious decisions we make based on the output of our monitoring processes (Perfect & Schwartz, 2002). Flavell (1979) went on to operationalize metacognition into four key areas: metacognitive knowledge, metacognitive experience, goals, and the activation of strategies. Central to much of metacognition inquiry is the agentic perspective of the person as an organism that actively monitors and regulates their cognitive processes towards the achievement of internal goals. Metacognitive recursive self-reflection and adaptation is central to both SRL (Winne, 2017) and stress and emotion regulation (Schmeichel, 2007).

The foundation of metacognition is in the mind of the individual (Flavell, 1979). Similar to SRL, psychological processes (e.g., emotion and affect, self-beliefs) are supported by metacognition (Efklides, 2006, 2011; Perfect & Schwartz, 2002) with monitoring and adaptation including two pertinent assumptions: (a) there is an assumption that subjective beliefs and feelings play a supervisory role even though cognitive processes may occur automatically or even unconsciously, we monitor our ongoing mental processes and the output of that monitoring

is a component of subjective, phenomenal experience and; (b) the conscious subjective experience is assumed to play a causal role with subjective beliefs and feelings affecting the regulation of cognitive processes and behaviour (Perfect & Schwartz, 2002). Stress regulation is also supported by awareness of cognitive and physiological information, external cues, and the meaning assigned to this information (Barrett, 2017). Winne's (2017) metacognitive depiction of learners as learning scientists who gather and analyze data to shape evolving self-theories can be applied to stress. For example, individuals can be encouraged to: (a) gather reliable data about their metacognitive and cognitive processes, emotions, and behaviour related to mental health and stress, (b) engage in strategies and tactics for understanding and managing mental health, and (c) generate the opportunity to practice strategies and cognition consistently until mastery reached.

Metacognition is activated during the entire learning process or SRL cycle, is central to conscious awareness and functions in close connection with emotions (Barrett, 2017; Efklides et al., 2018). Through all phases of SRL, the self-regulating learner is monitoring information about: (a) how learning was enacted using cognitive operations, study tactics and learning strategies; and (b) changes in the fit of internal and external conditions to various standards (Winne, 2017).

With respect to the relationship between control and monitoring (Nelson & Narens, 1990), Winne (2017) suggests this can be represented in the form of a production system: IF – THEN. He suggests as an example that IF information at the object level is monitored against known attributes and assessed against a meta-level profile as different, THEN cognition may be monitored at the object level by searching for a cognitive alternative at the meta-level that is

perceived to be more productive. This interplay between cognition and metacognition is the focus of theories and research in self-regulated learning (SRL).

Throughout all the phases of SRL, the motivations and emotions of learners are influential (Winne, 2017). As learners interact with cognitive and metacognitive processes, these arise automatically. Motivational and emotional states play three important roles. First, they are internal conditions that the learner considers in the initial phase of self-regulated work. Second, the standards for metacognitive monitoring can include the level or presence of motivations and emotions. Third, learners can establish goals to regulate both emotion and motivation in the same manner that they also regulate cognition. For example, motivation and emotions become objects altered when learners exercise tactics and strategies by route of metacognitive control. Efklides' (2011) describes how emotions could be triggered in different phases of SRL. In the forethought phase of SRL, a mismatch between prior knowledge and task features can elicit an emotional response (e.g., surprise, curiosity, confusion). In the performance phase, the experience of emotion is impacted by factors such as how effortful the task is. And in the reflection phase, students experience positive or negative emotion related to the evaluation of learning outcomes.

There is growing evidence of reciprocal interactions between metacognitive experiences (e.g., feeling of difficulty or not knowing, mental effort, confidence), affect and emotion (e.g., curiosity, frustration, satisfaction, stress), and cognitive events or states (e.g., interruption) (Efklides, 2016). Included within metacognitive processes is metamemory, or awareness of memory functioning. Metamemory informs a person's control decision regarding what strategies to use and inform a person's model of the situation and their self-perception as agentic. Metamemory and affect/emotion are closely interrelated with both influenced by self-knowledge (Efklides, 2016). I propose that stress beliefs are aspects of monitoring and subjective experience

related to optimal functioning and consequently fit within the reciprocal relations between metacognitive processes, affect/emotion/stress, and cognition within student academic experiences and self-regulated learning.

Metacognition likely impacts learning and student success through skills, knowledge, and theories. First, *metacognitive skills* facilitate students to assess their ability, make predictions about their performance, set realistic goals and strategic plans, and monitor and regulate learning efforts (Pintrich & Zusho, 2002). Second, Learners also accumulate *metacognitive knowledge* regarding the array of available strategies, how to enact those strategies, and in what context they are effective (Pintrich & Zusho, 2002). Third, learners also develop beliefs about their learning, or metacognitive theories, that guide cognition through metacognitive processes (Winne & Nesbitt, 2009). It is likely these metacognitive skills, knowledge and theories also apply to stress in academic contexts. For example, students likely use: (a) *metacognitive skills* to estimate their capacity to manage stress, make predictions about how stress impacts performance, and set realistic goals and plans regarding managing and coping with stress, and monitor ongoing stress regulation and appraisal in the learning context; (b) *metacognitive knowledge* regarding potential strategies, how to implement these, and under what parameters they are effective, and (c) *metacognitive theories* guide cognition through metacognitive processes.

Academic Social Engagement

Engaging socially in the academic context has several positive outcomes for university students. Aspects of social and emotional well-being have been associated with: (a) academic performance (Hadwin et al., 2011; Lobczowski, 2020; Won et al., 2018, 2021; van der Zanden et al., 2018), (b) mental health and well-being (Elmer et al., 2020), and (c) buffering against the detrimental impacts of stress (Cohen & Willis, 1985; Southwick et al., 2016).

Hadwin et al. (2022) operationalize social and emotional factors as overall psychological, social, and physical well-being including managing emotions like test stress, social belongingness and connectedness with the campus community, and physical health and wellness. University students with the sense of connectedness that comes from feeling accepted and valued by their instructors and peers are more likely to engage cognitively and behaviorally (Won et al., 2018, 2021), demonstrate stronger intentions to remain and complete their major (e.g., Lewis & Hodges, 2015), and have higher levels of actual enrollment (e.g., Hausmann et al., 2009). Engaging socially with their peers, instructors and academic community has also been shown to provide a protective effect against the stress and negative mental health impact from the mandatory shift to online learning during Covid-19 in terms of academic and social emotional outcomes (Elmer et al., 2020). A similar result is expected in this dissertation research with a positive association between levels of academic social engagement and social emotional (e.g., mental health) and academic (e.g., motivation and social emotional challenges) outcomes.

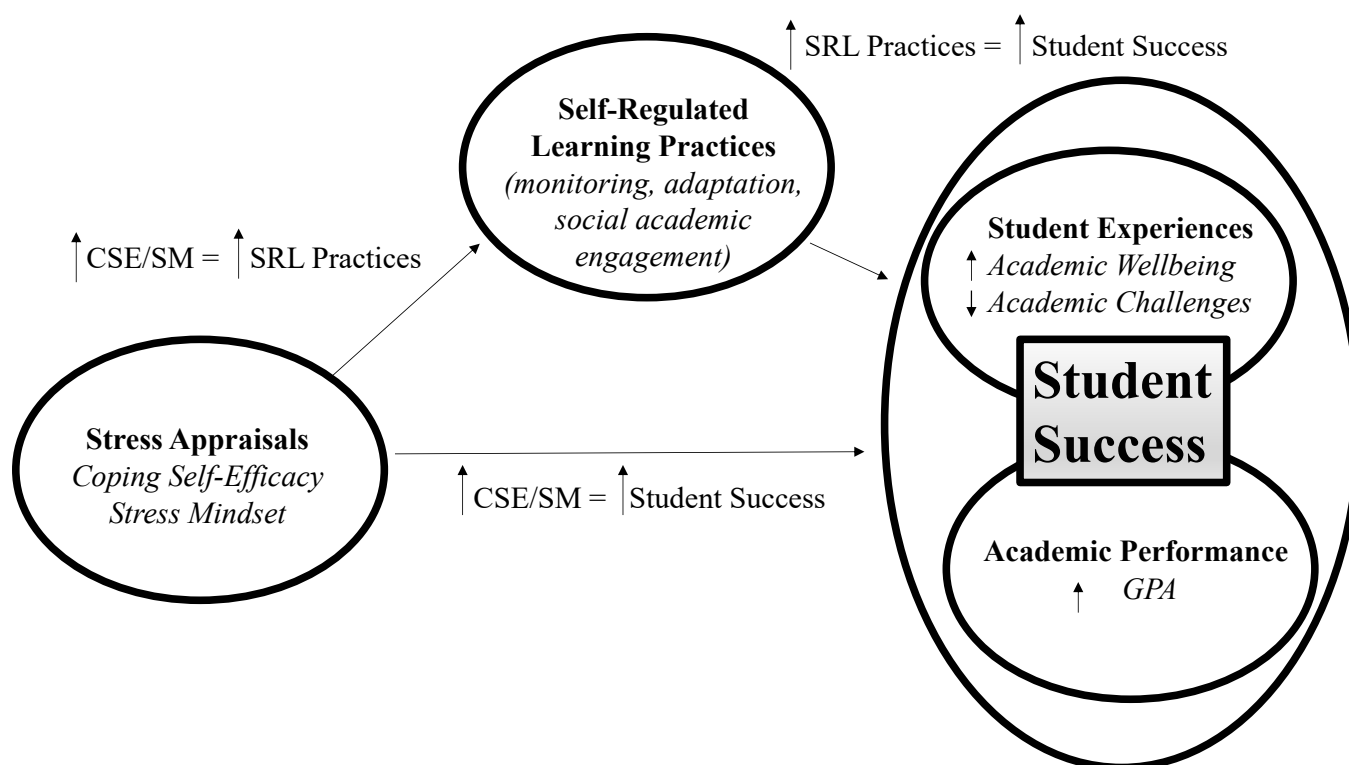
Summary

In the challenging and dynamic academic context, stress is expected and has the potential to be enhancing or hindering for student success outcomes depending on the: (a) stress related appraisals (e.g., coping self-efficacy, stress mindset), and (b) specific regulatory practice students enact to address the academic demand (e.g., SRL). An integrated approach that combines stress optimization and SRL is introduced to examine the contributions of stress regulation and self-regulated learning on student success outcomes. Together, SRL and stress optimization provide more than each approach on its own and inform this research regarding *doing well* and *feeling well* in student success. Figure 4 below shows the hypothesized associations between stress appraisals, SRL practices, and student success outcomes that emerged from the integrated theory.

In Figure 4, please note the arrow facing up denotes an increase in the level of that variable and an arrow facing down is a decrease. The expected increase in student success outcomes is comprised of an increase in *mental health* (e.g., academic wellbeing), decrease in academic challenges, and increase in academic performance. For a summary table of the hypotheses and evidence for the testable model that are discussed in this chapter, refer to Appendix B.

Figure 4.

Proposed Associations Between Stress Appraisals, Self-Regulated Learning and Student Success Outcomes.



Purpose

The purpose of this dissertation research is to examine the contributions of stress appraisals on student success outcomes, and how self-regulated learning practices contribute to the relationship between stress appraisals and student success outcomes. First, Paper One

examines whether the stress appraisals coping self-efficacy and stress mindset are associated with student success outcomes. Second, Paper Two examines the mediational role of self-regulated learning practices in explaining the relationship between coping self-efficacy and stress mindset and student success outcomes. This research is important for identifying directions for interventions that can help students cope with stress, which is expected in academic contexts, more productively.

Chapter Three: Methodology and Overview of the Two Studies

This dissertation research investigates how stress appraisals and regulatory practices contribute to student success outcomes. The three main aims of the dissertation are to: (1) examine contributions of stress appraisals and regulatory practices on student success outcomes, (2) examine the utility of coping self-efficacy and stress mindset in student success research, and (3) establish initial empirical support for the proposed integrated theoretical framework (e.g., see Chapter 1). Further, this research is exploratory in two primary areas: (1) proposing a theoretical framework that integrates stress optimization and self-regulated learning and (2) establishing the utility of coping self-efficacy in student success research.

To address the dissertation aims, this research unfolds over two papers. First, Paper One utilizes correlation and regression to establish the association between stress mindset and coping self-efficacy on student success outcomes (see Figure 5). It is necessary to establish the predictive capacity of stress mindset and coping self-efficacy on student success outcomes prior to introducing regulatory practices as potential mediators. Second, Paper Two builds on Paper One and unfolds over two parts. First, a replication study uses correlation and regression to re-examine whether stress appraisals predict student success outcomes with a new sample. Second, structural equation modelling (SEM) was employed for the focal study and tested how regulatory practices, like metacognitive monitoring and adapting and social emotional engagement, impact the association between stress appraisals (stress mindset, coping self-efficacy) and student success outcomes (academic wellbeing, motivation and social emotional challenges) that was established in the replication study.

Research Context

Regarding the research context, participants were voluntarily enrolled in an undergraduate course on learning strategies for university success. Data were collected as part of

required course activities and assignments. In weekly self-assessments, students reflected on their own strengths and weaknesses related to the course topic covered that week. Students used these self-report results in class discussions, to choose strategies for themselves and to complete a self-study report due at the end of the course. Temporal precedence in data collection was observed with coping self-efficacy and stress mindset data collected during week 8 of the term (predictor variables) and mental health and motivation challenges (student success outcome variables) and mediators collected during week 11 of the term.

The assessments used for data collection were completed as part of the weekly course requirements. Students consented to the research as a component of the course. All students were informed before, during and after the course of the process to decline consent, confidentiality was ensured through replacing student names with numeric identifiers and completing analysis after course grades were posted.

Data Analytic Strategy

Regarding the data analytic strategy, for Paper One the open-source R program was used for the analysis (Rosseel, 2012). Descriptive statistics and correlations were calculated first. Then, linear regression using the backward method was used to examine the effect of each predictor (see Figure 5). Separate regression analyses were conducted for the student success outcomes. Backward elimination starts with all possible explanatory variables and then discards the least significant, the backward approach is suitable when there is not a large number of candidate variables (Smith, 2018).

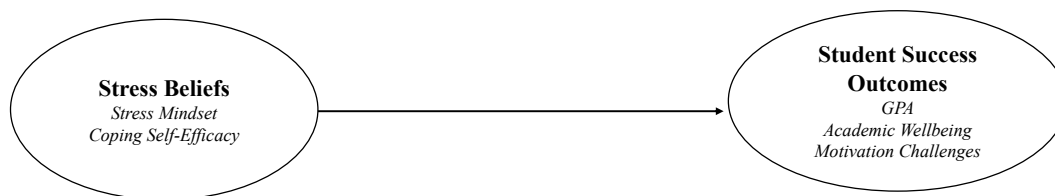
For Paper Two, correlation and regression were conducted using R for the replication study. For the focal study for Paper Two, the open-source R program was used for the analysis including the lavaan package for SEM (v. 0.6.11, Rosseel, 2012). This study utilized a SEM analysis which is well suited to assess the role of mediating variables (Tomarken & Waller,

2005). A key strength of SEM is the ability to compare models to make sense of patterns in the data and find the best fitting model. SEM analyses offer advantages over other correlational methods (Tomarken & Waller, 2005): (a) SEM includes a priori theoretical knowledge to inform model specification; (b) can test phenomena assessing multiple endogenous and exogenous variables; (c) account for the role of mediating variables, and (d) they allow for the analysis of statistically non-normal data, non-normal data is probable for mental health (Oishi et al., 2007) for example. Due to the relatively small sample size and to avoid related overparametization, the analytic strategy included four models tested separately whereby the two predictor variables coping self-efficacy and stress mindset are examined separately against the outcome academic wellbeing and the outcomes motivation and social emotional challenges.

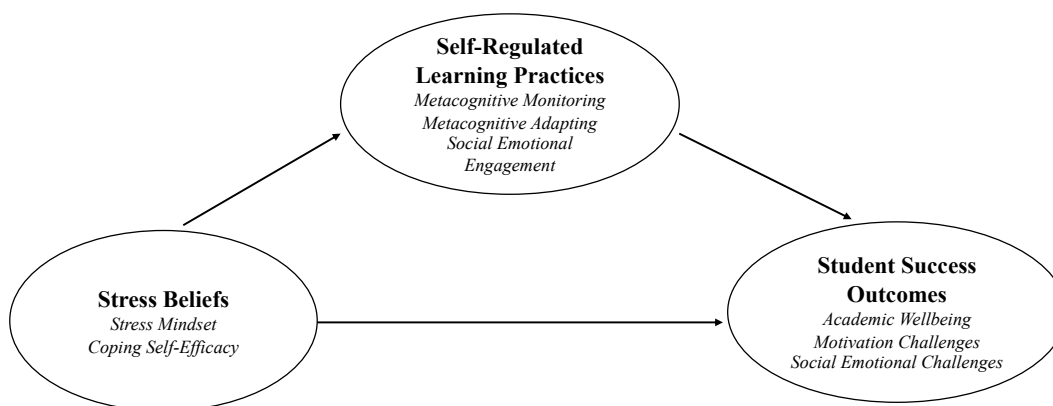
Refer to Figure 6 for the proposed testable model that will be examined in the focal study for Paper Two. This chapter will provide an overview of the two studies, the full manuscripts are available in Appendix E and Appendix F respectively.

Figure 5

Proposed Regression Model (Paper One and Paper Two Replication Study)

**Figure 6**

Proposed Testable SEM Model (Paper Two Focal Study)



Constructs And Measures Used Across Studies

Predictor Variables: Stress Appraisals

Predictor variables for Paper One and Two in the dissertation were two stress appraisals, coping self-efficacy and stress mindset. The assessments used for data collection were included in the weekly diary tool and a component of the course requirements, thus missing data was not an issue. Refer to Appendix C for complete list of measures and scale items used.

Coping Self-Efficacy. Coping self-efficacy was measured by the 26 item Coping Self-Efficacy Scale (CSES; Chesney et al., 2006), higher scores indicate higher levels of coping self-efficacy. Participants rated items on a 5-point Likert scale from *not confident* to *completely confident*. The scale consists of three subscales: (1) managing unpleasant emotions and thoughts,

(2) using problem focused coping, and (3) getting support from family and friends. The CSES uses this prompt before the scale items: *When things aren't going well for you, how confident are you that you can*. The scale prompt was adapted for this research by instructing the students to consider their responses in reference to coping with challenges in the academic context by using this prompt: *When things aren't going well for you at school, how confident are you that you can*. The CSES has high internal consistency ($\alpha = .95$)¹ and strong construct validity (Chesney et al., 2006). The generally agreed-upon lower limit for Cronbach's alpha is .70 (Hair et al., 2019).

Results from a CFA analysis prompted inclusion of only emotion-focused and problem-focused subscales in the analysis (15 items remained). The support subscale was methodologically problematic in the following ways and therefore excluded: (a) suboptimal fit indices for the three-factor model, (b) cross loading between support items and the emotion focused coping subscale items, (c) local misspecifications (e.g., cross loadings for the 4 support items), and (d) redundancy of the items.

Stress Mindset. The Stress Mindset Scale (SMS) (Crum et al., 2013) is an eight-item measure that assesses an individual's beliefs about the nature of stress and its consequences, for example whether the effects of stress are enhancing or debilitating. Items evaluate a participant's general stress mindset ("The effects of stress are negative and should be avoided"), as well as signs and symptoms related to the enhancing and debilitating consequences of stress in the realms of health and vitality, learning and growth, and performance and productivity ("Stress enhances my learning and growth"). Participants rated items on a five-point Likert Scale to indicate if the scale items are *never true*, *rarely true*, *sometimes true*, *usually true*, or *always true*. Stress mindset scores are obtained by reverse scoring the four negative items and then

¹ Measures of internal consistency scores for each study in the dissertation are reported in the results section of each manuscript.

taking the mean of all 8 items. Higher scores on the Stress Mindset Scale represent the mindset that stress is enhancing. Internal consistency for the SMS is reported as $\alpha = .86$ (Crum et al., 2013).

Outcome Variables: Student Success Experiences and Academic Performance

Student success outcome variables included academic performance and student success experiences. For both studies in the dissertation, academic performance was measured by GPA. In Paper One, the variables for student success experiences were mental health and motivation challenges. In Paper Two, the variables for student success experiences were mental health, motivation challenges, and social emotional challenges.

Academic Performance. Academic performance in student success was measured by semester GPA. Semester GPA was obtained by institutional data and reported on a nine-point GPA scale, where 0=E(0-48%), 1=D, (50-59%), 2=C+(60-64%), 4=B-(70-72%), 5=B(73-76%), 6=B+(77-79%), 7=A-(80-84%), 8=A(85-89%), and 9=A+(90-100%).

Student Success Experiences.

Academic Challenges. Academic challenges were measured using the 43-item Self-regulated learning challenges scale (SRL-C), which is the degree of academic challenges encountered by students with a higher score denoting more challenges, higher scores indicate a student is struggling to manage aspects of studying. (Hadwin et al., 2022). The SRL-C is part of the Self-Regulated Learning Assessment and Self-Diagnostic tool (SRL-PSD-2021; Hadwin et al., 2022). The SRL-C is comprised of 5 subscales assessing the degree to which students encountered a range of challenges in their studying over the last two weeks. Responses were reported on a 5-point Likert scale from *strongly disagree* to *strongly agree*. Higher scores indicate a student is struggling to manage aspects of studying theoretically and empirically associated with student

success and performance. Reliability scores for the SRL-C subscales range between $\omega = .70$ to $\omega = .88$ (Hadwin et al., 2022).

The five SRL-C subscales are (a) motivation, (b) metacognitive, (c) cognitive, (d) behavioural, and (e) socio-emotional. The motivation and socio-emotional challenges subscales were selected for this research. The *Motivation challenge* subscale (SRL-C) is comprised of 4-items related to motivational beliefs, interest, and persistence. Reliability scores for the Motivation challenge subscale is $\omega = .70$ (Hadwin et al., 2022). Items for Motivational challenges are in response to the prompt *Over the last two weeks, I struggled with*: “Believing I can do my work”, “Feeling like my work was worth doing”, “Persisting when things got tough”, and “Being discouraged by setbacks”. The *Socio-emotional challenge* subscale was comprised of 6-items related to emotional, social, and relational aspects of academic success. Reliability scores for the Socio-emotional subscale is $\omega = .83$. Sample items for Socio-emotional challenges in response to the same prompt are: “feeling connected”, “finding enjoyment at university”, and “managing my emotions/feelings”.

Mental Health. Mental health was measured by the nine item Academic Well-Being subscale (AWBS), a measure of mental health in academic contexts that assesses the degree to which students are flourishing regarding emotional, psychological, and social wellbeing in their academic context (Rostampour et al., 2023). Students rated each item on a 5-point Likert scale from *never* to *always*. Refer to Appendix for a validation study of the AWBS (Rostampour et al., 2023).

The AWBS was adapted from the Mental Health Continuum Short Form (MHC-SF) (Keyes, 2009) for the academic context. Refer to Table 7 for a comparison of scale items between the AWBS and the MHC-SF. The AWBS demonstrates improved predictive capacity

over the MHC-SF, and concurrent validity shows strong positive associations with (a) MHC-SF, (b) self-regulated learning (SRL) practices, (c) foundational academic behaviours, and (d) students' GPA. The AWBS predicts a wide range of academic challenges and is associated with students' GPA while the MHC-SF is not (see Rostampour et al., 2023). Composite reliability (McDonald's ω) is .71 - .88 for overall and subscale scores. Overall scores were used in this study.

Students responded to the prompt *How often is the following true for you?* A sample academic emotional wellbeing item is "I am interested in my classes". A sample academic psychological wellbeing item is "In general, I feel confident and positive about myself as a student". A sample academic social wellbeing item is "I have developed personal relationship with other students in my classes".

Table 7.*Comparison of Items in the MHC-SF and AWBS*

Note: Each item follows the prompt “*How are you doing this term? Please rate the following experiences at university*”

	MHC_SF	Academic Wellbeing Scale
Emotional Wellbeing <i>(hedonic)</i>	1. Happy	1. I am enjoying my classes
	2. Interested in life	2. I am interested in my classes
	3. Satisfied	3. I am satisfied with my classes
Psychological Wellbeing <i>(eudaimonic)</i>	4. That you had something important to contribute to society	4. In general, I feel confident and positive about myself as a student
	5. That you belonged to a community (like a social group, your neighborhood, your city)	5. I feel competent and capable in my classes
	6. That our society is becoming a better place for people	6. I am successfully adapting to new challenges
	7. That people are basically good	
	8. That the way our society works makes sense to you	

Social	9. That you liked most parts of	7. I have developed personal
Wellbeing	your personality	relationships with other
<i>(eudaimonic)</i>	10. Good at managing the	students in my classes
	responsibilities of your daily life	8. I feel comfortable
	11. That you had warm and trusting	contributing in class by
	relationships with others	asking questions, joining
	12. That you have experiences that	discussion, stating ideas and
	challenge you to grow and	opinions
	become a better person	9. I feel like I belong in the
	13. Confident to think or express	University community
	your own ideas and opinions	
	14. That your life has a sense of	
	direction or meaning to it	

Mediators: Self-Regulated Learning Practices

The mediators, self-regulated learning practices, were included only in the Paper Two (Focal Study) as part of the model tested using structural equation modeling.

Self-Regulated Learning Practices. Self-regulated practices (SRL-P) are different techniques or tactics students engage to foster adaptive SRL. SRL-P are measured by the SRL-P subscale of the Self-Regulated Learning Assessment and Self-Diagnostic Tool (SRL-PSD-2021) (Hadwin et al., 2021). In the SRL-P, students rate their agreement about utilizing specific SRL practices during the last two weeks on a 5-point Likert scale from *Strongly disagree* to *Strongly Agree*. High scores indicate students are engaging SRL practices that are expected to facilitate academic success. The subscales of the SRL-P are (a) Metacognitive Monitoring (3 items), (b)

Metacognitive Adapting (6 items), and (d) Academic Social Engagement (3 items).

Metacognitive Monitoring (Mon) sample items are: “Asked myself if I am understanding what I am supposed to be doing”, “Asked myself if I was remembering”, and “Asked myself if I was understanding the material”. Metacognitive Adaptation sample items were: “Changed my understanding of the task at hand”, “Modified my plans for the task, and “Switched to a different strategy or approach”. Academic Social Engagement items were: “had fun in university”, “helped classmates”, “got to know people in the class”. Reliability scores for the SRL-P are $\omega = .70 - .84$ for subscales (Hadwin et al., 2021).

Paper One: Coping Self-Efficacy and Stress Mindset as Predictors of Social Emotional and Academic Student Success Outcomes

Note: See Appendix E for complete manuscript.

The stress university students experience due to academic demands has the potential to impact student success (ACHA, 2016; Keyes, 2005; OECD, 2017). In recent years, stress in academic settings was further amplified by uncertainty and social isolation related to the global pandemic (Cockerham et al., 2021; Elmer et al., 2020). How students manage academic demands (e.g., assignments, studying) impacts student success (Panadero, 2018; Robbins et al., 2004; Winne & Hadwin, 2008). However, we know little about the degree to which student success outcomes are impacted by the ways students think about and respond to stress in academic contexts.

While the negative impacts of stress have often been overemphasized, stress is an expected and variable component of student success (Brooks, 2014; Jamieson et al., 2018; Jenkins et al., 2021). In addition to being expected in academic settings, stress is influential in student success and has the potential to impact outcomes positively (Denovan & Macaskill, 2017; Rudland et al., 2020) or negatively (Chou et al., 2011; Pascoe et al., 2020). When managed

well, stress in academic settings is important for achieving goals (Brooks, 2014; Jamieson et al., 2018) that are important for both academic (Jenkins et al., 2021) and social emotional outcomes (Ng et al., 2009).

Stress optimization theory (e.g., Jenkins et al., 2021) proposes that how people cope in motivated performance contexts including academic settings is determined in part by their beliefs about stress, however this has been under examined in academic contexts. An array of self-beliefs have been found to be important in academic contexts. Two beliefs that have received considerable attention are: self-efficacy and mindsets (e.g., Dweck, 2006; Bandura, 2008). However, despite the recognition that stress is ubiquitous in academic settings and that self-beliefs matter in these contexts, beliefs about stress have been largely ignored in the student success and educational psychology literature.

The purpose of this research is to examine the impact of beliefs about stress (e.g., coping self-efficacy, stress mindset) on student success related outcomes (e.g., motivation challenges, academic wellbeing, GPA). The following research questions are addressed: (1) Do stress related self-beliefs predict academic wellbeing? (2) Do stress related self-beliefs predict motivation challenges? and (3) Do stress related self-beliefs predict academic performance?

Participants were 185 consenting students at a Western Canadian university enrolled in an undergraduate elective educational psychology course on learning, motivation, mental health, and academic success (Learning Strategies for University Success) in Fall of 2021. Participants were from a range of faculties and included first, second, and upper-year students. The mean age of participant is 20.2 years ($SD = 2.7$) and 50.3 % were female.

In weekly self-assessments, students reflected on their own strengths and weaknesses related to the course topic covered that week. Students used these self-report results in class

discussions, to choose strategies for themselves and to complete a self-study report due at the end of the course. Temporal precedence in data collection was observed with CSE and stress mindset data collected during week 8 of the term (predictor variables) and mental health and motivation challenges (student success outcome variables) collected during week 11 of the term. The assessments used for data collection were completed as part of the weekly course requirements. Students consented to the research as a component of the course. All students were informed before, during and after the course of the process to decline consent, data was anonymized. To address the research questions linear regression was conducted using the backward method. Refer to Appendix E for a description of the variables and measured used.

For research question one, linear regression indicated that when stress mindset and coping self-efficacy are entered as predictors for Academic Wellbeing, only coping self-efficacy is a significant predictor of Academic Wellbeing, coping self-efficacy also accounted for 32% of the outcome variability in Academic Wellbeing. For research question two, linear regression indicated that when stress mindset and coping self-efficacy are entered as predictors for Motivation Challenges, only coping self-efficacy is a significant predictor of Motivation Challenges. Coping self-efficacy accounted for 16% of the outcome variability in motivation challenges. Regarding research question three, neither coping self-efficacy or stress mindset were significant predictors of GPA.

Summary

Findings showed that stress mindset had a negligible influence on student success. Stress mindset did not contribute directly to variability in any of the student success outcomes. In other words, stress mindset did not add any predictive capacity regarding student success outcomes above what was accounted for by coping self-efficacy. This finding was unexpected in light of

extant research indicating that stress mindset predicts academic performance (Crum et al., 2017; Jamieson et al., 2022). It is unclear whether this finding is unique to this sample, an impact of the pandemic context for example. A replication study is recommended to clarify the relationship between stress mindset and student success outcomes.

This study was exploratory in terms of confirming the utility of coping self-efficacy in educational settings. Results confirmed coping self-efficacy was a predictor of the student success outcomes academic wellbeing and motivation challenges. Coping self-efficacy did not predict GPA directly, however. The data was collected during the academic term, and GPA is a distal measure that is compiled upon completion of the term. It is possible that coping self-efficacy is more impactful on proximal processes such as mental health and motivation challenges.

These preliminary findings confirm coping self-efficacy as important in understanding student success and worth further exploration. In this study, coping self-efficacy predicted both higher mental health and lower motivation challenges. In other words, when students believe they can cope with stress and stressors at university, they report higher levels of mental health and lower levels of motivation challenges, with both mental health and motivation challenges being important contributors to student success (Hadwin et al., 2022; Howell, 2009; Koivuniemi et al., 2017). This result is important given the established impact of psychological processes like mental health for facilitating student success outcomes (Howell, 2009; Keyes, 2007; Kuh et al., 2005; Louis & Schreiner, 2012; Moulin et al., 2017) and the prior evidence that motivation challenges are associated with poor academic outcomes (Boekaerts, 2011; Hadwin et al., 2022; Koivuniemi et al., 2017; Zimmerman & Cleary, 2009). Findings are also consistent with prior

research in stress optimization that showed stress reappraisals predict adaptive coping in academic settings, specifically mastery performance goals (Jamieson et al., 2022).

With considerable outcome variability not accounted for, there is also room in future research to include additional variables that will impact student success. For example, how students are managing their academic demands was not included in this study. SRL practices and behaviours have been linked to both academic success and social emotional outcomes in academic settings (Howell, 2009; Davis, 2020; Lei et al., 2018; Robbins et al., 2004; Schunk & Greene, 2018; Zollanvari et al., 2017). The next step in this inquiry is to: (a) re-examine with a different sample the association between stress appraisals and student success outcomes and (b) where significant associations between stress appraisals and student success outcomes exist, to examine the mediating role of regulatory practices on these associations.

Note: Refer to Appendix E for Reference List for Study One and complete manuscript.

Paper Two: Investigating the Contributions of Stress Appraisals and Self-Regulated Learning Practices on Student Success Experiences and Outcomes

Note: Refer to Appendix F for complete manuscript and reference list.

Student success is facilitated by effectively navigating academic demands and the inevitable stress that is experienced in the academic context. Appraisals about stress impact coping, however stress appraisals have been underexamined in academic settings. Stress Optimization and Self-Regulated Learning theory inform the understanding of stress responses and learning processes respectively. Despite the importance for student success of managing both stress and academic demands, there is a paucity of research examining their combined contributions.

It is established that stress is non-specific and expected in academic contexts. Informed by theory and prior research, this study proposes that adaptive student responses to stress in

academic settings will be impacted primarily by three components: (a) adaptive stress appraisals, (b) self-regulatory practices, and (c) social regulatory practices. The purpose of this research is twofold and will be addressed with a replication and focal analysis. First, the replication analysis re-examines the unexpected finding from Paper One by assessing the capacity of stress mindset and coping self-efficacy to predict student success outcomes. The focal analysis examines, where significant associations between stress appraisals and student success outcomes exist, the extent to which metacognitive and social regulatory practices impact the relationship between stress appraisals and student success outcomes.

Replication Study

While stress appraisals are theoretically expected to contribute to student success outcomes (e.g., GPA, academic challenges, academic wellbeing), findings from a small set of empirical findings are mixed. For example, extant research shows stress mindset predicts academic performance (Crum et al., 2017; Jamieson et al., 2022). However, findings from Kapil et al., (2024) showed that CSE and not stress mindset predicted fewer motivation challenges and higher levels of academic wellbeing and neither CSE nor stress mindset predicted GPA. Since the finding from Kapil et al. (2024) that stress mindset did not predict student success outcomes was unexpected, the need to replicate that study emerged as it was unclear if results were unique to that sample (e.g., impacted by the pandemic context).

Drawing from a new sample of participants, the purpose of this replication study is to examine the influence of two stress appraisals on student success outcomes. Four research questions were addressed: (1) Do stress related self-beliefs predict academic wellbeing? (2) Do stress related self-beliefs predict motivation challenge appraisals? (3) Do stress related self-beliefs predict social emotional challenges? and (4) Do stress related self-beliefs predict GPA.

Participants (N=226, January 2022) were registered in an undergraduate educational psychology course on learning strategies for university success. Participants were from faculties across campus and included first, second, and upper-year students. The mean age of participant is 20.2 years (SD = 2.7) and 50.3 % were female. Data were collected as part of regular course activities and assignments. Through the course, students completed self-assessments, reflected on what the assessment mean in terms of their learning and success, and discussed strategies for their academic success and wellbeing. Students consented to the research as a component of the course. All students were informed before, during and after the course of the process to decline consent, data was anonymized.

Refer to Appendix F for the description of variables and measures used. The two stress appraisals coping self-efficacy and stress mindset were predictor variables. Data for CSE and stress mindset data were collected during week 8 of the term. Data for SRL practices (mediator), academic wellbeing and academic challenges (student success outcome variables) data were collected during week 11 of the term. The assessments used for data collection were included in the weekly diary tool and a component of the course requirements, thus missing data did not occur. The open-source R program was used for the analysis (Rosseel, 2012). Descriptive statistics and correlations were calculated first. Then, linear regression was conducted to examine the effect of each predictor. Separate regression analyses were conducted for the student success outcomes. Finally, correlations for GPA with SM and CSE were calculated.

Refer to complete manuscript in Appendix F for descriptive statistics and correlations. Linear regression was conducted to address whether coping self-efficacy and stress mindset predicted the student success outcomes of academic wellbeing, motivation challenges, social emotional challenges, and GPA.

Results indicated four main findings. First, when stress mindset and coping self-efficacy were entered as predictors for academic wellbeing, coping self-efficacy was a significant predictor of academic wellbeing, stress mindset was also a significant predictor of academic wellbeing. Second, when stress mindset and coping self-efficacy were entered as predictors for motivational challenges, coping self-efficacy was a significant predictor of motivational challenges, stress mindset was also a significant predictor of motivational challenges. Third, when stress mindset and coping self-efficacy were entered as predictors for social emotional challenges, coping self-efficacy was a significant predictor of social emotional challenges, stress mindset was also a significant predictor of Social Emotional Challenges, Finally, when stress mindset and coping self-efficacy were entered as predictors for GPA (see Table 2), neither was a significant predictor for GPA.

Next, correlation was calculated. As GPA was not correlated with coping self-efficacy and stress mindset, it was eliminated from further analysis. This elimination adds statistical power to the main analysis as the sample size is small and the structural equation models (SEM) already contain multiple parameters. Stress mindset and coping self-efficacy were significant predictors for academic wellbeing and motivation and social-emotional challenges, making the case for the focal study and the introduction of mediation variables.

Focal Study

Perceptions and beliefs regarding stress are important aspects of whether stress is experienced as helpful or harmful (Crum et al., 2017) and facilitates approach over avoidance coping behaviour (Jamieson et al., 2022). How students manage learning and academic demands impacts student success (e.g., Hadwin et al., 2022; Winne & Hadwin, 2008); therefore, factors other than stress self-beliefs also contribute to student success. Findings from the replication

analysis establish that stress mindset and coping self-efficacy predict student success outcomes, establishing the rationale for further analysis. The replication analysis ruled out GPA as associated with the stress self-beliefs and will therefore not be included in the focal analysis. The focal analysis examined how regulatory practices, like metacognitive monitoring and adapting and social emotional engagement, impact the association between stress beliefs (stress mindset, coping self-efficacy) and student success outcomes (academic wellbeing, motivation and social emotional challenges) that was established in the replication study.

The purpose of the focal study is to investigate where positive associations do exist between the stress self-beliefs and student success outcomes, whether selected regulatory practices are associated with this relationship. The following research questions are addressed: (1) Do regulatory practices mediate the association between stress self-beliefs and motivation challenge appraisals? (2) Do regulatory practices mediate the association between stress self-beliefs and social emotional challenges? (3) Do regulatory practices mediate the association between stress self-beliefs and academic wellbeing?

The open-source R program was used for the analysis including the lavaan package for SEM (v. 0.6.11, Rosseel, 2012). This study utilized a SEM analysis which is well suited to assess the role of mediating variables (Tomarken & Waller, 2005). A key strength of SEM is the ability to compare models to make sense of patterns in the data and find the best fitting model. SEM analyses offer advantages over other correlational methods (Tomarken & Waller, 2005): (a) SEM includes a priori theoretical knowledge to inform model specification; (b) can test phenomena assessing multiple endogenous and exogenous variables; (c) account for the role of mediating variables, and (d) they allow for the analysis of statistically non-normal data, non-normal data is probable for mental health (Oishi et al., 2007) for example. Due to the relatively

small sample size and to avoid related overparametization, the analytic strategy included four models tested separately whereby the two predictor variables coping self-efficacy and stress mindset are examined separately against the outcome academic wellbeing and the outcomes motivation and social emotional challenges.

Four mediation models showed three main findings: (1) CSE and SM both directly predicted flourishing academic wellbeing, and CSE alone directly predicted lower motivation and social emotional challenges, (2) the inverse impact of CSE on motivation challenges was mediated by metacognitive monitoring, (3) the impact of CSE and SM on social emotional challenges and academic wellbeing was mediated by academic social engagement. Results show regulatory practices can promote student success beyond what is provided by stress appraisals alone, this is important for understanding adaptive responses to stress for university students.

This research examined how stress appraisals contribute to student success directly as well as the mediating role of metacognitive and social regulatory practices on the relationship between stress appraisals and student success outcomes. Stress mindset and coping self-efficacy capture broad beliefs about stress and specific perceptions of coping with the academic context respectively. A primary purpose of this research was to examine the utility of coping self-efficacy and stress mindset, which are not well established in academic settings, in predicting student success outcomes. A second purpose was to examine how regulatory practices are associated with the relationship between stress appraisals and student success outcomes. Finally, this research acknowledges that a truly successful student and education system will support both social emotional and academic flourishing within conceptualizations of student success. Findings show that adaptive responses to stress and academic demands that support student success are

impacted by: (a) adaptive stress appraisals, (b) metacognitive regulatory practices, and (c) social regulatory practices.

In the challenging and stressful university context, feeling capable of coping with academic stress and academic demands and engaging in adaptive self and social regulatory practices contributes to student success. Findings from this research indicated stress appraisals and regulatory practices contribute to the student experience aspect of student success, which includes academic wellbeing and academic challenges. Eliminating stress is not a realistic option and may even be counter to overall mental health and performance, which are supported by adaptive responses to stress and achieving goals (e.g., see Ng et al., 2009; Ryff, 1989; Yaman-Sözbir et al., 2019). Thus, supporting students to regulate both stress and academic demands is integral to student success.

Overview of Dissertation Manuscripts

Refer to Table 8 for an overview of the two manuscripts included in the dissertation.

Table 8.*Overview of Dissertation Manuscripts*

Dissertation Purpose	Investigating contributions of stress appraisals and self-regulated learning in student success	
Manuscript	Study One: Coping Self-Efficacy and Stress Mindset as Predictors of Social Student Success Outcomes	Study Two: Investigating the Contributions of Stress Appraisals and Self-Regulated Learning Practices on Student Success Experiences and Outcomes
Theoretical Gap	Lack of research on coping self-efficacy and minimal research on stress mindset in educational settings. Specifically, lack of empirical evidence that coping self-efficacy and stress mindset can predict student success outcomes	Lack of research on associations between stress appraisals and beliefs, like coping self-efficacy and stress mindset, with self-regulated learning practices and social emotional and academic student success outcomes.
Research Purpose	The purpose of this research is to examine the impact of beliefs about stress (e.g., coping self-efficacy, stress mindset) on student success related outcomes (e.g., motivation challenges, academic wellbeing, GPA).	The purpose of this research is twofold. First, to re-examine findings from Paper One regarding the predictive capacity of stress appraisals on student success outcomes. Second, where significant associations between stress appraisals and student success

outcomes exist, to examine the mediating role of metacognitive and social regulatory practices (e.g., metacognitive monitoring and adapting, academic social engagement) on these associations.

Research (1) Do stress related self-beliefs

Questions predict academic wellbeing?

(2) Do stress related self-beliefs predict motivation appraisals?

(3) Do stress related self-beliefs predict academic performance?

Replication Study:

(1) Do stress related self-beliefs predict academic wellbeing? (2) Do stress related self-beliefs predict motivation challenge appraisals? (3) So stress related self-beliefs predict social emotional challenges? and (4) Do stress related self-beliefs predict GPA?

Focal Study:

(1) Do regulatory practices mediate the association between stress self-beliefs and motivation challenge appraisals? (2) Do regulatory practices mediate the association between stress self-beliefs and social emotional challenges? (3) Do regulatory

		practices mediate the association between stress self-beliefs and academic wellbeing?
Data	N = 185; participants enrolled in EDD	N= 226; participants enrolled in EDD
Sources	101 September 2021	101 September 2021
	Predictor Variables (Stress Appraisals)	Predictor Variables (Stress Appraisals)
	<ul style="list-style-type: none"> • Stress Mindset: Stress Mindset Scale (Crum et al., 2013) • Coping Self-Efficacy: Coping Self-Efficacy Scale (Chesney et al., 2006) 	<ul style="list-style-type: none"> • Stress Mindset: Stress Mindset Scale (Crum et al., 2013) • Coping Self-Efficacy: Coping Self-Efficacy Scale (Chesney et al., 2006)
	Outcome Variables Variables (Academic Performance and Student Experiences)	Outcome Variables (Academic Performance and Student Experiences)
	<ul style="list-style-type: none"> • GPA • Motivation Challenges: Motivation Challenges Scale (SRL-PSD-2021; Hadwin et al., 2022) • Mental Health: Academic Well-Being Scale (Rostampour et al., 2023) 	<ul style="list-style-type: none"> • GPA • Motivation Challenges: Motivation Challenges Scale (SRL-PSD-2021; Hadwin et al., 2022) • Social Emotional Challenges: Social Emotional Challenges

		Scale (SRL-PSD-2021; Hadwin et al., 2022)
		<ul style="list-style-type: none"> • Mental Health: Academic Well-Being Scale (Rostampour et al., 2023)
		Mediators (SRL Practices)
		SRL Practices Scale (SRL-PSD-2021; Hadwin et al., 2022)
		<ul style="list-style-type: none"> • Metacognitive Monitoring • Metacognitive Adapting • Social Emotional Engagement

Analytic Approach	Correlation, Regression	Replication Study: Correlation, Regression
		Focal Study: Structural Equation Modeling

Status	Analysis complete, manuscript draft submitted to Journal of Postsecondary Student Success	Analysis complete, manuscript draft prepared, ready to submit to Metacognition and Learning
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Chapter Four: Discussion

Returning to the scenario introduced at the beginning of Chapter One, take a moment to again reflect on the example of Sam which I will include below for review:

“Sam recently started their University studies and started out excited about the academic program. They had some previous challenges with getting assignments done on time but mostly had good grades in high school. They have been experiencing high levels of stress at university, noticing their heart pounding and rapid breathing when they think about assignments, reporting that they are not used to less structured classes and minimal oversight by instructors. They have been wondering if they are able to complete the unfamiliar assignments in their classes and if they can deal with how stressed they are feeling. Struggling to manage their stress, they are starting to think they are not capable of coping with university and that the stress they are feeling is making it hard to get their work done. They have started thinking that dealing with the demands of university is “too much”. Sam started to avoid going to class, is not studying, has stopped asking for help from instructors, and didn’t fare as well as expected on midterm assignments. Sam notices their motivation has dropped and their overall wellbeing is negatively impacted by their current struggles with school.”

Sam was struggling to manage their experience of the emotion of stress and the new academic demands they were experiencing at university. Sam’s experience, while fictional, paints a picture of the interwoven social emotional and academic processes students face while navigating the road to student success. Sam was struggling to regulate both stress and learning, resulting in languishing academic performance and wellbeing. Like Sam, students widely report high levels of stress and academic challenges that pose barriers to succeeding at university (ACHA, 2016; Barbayannis et al., 2022; Keyes, 2005; OECD, 2017). This dissertation research

supports students like Sam by adding theoretical understanding and empirical findings to existing student success research and knowledge, thereby informing potential avenues of support.

Informed by an integrated theoretical framework comprised of stress optimization and self-regulated learning, this dissertation includes two papers that addressed the main aims of the dissertation to: (1) examine the contributions of stress appraisals and self-regulated learning on student success outcomes, (2) examine the utility of coping self-efficacy and stress mindset in student success research, and (3) provide empirical support for the proposed integrated theoretical framework. In the discussion section of the dissertation, findings are discussed from the two studies that address the three research aims and inform: (a) responding adaptively to stress in academic contexts and (b) contributions to theory that supports student success.

Responding Adaptively to Stress in Academic Contexts

Student success is facilitated by effectively navigating academic demands and the inevitable stress that is experienced in the academic context. Stress is multifaceted, subjective, shaped by the situation (Lazarus et al., 1985), a necessary component of goal pursuit (Park et al., 2017) and therefore expected in educational settings. In addition to managing stress, students must navigate numerous academic demands in the pursuit of success. Further, when managed well, stress is an important resource in navigating academic demands and goals (de la Fuente, 2020) and integral to wellbeing (Ng et al., 2009). Consequently, it is not possible to eliminate either academic stress or demands in support of student success, the focus therefore shifts to how students are managing both.

This dissertation research examined how stress appraisals contribute to student success directly as well as the mediating role of self and social regulatory practices on the relationship between stress appraisals and student success. Stress mindset and coping self-efficacy capture broad beliefs about stress and specific perceptions of coping with the academic context

respectively. First, an aim of this research was to examine the utility of coping self-efficacy and stress mindset, which are not well established in academic settings, in contributing to student success outcomes. Second, how regulatory practices are associated with the relationship with stress appraisals and student success outcomes was examined. Third, this research acknowledges that a truly successful student and education system will support both social emotional and academic flourishing within conceptualizations of student success. As such, adaptive responses to stress and academic demands that support student success will be impacted by: (a) adaptive stress beliefs and appraisals, (b) self-regulatory practices, and (c) social regulatory practices.

Adaptive Stress Beliefs and Appraisals

Appraisals are a person's evaluative judgment of the situation shaped by individual and contextual factors and a key component of stress responses (Epel et al., 2018). Appraisals can be relative to a specific experience or instance as well as relative to a larger category of experiences which denotes a belief (e.g., stress mindset, coping self-efficacy). Prior findings indicate that appraisals and beliefs regarding stress determine whether stress: (a) is experienced as a resource or detriment (Crum et al., 2017; Jamieson et al., 2022), (b) facilitates approach over avoidance motivation and behaviour (Blascovich et al., 1999; Freire et al., 2016), and (c) facilitates higher levels of mental health (Crum et al., 2013, 2017; Yaeger et al., 2022). Consistent with extant research on stress appraisals and beliefs, this research hypothesized that adaptive appraisals or beliefs regarding stress (e.g., stress is enhancing mindset, higher levels of coping self-efficacy) will predict student success outcomes. Findings were consistent with this hypothesis for both coping self-efficacy and stress mindset and their impact on student experiences (e.g., academic well-being, motivation and social emotional challenges) but not for academic performance.

Coping Self-Efficacy. This research was exploratory regarding the role of coping self-efficacy (CSE) in student success. While coping self-efficacy has been studied in other motivated

performance contexts (e.g., Benight & Harper, 2002; Melato et al., 2017; Midkiff et al., 2018; Singer, Humphreys, & Lee, 2016; Wissing et al., 2011), utility has only recently been established in educational settings (Kapil et al., 2024a, 2024b). Overall, findings suggest the expectation that coping self-efficacy has considerable utility in student success research and contributes to student experiences. For example, when students believe they can cope with stress and academic demands, they report higher levels of academic wellbeing and lower levels of motivation and social emotional challenges (Kapil et al., 2024a, 2024b). Evidence shows both academic wellbeing and motivation challenges are important contributors to student success (Hadwin et al., 2022; Howell, 2009; Koivuniemi et al., 2017). This result is important given the established impact of psychological processes like mental health for facilitating student success outcomes (Howell, 2009; Keyes, 2007; Kuh et al., 2005; Louis & Schreiner, 2012; Moulin et al., 2017) and the prior evidence that motivation challenges are associated with poor academic outcomes (Boekaerts, 2011; Hadwin et al., 2022; Koivuniemi et al., 2017).

Findings are also consistent with prior research in stress optimization that showed stress reappraisals predict adaptive coping in academic settings, specifically mastery performance goals (Jamieson et al., 2022). Findings from this study support the value of coping self-efficacy as: (a) a metric of student expectations regarding capacity to cope with academic stress and demands and (b) a predictor of student success outcomes. For a student like the fictional Sam, this research confirms the utility of coping self-efficacy as a predictor for student success. This finding implies that interventions to support Sam can potentially target emotion focused and problem focused coping that comprise coping self-efficacy as an avenue for facilitating student success.

Findings in this study add to the growing literature linking different types of self-efficacy with social emotional outcomes. For example: (a) emotional self-efficacy is linked to well-being and positive coping strategies during the pandemic (Cattelino et al., 2021), high levels of positive thinking and happiness (Caprara et al., 2006), and increased levels of mental health (Won et al., 2023), (b) academic self-efficacy is associated with psychological wellbeing (Freire et al., 2019; Melato et al., 2017), and (c) coping self-efficacy has functioned in a predictive capacity for emotional and psychological well-being (Melato et al., 2017).

While links have been established between different types of self-efficacy, including coping self-efficacy, and social emotional outcomes in prior research (e.g., Caprara et al., 2006; Cattelino et al., 2021; Delahaij & VanDam, 2017; Freire et al., 2019; Melato et al., 2017) coping self-efficacy is not typically used in student success research. The assertion in this research is that coping self-efficacy is overlooked in educational settings and is well suited to student success research that encompasses both student experiences and performance. With the inclusion of emotion-focused, support, and problem focused components of coping, coping self-efficacy has the potential to support students' adaptive coping and subsequent student success.

It is likely that self-efficacy appraisals, which are self-referencing, facilitate adaptive coping through: (a) informing the perceived ratio of demands and resources that indicate whether an experience of stress is a challenge or a threat (e.g., see Bandura, 2008; Liu & Liu, 2018) and (b) promoting adaptive coping and approach behaviour (e.g., see Freire et al., 2016; Karademas & Kalantzi-Azizi, 2017), and (c) facilitating direct control of the situation through problem focused coping (e.g., SRL practices) (e.g., see Folkman, 2008). Further, social cognitive theory purports internal self-influence factors, in addition to external social systems, motivate and regulate behaviours (Bandura, 2012; Honicke & Broadbent, 2016; Schunk & Pajares, 2002). I

propose that coping self-efficacy is an internal self-influence factor that impacts student success through motivating enactment of adaptive SRL practices, therefore facilitating adaptive approach coping.

A main source of self-efficacy is mastery experiences (e.g., Usher & Pajares, 2009). In an academic context, how students regulate academic demands and respond to academic challenges is relevant for student success. For example, an individual with high coping self-efficacy is more likely to appraise the situation as a challenge as opposed to a threat and perceive they can access adequate resources, such as adaptive SRL practices, to manage the challenge. Consider the example of Sam again, Sam was exhibiting low coping self-efficacy as evidenced by low engagement with emotion focused coping (the emotion of stress), problem focused coping (adaptive learning practices), and support (asking the instructor for help) which was associated with lower-than-expected assignment grades and wellbeing. Now imagine that Sam felt capable of (likely based on experience) managing their stress through reappraisal and physiological regulation, enacting adaptive SRL practices to meet the new academic demands, and seeking appropriate help. With Sam, the higher level of coping self-efficacy is expected to be associated with enacting adaptive SRL and subsequent improvement in student success outcomes.

In addition, stress and coping theory indicate stress is a person-environment relationship (Chesney et al., 2006; Lazarus & Folkman, 1984); Folkman & Lazarus, 1985). Experiences of high stress result when a situation or stressor is evaluated as personally significant, academic success for example, and exceeding a person's available coping resources (Lazarus & Folkman, 1984). I suggest that this primary appraisal has the potential to be impacted by SRL practices, SRL has potential to equip a student with informed and strategic resources regarding learning and academic success. Further, SRL can influence secondary appraisal, which includes available

options for coping and the degree of control a person holds over a situation (e.g., Chesney et al., 2006). SRL provides an array of options for coping with academic demands and subsequently increases control over the situation. Self-efficacy is expected to contribute to secondary appraisal coping judgements (Park & Folkman, 1997; Chesney et al., 2006). I suggest that SRL also contributes to secondary coping appraisals through increasing available coping options and related situational control.

While coping self-efficacy was associated with student success outcomes in this dissertation research, contributions were modest and there was no significant association with GPA. It is likely that the link from coping self-efficacy to regulatory practices would be stronger if examined over time, given the expected role of mastery experiences in other types of self-efficacy (e.g., Usher & Pajares, 2009). In addition, GPA is a distal outcome performance measure with multiple contributions (Richardson et al., 2012; Robbins et al., 2004; Zollanvari et al., 2017). There was a small positive correlation between academic wellbeing and GPA, as well as a small negative correlation between motivation challenges and GPA. Thus, it is possible that over a longer period of time GPA would be impacted indirectly by coping self-efficacy through the association from coping self-efficacy to student experiences (e.g., academic wellbeing, academic challenges) as mediated by regulatory practices. The cross-sectional approach did not capture recursive and iterative cycles of stress optimization and self-regulated learning that would only be evident with longitudinal design, an area for future research to examine.

Stress Mindset. This dissertation also examined the impact of stress mindset on student success. Stress mindset findings were inconsistent across the two papers in this dissertation. Mindsets are operationalized as a ‘lens’ or ‘frame of mind’ that orients a person to a particular set of associations, expectations, and predictions (Dweck, 2006). Stress is a complex process and

can have both enhancing and debilitating effects, stress mindsets can simplify and orient individuals to a set of expectations, strategies, and motivations that increase the chance that a person will experience the enhancing effects of stress, especially in performance situations (e.g., exams, university context) (Crum et al., 2013; 2017).

In Paper One, stress mindset did not add any predictive capacity regarding student success outcomes above what was accounted for by coping self-efficacy. Stress mindset was only significantly positively correlated with mental health, although the strength of the association was small. Findings from Paper Two showed stress mindset was associated with: (a) lower levels of social emotional challenges when mediated by academic social engagement and (b) higher levels of academic wellbeing, both directly and when mediated by academic social engagement. Extant research has shown the predictive capacity of stress mindset for wellbeing, performance, and health (Crum et al., 2013; Crum et al., 2017; Keech et al., 2018, Jenkins et al., 2021). However, only Paper Two results were consistent with this prior research, albeit the strength of the associations were modest.

In keeping with the assertion that stress mindset is not a ‘panacea’ (Crum et al., 2017), stress mindset had variable and relatively small contributions to student success outcomes in this dissertation research. To explore this further, imagine that someone asks you about your stress mindset, “*do you think stress is good or bad*” for example. It is likely that your response holds some version of “*it depends*”. Stress mindset is portrayed as assessing general beliefs about stress itself (Crum et al., 2013). However, items in the Stress Mindset Scale refer to general beliefs about stress (e.g., Item 1. *The effects of stress are negative and should be avoided*) and self-referent beliefs regarding personal experiences of stress (Item 2. *Experiencing stress facilitates my learning and growth*). This assumes that self-referent and general beliefs about

stress are the same, and this may not be the case. For example, returning to the question posed earlier “*do you think stress is good or bad*”, it is possible for a person to believe stress is enhancing in general, but stress does not facilitate learning and growth for them personally. As noted in the previous example, a person may hold a self-referential belief that stress is debilitating for them and simultaneously hold a general belief that stress is enhancing for others, even if that is not their personal experience.

Sam, for instance, would be hard pressed to believe of stress as enhancing at this moment in their academic career, that would be dissonant with their current experience. They may be able to believe that stress is enhancing in theory, and for other people. As noted in this example, a person may hold a self-referential belief that stress is debilitating for them and simultaneously hold a general belief that stress is enhancing for others, even if that is not their personal experience. The current stress mindset scale mostly asks questions about whether stress is enhancing for *you*, which is not the same as a general belief about stress. The dissonant perceptions in the example of Sam may be based on their personal prior experience, this aligns with a psychological construction perspective on emotion (Barrett, 2017). The context against which the stress mindset beliefs are being assessed, self-referential versus general beliefs, may be an important consideration in how stress mindset functions and may account for differences in findings.

In line with suggestions for intelligence mindset, it is possible the stress is enhancing and stress is debilitating mindsets need to be assessed separately (e.g., see Yan & Schuetze, 2023). In addition, although the idea of mindsets are appealing, there has also been recent criticism levelled at intelligence mindset research regarding: (a) effect size (Macnamara & Burgoyne, 2023; Sisk et al., 2018), (b) construct validity (Macnamara & Burgoyne, 2023), and (c)

overstating claims of importance for academic performance and wellbeing (Burnette et al., 2023; Macnamara & Burgoyne, 2023; Yan & Schuetze, 2023). I hypothesize that it was a combination of the above factors that detracted from stress mindset exerting more impact on student success outcomes in this research. The variable predictive strength of stress mindset across the two dissertation studies implies that stress mindset does contribute to student success outcomes, although minimally. For practice, given that stress mindset interventions are brief, it is therefore useful to provide a student like Sam information about stress mindset. However, stress mindset is not sufficient to reduce academic challenges without also including regulatory practices.

Self-Regulatory Practices

Adaptive appraisals of stress are expected to facilitate approach motivation and behaviour, which in turn enhance self-regulatory actions (e.g., see Freire et al., 2016; Jamieson et al., 2022; Karademas & Kalantzi-Azizi, 2017). While stress optimization is informative regarding stress responses, this theory includes minimal specific information regarding adaptive self-regulatory practices expected to enhance student success. We turn to self-regulated learning literature to inform expectations in this area.

Central to effective SRL is a student who actively monitors and regulates (e.g., adapts) cognitive, affective, motivational, and behaviours processes in their pursuit of academic goals. For this reason, metacognitive monitoring and adapting is essential for adaptive self-regulatory capacity (Panadero, 2018; Perfect & Schwartz, 2002). This research hypothesized that: (a) stress appraisals, through facilitation of approach motivation and behaviours, will have positive associations with monitoring and adapting and (b) self-regulatory practices will mediate the association between stress appraisals and student success.

Findings partially confirmed the hypotheses, specifically: (a) coping self-efficacy and stress mindset were positively associated with monitoring and adapting, (b) metacognitive

monitoring provided a moderate partial inverse mediation between CSE and motivation challenges as well as between stress mindset and motivation challenges, and (c) adapting provided a moderate partial positive mediation between CSE and motivation challenges. Thus, self-regulatory practices may promote student success beyond what is provided by stress appraisals, indicating both are important to student success and thriving. For a student like Sam, this means that student success is best facilitated by integrating both stress appraisals and regulatory practices in support of student success.

Of note, the two empirical studies included in this dissertation only addressed metacognitive regulatory practices, and not the entire array of self-regulatory practices. Thus, evidence from the dissertation findings only indicate that metacognitive regulatory practices mediate the association between stress appraisals. Given the centrality of metacognition in SRL (Panadero, 2018; Perfect & Schwartz, 2002; Thiede & Dunlosky, 1999), I hypothesize that other SRL regulatory practices may also contribute to the association between stress appraisals and student success outcomes, but this was not examined within the scope of this dissertation.

One unexpected finding was the positive mediation exerted by adapting on the association between coping self-efficacy and motivation challenges. This association was significant but resulted in an increase in motivation challenges. The increased effort or drain on resources required to adapt and change may explain this finding, even when the change leads to a desired outcome. Stress optimization provides two additional explanations for this finding. First, the psychological construction theory of emotion outlines the intrinsic orientation towards maintaining the status quo (e.g., homeostasis) and uses the metaphor of a 'withdrawal' from your 'body budget' or available resources (e.g., allostasis) from a change or adaptation that can produce the perception that effort required will consume more than the available resources

(Barrett, 2017a, Barrett, 2017b), which would elicit an increase in motivation challenges.

Second, the biopsychosocial perspective denotes that stress is impacted by the perceived ratio of resources and demands, with adaptation likely increasing perceived demands and subsequently increasing motivation challenges (e.g., see Jamieson et al., 2018).

Social Regulatory Practices

How a student engages with and regulates the social elements of their academic context is linked with a range of positive outcomes. Social and emotional regulatory factors encompass overall psychological, social, and physical wellbeing, including managing stress (Hadwin et al., 2022). Social regulatory practices are expected to contribute to: (a) mental health and well-being (Elmer et al., 2020), (b) academic practices and performance (Hadwin et al., 2011; Lobczowski, 2020; Won et al., 2018, 2021; van der Zanden et al., 2018), and (c) buffering against the detrimental impacts of stress (Cohen & Willis, 1985; Southwick et al., 2016).

In addition to self-regulatory practices, the social-regulatory practice *academic social engagement* emerged as particularly impactful. Consistent with hypothesized results, academic social engagement provided: (a) a moderate positive full mediation between stress mindset and academic well-being, (b) a strong partial mediation between coping self-efficacy and academic well-being, and (c) a small partial inverse mediation between coping self-efficacy and social emotional challenges. Thus, a social regulatory practice like academic social engagement may promote student success beyond what is provided by stress appraisals alone.

These findings are consistent with a growing consensus that academic social engagement is an important element in understanding what students need to be successful. Increasingly, student success research includes social and emotional aspects (Louis & Schreiner, 2012) and successful education is viewed as attending to far more than grades (OECD, 2017). The degree to which university students engage socially with their peers, instructors and academic

community has also been shown to provide a protective effect on the negative mental health impact from the mandatory shift to online learning during Covid-19 in terms of academic and social emotional outcomes (Elmer et al., 2020). Findings from this dissertation research provided additional evidence of the importance of social and emotional factors in student success.

Contributions to Theory that Supports Student Success

This research examined associations between stress appraisals, regulatory practices, and student success outcomes. Two theoretical perspectives frame the two studies that comprise the dissertation, self-regulated learning (SRL) and stress optimization. SRL informs expectations regarding learning practices, academic challenges, and student success outcomes as the students interact with academic demands. Stress optimization informs expectations regarding the role of stress appraisals on aspects of self-regulated learning and student success outcomes. When integrated, SRL and stress optimization address academic stress and demands that are expected components of student experiences and success at university. This research provides meaningful contributions to theory that supports student success including: (a) self-regulated learning theory, (b) stress optimization theory, and (c) an integrated theoretical approach.

Self-Regulated Learning Theory

In this dissertation research, stress mindset and coping self-efficacy were associated with aspects of self-regulated learning. Specifically, stress mindset and coping self-efficacy had significant positive associations with SRL practices and negative associations with SRL challenges. Findings from Study One and Study Two showed: (a) coping self-efficacy predicted lower levels of motivation and social emotional challenges, (b) coping self-efficacy and stress mindset had significant positive associations with SRL practices, (c) the SRL practice academic social engagement had a positive association with academic wellbeing, and (d) SRL practices mediated the association between stress appraisals and student success outcomes (e.g.,

metacognitive monitoring provided a moderate partial inverse mediation between coping self-efficacy and motivation challenges, academic social engagement provided a small partial inverse mediation between coping self-efficacy and stress mindset and social emotional challenges and a positive mediation between coping self-efficacy and academic wellbeing). These findings support the hypothesis that stress appraisals and self-regulated learning practices contribute to student success outcomes. In other words, when students believe they can cope with stress and hold a stress is enhancing mindset, they may be more likely to engage in productive SRL practices, which is associated with higher levels of mental health and lower levels of academic challenges.

These findings are consistent with SRL theory that includes motivational factors and social context as comprising conditions for learning (Greene & Azevedo, 2007; Hadwin et al., 2011; Puustinen & Pulkkinen, 2001) as well as emotion regulation (Webster, 2019) and mental health (Davis, 2020). Extant research further demonstrates negative affective states like stress are negatively correlated with academic performance (Greene and Azevedo, 2007; Pekrun, 2017), again consistent with the negative association indicated in Study Two between stress appraisals and motivation and social emotional challenges.

Findings from this research indicate positive associations between both coping self-efficacy and stress mindset and the SRL practices metacognitive monitoring and adaptation, and academic social engagement. Emotions and motivational beliefs have been conceptualized as both conditions and products in regulation (see COPES framework; Davis, 2020; Webster, 2019; Winne & Hadwin, 2008) and exemplars of cognitive and metacognitive operations (Webster, 2019). Conditions can be molded from memories of past learning experiences and include beliefs, dispositions and styles, motivation, domain knowledge, knowledge of the current task,

and knowledge of study tactics and strategies (Greene and Azevedo, 2007). It follows that stress and stress appraisals align with the established role of emotion in SRL with stress being: (a) both an internal condition and product of each phase of SRL, and (b) a target of the regulatory process.

Stress can become a target for regulation when students evaluate products of stress against standards and perceive a discrepancy (Winne & Hadwin, 2008). The criteria for this evaluation may be influenced by multiple factors including goals and internal or external conditions that shape the regulatory process. From the Winne & Hadwin (1998, 2008) model, regulating stress is consistent with regulation of mental health and potentially involves: (a) being aware of and understanding stress and stress appraisals, (b) setting goals and devising plans for influencing stress, (c) implementing strategies for achieving goals, and (d) adapting the approach to regulating stress as needed (see Davis, 2020). This research showed that stress appraisals were associated with SRL practices and SRL challenges which underscores that stress plays a role in learning processes and student success. I hypothesize that stress operates as a condition and product in the recursive regulatory processes within SRL, although this claim was not tested in the cross-sectional research within this dissertation. Future research can investigate recursive interactions between aspects of stress and SRL by examining these variables over time.

Findings from this research indicate that stress appraisals, SRL practices, and student success outcomes are associated. Thus, interventions and curriculum to support student success for students like Sam will benefit from inclusion of information and support for students to: (a) regulate stress (e.g., stress mindset and coping self-efficacy, the role of prior experience in perceptions of coping with stress and stressors), (b) regulate learning and academic stressors (e.g., SRL practices, SRL processes applied to academic stressors such as tests and

presentations), and (c) understand student experience and performance aspects of student success. Supporting students to build capacity about managing stress and academic demands has potential to facilitate success and may be an important implication of this research. However, this dissertation research included only three SRL practices and two SRL challenges, and only at one point in time. Thus, only preliminary information was gathered regarding how SRL practices interact with stress appraisals and student success. The intricacies and finer nuances of how these puzzle pieces fit together over time needs to be addressed in future research.

Stress Optimization Theory

Informed by stress optimization theory, this research confirmed that the appraisals stress mindset and coping self-efficacy contributed to student success outcomes, with coping self-efficacy emerging with stronger predictive capacity than stress mindset. In addition, SRL practices mediated the association between stress appraisals and student success outcomes. The integration of specific SRL practices adds information to stress optimization about potential factors associated with academic stress and demands. Prior stress optimization research has included academic processes such as goal orientation (e.g., see Jamieson et al., 2018). Without a comprehensive framework to interpret and guide research on student success, interpretation and research is limited. For example, without a framework like SRL, how do researchers address questions such as: (a) *What other processes besides goal orientation contribute to student outcomes?* and (b) *What phase of learning do stress appraisals exert influence on?* and (c) *What student success outcomes are impacted by stress and stress appraisals?* Through integrating SRL with stress optimization, research regarding stress, learning and student success can more fully explore questions such these in future research. Initial evidence was provided in this dissertation research that SRL practices promote student success beyond what is provided by stress appraisals alone, indicating both stress optimization and SRL contribute to student success.

Future research can continue to explore associations between components of stress optimization and SRL over time and across individuals.

Stress Appraisals and Beliefs Within Stress Optimization. Appraisals, self-efficacy beliefs, and stress mindset beliefs are types of cognitive processes important for understanding stress and student success which are distinct and interrelated. First, appraisals indicate a cognitive evaluation in reference to a situation or event that is influential with respect to: (a) emotional reactions and coping and (b) whether an individual experiences a stressful situation as a challenge or a threat (Diotaeiti et al., 2023; Lazarus, 1991; Scherer & Moors, 2019). Appraisals include situation and individual dispositional factors (Lazarus & Folkman, 1984) and occur either as conscious and effortful or unconscious and automatic (Poluektova et al., 2023). Second, self-efficacy refers to an individual's belief in their ability or capacity to succeed in a specific situation, task or topic, or process (Bandura, 1986; Poluektova et al., 2023). According to Bandura, self-efficacy beliefs determine whether individuals will engage in coping behaviour and how long they will persist in the face of challenges (Poluektova et al., 2023). Third, stress mindset beliefs refer to the expectations and attributes associated with stress regardless of whether the individual is stressed or not (Crum et al., 2013). A mindset is a mental frame or heuristic that selectively organizes and encodes information, orienting a person towards making sense of a situation in a particular way and subsequently guiding corresponding actions and coping responses (see Dweck, 2008), where coping refers to the situation specific process of appraising threat and mobilizing cognitive and behavioural resources to manage stress (Folkman & Lazarus, 1980).

Appraisals, self-efficacy beliefs, and stress mindset beliefs are also associated with each other and the constructs overlap. To clarify further, appraisals are situation specific and mindset

and self-efficacy beliefs are considered more stable across situations (Poluektova et al., 2023). However, mindsets and self-efficacy are also: (a) subject to change (Crum et al., 2013, 2017; Usher & Pajares, 2009), (b) experience dependent (Crum et al., 2013), and (c) impacted by situation specific appraisals (Poluektova et al., 2023). Further, self-efficacy acts as an appraisal that can impact the relationship between coping and emotional responses (Lazarus, 1991; Lowe et al., 2008). For example, self-efficacy is situation specific and similar to the concept of secondary appraisal whereby coping resources are assessed (e.g., see Bandura, 1977 and Lazarus & Folkman, 1984). In addition, primary appraisals (e.g., appraisal of the degree to which the situation is demanding) and stress mindset are considered similar (Kilby & Sherman, 2016), although primary appraisals draws on contextual cues (Lazarus & Folkman, 1984) while stress mindset relates to stress in general and disregards the context (Crum et al., 2023). Further, mindset research has shown that a stress is enhancing mindset, expecting stress to facilitate growth, is associated with a situation specific appraisal that denotes a challenge stress response (e.g., enough resources to meet the demands of the situation) and corresponding approach coping behaviour (Crum et al., 2013; Kilby & Sherman, 2016; Poluektova et al., 2023).

Therefore, while presented as distinct psychological constructs in the research literature, appraisals, mindset beliefs, and self-efficacy beliefs are dynamic and recursive and may interact and overlap (e.g., de Ruiter & Thomaes, 2023; Poluektova et al., 2023). A stress optimization perspective that includes a psychological construction perspective of emotion further challenges the traditional conceptualization of appraisals in experiences of emotions like stress. From this perspective, the primary function of the brain is prediction and categorization (Barrett, 2017a, 2017b). For example, the brain uses emotion concepts to categorize instances that involve similar function and makes predictions about the present based on prior experience (Barrett, 2017a,

2017b, 2022). Appraisals, and other cognitive processes like self-efficacy and mindset, are not literal cognitive antecedents of emotion (Barrett et al., 2007). Instead, these constructs are involved in describing what it feels like to experience emotion and properties of emotion as opposed to causal mechanisms (Barrett et al., 2007). Further, emotions like stress can be conceptualized as a category, an individual can experience a specific instance of that emotion (e.g., akin to emotional state) or multiple instances within the larger category (e.g., akin to emotional trait) (Barrett, 2022). Similarly, I propose stress related beliefs like stress mindset and coping self-efficacy may capture a larger category of experiences related to stress itself and coping with a stressful situation respectively, while an appraisal is related to one specific instance (see Barrett, 2022). From this perspective, I propose that appraisals, stress mindset, and self-efficacy beliefs represent specific instances of appraisals about stress (appraisals) and larger categories (beliefs). I propose that the instances or appraisals are potentially more malleable and context dependent and larger categories like self-efficacy and mindset beliefs slower to change and more independent of context. This perspective is informed by current emotion research that indicates each individual is constantly engaged in constructing experiences of stress and other emotions from signals relative to their entire context (Barrett, 2017a; Barrett, 2017b; Barrett, 2022). In this way, appraisals, stress mindset, and coping self-efficacy are all involved as predictive processes in the brain that are constantly under construction and inform student experiences of stress and student success (Barrett, 2022).

An Integrated Theoretical Approach

An important contribution of this dissertation research is the proposed integrated theoretical framework to address the multiple recursive components of stress, self-regulated learning, and student success. When considering stress in educational contexts, stress optimization approaches benefit from extensive knowledge offered within self-regulated

learning. Self-regulated learning potentially adds specific information regarding enhancing resources and reducing demands, which influences experiences of stress, through effective task understanding, goal setting, enacting adaptive strategies, and ongoing reflection and adaptation specific to the academic context. In this way, self-regulated learning facilitates a challenge over a threat stress response for students like Sam from the example, thus increasing the likelihood that students will experience the inevitable stress at school as adaptive and enhancing.

While self-regulated learning rests on a primarily metacognitive foundation (Hadwin et al., 2011; Panadero, 2018; Winne & Hadwin, 2008), stress optimization raises the possibility that not all aspects of stress are under metacognitive control. Stress optimization literature links to non-conscious influences like implicit beliefs, stress appraisals for example, that impact approach coping (e.g., Crum et al., 2013; Jamieson et al., 2018) and challenge and threat appraisals are accompanied by specific patterns of physiological responding that are experience dependent and automatic (see Mendes & Park, 2014 for review). In other words, some aspects of stress experiences may be outside of conscious awareness and control. In addition, a component of stress according to a psychological construction theory of emotion, is prior experience (Barrett, 2017a, 2017b). This prior experience (e.g., memory) may include automatic patterned physiological responses in addition to cognition, exerting an implicit instead of metacognitive influence and driving avoidance behaviour linked with poor behaviour and wellbeing (Jamieson et al., 2018; Jamieson et al., 2022). Self-regulated learning benefits from a stress optimization informed approach that includes nonconscious processes such as implicit memory and patterned physiological responses when examining stress and other emotions within self-regulated learning.

Similarly, stress optimization may also benefit from the integration of SRL. A stress optimization approach aims to facilitate thriving, resilience, and adaptive coping in times of pressure and uncertainty, which are often expected in academic settings (Jamieson et al., 2018). How you perceive a stressful situation informs your experience of the demand as a challenge (adaptive) or threat (debilitating) and this is shaped by both internal (e.g., heart rate, thoughts) and external (e.g., the situation) cues as well as by prior experience (e.g., see Barrett, 2022). However, within the academic context, stress optimization approaches have not adequately accounted for additional processes and practices involved in the regulation of learning. As a result, the individual's assessment of an academic demand as debilitating or facilitating may be incomplete using stress optimization alone. For example, stress optimization considers the ratio of demands and resources in the appraisal of challenge or threat stress responses (Jamieson et al., 2018; Lazarus & Folkman, 1984; Mendes & Park, 2014). This assessment will be incomplete within academic settings without the rich knowledge of learning processes and strategies contained with an approach like SRL, especially in terms of leveraging resources and reducing demands to facilitate a challenge over threat stress responses and subsequent approach behaviour in support of student success.

In addition, stress appraisals and stress mindset are both experience dependent (Crum et al., 2013; Jamieson et al., 2018) and will be impacted by *how* the student is managing their academic demands. SRL provides a framework for learners to strategically learn and attain academic goals, effectively boosting resources and supporting students to experience academic stress as adaptive coping, consistent with stress optimization perspectives (e.g., see Jamieson et al., 2017; Jamieson et al., 2018; Jamieson & Hangen, 2020). SRL adds considerable value to stress optimization, providing specific knowledge and practices regarding learning and academic

performance and stress optimization adds considerable value to SRL, providing specific knowledge and practices regarding stress and stress regulation.

Implications for Practice

In addition to implications for theory and research, findings from this dissertation have implications for practice. First, stress mindset contributions were small and inconsistent but still contribute to student success outcomes. A stress mindset intervention includes accurate information about: (a) the benefits of stress in motivated performance contexts like school (b) the importance of stress for achieving goals, and (c) the presence of stress in wellbeing (e.g., eudaimonic wellbeing). Even if the contribution is small, given they are short and easy to deliver, stress mindset interventions may still be worthwhile providing students are also supported to develop self-regulated learning capacity, stress mindset interventions are possibly insufficient on their own.

Second, coping self-efficacy emerged as a useful variable to consider in student success research. Given the empirical support from this research for the impact of coping self-efficacy on student success outcomes, coping self-efficacy has the potential to inform curriculum development that supports students to manage the inherent stress in educational settings. Curriculum to support students to manage stress in academic contexts could be framed by coping self-efficacy and the three coping self-efficacy subscales, effectively helping students to understand stress accurately, thus promoting adaptive stress regulation. For example, coping self-efficacy learning modules can include: (a) managing the emotion of stress with the *emotion-focused coping* module, (b) adaptive help seeking and sense of belonging in the *support* module, and (c) self-regulated learning practices to managing typical academic demands in the *solution-focused* module. Content of each of these three ‘units’ would draw from research and theory

from both stress optimization and self-regulated learning, putting the proposed integrated theoretical perspective into practice.

Third, this research provided preliminary theoretical and empirical support for an integrated approach to student success that includes stress optimization and SRL. This integrated theoretical framework has the potential to guide social emotional curriculum development for students that supports understanding and regulating stress within academic contexts. Evidence from the two studies included here support including stress mindset, coping self-efficacy, and self-regulated learning practices to facilitate student flourishing in terms of both *doing well* and *feeling well* at school, and ultimately how to respond adaptively to stress in academic contexts.

Limitations and Next Steps

Findings from this research provide important information in student success research, and there are some notable limitations. First, the sample size is adequate for: (a) a regression analysis, (b) an exploratory study investigating coping self-efficacy in student success, and (c) an exploratory study seeking empirical support for the proposed integrate theoretical framework. However, the sample sizes in both studies are relatively small, especially considering the multiple variables included in the SEM analysis. Optimally, future research can replicate these findings with larger samples. In addition, a larger sample size would allow for SEM models with additional variables without risk of overparametization. For example, the outcome and predictor variables were assessed separately in this research due to sample size limitations. A larger sample would allow for all outcome measures and predictor variables to be modeled together for a more accurate assessment of the combined interactions of the variables in this research.

Second, this study is cross-sectional. The study is exploratory as coping self-efficacy is not well established in academic or student success research. Thus, a cross sectional design is appropriate for establishing associations between coping self-efficacy and self-regulated learning

practices, and student success outcomes. However, given the multifaceted and recursive nature of the variables, generalize results with caution. It is recommended future research examines change over time and include measurement at multiple time points.

Third, this research used a variable centered approach, again appropriate for the exploratory nature of the research. However, conceptualizations of stress, SRL, and mental health are complex and contain individual differences. Future research can address this with the inclusion of person-centered analytic methods and qualitative analysis to examine individual variability.

Fourth, within stress optimization, stress is conceptualized as embodied. Only appraisals were measured in this research. Future research on stress, SRL, and student success would benefit from inclusion of measurement of physiological aspects of stress (e.g., cortisol, breathing, heart rate, self-report descriptions) and self-report to calibrate interoception with objective measures of physiological activation in order to better represent physiological and non-conscious components of stress in the research.

Fifth, only three SRL practices and two SRL challenges were included in this dissertation research. To fully examine the associations between stress appraisals, SRL practices and student success outcomes, a complete array of SRL practices and challenges need to be included, which would require a much larger sample.

Sixth, some of the scales used are recently developed. Specifically, the AWBS (Rostampour et al., 2023) and SRL-PSD (Hadwin et al., 2022) have yet to be tested with a range of participants and contexts, raising potential concerns regarding validity and reliability until these scales are more widely used. In addition, many of these scales (e.g., academic social engagement) were part of a larger multidimensional measure, but for this study used as discrete

scales. As a result, some scales may have relatively few items which has the potential to impact reliability of scales. However, it is important to note that all scales used in this dissertation had acceptable reliability. (see Hair et al., 2019). Further development and testing of these scales is warranted. Although several limitations are noted, this dissertation work has supported steps forward regarding understanding stress and student success.

Conclusion

In the challenging and stressful academic context, feeling capable of coping with academic stress and demands and engaging in adaptive self and social regulatory practices facilitates student success. Eliminating stress is not a realistic option and may even be counter to overall mental health and performance, which are supported by adaptive responses to stress and achieving goals (e.g., see Ng et al., 2009; Ryff, 1989; Yaman-Sözbir et al., 2019). Thus, supporting students to manage academic stress and demands is integral to student success. This dissertation made several notable contributions including providing: (a) evidence for considering coping self-efficacy as predictive of student success outcomes, (b) empirical support that stress appraisals, SRL practices, and student success are associated, (c) a conceptualization of student success that includes student experiences and performance, and (d) preliminary support for integrating stress optimization and self-regulated learning theory in student success research. Finally, this dissertation research sought to understand and ultimately support students like Sam who encounter challenges that interfere with flourishing in their educational setting.

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Appendix A: Supplemental Definitions

Affect is a generic, broad term that encompasses emotion as well as physical sensations including positive and negative valences, any experience of feeling or emotion, from the simplest to the most complex (Pekrun, 2006). Feelings and emotion are affective states (APA, 2020a). Affective feeling is inborn and stems from interoceptive sense data from the body, is tied to allostatic regulation of infants by caregivers and other social experiences, and forms the foundation for the later development of emotion concepts (Barrett, 2020). Affective feelings are transformed into instances of emotion through learning to use conceptual knowledge that we acquire from cultural and contextual learning (Barrett, 2017a, 2017b, 2020).

Feelings are the experiential aspect of emotions and are conscious. Feelings can also be non-emotional, such as metacognitive feelings that are qualitatively pleasant or unpleasant and relate to cognitive states (Pekrun, 2006).

Emotions are considered multi-component, coordinated processes of psychological subsystems including affective, cognitive, motivational, expressive, and peripheral physiological processes (Pekrun, 2006). Emotions are widely referred to as “a collection of psychological states that include subjective experience, expressive behavior (e.g., facial, bodily, verbal), and peripheral physiological responses (e.g., heart rate, respiration)” (p. 9) and are central in any psychological model of the human mind (Gross & Barrett, 2011). Beyond, this, there is considerable controversy and conversation regarding the nature of emotions that I will not address here including: (a) whether emotions are universal and biologically determined (Ekman, 1992); (b) whether emotions are culturally crafted in terms of meaning and practices (Bruner 1990; Kitayama 2002); and (c) whether emotions are constructed by multiple brain networks (Barrett, 2017).

Emotion regulation refers to the process by which individuals recognize their emotions as they experience them, influence which emotions arise, when they have these emotions, and how they experience and express them. Emotion or emotional regulation can be automatic or controlled, conscious or unconscious, and may have effects at one or more points in the emotion producing process (Gross, 1998).

Psychological well-being was introduced by Jahoda (1958) and further operationalized by Ryff (1989). Psychological well-being addresses eudaimonic well-being and what it means for a person to be fully functioning and live optimally in six areas: (1) the extent to which individuals felt their lives had meaning, purpose, and direction (**purpose in life**); (2) whether they viewed themselves to be living in accord with their own personal convictions (**autonomy**); (3) the extent to which they were making use of their personal talents and potential (**personal growth**); (4) how well they were managing their life situations (**environmental mastery**); (5) the depth of connection they had in ties with significant others (**positive relationships**); and (6) the knowledge and acceptance they had of themselves (**self-acceptance**).

Subjective well-being, a term coined by Diener (1984), includes: (a) the presence of positive affect, absence of negative affect, and assessment of life satisfaction; (b) refers to people's cognitive and affective evaluations of their lives (Diener, 2000); and (c) how good one's life feels and how well it meets expectations (Veenhoven, 1997). There are three components of subjective well-being: (a) frequent positive affect, (b) infrequent negative affect, and (c) cognitive evaluations of one's life satisfaction. Thus, subjective well-being is much more than just happiness. Subjective well-being is defined as a person's overall evaluation of their lives and their emotional experiences, includes broad appraisals (e.g., life and health satisfaction

judgments), specific feelings that reflect reactions to events and circumstances, and is multidimensional (Diener et al., 2017).

Positive psychology is an area of research and practice within psychology that addresses optimal functioning in individuals, institutions, and society and is the scientific study of what makes life worth living (Seligman & Csikszentmihali, 2000). Positive psychology includes the study of positive subjective experience, positive individual traits, and positive institutions with the overarching intention of improving quality of life. Mental health, defined and discussed in more detail below, fits underneath the umbrella of positive psychology and captures subjective well-being and psychological well-being, and all of these areas are informed by emotions and emotion regulation.

Mental Illness refers to the presence or absence of psychopathology (e.g., DSM V; APA, 2013), is considered a health condition involving changes in emotion, thinking, or behaviour (or a combination of these), is associated with distress and/or problems functioning in social, work or family activities (APA, 2020b) and is distinct from mental health (Keyes, 2005).

Self-Regulated Learning (SRL) is defined as individual learners taking metacognitive control of cognitive, behavioural, motivational, and emotional conditions or states through iterative processes involving reflection and adaptation within the situated socio-historical context of each learner (Hadwin et al., 2011).

Stress mindsets are mindsets about how a person perceives the experience of stress, such as whether stress is believed to have enhancing or debilitating consequences (Crum et al, 2013).

Coping self-efficacy is comprised of three broad factors, confidence in the ability to; a) use problem focused coping, b) get support from friends and family, and c) stop unpleasant emotions or thoughts (Chesney et al., 2006). Coping self-efficacy (CSE) addresses “perceived

self-efficacy for coping with challenges or threats” (Chesney et al., 2006, p. 2). This refers to an individuals’ belief in their ability to cope with emotions (e.g., stress), and stressful events (e.g., tests and other academic challenges) that are expected at university.

Mental health in this research is defined as distinct from mental illness, a complete state in which individuals are flourishing (Keyes, 2002) with high level of emotional, psychological, and social well-being (Keyes, 2005) and is widely viewed as a state of well-being that supports individuals to cope with stressors, work productively, and function as a contributing member of society (WHO, 2016).

Hedonic Mental Health. The hedonic dimension of mental health rests on a determination of well-being that is largely subjective, equates well-being with pleasure and happiness (Ryan and Deci, 2001), and can be considered *feeling well* (e.g., happiness and positive affect) (Trompeter et al., 2017). Hedonic pursuits, the experience of enjoyment and pleasure, are more likely short term and dissipate rapidly in their impact on psychological functioning (Steger et al. 2008) and likely are best assessed in the short term and relative to a particular event (Huta & Ryan, 2010). Hedonic mental health is considered stable over time and still impacted by life events (Lucas, 2007; Luhmann et al., 2012), thus comprised of both state stability and trait variation (Eid & Diener, 2004).

Positive emotional or hedonic well-being can contribute to adaptive functioning (Trompeter et al., 2017), broaden attention and cognition (e.g., more flexible thinking), is associated with approach behaviour and problem solving (Fredrickson, 2001, 2013), enhances behavioural engagement (Linnebruck, 2007), enhances academic performance (Ben-Eliyahu & Linnenbrink-Garcia, 2013) and fluctuates in positive association with academic engagement (Davis, 2020; Kapil et al., 2021; Rostampour et al., 2020). An increase in hedonic mental health

does not necessarily lead to an increase in eudaimonic mental health in the long term (Cobo-Rendón et al., 2020).

Eudaimonic Mental Health. The concept of eudaimonia originated with Aristotle and concerns fulfilling ways of living in alignment with virtue as the cause of human well-being (Huta & Ryan, 2010; Kashdan et al., 2008; Ryan and Martela, 2016). The eudaimonic tradition considers optimal psychological functioning in life and includes psychological and social well-being, together these depict how much individuals see themselves as *doing well* in life (Deci & Ryan, 2008; Keyes, 2002; Lamers et al., 2012). The eudaimonic dimension measures well-being against more objective experiences that are good for the person and considers well-being as acting in accordance with one's inner nature and values, the realization of personal potential (Deci & Ryan, 2008; Ryan & Deci, 2001; Ryff & Keyes, 1995) and the experience of purpose and meaning in life (Ryff, 1989), and is considered a global construct (Ryff, 2016).

Eudaimonic approaches are more likely to be good for the person in the long term, thus more enduring with respect to well-being (Huta & Ryan, 2010; Steger et al. 2008) and likely need to be assessed over longer periods of time. From a eudaimonic perspective, happiness includes self-actualization and personal growth at the individual level (Huta & Ryan, 2010; Ryff, 1989; 2015) and commitment to socially shared goals and values at the social level, with the content of goals and meanings differing across society and culture (Christopher, 1999; Diener & Suh, 2000). The eudaimonic approach to well-being asks people to live in alignment with their *daimon*, or true self (Deci & Ryan, 2000) with these eudaimonic goals being shaped by both the individual and their context (Diener et al., 2017).

Eudaimonic pursuits facilitate engagement in the longer term with a broader whole, while hedonic pursuits relate to more immediate outcomes, suggesting these complementary pursuits

relate to different time scales (Huta & Ryan, 2010; Ryan et al., 2013). A key antecedent of hedonia is self-regulation of emotion but this effect is strongest at the short-term time scale (Huta & Ryan, 2010). From a eudaimonic perspective, the assessment of well-being rests on being fully functioning, even being sad (e.g., expressing appropriate disappointment after a poor grade) or experiencing other negative emotions can be seen as adaptive and a sign of well-being. For example, while academic stress is generally considered undesirable, appropriate levels of stress can improve performance and positively impact GPA (Travis et al., 2020). Positive emotions are expected to be the by-product of eudaimonic living and not a necessarily a goal by themselves (Ryan and Deci, 2001). The hedonic and eudaimonic dimensions are both important to psychological functioning or mental health (Ryan and Deci, 2001) and the current approach to understanding mental health is increasingly less unilateral and moving away from a focus on either subjective (hedonic) or psychological (eudaimonic) well-being in favour of a more integrated framework (Diener et al., 2017; Keyes, 2002; Seligman, 2002).

IPNB and Neurodevelopmental Assumptions. IPNB informs expectation the brain, mind, and body develop in an interactive way that is shaped by internal and external experiences. This includes internal beliefs and meaning and the sociocultural context within which we live. The mind is further shaped within a neurodevelopmental context that informs additional expectations regarding the individual relative to their neurodevelopmental progress and experience.

- Development occurs across the lifespan, including continued development of the brain and body, which is influenced by relationships and experiences (Siegel, 2020)
- Early experiences are particularly impactful and can have a lasting impact on mind, brain, and corresponding behaviour. Relationships with caregivers early in life, sometimes

referred to as attachment relationships, are influential and linked to brain development, behaviour, and emotional regulation capacity (Perry, 2009; Schore, 2021; Siegel, 2020)

- Development is dynamic and complex and shaped by interactions between brain, body, social context (Schore, 2021; Siegel, 2001, 2020)
- Relationships are central to development and considered critical to healthy growth and maturation (Siegel, 2001, 2020)
- Relationships are integral to emotional regulation which emerges in a dynamic way throughout the lifespan (Siegel, 2001, 2020)
- Co-regulation is expected where the adult through attuned support and connection co-regulates the emotional and physiological processes of the child. More broadly, co-regulation refers to two or more people interacting reciprocally to manage emotional and physiological states through verbal and non-verbal communication of emotional and social cues (Siegel, 2020). The younger the child, the more co-regulation is required to manage emotional and physiological states (Schore, 2021; Siegel, 2001, 2019, 2020).

Appendix B: Hypotheses and Evidence for the Testable Models

Hypotheses and Evidence for the Testable Models

Path	Path in Model	Hypothesis	Evidence
c path	CSE to AWB	CSE will be positively associated with AWB	<p>Ribeiro, 2018</p> <p>From stress optimization, CSE will impact AWB, higher stress=low wellbeing</p> <p>Benight & Harper, 2002</p> <p>CSE mediated acute stress & PTSD</p> <p>Melato et al., 2017</p> <p>CSE predicted emotional and psychological well-being in a sample of South African youth</p> <p>Midkiff et al., 2018</p> <p>CSE mediated the relationship between emotion dysregulation and the frequency of non-suicidal self-injury and young adults</p> <p>Singer, Humphreys, & Lee, 2016</p> <p>CSE also mediated the relationship between childhood abuse and ADHD symptoms in youth</p> <p>Wissing et al., 2011</p> <p>CSE mediated the relationship between distress and well-being in South African college students</p>

CSE to Motivation and Social Emotional Challenges	CSE will be negatively associated with MotCh and SECh	Reschley et al., 2008 Bandura & Locke, 2003 Hadwin et al., 2022; Robbins et al., 2004 Jamieson et al., 2022; Delahajj & Van Dam, 2017	High stress = low achievement Academic self-efficacy = academic performance, plays a role in motivation Self-efficacy beliefs are established motivation factors associated with performance and academic success. Motivation and social emotional challenges consistently high even when goals attained ASE predicts student engagement in adaptive learning and academic achievement Reappraisal = higher GPA, lower math test stress, adaptive coping; persisting and coping in course Associated with adaptive coping in military personnel
CSE to Mon and AD	CSE will be positively	Barrett, 2017a	Distinct goal pathway implicated for threat versus challenge stress response

	associated	Boekaerts &	stress regulation is part of what signals learner to engage in
	with Mon	Cascallar, 2006	adaptive learning
a path		Boekaerts &	Distinct goal pathway implicated for threat versus challenge
		Corno, 2005	stress response
			Stress can shift learner away from adaptive regulation of learning
		Boekaerts &	When it is perceived demands exceed resources, adaptive
		Niemivirta, 2000	regulation of learning breaks down
		Panilio et al.,	High perceptions of stress disrupt regulation of learning; prime a
		2019	student for negative appraisals and attributions
		Jamieson et al.,	Students effective at reappraisal on exams tend to out-perform
		2010	other students
CSE to	CSE will be	Barrett, 2017a	Distinct goal pathway implicated for threat versus challenge
Academic	positively		stress response
Social	associated	Boekaerts &	stress regulation is part of what signals learner to engage in
Engagement	with ASE	Cascallar, 2006	adaptive learning

			Boekaerts & Corno, 2005	Distinct goal pathway implicated for threat versus challenge stress response
				Stress can shift learner away from adaptive regulation of learning
			Boekaerts & Niemivirta, 2000	When it is perceived demands exceed resources, adaptive regulation of learning breaks down
			Panilio et al., 2019	High perceptions of stress disrupt regulation of learning; prime a student for negative appraisals and attributions
			Jamieson et al., 2010	Students effective at reappraisal on exams tend to out-perform other students
b path	FAB to AWB	FAB will be positively associated with AWB	Howell, 2009	SRL associated with mental health
	FAB to Mot Ch	FAB will be negatively	Hadwin et al., 2022	SRL associated with academic success Students who engage in effective SRL practices experience fewer academic challenges and perform better academically

	associated with Mot Ch		Self-regulated learning challenges are inversely related to a student's capacity to engage in effective SRL practices students who engaged in more effective SRL practices experienced less academic challenges and performed better academically (e.g., GPA) and were less impacted by COVID related stress
		Jansen et al., 2019	SRL associated with academic success SRL practices mediate academic outcomes
		Theobold, 2021	SRL associated with academic success
		Jansen et al., 2019	SRL associated with academic success SRL practices mediate academic outcomes
		Theobold, 2021	SRL associated with academic success
Academic Social Engagement to AWB	ASEng will be positively associated with AWB	Howell, 2009	SRL associated with mental health

Academic	ASE will be	Hadwin et al.,	SRL associated with academic success
Social	negatively	2022	Students who engage in effective SRL practices experience fewer
Engagement to	associated		academic challenges and perform better academically
Mot Ch	with Mot Ch		Self-regulated learning challenges are inversely related to a
			student's capacity to engage in effective SRL practices
		Jansen et al.,	SRL associated with academic success
		2019;	SRL practices mediate academic outcomes
		Theobald, 2021	SRL associated with academic success
Stress	Stress mindset	Crum et al., 2017	Stress mindset is expected to facilitate a context where adaptive
Mindset	to <u>a path</u>	Jamieson et al.,	processes in student success can occur including motivation and
	enhancing	2022	performance, wellbeing
	mindset will		Stress mindset facilitates approach coping
	be associated		
	with higher		
	levels of		
	SRL-P which		

	in turn		
	increase		
	AWB and		
	decrease		
	MotCh		
Stress mindset	Stress is	Jamieson et al.,	Stress mindset = greater self-control
to <u>b path</u>	enhancing	2018;	
(SRL practices	mindset will	Park et al., 2017	Stress mindset moderates impulsive actions in response to
& FAB -	be associated		adverse life events in adolescents
AWB)	with higher	Howell, 2017	A study of Canadian undergraduates' implicit theories regarding
(SRL practices	levels of		malleability of well-being showed incremental beliefs were
& FAB - Mot	SRL-P and		associated with positive affect and positive functioning
Ch)	FAB which	Tamir et al., 2007	flexible mindset regarding emotions associated with higher
	in turn		psychological well-being and increased positive emotion
	increase	Keech et al., 2018	Stress mindset = improved academic performance

AWB and decrease MotCh	Khan & Shamama-tus- Sabah, 2020	Stress mindset = improved mental health
	Jenkins et al., 2021	Stress mindset =improved psychological wellbeing

Appendix C: Dissertation Scale Items

Measure	Scale	Prompt	Items
Stress Mindset Scale (Crum et al., 2013)	5-point Likert Scale to indicate if the scale items are never true, rarely true, sometimes true, usually true, or always true.	<i>Please rate how true each statement is for you.</i>	<ol style="list-style-type: none"> 1. The effects of stress are negative and should be avoided 2. Experiencing stress facilitates my learning and growth. 3. Experiencing stress depletes my health and vitality* 4. Experiencing stress enhances my performance and productivity 5. Experiencing stress inhibits my learning and growth* 6. Experiencing stress improves my health and vitality 7. Experiencing stress debilitates my performance and productivity* 8. The effects of stress are positive and should be utilized <p><i>Note: * denotes reverse coding</i></p>
Coping Self-Efficacy Scale	5-point Likert scale from not confident	<i>When things aren't going well for you at</i>	(Emotion Focused) <ol style="list-style-type: none"> 1. Keep from getting down in the dumps. 2. Talk positively to yourself

(Chesney et al., 2006) *to completely confident.* *school, how confident are you that you can do the following.*

3. Do something positive for yourself when you are feeling discouraged
4. Make unpleasant thoughts go away.
5. Visualize a pleasant activity or place.
6. Keep yourself from feeling lonely.
7. Look for something good in a negative situation.

(Problem Focused)

1. Sort out what can be changed, and what can not be changed.
 2. Talk positively to yourself.
 3. Find solutions to your most difficult problems.
 4. Break an upsetting problem down into smaller parts.
 5. Leave options open when things get stressful.
 6. Make a plan of action and follow it when confronted with a problem.
 7. Think about one part of the problem at a time.
 8. Try other solutions to your problems if your first solutions don't work.
-

SRL Practices	5-point Likert	How often in	1. Asked myself if I am understanding what I am supposed to be doing?
<i>Metacognitive</i>	Scale from	the last two	2. Asked myself if I was remembering?
<i>Monitoring</i>	strongly	weeks have I:	3. Asked myself if I was understanding the material?
(SRL-PSD-	disagree to		
2021; Hadwin et	strongly		
al., 2022)	agree		
SRL Practices	5-point Likert	How often in	1. Changed my understanding of the task at hand?
<i>Metacognitive</i>	Scale from	the last two	2. Changed my feelings about the task?
<i>Adapting</i>	strongly	weeks have I:	3. Altered the level of effort I put in?
(SRL-PSD-	disagree to		4. Modified my beliefs about how well I would do on my tasks?
2021; Hadwin et	strongly		5. Modified my plans for the task?
al., 2022)	agree		6. Switched to a different strategy or approach?
SRL Practices	5-point Likert	How often in	1. Had fun in university.
<i>Academic Social</i>	Scale from	the last two	2. Helped classmates.
<i>Engagement</i>	strongly	weeks have I:	3. Got to know people in the class.
	disagree to		

(SRL-PSD- strongly
2021; Hadwin et agree
al., 2022)

Academic 5-point Likert How are you **(Hedonic)**

Wellbeing Scale from doing this 1. I am enjoying my classes
(Rostampour et never to term? 2. I am interested in my classes
al., 2023) always 3. I am satisfied with my classes

(Eudaimonic/Psychological Wellbeing)

4. In general, I feel confident and positive about myself as a student
5. I feel competent and capable in my classes
6. I am successfully adapting to new challenges

**(Eudaimonic/
Social Wellbeing)**

7. I have developed personal relationships with other students in my
classes
-

			8. I feel comfortable contributing in class by asking questions, joining discussion, stating ideas and opinions
			9. I feel like I belong in the University community
SRL	5-point Likert	Over the last	1. Believing I can do my work.
Challenges	Scale from	two weeks, I	2. Feeling like my work was worth doing.
<i>Motivation</i>	strongly	struggles with:	3. Persisting when things got tough.
<i>Challenges</i>	disagree to		4. Being discouraged by setbacks. (Reverse coding)
(SRL-PSD-	strongly		
2021; Hadwin et	agree		
al., 2022)			
SRL	5-point Likert	Over the last	1. Feeling lonely.
Challenges	Scale from	two weeks, I	2. Finding enjoyment at university.
<i>Social</i>	strongly	struggles with:	3. Managing my emotions/feelings.
<i>Emotional</i>	disagree to		4. Managing relationships.
<i>Challenges</i>	strongly		5. Taking care of my mental health and well-being.
	agree		6. Taking care of my physical health and wellbeing.

(SRL-PSD-
2021; Hadwin et
al., 2022)

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¹ Note: Printed with permission of authors.

Appendix D: Validation of Academic Wellbeing Scale

Academic Well-Being: Construct Validation of an Instrument to Measure Student Mental Health and Well-Being in Academic Settings (presented at EARLI, August 2023)

Abstract

Academic Wellbeing, the subjective sense of how well students feel about and perform in their academic contexts, has gained attention as an important student success factor. This study introduces a scale for assessing well-being in academic settings, the Academic Well-Being Scale (AWBS). The AWBS provides a measurement solution to the shift in conceptualizations of student success towards flourishing and thriving and away from outcome markers alone. The AWBS is informed by extant research on mental health and well-being and current approaches to student success that include both psychosocial and academic elements. This scale is an adaptation of the Mental Health Continuum Short Form (MHC-SF; Keyes, 2009), tailored for the academic context. Findings support validity, reliability, and improved predictive capacity of the AWBS over the MHC-SF for a sample of university students (N=221). Analysis for concurrent validity shows strong positive associations with (a) MHC-SF, (b) self-regulated learning (SRL) practices, (c) foundational academic behaviours, and (d) students' expected GPA. Comparing the predictive power of the AWBS to the original MHC-SF shows the AWBS predicts a wider range of academic challenges compared to MHC-SF and is associated with students' expected GPA while the MHC-SF is not. Findings highlight the potential application of this measure in research regarding adaptive student learning and student success outcomes. Further, in the current context of global change and uncertainty, the AWBS is consistent with student success trends that integrate psychological processes alongside academic processes in the study of learning, supporting students to not merely survive but thrive.

Introduction

Moving away from a sole focus on outcome markers (e.g., grades, retention), student success increasingly includes processes supporting self-actualization and personal development (e.g., persistence, effective learning, emotion/motivation regulation) (Kuh et al., 2005). This approach takes a holistic view of student development centering around thriving and optimizing potential that includes healthy relationships and managing challenges effectively (Louis & Schreiner, 2012). In other words, thriving extends student success beyond grades and graduation to include psychosocial elements leading to higher levels of wellbeing (Louis & Schreiner, 2012).

Keyes (2013) posits that mental health is not the absence of mental illness but is a state in which individuals are flourishing with high level of emotional, psychological, and social wellbeing supporting them to cope with stressors, work productively, and function as a contributing member of society (WHO, 2016).

These aspects of wellbeing are often classified into two dimensions, hedonic and eudaimonic, referring to one's judgement of quality of life derived from experiencing pleasure and happiness (Ryan and Deci, 2001) and from self-actualization and purposefulness (Diener et al., 2017). Well-being requires a high level of both eudaimonic and hedonic wellbeing (Keyes and Annas, 2009) and is associated with superior physical health and psychosocial, work, and academic functioning (Howell, 2009; Moulin et al., 2017).

The Academic Well-Being Scale Against this backdrop, the AWBS, adapted from the MHC-SF (Keyes, 2009), was designed to be a measure sensitive to well-being specifically in academic settings where challenges to wellbeing are common (AHSA, 2016). Students' perceptions of themselves as learners and of their learning context impact their general wellbeing

(Tuominen-Soini et al., 2012). AWBS, as a context-sensitive measure of wellbeing, helps us further understand how general and academic wellbeing states are inter-related and how they contribute to academic outcomes and student success.

The AWBS also includes both hedonic and eudaimonic dimensions measuring the degree to which students (a) feel positive about their academic life, (b) evaluate their personal growth and self-actualization in the academic context, and (c) perceive themselves as active and integrated members of their school community.

Methodology

The purpose of this study was to assess psychometric adequacy for the AWBS in an academic setting. The first step examined the validity of the construct using confirmatory factor analysis. The second step tested concurrent validity by measuring associations between MHC-SF and AWBS. The third step tested criterion validity by assessing AWBS associations against some measures of academic outcomes (e.g., Expected GPA, SRL practices, foundational academic behaviour) and examined the differential predictive capacity of AWBS compared to MHC-SF in predicting a measure of academic challenges.

Analysis and Results

Participants and Data Collection

Participants were 221 students in September of 2021 from a range of faculties at a public university. Data were collected during a semester-long undergraduate elective educational psychology course on science and strategies for SRL.

Variables and Measures

Measures included: (1) Academic Well-Being Scale (AWBS) (Authors, unpublished), a 9-item modified version of the MHC-SF (Keyes, 2009), (2) Mental Health Continuum Short Form

(MHC-SF; Keyes, 2009), (3) Self-regulated Learning Profiles and Self-Diagnostic Tool (SRL-PSD-2021; Authors et al., 2022) comprised of : (a) SRL practices: a 47-item scale measuring the degree to which students use important types of self-regulatory actions and practices, namely, planning, goal and time management, metacognitive monitoring and adapting, motivation and academic social and emotional engagement. (b) Academic challenges, a 32-item scale measuring the degree to which students encountered 6 areas of challenges that correspond to major areas identified in students' success literature (challenges related to motivation, initiating & sustaining engagement, goal & time management, cognition, metacognition, and academic social and emotional functioning), and (c) Foundational Academic Behaviours: a 4-item scale measuring students' engagement and participation in academic activities such as going to class and handing in assignments.

Construct Validation

Confirmatory factor analysis was conducted to validate AWBS. Consistent with the original MHC-SF, a three-factor structure shown in Figure 2 (emotional, psychological, and social well-being) was validated. Fit indices ($X^2(24, 221) = 33.107$, CFI=0.989, TLI=0.983, RMSEA=0.04, $p=0.5$, SRMR=0.03) indicated good model fit. Omega coefficients (ω) were above 0.7 for all subscales indicating acceptable reliability of the scale.

Concurrent Validity

Validity check summarized in Table 1, was done by testing structural associations within SEM framework. Analyses for concurrent validity show strong positive associations with (a) MHC-SF, (b) all 8 dimensions of SRL practices (planning, goal and time management, metacognitive monitoring and adapting, managing motivation, managing, social and emotional

functioning), and (c) foundational academic behaviours (e.g., going to class). AWBS is also positively associated with students' expected GPA while MHC-SF is not.

Predictive Validity

Results from structural regressions shown in Table 2 show the academic psychological wellbeing subscale of AWBS can negatively predict a wider range of academic challenges than MHC-SF (challenges related to motivation, initiating & sustaining engagement, goal & time management, cognition, metacognition, and social and emotional functioning). Refer to Table 3 from a comparison of items between the MHC-SF and the AWBS.

Discussion

From these initial findings, AWBS has high utility for research on (a) well-being in academic settings and (b) student success. Results showed the AWBS satisfied requirements for construct validation and concurrent and predictive validity for academic outcomes. The AWBS is supported by extensive theory and research on mental health (Keyes, 2009, 2013) and provides a measure that is specific for the academic context. Indeed, AWBS showed higher associations with academic outcomes than its predecessor the MHC-SF. Final paper will include modifications rendering AWBS more robust across cultural samples and guidelines for categorization of participants into wellbeing profiles that are differentially predictive of academic outcomes.

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Note: full reference list is not provided due to word limit, available upon request.

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Table 1*Concurrent Validity of Academic Wellbeing Scale*

	Academic Emotional Wellbeing	Academic Psychological Wellbeing	Academic Social Wellbeing
Mental Health Continuum – Short Form			
Emotional Wellbeing	0.602***	0.765***	0.6***
Psychological Wellbeing	0.426***	0.781***	0.675***
Social Wellbeing	0.573***	0.777***	0.727***
SRL Practices			
Task Understanding	0.545***	0.508***	0.563***
Goal Management	0.404***	0.458***	0.467***
Adaptation	0.4***	0.53***	0.506***
Task Value	0.354***	0.382***	0.409***
Time Managment	0.423***	0.499***	0.489***
Motivation Appraisal	0.24	0.574**	0.24
Monitoring	0.637***	0.596***	0.583***
Academic Social Engagement	0.523***	0.616***	0.91***
Foundational Academic Behaviours	0.43***	0.528***	0.584***
Expected GPA	0.297***	0.282***	0.242**

Note. Estimates are SEM extracted correlation coefficients.

Ns $P > 0.05$, * $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$.

Table 2

Validity of Academic Wellbeing Scale vs. Mental Health Continuum short form in predicting Academic Challenges

	Academic Wellbeing Scale				Mental Health Continuum			
	AEWB	APWB	ASWB	R ²	EW	PW	SW	R ²
MOT_Ch	0.07	-0.976***	0.29	0.515	0.133	-0.133	-0.625	0.394
ISE_Ch	0.02	-0.539*	-0.13	0.404	0.223	-0.454*	-0.372	0.383
GTM_Ch	0.13	-0.513*	-0.12	0.284	-0.279	-0.522*	0.26	0.283
COG_Ch	0.01	-0.787***	0.39	0.253	-0.072	-0.258	-0.113	0.176
MET_ch	0.13	-0.687***	0.11	0.282	-0.193	-0.431*	0.082	0.268
SE_ch	0.12	-0.725***	-0.14	0.599	-0.166	-0.087	0.528*	0.566

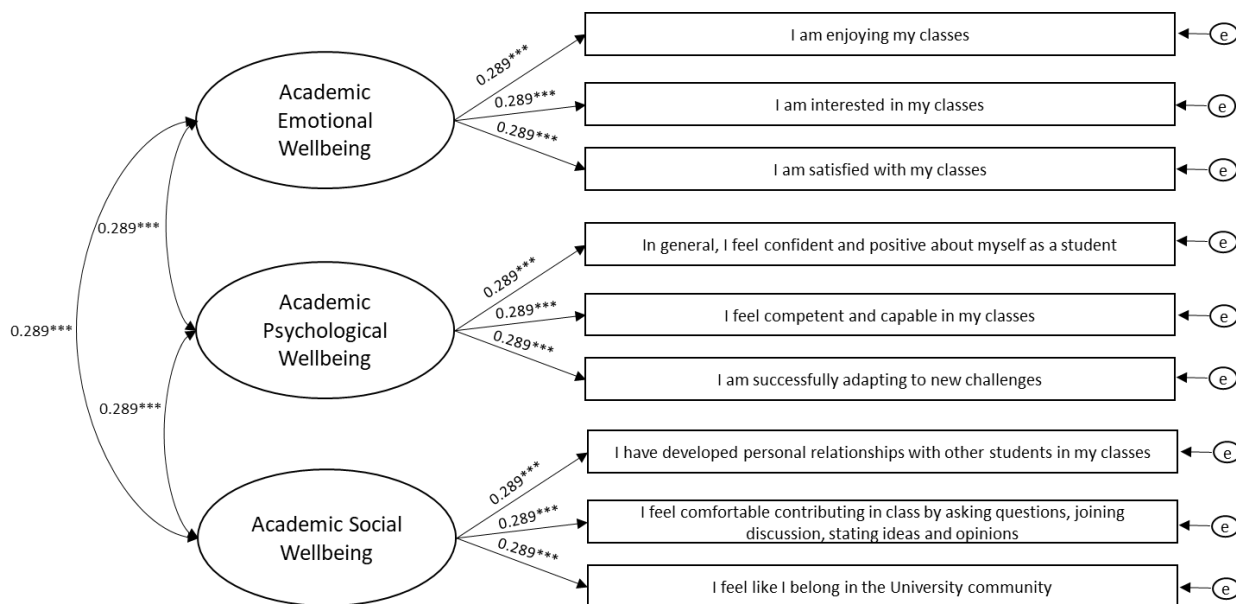
Note. Estimates are standardized SEM extracted regression coefficients.

Ns $P > 0.05$, * $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$. Significant estimates are highlighted.

AEWBS: Academic Emotional Wellbeing, APWB: Academic Psychological Wellbeing, ASWB: Academic Social Wellbeing, EW: Emotional Wellbeing, PW: Psychological Wellbeing, SW: Social Wellbeing, MOT_Ch: Motivation Challenges, ISE_Ch: Challenges related to Initiating and Sustaining Engagement, GTM_Ch: Goal and Time Management Challenges, COG_Ch: Cognitive Challenges, MET_Ch: Metacognitive Challenges, SE_Ch: Social and Emotional Challenges.

Figure 1

Factorial Structure of Academic Psychological Wellbeing Scale.

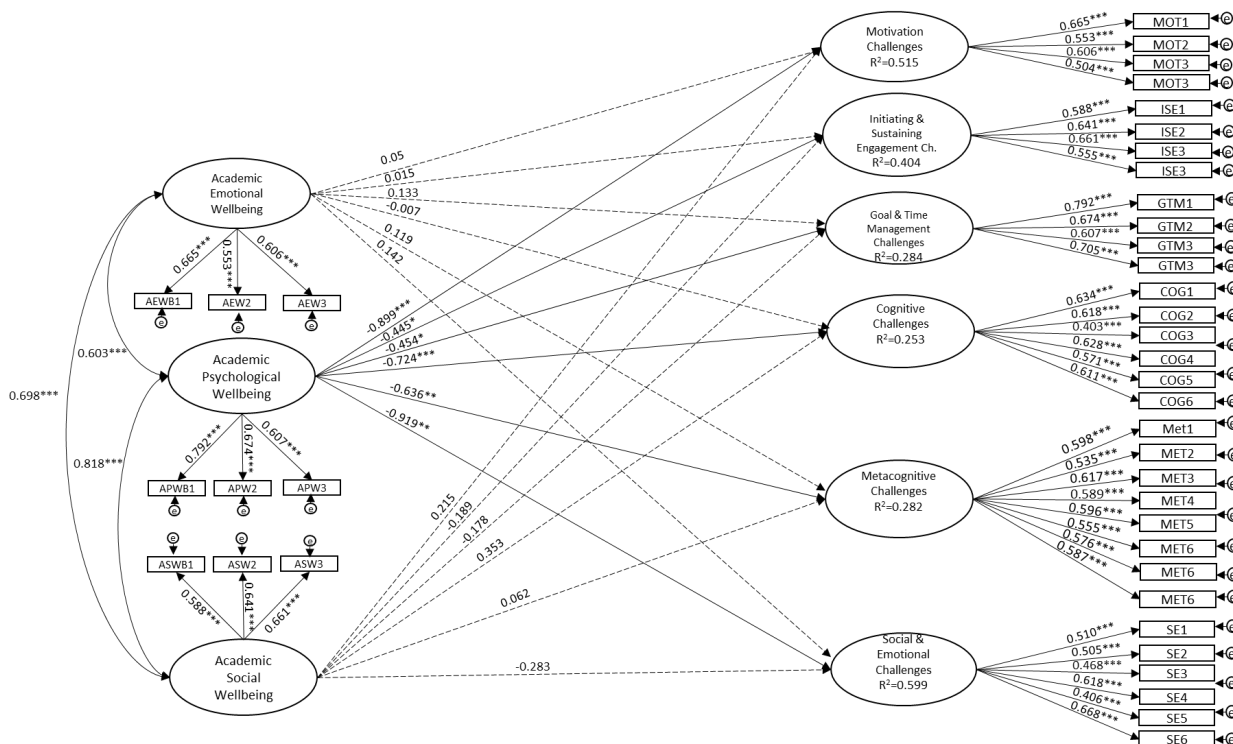


Note. Fit indices: ($\chi^2(24, 221) = 33.107$, CFI=0.989, TLI=0.983, RMSEA=0.04, $p=0.5$, SRMR=0.03).

Ns $P > 0.05$, * $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$.

Figure 2

Structural Association indicating validity of Academic Psychological Wellbeing Scale in predicting Academic Challenges.



Note. Fit indices: (X^2 (749, 221) = 995.988, CFI=0.929, TLI=0.922, RMSEA=0.042, $p=0.9$, SRMR=0.06, estimator=MLM). Ns $P > 0.05$, * $P \leq 0.05$, ** $P \leq 0.01$, *** $P \leq 0.001$.

Note: PFCs: Problem Focused Coping Self-Efficacy, EFCs: Emotion Focused Coping Self-Efficacy, mot: motivation challenges, ise: initiating and sustaining engagement challenges, cog: cognition challenges, met: metacognition challenges, gtm: goal and time management challenges, se: self-efficacy challenges.

Appendix E: Paper One

Coping Self-Efficacy and Stress Mindset as Predictors of Student Success Outcomes

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Abstract

University students experience stress from academic demands, stress is in fact expected in academic settings and important for achieving goals. How students experience the inevitable stress in the academic context matters for student success and would benefit from further study. This study examined two types of beliefs regarding academic stress: (a) perceptions of coping with academic stress and demands, named *coping self-efficacy* and (b) general beliefs regarding stress itself, named *stress mindset*. This study examined the impact of the two stress self-beliefs on two types of outcomes related to student success: (a) academic performance (GPA) and (b) student experiences (academic wellbeing, perceived motivation challenges). Findings indicate coping self-efficacy positively predicts higher academic wellbeing and lower motivation challenges, neither stress mindset nor coping self-efficacy predicted GPA. Coping self-efficacy emerged as a useful predictor of student success outcomes.

Keywords: student success, student retention, stress appraisal, coping self-efficacy, stress mindset, academic well-being.

Coping Self-Efficacy and Stress Mindset as Predictors of Student Success Outcomes

University students experience stress from academic demands, which has the potential to impact student success (ACHA, 2016; Keyes, 2005; OECD, 2017). In recent years, stress in academic settings was further amplified by uncertainty and social isolation due to the global pandemic (Cockerham et al., 2021; Elmer et al., 2020). However, we know little about the degree to which student success outcomes are impacted by the ways students think about and respond to academic stress.

The negative impacts of stress have often been overemphasized, stress is an expected and variable component of student success (Brooks, 2014; Jamieson et al., 2018; Jenkins et al., 2021). In addition to being expected in academic settings, stress is influential in student success and has the potential to impact outcomes positively (Denovan & Macaskill, 2017; Rudland et al., 2020) or negatively (Chou et al., 2011; Pascoe et al., 2020). When managed well, stress in academic settings is important for achieving goals (Brooks, 2014; Jamieson et al., 2018) that are important for both academic (Jenkins et al., 2021) and wellbeing outcomes (Ng et al., 2009).

While undergraduate university students report high levels of stress, an emphasis on eliminating stress for students is: (a) not possible or practical and (b) counterproductive (Jenkins et al., 2021). The academic context is expected to include stress and stress has the capacity to either help or hinder student success depending on how stress is perceived or managed (Jenkins et al., 2021). Stress optimization theory suggests that how people cope in motivated performance contexts, academic settings for example, is determined in part by their beliefs about stress (e.g., Jenkins et al., 2021). Despite recognition that stress is impactful in academic settings and the significance of self-beliefs in these contexts, the student success and educational psychology literature has largely overlooked beliefs about stress.

Relevant Literature and Theory

It is well documented that how students manage academic demands, like assignments and studying, impacts student success (Panadero, 2018; Robbins et al., 2004; Winne & Hadwin, 2008). However, the impact of student perceptions and beliefs regarding academic stress on student success is not understood as thoroughly. Managing stress and academic demands are both important for student success. To understand what to expect from the impact of stress related beliefs on student success, we turn to stress optimization research.

Stress Optimization Theory

Stress is expected in academic settings where students are pursuing personally relevant goals and the context is evaluative, goal-oriented, and performance based (Brooks, 2014; Jamieson et al., 2018; Park et al., 2017). Responding to stress adaptively is integral to wellbeing (Denovan & Macaskill, 2017) and adaptive learning (Vogel & Schwabe, 2016). When not managed well, academic related stress can: (a) reduce academic achievement, (b) decrease motivation, and (c) increase risk of dropout and reduce retention (Pascoe et al., 2020).

A stress optimization approach recognizes that stress is expected in academic settings, and other motivated performance contexts characterized by goal pursuit (Jamieson et al., 2018). A stress optimization approach aims to facilitate thriving, resilience, and adaptive coping in times of pressure and uncertainty, often inevitable in academic contexts (Jamieson et al., 2018). Stress optimization theory is relevant for research on student success because stress is commonly experienced in academic settings (Jenkins et al., 2021). Additionally, stressful experiences can impact both performance and wellbeing for students (Jamieson et al., 2018, 2022).

Stress optimization encompasses both stress appraisal and stress mindset research, both are informed by the idea that stressful experiences can: (a) lead to physiological and

psychological thriving, (b) enhance performance and wellbeing when stressors are perceived as opportunities for growth, and (c) be appraised as functional and adaptive in acute motivated performance contexts (Jamieson et al., 2018). Student responses to stress, including beliefs about stress, have the potential to impact both learning processes and academic outcomes (de la Fuente et al., 2020). Stress optimization theory suggests that how we perceive and cope with stress is influenced by our beliefs and appraisals about stress (Crum et al., 2017; Jamieson et al., 2022). However, this has been under examined in academic contexts. Thus, student's stress related self-beliefs are a critical component of adaptive learning and student success. This study aims to investigate the impact of two different stress appraisals, namely stress mindset and coping self-efficacy, on student success outcomes.

Stress Mindset

In the challenging university context, this research turns to stress mindset as an important self-belief for student success. Stress mindset refers to beliefs about the nature of stress as enhancing or debilitating (Crum et al., 2013; 2017). It proposes that stress responses can be influenced, even when the situation cannot be changed (Crum et al., 2017), such as academic program requirements. Stress mindset is expected to shape the impacts of stress including behaviour, performance, and wellbeing, and is expected to inform psychological and motivational contexts within which coping actions are selected and enacted (Crum et al., 2017).

Extant research shows stress mindset is predictive of different outcomes. To elaborate, stress mindset is implicated in a range of outcomes important to university students, such as: (a) psychological wellbeing (Keech et al., 2018), (b) perceived stress (Keech et al., 2018), (c) physical wellbeing (Keech et al., 2018), (d) cortisol levels (Crum et al., 2013), (e) positive affect (Crum et al., 2017), (f) cognitive flexibility (Crum et al., 2017), (g) attentional bias towards

positive stimuli (Crum et al., 2017), (h) mental health (Khan & Shamama-tus-Sabah, 2020), (i) academic performance (Keech et al., 2018), and (j) mental and physical health as mediated by approach coping and perceived distress in college students (Jenkins et al., 2021).

Stress Appraisal

Stress appraisal, and reappraisal, can be viewed as a cognitive perceptual process that shapes valuations with the goal of modifying actions (e.g., approach or avoidance behaviour) (Gross, 2015). Within stress optimization, it is recognized that emotional processes like stress are malleable. Cognitive appraisals and reappraisals, which are perceptions or judgments of stress as adaptive or distressing, play a critical role in regulating emotion and stress (Barrett, 2017). Thus, stress responses can be impacted by how each person perceives both internal (e.g., heart rate) and external (e.g., the situation) cues. For example, a student's experience of stress regarding a test will depend on: (a) their previous experience with tests and corresponding expectations for the current test, (b) their physiological reaction and the meaning they ascribe to this reaction based on prior experience, and (c) whether they see the test as an opportunity for learning and growth or an upsetting event. These contextual factors combine to determine whether the experience is appraised as debilitating or facilitating for the student. Stress optimization research similarly shows reappraisal predicts academic performance by facilitating the belief that stress is beneficial and can be managed (e.g., see Jamieson et al., 2022; Jamieson & Hangen, 2020).

Informed by stress optimization, it is therefore not the presence of stress or academic demands that is inherently problematic. Both are expected in academic settings and can exert positive or negative influence on student success, depending on how they are perceived and managed. Instead, how students manage stress and academic demands is crucial in determining whether stress supports or detracts from student success. However, the student success literature

has limited information on beliefs about being able to cope with both academic stress and demands simultaneously.

Student Success

Historically student success research was motivated by concerns about attrition and measured primarily by rate of graduation (Louis & Schreiner, 2012). Shifting from a focus on outcome markers like grades and degree completion, student success research now encompasses processes that contribute to success, such as persistence, motivation, effective learning, and mental health (Kuh et al., 2005; Louis & Schreiner, 2012; Suldo et al., 2006; Tinto, 2017). This is a holistic view of student success that recognizes the importance of both doing well *and* feeling well. Despite theory and evidence indicating that student success includes aspects of both *student experiences* and *performance* outcomes (Chou et al., 2011; de la Fuente et al., 2020; Denovan & Macaskill, 2017; Pascoe et al., 2020; Vogel & Schwabe, 2016), student success research frequently examines these outcomes in isolation. Thus, this study examines the impact of stress self-beliefs on two types of student success outcomes: (a) academic performance and (b) student experiences.

Academic Performance Outcomes

A standard measure for capturing academic success is GPA (Robbins et al., 2004; Zollanvari et al., 2017). Prior research has demonstrated that predicting GPA is multifaceted and complex, and best predicted by a range of individual differences (Richardson et al., 2012; Robbins et al., 2004; Zollanvari et al., 2017). Evidence does show that cognitions specific to academic performance (e.g., performance self-efficacy) are correlated most strongly with GPA (Richardson et al., 2012). In addition, Jamieson et al., (2022) reported evidence that cognitive

appraisals were predictive of GPA. It is therefore expected that the stress beliefs stress mindset and coping self-efficacy will be positively associated with GPA in this research.

Student Experience Outcomes

As previously indicated, student success research includes student experiences or processes that contribute to success such as persistence, motivation, regulation of learning, and mental health (Kuh et al., 2005; Louis & Schreiner, 2012; Suldo et al., 2006; Tinto, 2017). This study focuses on two student experiences implicated in student success that may be sensitive to beliefs about stress, motivation challenges and mental health.

Motivation challenges are a specific type of academic challenge (Author, 2021). Limited attention is given to academic difficulties or challenges that are associated with deleterious impacts on student success. Navigating challenges effectively is an important academic outcome in student success (e.g., see Louis & Schreiner, 2012). Academic challenges are: (a) negatively association with academic performance (b) create opportunities for students to engage self-regulatory control by implementing adaptive learning practices, and (c) function as a metric of adaptive regulation of learning (Author, 2021; Koivuniemi et al., 2017). Specifically, motivation challenges will be assessed as an outcome in this research as they are consistently high for students (Author, 2019; Koivuniemi et al., 2017). In addition, prior research suggest stress related self-beliefs like stress mindset and self-efficacy will be influential constructs in shaping student motivation (Bandura & Locke, 2003; Crum et al., 2017; Schunk, 1991). Those who feel more capable of achieving desired outcomes through personal effort have more incentive to try, therefore self-efficacy is an important aspect of human motivation (Usher, 2023). It is therefore expected that proactive stress related self-beliefs, like higher levels coping self-efficacy and a stress is enhancing mindset, will be associated with lower reports of motivation challenges.

Mental health and well-being is another student experience that is implicated in student success. A broad and multifaceted construct that refers to optimal functioning and experience (Diener et al., 2017; Ryan & Deci, 2001), mental health and wellbeing is associated with superior functioning related to; (a) psychosocial functioning, (b) work and academic performance, and (c) physical health (Howell, 2009; Keyes, 2007; Moulin et al., 2017). Mental health captures the degree to which students are flourishing emotionally, psychologically, and socially and aligns with current perspectives regarding student success (e.g., see Louis & Schreiner, 2012). There is prior evidence that self-beliefs are predictive of: (a) emotional and psychological well-being (Freire et al., 2019; Melato et al., 2017), (b) positive coping (Cattellino et al., 2021), and (c) happiness (Caprara et al., 2006). It is therefore expected in this study that stress related self-beliefs will predict mental health and wellbeing for students. Please note, the terms mental health and academic wellbeing are used interchangeably in this study.

Self-Beliefs in Academic Contexts

In academic contexts, internal self-influence factors such as self-efficacy have been consistently demonstrated to predict motivation and a range of academic outcomes. From a self-regulated learning (SRL) and social cognitive perspective, it is purported that a combination of external social systems (e.g., academic context) and internal self-influence factors (e.g., stress mindset, coping self-efficacy) motivates and regulates behaviour (Bandura, 2001; Schunk & Pajares, 2002). Self-beliefs are important and influence strategic choices and regulatory processes that impact academic performance. While stress related beliefs have not been thoroughly explored in academic contexts, two self-beliefs have received considerable attention, namely intelligence mindsets academic self-efficacy (e.g., Bandura, 2008; Dweck, 2006).

Intelligence Mindsets

Prior to stress mindsets, general mindset theory was developed by Carol Dweck (Dweck, 2006; Dweck et al., 1995). This theory posits that students with growth mindsets tend to demonstrate more adaptive behaviours and psychological traits such as resilience when faced with failure, which in turn generates greater academic achievement. Implicit theories about intelligence have been studied extensively in educational settings including how they relate to (a) intelligence (Dweck, 2006), (b) facilitate challenge seeking (Yeager & Dweck, 2012), (c) academic performance and physiological stress responses (Yeager et al., 2022; Yaeager & Dweck, 2012), (d) psychological well-being and increased positive emotion (Tamir et al., 2007), and (e) positive affect and positive functioning (Howell, 2017). Extant evidence shows that endorsing a malleable perspective of emotion is associated with more adaptive functioning than an fixed view (Howell, 2017). A similar relationship is expected between stress mindset and student success outcomes in this study. For example, a *stress-is enhancing* mindset is expected to be associated with higher levels of mental health and adaptive academic functioning (e.g., lower motivation challenges, higher GPA).

Academic Self-Efficacy

Although self-efficacy related to coping with expected academic stress has been underexamined, existing literature indicates that academic self-efficacy plays a role in student success. Academic self-efficacy has been shown to contribute to motivation and performance across a range of contexts (Bandura & Locke, 2003), predict student success (Pajares, 1996, 2003), and influence stress outcomes by shaping perceptions of stress as either a challenge or a threat (Freire et al., 2019; Karedemas & Kalantzi-Azizi, 2004). Academic self-efficacy: (a) is a positive significant predictor of coping with stress (Freire et al., 2016), (b) promotes adaptive coping (Freire et al., 2016; Karademas & Kalantzi-Azizi, 2017), (c) facilitates positive mental

health (Kashdan et al., 2018), (d) is associated with academic performance (Klassen & Klassen, 2018), and (e) successfully enacting academic strategies (Bandura, 2001).

Several types of self-efficacy have been positively associated with social emotional outcomes. For example, (a) emotional self-efficacy is linked to well-being and positive coping strategies during the pandemic (Cattelino et al., 2021; Won et al., 2023) and high levels of positive thinking and happiness (Caprara et al., 2006), (b) academic self-efficacy is associated with psychological wellbeing (Freire et al., 2019; Melato et al., 2017), and (c) coping self-efficacy has functioned in a predictive capacity for emotional and psychological well-being (Melato et al., 2017). Self-efficacy beliefs have been established as an important component of motivation associated with performance and academic success (Author, 2022; Richardson et al., 2012; Robbins et al., 2004). Self-efficacy contributes to the assessment of demands as challenges or threats (Bandura, 2008; Liu & Li, 2018), and therefore a component of adaptive coping (Freire et al., 2016; Karademas & Kalantzi-Azizi, 2017). In summary, extant evidence indicates the predictive capacity of different types of self-efficacy on aspects of student experiences and performance that are important for student success. This provides the rationale for examining the predictive capacity of coping self-efficacy, which has received minimal attention in student success research.

Coping Self-Efficacy

Given that stress is expected in academic contexts and is not inherently good or bad, the focus in this research pivots to examining coping with stress as impactful regarding student success. The regulation of stress in academic environments is important, with a focus on an individual's perception of their ability to cope effectively with a variety of challenges and demands, referred to as coping self-efficacy (Chesney et al., 2006). Coping self-efficacy (CSE) is

an appraisal in coping and stress regulation and is comprised of three broad factors, confidence in the ability to: (a) use problem focused coping, (b) get support from friends and family, and (c) stop unpleasant emotions or thoughts (e.g., emotion focused coping) (Chesney et al., 2006). In the academic context, CSE captures perceptions of managing both academic stress and demands and therefore has considerable potential in research regarding stress and student success.

Coping self-efficacy has been primarily studied in other acute motivated performance contexts such as the military (e.g., Delahajj & Van Dam, 2017) and mental health settings (e.g., Benight & Harper, 2002; Melato et al., 2017; Midkiff et al., 2018; Singer, Humphreys, & Lee, 2016; Wissing et al., 2011). While research about coping self-efficacy and student success is exploratory, prior research confirms the predictive capacity for other types of self-efficacy (e.g., academic self-efficacy) in student success research while coping self-efficacy has proven utility in contexts other than student success research. It is therefore hypothesized in this research that coping self-efficacy will similarly be effective at predicting student success outcomes, especially considering the importance of feeling capable of coping with both stress and academic demands.

While academic self-efficacy is well established with academic performance outcomes (see Robbins et al., 2004; Honicke & Broadbent, 2016; Richardson et al., 2012, for reviews), and coping self-efficacy and stress reappraisals are associated with coping with high stress situations (Delahajj & Van Dam, 2017) and persisting in academic contexts (Jamieson et al., 2022), coping self-efficacy has not been established as a predictor of student success outcomes. This study proposes that coping self-efficacy is underutilized in educational and student success research. It is hypothesized in this research that higher levels of coping self-efficacy will be associated with higher GPA and adaptive student experiences that support student success, including flourishing mental health and lower motivation challenges.

Present Study

This research recognizes that university students will experience stress and challenges. This can be good or bad for students depending on how they appraise: (a) their capacity to cope with academic stress and demands (coping self-efficacy) and (b) stress itself (stress mindset). Evidence is growing to support the assertion that in motivated performance contexts like academic settings, (a) stress responses, (b) psychological processes, and (c) behavioural and performance outcomes can benefit from attention to stress appraisals (e.g., Brady et al., 2018; Jamieson et al., 2022). However, there is a notable gap in student success literature regarding how stress appraisals, like stress mindset and coping self-efficacy, contribute to student success outcomes.

Three notable gaps exist in the current literature regarding stress and student success: (1) in education and student success research self-efficacy beliefs have focused on domain specific knowledge beliefs and academic performance but beliefs about capacity to cope with stress and stressful situations have been underexamined, (2) distal academic outcomes such as academic performance have been examined with limited attention to the broad array of academic difficulties or challenges associated with deleterious academic performance outcomes, and (3) academic success related outcomes have narrowly emphasized performance (e.g., GPA) with little attention to feeling well (e.g., mental health and wellbeing) beyond motivational outcomes.

Therefore, informed by stress optimization, this study examines the degree to which two stress related beliefs, stress mindset and coping self-efficacy, contribute to two kinds of student success outcomes: (a) academic performance and (b) student experiences. It is hypothesized that both stress mindset and coping self-efficacy will contribute to higher levels of mental health, lower motivation challenges, higher GPA, and therefore contribute to overall student success.

Method

Aims

The purpose of this research is to examine the impact of beliefs about stress (e.g., coping self-efficacy, stress mindset) on student success related outcomes (e.g., motivation challenges, academic wellbeing, GPA).

Research Questions

The following research questions are addressed: (1) Do stress related self-beliefs predict academic wellbeing? (2) Do stress related self-beliefs predict motivation challenges? and (3) Do stress related self-beliefs predict academic performance?

Participants

Participants were 185 consenting students at a Western Canadian university enrolled in an undergraduate elective educational psychology course on learning, motivation, mental health, and academic success (Learning Strategies for University Success) in Fall of 2021. Participants were from a range of faculties and included first, second, and upper-year students. The mean age of participant is 20.2 years ($SD = 2.7$) and 50.3 % were female.

Research Context

Participants were voluntarily enrolled in an undergraduate course on learning strategies for university success. Data were collected as part of required course activities and assignments. In weekly self-assessments, students reflected on their own strengths and weaknesses related to the course topic covered that week. Students used these self-report results in class discussions, to choose strategies for themselves and to complete a self-study report due at the end of the course. Temporal precedence in data collection was observed with coping self-efficacy and stress

mindset data collected during week 8 of the term (predictor variables) and mental health and motivation challenges (student success outcome variables) collected during week 11 of the term.

The assessments used for data collection were completed as part of the weekly course requirements. Students consented to the research as a component of the course. All students were informed before, during and after the course of the process to decline consent, confidentiality was ensured through replacing student names with numeric identifiers and completing analysis after course grades were posted.

Variables and Measures

In this section, the variables included in the analysis and the measures used to collect data are described.

Academic Performance Student Experience Outcomes

Academic performance in student success was measured by GPA and students' self-reported motivational challenge experiences. Academic performance was measured by semester GPA. Semester GPA was obtained by institutional data and reported on a nine-point GPA scale, where 0=E(0-48%), 1=D, (50-59%), 2=C+(60-64%), 4=B-(70-72%), 5=B(73-76%), 6=B+(77-79%), 7=A-(80-84%), 8=A(85-89%), and 9=A+(90-100%).

Student Experience Outcomes

Mental health was measured by the nine item Academic Well-Being subscale (AWBS), a measure of mental health in academic contexts that assesses the degree to which students are flourishing regarding emotional, psychological, and social wellbeing in their academic context (Rostampour et al., 2023). Students rated each item on a 5-point Likert scale from *never* to *always*.

The AWBS was adapted from the Mental Health Continuum Short Form (MHC-SF) (Keyes, 2009) for the academic context. The AWBS demonstrates improved predictive capacity over the MHC-SF, and concurrent validity shows strong positive associations with (a) MHC-SF, (b) self-regulated learning (SRL) practices, (c) foundational academic behaviours, and (d) students' GPA. The AWBS predicts a wide range of academic challenges and is associated with students' GPA while the MHC-SF is not (see Rostampour et al., 2023). Overall scores were used in this study. Composite reliability (McDonald's ω) is .71 - .88 for overall and subscale scores. The generally agreed-upon lower limit for Cronbach's alpha is .70 (Hair et al., 2019).

Students responded to the prompt *How are you doing this term?* A sample academic emotional wellbeing item is "I am interested in my classes". A sample academic psychological wellbeing item is "In general, I feel confident and positive about myself as a student". A sample academic social wellbeing item is "I have developed personal relationship with other students in my classes".

Academic challenges were measured using the 43-item Self-regulated learning challenges scale (SRL-C), which is the degree of academic challenges encountered by students with a higher score denoting more challenges, higher scores indicate a student is struggling to manage aspects of studying. (Hadwin et al., 2022). The SRL-C is part of the Self-Regulated Learning Assessment and Self-Diagnostic tool (SRL-PSD-2021; Hadwin et al., 2022). The SRL-C is comprised of 5 subscales assessing the degree to which students encountered a range of challenges in their studying over the last two weeks. Responses were reported on a 5-point Likert scale from *strongly disagree* to *strongly agree*. Higher scores indicate a student is struggling to manage aspects of studying theoretically and empirically associated with student success and

performance. Reliability scores for the SRL-C subscales are $\omega = .70$ to $\omega = .88$ (Hadwin et al., 2022).

The five SRL-C subscales are (a) motivation, (b) metacognitive, (c) cognitive, (d) behavioural, and (e) socio-emotional. The motivation and socio-emotional challenges subscales were selected for this research. The *Motivation challenge* subscale (SRL-C) is comprised of 4-items related to motivational beliefs, interest, and persistence. Reliability scores for the Motivation challenge subscale is $\omega = .70$ (Hadwin et al., 2022). Items for Motivational challenges are in response to the prompt *Over the last two weeks, I struggled with*: “Believing I can do my work”, “Feeling like my work was worth doing”, “Persisting when things got tough”, and “Being discouraged by setbacks”.

Coping Self-Efficacy

Coping self-efficacy was measured by the 26 item Coping Self-Efficacy Scale (CSES; Chesney et al., 2006), higher scores indicate higher levels of coping self-efficacy. Participants rated items on a 5-point Likert scale from *not confident* to *completely confident*. The scale consists of three subscales: (1) managing unpleasant emotions and thoughts, (2) using problem focused coping, and (3) getting support from family and friends. The CSES uses this prompt before the scale items: *When things aren't going well for you, how confident are you that you can*. The scale prompt was adapted for this research by instructing the students to consider their responses in reference to coping with challenges in the academic context by using this prompt: *When things aren't going well for you at school, how confident are you that you can*. The CSES has high internal consistency ($\alpha = .95$) and strong construct validity (Chesney et al., 2006).

Results from a CFA analysis prompted inclusion of only emotion-focused and problem-focused subscales in the analysis (15 items remained). The support subscale was

methodologically problematic in the following ways and therefore excluded: (a) suboptimal fit indices for the three-factor model, (b) cross loading between support items and the emotion focused coping subscale items, (c) local misspecifications (e.g., cross loadings for the 4 support items), and (d) redundancy of the items.

Stress Mindset

The Stress Mindset Scale (SMS) (Crum et al., 2013) is an eight-item measure that assesses an individual's beliefs about the nature of stress and its consequences, for example whether the effects of stress are enhancing or debilitating. Items evaluate a participant's general stress mindset ("The effects of stress are negative and should be avoided"), as well as signs and symptoms related to the enhancing and debilitating consequences of stress in the realms of health and vitality, learning and growth, and performance and productivity ("Stress enhances my learning and growth"). Participants rated items on a five-point Likert Scale to indicate if the scale items are *never true*, *rarely true*, *sometimes true*, *usually true*, or *always true*. Stress mindset scores are obtained by reverse scoring the four negative items and then taking the mean of all 8 items. Higher scores on the Stress Mindset Scale represent the mindset that stress is enhancing. Internal consistency for the SMS is reported as $\alpha = .86$ (Crum et al., 2013).

Data Analytic Strategy

The open-source R program was used for the analysis (Rosseel, 2012). Descriptive statistics and correlations were calculated first. Then, linear regression using the backward method was used to examine the effect of each predictor. Separate regression analyses were conducted for the student success outcomes. Backward elimination starts with all possible explanatory variables and then discards the least significant, the backward approach is suitable when there is not a large number of candidate variables (Smith, 2018).

Results

Descriptive Statistics and Correlations

The assumptions of linearity, independence, and homoscedasticity were met. The analyses were conducted using complete data sets (e.g., no missing values). Students completed the measures as part of the course requirements. Descriptive statistics are displayed in Table 1. Skewness and kurtosis scores indicated responses fall within normal distribution range. Correlations are displayed in Table 2. Correlation scores and the direction of the relationships are consistent with expectations regarding relationships among variables. Results showed Coping Self-Efficacy (CSE) was significantly correlated with Academic Well-being (AWB) ($r = .57***$), Motivation Challenges (MotCh) ($r = -.40***$), Stress Mindset ($r = .29***$). Stress Mindset was significantly correlated with Academic Wellbeing (AWB) ($r = .19*$). Academic Wellbeing was significantly correlated with all other variables. Motivation Challenges was significantly negatively associated with CSE ($r = -.4***$) and Academic Wellbeing ($r = -.38***$). The outcome variable GPA was only significantly positively associated with AWB ($r = .24***$).

Table 1

Descriptive Statistics and Correlations

Variable	Mean	sd	Skewness	Kurtosis	α	CSE	SM	AWB	Mot_Ch	GPA
CSE	3.11	.68	-.05	.09	.92	-				
SM	2.67	.55	.04	.49	.78	.29***	-			
AWB	3.53	.63	-.58	.63	.86	.57***	.19*	-		
Mot_Ch	2.84	.81	-.24	.14	.75	-.40***	-.11	-.38***	-	
GPA	5.46	1.8	-.01	-.9	n/a	-.008	-.04	.24***	-.10	-

$N=185$; * $p < .05$, ** $p < .01$, *** $p < .001$

To address the research questions regarding whether coping self-efficacy and stress mindset predict the student success outcomes, academic wellbeing, and motivation challenges, linear regression was conducted using the backward method. A Bonferroni correction was applied to reduce the likelihood of Type 1 error, with the adjusted p value 0.025.

The results in Table 2 show that when stress mindset and coping self-efficacy were entered as predictors for Academic Wellbeing, only coping self-efficacy was a significant predictor of Academic Wellbeing, ($\beta = 0.57$, $t(184) = 9.29$, $p < .001$, $R^2 = 0.32$). Coping self-efficacy also accounted for 32% of the outcome variability in Academic Wellbeing. Thus, the model with only CSE as predictor was selected.

The results in Table 3 show that when stress mindset and coping self-efficacy were entered as predictors for Motivational Challenges, only coping self-efficacy was a significant predictor of Motivational Challenges, ($\beta = -.40$, $t(184) = -5.87$, $p < .001$, $R^2 = 0.16$). Coping self-efficacy accounted for 16% of the outcome variability in motivation challenges. Neither coping self-efficacy nor stress mindset were significant predictors of GPA (Table 4).

Findings indicate coping self-efficacy positively predicts academic wellbeing, and negatively predicts motivation challenges. However, neither stress mindset nor coping self-efficacy were significant predictors of GPA. Stress mindset had no incremental predictive capacity above and beyond CSE.

Table 2*Linear Regression Model Summary with Academic Wellbeing as Outcome Variable*

Model		B	SE	β	<i>t</i>	<i>p</i>
1	CSE	.52	.06	.56	8.76	<.001
	SM	.03	.07	.03	.45	.66
2	CSE	.52	.06	.566	9.29	<.001

Note. Method = backward; R^2 for model is .32; SM was considered but not included.

Table 3*Linear Regression Model Summary with Motivation Challenges as Outcome Variable*

Model		B	SE	β	<i>t</i>	<i>p</i>
1	CSE	-.47	.08	-.40	-5.64	<.001
	SM	.01	.11	.01	.11	.91
2	CSE	-.47	.08	-.40	-5.87	<.001

Note. Method = backward; R^2 for model is .16. SM was considered but not included.

Table 4*Linear Regression Model Summary with GPA as Outcome Variable*

Model		B	SE	β	<i>t</i>	<i>p</i>
1	CSE	.01	.21	.00	7.00	.96
	SM	-.14	.27	-.04	.05	.61
2	SM	-.13	.25	-.40	-5.87	.60

Note. Method = backward; R^2 for model is .002.

Discussion

In academic settings that are inherently evaluative, goal-oriented, and performance-based, stress and academic demands are expected. It is neither practical nor possible to eliminate stress in motivated performance contexts like academic settings. Further, when stress is well managed it provides a valuable resource and is an adaptive component of well-being and performance that comprises student success (de la Fuente, 2020). Appraisals about stress play a key role in how stress is managed, whether stress is adaptive or distressing for example. This research examined two types of stress appraisals and their association with student success outcomes: (a) general beliefs about stress itself or *stress mindset* and (b) specific appraisals of coping with academic stress and demands or *coping self-efficacy*. Findings inform the role of coping self-efficacy and stress mindset in relation to the student success outcomes included in this study.

Stress Mindset and Student Success

Findings showed that stress mindset had a negligible influence on student success in this study. Stress mindset did not contribute directly to variability in any of the student success outcomes. In other words, stress mindset did not add any predictive capacity regarding student success outcomes above what was accounted for by coping self-efficacy. Stress mindset was only significantly positively correlated with mental health, although the strength of the association was small. In this study, stress mindset did not contribute to student success despite prior research indicating stress mindset contributes to psychological, motivational, and performance outcomes (Crum et al., 2017; Jamieson et al., 2018; Jenkins et al., 2022).

Mindsets are operationalized as a ‘lens’ or ‘frame of mind’ that orients a person to a particular set of associations, expectations, and predictions (Dweck, 2006). Stress is a complex process and can have both enhancing and debilitating effects, stress mindsets can simplify and

orient individuals to a set of expectations, strategies, and motivations that increase that chance that a person will experience the enhancing effects of stress, especially in performance situations (e.g., exams, university context) (Crum et al., 2013; 2017). Although the idea of mindsets are appealing, mindsets research has been criticized recently with respect to: (a) effect size (Macnamara & Burgoyne, 2023; Sisk et al., 2018), (b) construct validity (Macnamara & Burgoyne, 2023), and (c) overstating claims of importance for academic performance and wellbeing (Burnette et al., 2023; Macnamara & Burgoyne, 2023; Yan & Schuetze, 2023). Although extant research shows stress mindset functioning in a predictive role (Crum et al., 2013; 2017; Keech et al., 2018, Jenkins et al., 2021), this research did not confirm the predictive capacity of stress mindsets on student success outcomes in academic settings. We hypothesize that it was a combination of the above factors that detracted from stress mindset exerting significant impact on student success in this research.

Coping Self-Efficacy and Student Success

This study was exploratory in terms of confirming the utility of coping self-efficacy in educational settings. Coping self-efficacy captures student perceptions of being able to cope with both the emotion of stress and academic demands, both of which are expected in academic settings. Results showed coping self-efficacy was confirmed as holding value as a predictor of student success. Coping self-efficacy did not predict GPA directly, however. The data was collected during the academic term, and GPA is a distal measure that is compiled upon completion of the term. It is possible that coping self-efficacy is more impactful on proximal processes such and academic wellbeing and motivation challenges.

These preliminary findings confirm coping self-efficacy as important in understanding student success and worth further exploration. In this study, coping self-efficacy predicted both

higher mental health and lower motivation challenges. In other words, when students believe they can cope with stress and academic demands at university, they report higher levels of academic wellbeing and lower levels of motivation challenges. Evidence shows both academic wellbeing and motivation challenges are important contributors to student success (Author, 2022; Howell, 2009; Koivuniemi et al., 2017). This result is important given the established impact of psychological processes like mental health for facilitating student success outcomes (Howell, 2009; Keyes, 2007; Kuh et al., 2005; Louis & Schreiner, 2012; Moulin et al., 2017) and the prior evidence that motivation challenges are associated with poor academic outcomes (Boekaerts, 2011; Author, 2022; Koivuniemi et al., 2017). Findings are also consistent with prior research in stress optimization that showed stress reappraisals predict adaptive coping in academic settings, specifically mastery performance goals (Jamieson et al., 2022). Findings from this study support the value of coping self-efficacy: (a) as a metric of student expectations regarding capacity to cope with academic stress and demands and (b) as a predictor of student success outcomes.

Suggesting an Integrated Framework for Examining Stress-Related Self-Beliefs and Student Success

This study proposes that it is important for students to manage both stress and demands in academic settings in support of student success. Stress optimization informs expectations regarding stress and stress related self-beliefs in motivated performance contexts like education. Extant literature regarding self-beliefs from educational psychology perspectives like self-regulated learning also informed expectations for this study. For future research regarding stress and student success, an integrated theoretical approach that includes stress optimization and self-regulated learning may provide a more robust theoretical frame to understand both stress and academic demands in academic contexts.

There is considerable potential utility for a theoretical frame that can account for both stress and academic demands in academic settings. For example, in this study stress optimization alone did not account for the variability in GPA as neither stress mindset nor coping self-efficacy were predictive of academic performance, in contrast with prior research (e.g., Jamieson et al, 2022). SRL theory has the potential to add capacity to the stress optimization literature in several areas including: (a) the assessment of resources and demands in academic contexts, (b) facilitating task understanding and engagement as part of the context for stress appraisal, and (c) providing adaptive resources for students that foster positive predictions about future academic demands. It is recommended that future research on stress and student success include SRL, specific practices for example.

Further, a stress appraisal like coping self-efficacy captures perceptions of managing both the emotion of stress and the demands within an academic setting, which are distinct processes. In addition, self-regulated learning is fueled by executive functioning and complex cognitive and metacognitive processes to maintain top-down volitional control and agency of learning processes. ‘Hot’ emotions like stress (Pekrun, 2006) can interrupt regulation of negative emotions, prime a student for negative appraisals and attributions (Kim & Cicchetti, 2010; Panlilio et al., 2019), and disrupt effective regulation of behaviour, emotion and cognition (Panlilio et al., 2019). Stress optimization further informs how stress and stress regulation influence aspects of self-regulated learning and student success through providing information about: (a) the relative impact of resources and demands, (b) challenge and threat responses, and (c) nonconscious components of stress that impact physiology, psychology, motivation, and behaviour. In addition, by adding a theoretical perspective like SRL, stress researchers can address questions such as (a) *What kind of processes contribute to student outcomes beyond well*

documented influences such as goal orientation (e.g., Jamieson et al., 2022)? and (b) What phase of learning do stress appraisals exert influence on? and (c) What student success outcomes are impacted by stress and stress appraisals? Through integrating SRL with stress optimization, research regarding stress, learning, and student success can more fully explore such questions.

When considering stress in educational contexts, stress optimization approaches benefit from extensive knowledge offered within self-regulated learning. Self-regulated learning moves beyond an outcome focus to examine processes that support effective learning and success, creating an extensive map to support students to achieve autonomy and regulation over time. While self-regulated learning rests on a primarily metacognitive foundation (Author, 2011; Panadero, 2018; Winne & Hadwin, 2008), stress optimization raises the possibility that not all aspects of stress are under metacognitive control. What aspects of stress and stress regulation are or are not under metacognitive control is a question to address in future research.

Implications and Future Directions

Students are experiencing high levels of stress that presents a threat to well-being and performance aspects of student success. Findings from this research supports the integration of coping self-efficacy in supporting student success. Additional information regarding the role of perceptions of coping with school stress and demands has potential for supporting student thriving and success.

With considerable outcome variability not accounted for, there is room in future research to include additional variables that will impact student success. For example, how students are managing their academic demands was not included in this study. SRL practices and behaviours have been linked to both academic success and social emotional outcomes in academic settings (Howell, 2009; Robbins et al., 2004; Schunk & Greene, 2018; Zollanvari et al., 2017). The next

step in this inquiry would be to include SRL practices and whether they mediate the association between coping self-efficacy and the student success outcomes. It is expected that including what students do to manage academic stress and demands is connected to perceptions of coping with the academic context and student success and may account for additional variability in student success that was not captured in this study.

Limitations

While findings from this research provide important information in student success research, there are some notable limitations. First, the sample size is adequate for a regression analysis but still relatively small. Optimally, future research can replicate these findings with a larger sample. Second, this study is cross-sectional. The study is exploratory as coping self-efficacy is not well established in academic or student success research. Thus, the first step is to establish the association between coping self-efficacy and outcome variables. However, with a cross-sectional study using regression, the findings should be generalized with caution. It is recommended future research attends to the multifaceted and recursive nature of the variables involved by examining change over time and measurement at multiple time points. Finally, some of the scales used are recently developed. Specifically, the AWBS (Rostampour et al., 2023) and SRL-PSD (Hadwin et al., 2022) have yet to be tested with a range of participants and contexts, raising potential concerns regarding validity and reliability until these scales are more widely used. In addition, some of the subscales consisted of relatively few items and were used separately from the larger scale (e.g., academic social engagement) which has the potential to impact validity of findings.

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Appendix F: Paper Two

Investigating the Contributions of Stress Appraisals and Self-Regulated Learning Practices on Student Success Experiences and Outcomes

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Abstract

Student success is facilitated by effectively navigating academic demands and the inevitable stress that is experienced in the academic context. Appraisals about stress impact coping, however stress appraisals have been underexamined in academic settings. Stress Optimization and Self-Regulated Learning theory inform the understanding of stress responses and learning processes respectively. Despite the importance for student success of managing both stress and academic demands, there is a paucity of research examining their combined contributions. This research (N=226 university students) included a replication study to re-examine the predictive capacity of two stress appraisals, coping self-efficacy (CSE) and stress mindset (SM), on student success outcomes (academic wellbeing, motivation challenges, social emotional challenges, GPA). Next, where significant associations between stress appraisals and student success outcomes exist, the focal study examined the mediating role of metacognitive and social regulatory practices (e.g., metacognitive monitoring and adapting, academic social engagement) on these associations. First, neither coping self-efficacy nor stress mindset were significant predictors of GPA. Second, mediation models showed CSE and SM both directly predicted flourishing academic wellbeing, CSE alone directly predicted lower motivation and social emotional challenges. Third, the inverse impact of CSE on motivation challenges was mediated by metacognitive monitoring. Fourth, the impact of CSE and SM on social emotional challenges and academic wellbeing was mediated by academic social engagement. Results show regulatory practices can promote student success beyond what is provided by stress appraisals alone, this is important for understanding adaptive responses to stress for university students.

Keywords: academic wellbeing, academic challenges, coping self-efficacy, self-regulated learning, stress optimization, stress mindset, student success.

Investigating the Contributions of Stress Appraisals and Regulatory Practices on Student Success Experiences and Outcomes

Introduction

Student experiences of stress in the academic context are an important component of academic well-being and academic performance which together comprise student success. In a holistic approach to student success, students strive to *do well* academically and *feel well* psychologically and socially in their academic context (e.g., see Keyes & Haidt, 2003; Kuh et al., 2005; Suldo et al., 2006; Tinto, 2017). Stress is expected in motivated performance contexts like academic settings, and anytime a goal is pursued (Brooks, 2014; Jamieson et al., 2018), thus stress is a pervasive aspect of student success (Park et al., 2017).

Stress is neither inherently good nor bad, and therefore has the potential to enhance or detract from student success depending on how students manage their: (a) academic demands and (b) experience of stress in academic settings (ACHA, 2016; Keyes, 2005; OECD, 2017). Therefore, adaptively responding to stress and academic demands is important in student success (Brooks, 2014; Denovan & Macaskill, 2017; Jamieson et al., 2018; Rudland et al., 2020). For example, regulatory practices are important for students to effectively manage academic demands (Broadbent & Poon, 2015; Hadwin et al., 2022; Zollanvari et al., 2017) and appraisals about stress are important for adaptive experiences of stress (Barrett, 2006; Gross, 2015; Uusberg et al., 2019). However, a paucity of research examines the combined contribution of adaptive aspects of stress, like stress appraisals, and academic regulatory practices on specific student success outcomes. This research addresses that gap.

Literature Review

Stress and Student Success

What Is Stress And Where Does It Come From?

Stress is an individual's response to a perception of demand or threat (Folkman & Lazarus, 1984; Lazarus, 1985). Stress is non-specific (Selye, 1936, 1976) and therefore not inherently good or bad. It is not the situation itself that is problematic, rather the individual's capacity to regulate the stress that is important (Bienertova-Vasku et al., 2020; Keller et al., 2012; Lazarus, 1985). Although stress occurs in contexts where students strive for success, the impact of stress on students is variable (Brooks, 2014; Jamieson et al., 2018; Jenkins et al., 2021). Stress responses can be impacted by how each person perceives both internal (e.g., heart rate, cognitive appraisals) and external (e.g., the situation) contextual cues. Cognitive appraisals (e.g., perceptions and beliefs) regarding stress have direct consequences for biological, psychological, and behavioural responses (Barrett, 2017; Epel et al., 2018; Jamieson et al., 2018). This suggests adaptive responses to stress that facilitate student success include adaptive cognitive appraisals (e.g., Jamieson et al., 2018).

Why Does Stress Matter in Academic Settings?

Stress is expected in academic settings where students are pursuing personally relevant goals (Park et al., 2017) and the context is evaluative, goal-oriented, and performance based (Brooks, 2014; Jamieson et al., 2018). Responding to stress adaptively is integral to wellbeing (Denovan & Macaskill, 2017), adaptive learning (Vogel & Schwabe, 2016), and academic performance (Yaman-Sözbir et al., 2019). When not managed well, academic related stress can: (a) reduce academic achievement, (b) decrease motivation, (c) increase risk of dropout (Pascoe et al., 2020), (d) interfere with behavioural, cognitive and motivational processes during learning and studying (Chou et al., 2011), (e) impair memory, attention, and information recall (de la

Fuente et al., 2020), and (f) impact learning processes and academic outcomes (de la Fuente et al., 2020).

Perceptions or appraisals students hold about stress are believed to contribute to how well stress is managed and the subsequent impact of stress on student success (Crum et al., 2017; Epel et al., 2018; Jamieson et al., 2018). However, research is limited regarding how appraisals impact both performance and social emotional components of student success. This research posits that student beliefs or appraisals about stress have the capacity to impact: (a) the experience of stress, (b) subsequent adaptive learning processes, and (c) student success, especially in the university context where stress is expected.

What is Student Success?

Grade point average (GPA) is often used as a primary indicator of student success. However, a holistic view of student success includes both student experiences and academic performance outcomes (Kuh et al., 2005; Louis & Schreiner, 2012; Suldo et al., 2006; Tinto, 2017).

Student Experiences. Two important aspects of student experiences that may be sensitive to stress responses and implicated in student success are: (a) mental health and wellbeing and (b) academic challenges. First, *mental health and wellbeing* refers to optimal functioning and experience (Diener et al., 2017; Ryan and Deci, 2001) and is important for student success through its association with functioning well in range of categories including: (a) psychosocial functioning (Barybayannis et al., 2022) and (b) work and academic performance (Howell, 2009; Keyes, 2007; Moulin et al., 2017). There is prior evidence that self-beliefs are predictive of: (a) aspects of mental health and well-being (Caprara et al., 2006; Freire et al., 2019; Kapil et al., 2023; Melato et al., 2017) and positive coping (Cattelino et al., 2021). We

hypothesized that adaptive stress appraisals should be associated with flourishing mental health, also referred to as academic wellbeing in this research.

Second, *academic challenges* are integral to student experiences and success (e.g., see Louis & Schreiner, 2012). Academic challenges are defined as the difficulties and obstacles students face in their academic work (Hadwin et al., 2019) and can also provide opportunities for students to engage in self-regulated learning (Hadwin et al., 2011). Academic challenges are: (a) a predictor of academic performance, (b) contribute to continued learning and growth, (c) create opportunities for students to engage self-regulatory control by implementing adaptive learning practices, and (d) function as a metric of adaptive regulation of learning by predicting academic success (Hadwin et al., 2022; Koivuniemi et al., 2017). Two academic challenges, *motivation and social emotional challenges*, are particularly important because they have been found to be consistently high for students and independent of goal attainment (Hadwin et al., 2019; Hadwin et al., 2022; Koivuniemi et al., 2017).

Prior research suggests stress related self-beliefs like stress mindset and self-efficacy impact student motivation (Bandura & Locke, 2003; Bong, 2001; Crum et al., 2017; Pascoe et al., 2020; Schunk, 1991), likely by contributing to the assessment of a situation as less threatening which promotes adaptive coping (e.g., (Freire et al., 2016; Karademas & Kalantzi-Azizi, 2017), engagement with learning (Boekaerts & Cascallar, 2006), and mental health (Kashdan et al., 2018). Motivation and social emotional challenges are widely experienced by students, these challenges may also be mitigated by regulatory practices in pursuit of academic goals (Hadwin et al., 2018, 2019). Although stress related beliefs and appraisals have been linked to student experiences and performance (e.g., Freire et al., 2019; Jamieson et al., 2022), minimal research includes: (a) both performance and social emotional outcomes to represent a holistic

approach to student success, and (b) regulatory practices that impact the association between stress appraisals and student success.

Academic Performance. Although grade point average (GPA) is a useful and widely used metric of academic performance, GPA can be a problematic measure of student success in the university context where students vary considerably in terms of the type and number of courses they are taking. In addition, GPA is a distal outcome measure and does not explicitly identify academic difficulties or challenges that are associated with deleterious impacts on student success. Extant research has demonstrated limited success in predicting GPA, with academic performance best predicted by an assessment of a variety of individual differences (Richardson et al., 2012; Robbins et al., 2004; Zollanvari et al., 2017). For example, GPA is correlated with previous academic performance, academic self-efficacy, academic engagement, SRL strategies, and conscientiousness (Pérez-González et al., 2022). Prior research is mixed regarding the impact of cognitive appraisals of stress on GPA (eg., Jamieson et al., 2022; Kapil et al., 2024) with cognitions specific to academic performance (e.g., performance self-efficacy) reported as having the strongest correlates with GPA (Richardson et al., 2012). The degree to which students enact self-regulatory learning strategies may mediate the effect of psychosocial contextual influences (e.g., stress appraisals) on academic performance (see Richardson et al., 2012). This research addresses whether self-regulatory practices mediate the association between stress appraisals and student success. Stress appraisal and regulatory practices are hypothesized to contribute to how students are managing stress and academic demands, therefore combining to impact student success.

Theory Informed Expectations Regarding How Students Can Manage Stress in Academic Settings

Given that stress impacts student success, three perspectives inform a useful framework for conceptualizing adaptive responses to stress in academic settings (Figure 1): (a) stress optimization theory, (b) student stress appraisals in the academic context (*how a student perceives their environment*), and (c) student regulatory responses to stress appraisals in the academic context (*how a student manages their environment*).

Stress Optimization Theory

Central to stress optimization is the perspective that stress is typically unavoidable in motivated performance contexts like academic settings (Barrett, 2017; Jamieson et al., 2018; Jenkins et al., 2021). Stress optimization integrates stress theories to facilitate optimizing and benefitting from acute stress experiences instead of avoiding them (Jamieson et al., 2018). Stress optimization aims to foster thriving, resilience, and adaptive coping during pressure and uncertainty that comprise meaningful goal pursuit, which is expected in motivated performance settings like education (Brooks, 2014; Jamieson et al., 2018; Park et al., 2017).

Stress optimization encompasses both stress appraisal and stress mindset research, both are informed by the idea that stressful experiences can: (a) lead to physiological and psychological thriving, (b) enhance performance and wellbeing when stressors are perceived as opportunities for growth, and (c) be appraised as functional and adaptive in acute motivated performance contexts (Jamieson et al., 2018, 2022) Informed by both appraisal and psychological construction perspectives regarding emotion, stress optimization recognizes that multiple internal and external contextual factors interact to shape an individual's experience of an emotion like stress (Barrett, 2022).

Student Stress Appraisals in the Academic Context

Stress optimization theory proposes that stress perceptions and coping are determined by beliefs or appraisals about stress itself (Crum et al., 2017; Jamieson et al., 2022), but this is under examined in academic contexts. The current research considers two stress appraisals expected to impact student success: stress mindset and coping self-efficacy.

Stress Mindset. Stress mindset refers to a person's general belief about the nature of stress itself as enhancing or debilitating and asserts that stress responses can be modified even when the situation itself cannot be changed (Crum et al., 2017). Evidence exists that stress mindset can impact various outcomes for university students, higher levels of stress mindset denoting a stress is enhancing mindset predict greater levels of: (a) psychological wellbeing (Keech et al., 2018), (b) perceived stress (Keech et al., 2018), (c) physical wellbeing (Keech et al., 2018), (d) cortisol levels (Crum et al., 2013), (e) positive affect (Crum et al., 2017), (f) cognitive flexibility (Crum et al., 2017), (g) attentional bias towards positive stimuli (Crum et al., 2017), (h) mental health (Khan & Shamama-tus-Sabah, 2020), (i) academic performance (Keech et al., 2018), and (j) mental and physical health as mediated by approach coping and perceived distress in college students (Jenkins et al., 2021).

While stress mindset is under examined in educational settings, growth mindset or implicit theories about intelligence have been studied extensively. Of note, growth mindset research has examined how mindsets relate to (a) intelligence (Dweck, 1999), (b) facilitate challenge seeking (Yeager & Dweck, 2012), (c) academic performance and physiological stress responses (Yeager et al., 2016; Yeager et al., 2022; Yeager & Dweck, 2012), (d) psychological well-being and increased positive emotion (Tamir et al., 2007), and (e) positive affect and positive functioning (Howell, 2017).

We posit that stress mindset contributes to adaptive regulatory practices and student success outcomes. Specifically, a stress-is enhancing mindset is hypothesized to predict higher levels of mental health and lower academic challenges (student experiences), higher GPA (student performance), and higher levels of regulatory practices. While prior evidence does support stress mindset as a predictor of student success outcomes, minimal research compares the effect of stress mindset against: (a) other stress related appraisals and (b) social emotional and performance student success outcomes. Therefore, this research introduces coping self-efficacy to gauge the relative predictive capacity of two stress related appraisals, stress mindset and coping self-efficacy, on student success outcomes.

Coping Self-Efficacy. Relevant for stress in academic contexts is an individual's perception of being able to cope effectively with the emotion of stress and a range of challenges and demands, termed coping self-efficacy (Chesney et al., 2006). In this research, coping self-efficacy (CSE) represents a person's belief in their capacity to cope with both the emotion of stress and the stressful academic situation, such as a test or presentation, that are expected at university. CSE in the academic context captures perceptions of managing both academic stress and academic demands, both of which are expected in academic settings; therefore, this research proposes CSE is important when considering stress and student success.

Despite the potential of CSE in student success research, CSE has been minimally studied in educational settings. One prior study indicated that CSE predicts higher academic wellbeing and lower motivation challenges, but not GPA (Kapil et al., 2024). CSE has also been the subject of research in other acute motivated performance contexts such as mental health settings (e.g., Benight & Harper, 2002; Melato et al., 2017; Midkiff et al., 2018; Singer, Humphreys, & Lee, 2016; Wissing et al., 2011) and the military (e.g., Delahajj & Van Dam, 2017). Extant literature

indicates various other types of self-efficacy are implicated in student success. For example, academic self-efficacy is associated with: (a) academic performance (Klassen & Klassen, 2018), (b) successfully enacting academic strategies (Bandura, 2001), (c) adaptive coping (Freire et al., 2016; Karademas & Kalantzi-Azizi, 2017), and (e) flourishing mental health (Freire et al., 2019; Kashdan et al., 2018; Melato et al., 2017). In the present study, we hypothesize that coping self-efficacy will be associated with both: (a) student success outcomes and (b) the degree to which students engage adaptive regulatory practices.

Student Regulatory Responses to Stress Appraisals in the Academic Context

In addition to self-beliefs and perceptions about stress, how students manage their academic environment also impacts experiences of stress and student success (de la Fuente, 2020). Specific to the academic context, stress is related to regulatory practices that exert strategic influence on the academic environment (de la Fuente, 2020). In stress optimization literature, attention has been given to the impact of stress related beliefs on academic performance (e.g., Jamieson et al., 2022). However, specific learning practices and behaviours enacted to manage academic demands have been under examined in that research. Educational psychology and self-regulated learning (SRL) literature delineates processes, practices, and behaviours associated with student success, independent of stress-related self-beliefs. For the current study, we hypothesize that these processes, practices, and behaviours are potential resources for students and will therefore impact the association between stress appraisals and student success outcomes.

Metacognitive Regulatory Practices. How students respond to stress appraisals with regulatory actions is expected to impact experiences of stress and student success. Adaptive appraisals of stress are expected to facilitate approach motivation and behaviour, therefore

enhancing regulatory actions (e.g., see Freire et al., 2016; Jamieson et al., 2022; Karademas & Kalantzi-Azizi, 2017). As stress optimization includes minimal specific information regarding adaptive self-regulatory practices that facilitate student success, we turn to the literature regarding self-regulated learning (SRL) to fill this gap.

SRL is an iterative and agentic process that facilitates learners to metacognitively monitor and regulate their external (e.g., academic tasks) and internal (e.g., cognition, motivation, emotion) environments as well as regulate key processes that support student success (e.g., planning, decision making, goal setting, studying) (Hadwin et al., 2022; Winne & Hadwin, 2008). Across most models of SRL (e.g., Efklides, 2011; Panadero, 2018; Winne & Hadwin, 2008; Zimmerman, 2000), metacognition: (a) is a central mechanism supporting regulation of learning and psychological processes, (b) is activated during the entire learning process or SRL cycle, and (c) functions in close connection with emotions (Barrett, 2017; Efklides et al., 2018).

Supported by metacognition, SRL is the agentic perspective that the individual actively monitors and regulates cognitive and affective processes towards the achievement of goals through processes of *monitoring* (e.g., observing and reflecting on experience, cognitive and affective processes such as mental health) and control or *adaptation* (e.g., conscious and non-conscious decisions we make based on the output of monitoring, also referred to as adapting) (Nelson & Narens, 1990; Perfect & Schwartz, 2002; Thiede & Dunlosky, 1999). Metacognitive monitoring and control by students is considered essential to learning (Grund et al., 2023). Knowledge about cognition and regulation of cognition are two aspects of metacognitive awareness that are related to deeper learning and organized studying for example (Tuonen et al., 2023). For example, it is critical for student success that students can monitor

aspects of their academic context including asking themselves: “*what am I supposed to be doing*”, “*am I remembering what I’m learning*” and “*do I understand the material*”?

Students also benefit from adapting effectively when their attempts to navigate an academic task are not working. For example, changing their understanding of the task, modifying plans, and switching to a different strategy or approach. This kind of self-regulatory practice is an example of metacognitive adaptation in this research. It is hypothesized in this research that metacognitive monitoring and adapting will be facilitated by adaptive stress appraisals and will occupy a mediating role in the relationship between stress appraisals and student success experiences and outcomes.

Social Regulatory Practices. Engaging in and regulating social aspects of the academic context has several positive outcomes for university students with respect to adaptive responses to stress and managing academic demands (McLean et al., 2023; Tinto, 2017).

Hadwin et al., (2022) operationalize social and emotional factors as overall psychological, social, and physical well-being including managing emotions like test stress, social belongingness and connectedness with the campus community, and physical health and wellness. Having fun at university, helping classmates, and getting to know others in the class are examples of academic social engagement, the social regulatory practice included in this research.

Aspects of social and emotional well-being have been associated with academic performance (van der Zanden et al., 2018). In addition, university students with a sense of connectedness that comes from feeling accepted and valued by their instructors and peers are more likely to engage cognitively and behaviorally (Tinto, 2017; Won et al., 2018, 2021), they demonstrate stronger intentions to remain and complete their major (Lewis & Hodges, 2015),

and have higher levels of enrollment (Hausmann et al., 2009). Engaging socially with peers, instructors and academic community has also been shown to provide a protective effect against the stress and negative mental health impact from the mandatory shift to online learning during Covid-19 in terms of academic and social emotional outcomes (Elmer et al., 2020). An individual is buffered against the detrimental impacts of stress when they have high resources and social support (Cohen & Willis, 1985; Southwick et al., 2016)

Purpose

It is established that stress is non-specific and expected in academic contexts. Informed by theory and prior research, this study proposes that adaptive student responses to stress in academic settings will be impacted primarily by three components: (a) adaptive stress appraisals, (b) self-regulatory practices, and (c) social regulatory practices. The purpose of this research is twofold and will be addressed with a preliminary and main study. First, the preliminary analysis re-examines the unexpected finding from Kapil et al., (2024) by re-assessing the capacity of stress mindset and coping self-efficacy to predict student success outcomes. The main analysis examines, where significant associations between stress appraisals and student success outcomes exist, the extent to which metacognitive and social regulatory practices impact the relationship between stress appraisals and student success outcomes.

Replication Study

Rationale

While stress appraisals are theoretically expected to contribute to student success outcomes (e.g., GPA, academic challenges, academic wellbeing), findings from a small set of empirical findings are mixed. For example, extant research shows stress mindset predicts academic performance (Crum et al., 2017; Jamieson et al., 2022). However, findings from Kapil

et al., (2024) showed that CSE and not stress mindset predicted fewer motivation challenges and higher levels of academic wellbeing and neither CSE nor stress mindset predicted GPA. Since the finding from Kapil et al. (2024) that stress mindset did not predict student success outcomes was unexpected, the need to replicate that study emerged as it was unclear if results were unique to that sample (e.g., impacted by the pandemic context).

Purpose and Research Questions

Drawing from a new sample of participants, the purpose of this replication study is to examine the influence of two stress appraisals on student success outcomes. Three research questions were addressed: (1) Do stress related self-beliefs predict academic wellbeing? (2) Do stress related self-beliefs predict motivation challenge appraisals? (3) Do stress related self-beliefs predict social emotional challenges? and (4) Do stress related self-beliefs predict GPA.

Method

Research Context

Participants were registered in an undergraduate educational psychology course on learning strategies for university success. Data were collected as part of regular course activities and assignments. Through the course, students completed self-assessments, reflected on what the assessments meant in terms of their learning and success, and discussed strategies for their academic success and wellbeing. Students consented to the research as a component of the course. All students were informed before, during and after the course of the process to decline consent, confidentiality was ensured by replacing student names with numbers.

Participants

Participants were 226 consenting students in January of 2022 enrolled in a semester-long undergraduate elective educational psychology course that introduced students to the science and

strategies for self-regulating learning, motivation, emotions, behaviours, and psychological and social well-being. Participants were from faculties across campus and included first, second, and upper-year students. The mean age of participant is 20 years (SD = 1.7) and 44 % were female.

Variables and Measures

Stress Appraisals

Predictor variables were two stress appraisals, coping self-efficacy and stress mindset. Data for coping self-efficacy and stress mindset data were collected during week eight of the term. The assessments used for data collection were included in the weekly diary tool and a component of the course requirements, thus missing data did not occur.

Coping Self-Efficacy. Coping self-efficacy was measured by the 26 item Coping Self-Efficacy Scale (CSES; Chesney et al., 2006), higher scores indicate higher levels of coping self-efficacy. Participants rated items on a 5-point Likert scale from *not confident* to *completely confident*. The scale consists of three subscales: (1) managing unpleasant emotions and thoughts, (2) using problem focused coping, and (3) getting support from family and friends. The CSES uses this prompt before the scale items: *When things aren't going well for you, how confident are you that you can*. The scale prompt was adapted for this research by instructing the students to consider their responses in reference to coping with challenges in the academic context by using this prompt: *When things aren't going well for you at school, how confident are you that you can*. The CSES has high internal consistency ($\alpha = .95$) and strong construct validity (Chesney et al., 2006). The generally agreed-upon lower limit for Cronbach's alpha is .70 (Hair et al., 2019).

Results from a CFA analysis prompted inclusion of only emotion-focused and problem-focused subscales in the analysis (15 items remained). The support subscale was methodologically problematic in the following ways and therefore excluded: (a) suboptimal fit

indices for the three-factor model, (b) cross loading between support items and the emotion focused coping subscale items, (c) local misspecifications (e.g., cross loadings for the 4 support items), and (d) redundancy of the items.

Stress Mindset. The Stress Mindset Scale (SMS) (Crum et al., 2013) is an eight-item measure that assesses an individual's beliefs about the nature of stress and its consequences, for example whether the effects of stress are enhancing or debilitating. Items evaluate a participant's general stress mindset ("The effects of stress are negative and should be avoided"), as well as signs and symptoms related to the enhancing and debilitating consequences of stress in the realms of health and vitality, learning and growth, and performance and productivity ("Stress enhances my learning and growth"). Participants rated items on a five-point Likert Scale to indicate if the scale items are *never true*, *rarely true*, *sometimes true*, *usually true*, or *always true*. Stress mindset scores are obtained by reverse scoring the four negative items and then taking the mean of all 8 items. Higher scores on the Stress Mindset Scale represent the mindset that stress is enhancing. Internal consistency for the SMS is reported as $\alpha = .86$ (Crum et al., 2013).

Student Success Experiences and Outcomes

Data for SRL practices (mediator), academic wellbeing, and academic challenges (student success outcome variables) data were collected during week 11 of the term.

Academic Challenges. Academic challenges were measured using the 43-item Self-regulated learning challenges scale (SRL-C), which is the degree of academic challenges encountered by students with a higher score denoting more challenges, higher scores indicate a student is struggling to manage aspects of studying. (Hadwin et al., 2022). The SRL-C is part of the Self-Regulated Learning Assessment and Self-Diagnostic tool (SRL-PSD-2021; Hadwin et al., 2022).

The SRL-C is comprised of 5 subscales assessing the degree to which students encountered a range of challenges in their studying over the last two weeks. Responses were reported on a 5-point Likert scale from *strongly disagree* to *strongly agree*. Higher scores indicate a student is struggling to manage aspects of studying theoretically and empirically associated with student success and performance. Reliability scores for the SRL-C subscales are $\omega = .70$ to $.88$ (Hadwin et al., 2022).

The five SRL-C subscales are (a) motivation, (b) metacognitive, (c) cognitive, (d) behavioural, and (e) socio-emotional. The motivation and socio-emotional challenges subscales were selected for this research. The *Motivation challenge* subscale (SRL-C) is comprised of 4-items related to motivational beliefs, interest, and persistence. Reliability scores for the Motivation challenge subscale is $\omega = .70$ (Hadwin et al., 2022). Items for Motivational challenges are in response to the prompt *Over the last two weeks, I struggled with*: “Believing I can do my work”, “Feeling like my work was worth doing”, “Persisting when things got tough”, and “Being discouraged by setbacks”. The *Socio-emotional challenge* subscale was comprised of 6-items related to emotional, social, and relational aspects of academic success. Reliability scores for the Socio-emotional challenges subscale is $\omega = .83$. Sample items for Socio-emotional challenges in response to the same prompt are: “feeling connected”, “finding enjoyment at university”, and “managing my emotions/feelings”.

Mental Health. Mental health was measured by the nine item Academic Well-Being subscale (AWBS), a measure of mental health in academic contexts that assesses the degree to which students are flourishing regarding emotional, psychological, and social wellbeing in their academic context (Rostampour et al., 2023). Students rated each item on a 5-point Likert scale from *never* to *always*.

The AWBS was adapted from the Mental Health Continuum Short Form (MHC-SF) (Keyes, 2009) for the academic context. The AWBS demonstrates improved predictive capacity over the MHC-SF, and concurrent validity shows strong positive associations with (a) MHC-SF, (b) self-regulated learning (SRL) practices, (c) foundational academic behaviours, and (d) students' GPA. The AWBS predicts a wide range of academic challenges and is associated with students' GPA while the MHC-SF is not (see Rostampour et al., 2023). Composite reliability (McDonald's ω) is .71 - .88 for overall and subscale scores. Overall scores were used in this study.

Students responded to the prompt *How are you doing this term?* A sample academic emotional wellbeing item is "I am interested in my classes". A sample academic psychological wellbeing item is "In general, I feel confident and positive about myself as a student". A sample academic social wellbeing item is "I have developed personal relationship with other students in my classes".

GPA. Academic performance in student success was measured by GPA and students' self-reported motivational challenge experiences. Academic performance was measured by semester GPA. Semester GPA was obtained by institutional data and reported on a nine-point GPA scale, where 0=E(0-48%), 1=D, (50-59%), 2=C+(60-64%), 4=B-(70-72%), 5=B(73-76%), 6=B+(77-79%), 7=A-(80-84%), 8=A(85-89%), and 9=A+(90-100%).

Analytic Approach

The open-source R program was used for the analysis (RosseeL, 2012). Descriptive statistics and correlations were calculated first. Then, linear regression was conducted to examine the effect of each predictor. Separate regression analyses were conducted for the student success outcomes. Finally, correlations for GPA with SM and CSE were calculated.

Results

Descriptive Statistics and Correlations

The assumptions of linearity, independence, and homoscedasticity were met. Descriptive statistics and correlations are displayed in Table 1. Skewness and kurtosis scores indicated responses fall within normal distribution range. Correlation scores and the direction of the relationships were consistent with expectations regarding relationships among variables. Specifically, results showed coping self-efficacy and stress mindset were both significantly positively correlated with each other and with all student experience outcomes (academic wellbeing, motivation and social emotional challenges). Coping self-efficacy and stress mindset were also both significantly positively correlated with the regulatory practices (monitoring, adapting, academic social engagement), but the strength of these correlations is small. Academic Wellbeing was significantly correlated with all variables. GPA was significantly positively correlated with two regulatory practices (monitoring, academic social engagement) and the outcome variable academic wellbeing. GPA was significantly negatively correlated with the outcome motivation challenges but not social emotional challenges. GPA was not significantly correlated with either stress mindset or coping self-efficacy.

Table 1*Descriptive Statistics and Correlations*

Variable	mean	sd	α	GPA	CSE	SM	AWB	MOT_CH	SE_CH	MON	AD	ASE
GPA	4.8	2.2	n/a	-								
CSE	3.11	.63	.90	-.08	-							
SM	2.7	.60	.78	.027	0.40***	-						
AWB	3.44	.67	.88	.24***	0.45***	0.29***	-					
MOT_CH	2.9	.87	.78	-.21**	-0.31***	-.23*	-0.37***	-				
SE_CH	2.87	.84	.87	-.12	-0.35***	-0.14*	-0.41***	0.62***	-			
MON	3.68	.72	.78	.18*	0.27***	0.20**	0.46***	-0.27***	-0.10	-		
AD	3.58	.53	.85	.10	0.29***	0.23*	0.49***	-0.13	-0.10	0.60***	-	
ASE	3.11	.87	.76	.19**	0.32***	0.22***	0.62***	-0.22**	-0.30***	0.43***	0.47***	-

Note: $N=226$; * $p<.05$, ** $p<.01$, *** $p<.001$

GPA=grade point average; CSE= coping self-efficacy; SM=stress mindset; AWB=academic well-being; MOT_CH = motivation challenges; SE_CH = social emotional challenges; MON = monitoring; AD=adaptation; ASE=academic social engagement.

Linear regression was conducted to address whether coping self-efficacy and stress mindset predicted the student success outcomes of academic wellbeing, motivation challenges, social emotional challenges, and GPA. A Bonferroni correction was applied to reduce the likelihood of Type 1 error, with the adjusted p value 0.025.

Results indicated four main findings (see Table 2). First, when stress mindset and coping self-efficacy were entered as predictors for academic wellbeing, coping self-efficacy was a significant predictor of academic wellbeing, ($\beta = 0.47, t(226) = 7.00, p < .001, R^2 = 0.20$). Stress mindset was also a significant predictor of academic wellbeing, ($\beta = 0.35, t(226) = 4.24, p < .001, R^2 = 0.09$). Second, when stress mindset and coping self-efficacy were entered as predictors for motivational challenges, coping self-efficacy was a significant predictor of motivational challenges, ($\beta = -.40, t(226) = -4.55, p < .001, R^2 = 0.10$). Stress mindset was also a significant predictor of motivational challenges, ($\beta = -.32, t(226) = -3.21, p .002, R^2 = 0.05$). Third, when stress mindset and coping self-efficacy were entered as predictors for social emotional challenges, coping self-efficacy was a significant predictor of social emotional challenges, ($\beta = -.23, t(226) = -5.23, p < .001, R^2 = 0.13$). Stress mindset was also a significant predictor of Social Emotional Challenges, ($\beta = -.23, t(226) = -3.21, p .005, R^2 = 0.13$). Finally, when stress mindset and coping self-efficacy were entered as predictors for GPA (see Table 2), neither was a significant predictor for GPA.

Correlations (Table 3) indicated GPA was not associated with coping self-efficacy and stress mindset, therefore it was eliminated from further analysis. This elimination adds statistical power to the main analysis (study 2) as the sample size is small and the structural equation models (SEM) already contain multiple parameters. Stress mindset and coping self-efficacy

were significant predictors for academic wellbeing and motivation and social-emotional challenges, making the case for the main study and the introduction of mediation variables.

Table 2

Linear Regression Summary for Preliminary Analysis

Predictor	Outcome	B	SE	β	<i>t</i>	<i>p</i>	R ²
CSE	AWB	.47	.07	.45	7.00	<.001	.20
SM		.35	.08	.29	4.24	<.001	.09
CSE	Mot_Ch	-.40	.09	-.31	-4.55	<.001	.10
SM		-.32	.10	-.23	-3.21	.002	.05
CSE	SE_Ch	-.46	.09	-.35	-5.23	<.001	.12
SM		-.21	.10	-.14	-2.00	.005	.15
CSE	GPA	-.27	.23	-.08	-1.14	.26	.00
SM		.10	.27	.03	.39	.70	.00

*Note: N=226; *p<.05, **p<.01, ***p<.001*

GPA=grade point average; CSE=coping self-efficacy; SM=stress mindset; AWB=academic well-being; MOT_CH = motivation challenges; SE_CH = social emotional challenges; MON = monitoring; AD=adaptation; ASE=academic social engagement.

Table 3*Correlation of GPA, CSE, and SM*

Variables	Estimate	Std. Error	z-value	p	95% Confidence Interval	
					Lower	Upper
CSE - GPA	-.09	.08	-1.12	.26	-.25	.07
SM - GPA	.06	.09	.59	.56	-.28	.23

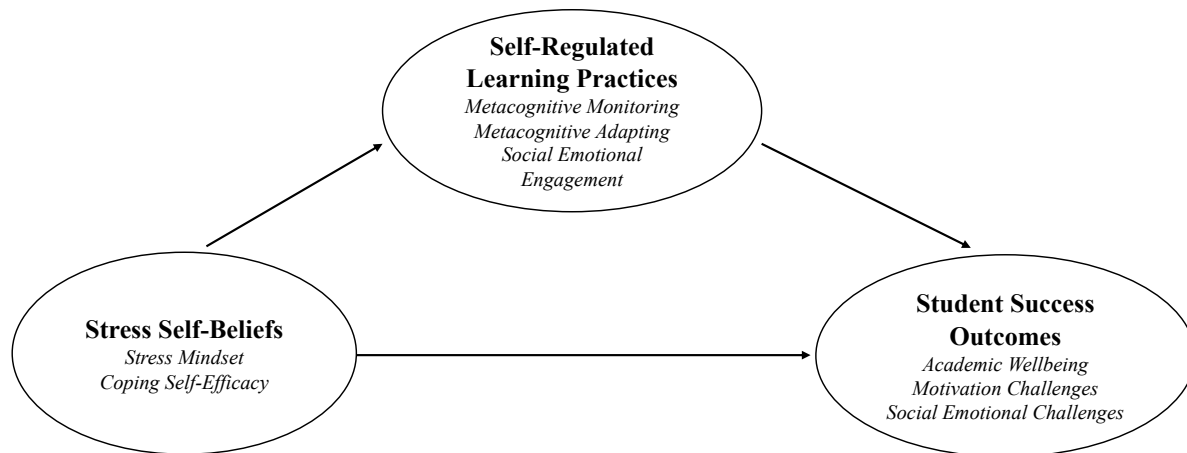
Note: $N=226$; * $p<.05$, ** $p<.01$, *** $p<.001$

GPA=grade point average; CSE=coping self-efficacy; SM=stress mindset

Focal Study

Rationale

Perceptions and beliefs regarding stress are important aspects of whether stress is experienced as helpful or harmful (Crum et al., 2017) and facilitates approach over avoidance coping behaviour (Jamieson et al., 2022). How students manage learning and academic demands impacts student success (e.g., Hadwin et al., 2022; Winne & Hadwin, 2008); therefore, factors other than stress self-beliefs also contribute to student success. Findings from the preliminary study established that stress mindset and coping self-efficacy predict student success outcomes. Findings from that study ruled out GPA as a meaningful outcome because it was not associated with the stress self-beliefs setting the stage to consider the role of self-regulatory practices play.

Figure 1*Proposed Testable Model***Purpose and Research Questions**

The purpose of this focal study was to investigate whether selected regulatory practices explain the relationship between stress self-beliefs and student success outcomes. The following research questions were addressed: (1) Do regulatory practices mediate the association between stress self-beliefs and motivation challenge appraisals? (2) Do regulatory practices mediate the association between stress self-beliefs and social emotional challenges? (3) Do regulatory practices mediate the association between stress self-beliefs and academic wellbeing?

Method**Research Context and Participants**

Refer to the replication study section of this paper regarding the research context and description of participants which remain the same for the focal study.

Variables and Measures

Refer to the Variable and Measures section for the preliminary study for the description of stress appraisals (stress mindset, coping self-efficacy) and student experiences and outcomes (motivation challenges, social emotional challenges, mental health), which remain the same for the main study. The mediator variables and measures for the main study are described in the next section (e.g., motivation regulatory practices, social regulatory practices).

Self-Regulated Learning Practices

Self-regulated practices (SRL-P) are different techniques or tactics students engage to foster adaptive SRL. SRL-P are measured by the SRL-P subscale of the Self-Regulated Learning Assessment and Self-Diagnostic Tool (SRL-PSD-2021) (Hadwin et al., 2021). In the SRL-P, students rate their agreement about utilizing specific SRL practices during the last two weeks on a 5-point Likert scale from *Strongly disagree* to *Strongly Agree*. High scores indicate students are engaging SRL practices that are expected to facilitate academic success. The subscales of the SRL-P included in this research are: (a) Metacognitive Monitoring (3 items), (b) Metacognitive Adapting (6 items), and (d) Academic Social Engagement (3 items). Metacognitive Monitoring (Mon) sample items are: “Asked myself if I am understanding what I am supposed to be doing”, “Asked myself if I was remembering”, and “Asked myself if I was understanding the material”. Metacognitive Adaptation sample items are: “Changed my understanding of the task at hand”, “Modified my plans for the task, and “Switched to a different strategy or approach”. Academic Social Engagement items are: “had fun in university”, “helped classmates”, “got to know people in the class”. Reliability scores for the SRL-P are .70 - .84 for subscales (Hadwin et al., 2021).

Analytic Approach

The open-source R program was used for the analysis including the lavaan package for SEM (v. 0.6.11, Rosseel, 2012). This study utilized a SEM analysis which is well suited to assess

the role of mediating variables (Tomarken & Waller, 2005). A key strength of SEM is the ability to compare models to make sense of patterns in the data and find the best fitting model. SEM analyses offer advantages over other correlational methods (Tomarken & Waller, 2005): (a) SEM includes a priori theoretical knowledge to inform model specification; (b) can test phenomena assessing multiple endogenous and exogenous variables; (c) account for the role of mediating variables, and (d) they allow for the analysis of statistically non-normal data, non-normal data is probable for mental health (Oishi et al., 2007) for example. Due to the relatively small sample size and to avoid related overparametization, the analytic strategy included four models tested separately whereby the two predictor variables coping self-efficacy and stress mindset are examined separately against the outcome academic wellbeing and the outcomes motivation and social emotional challenges.

Results

Model One: Coping Self-Efficacy, Regulatory Practices, and Academic Challenges

The fit indices of the model were indicative of acceptable fit of the model to the data ($\chi^2=844.90$, $df= 613$, $p<.001$; $CFI=.91$, $TLI=.91$, $RMSEA=.04$; $SRMR=.06$). For cutoff criteria for fit indices in covariance-based structure analysis refer to Hu and Bentler (1999).

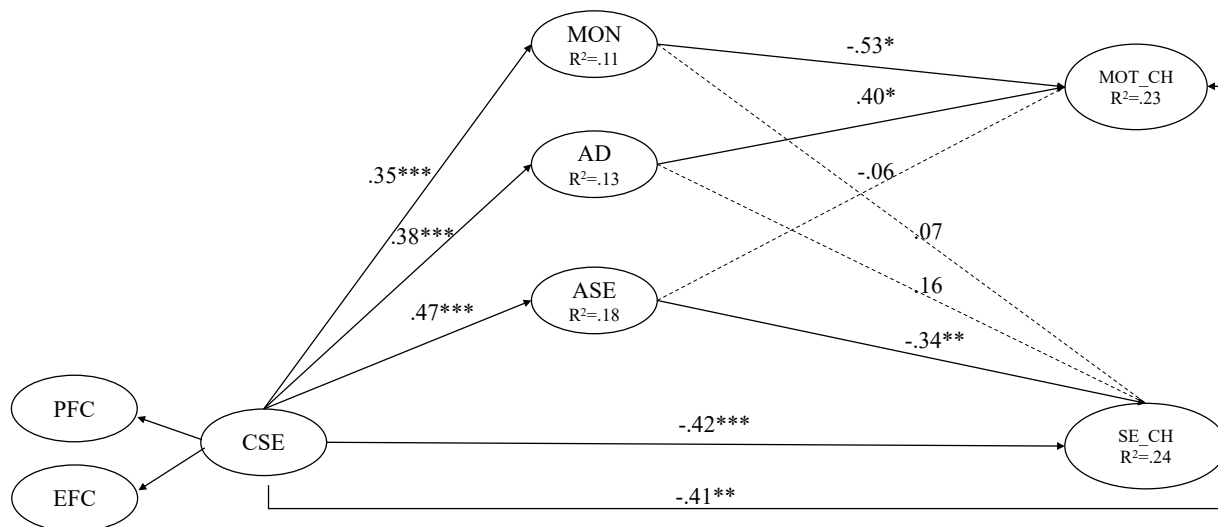
Examining the direct effect, coping self-efficacy predicted a decrease in both motivation and social emotional challenges. Coping self-efficacy had a significant positive association with the three regulatory practices. Three indirect relationships were also evident (see Figure 2, Table 4). First, academic social engagement mediated the effect of the negative association between coping self-efficacy and social emotional challenges. Second, monitoring mediated the effect of the negative association between coping self-efficacy and motivation challenges. Third, adapting was a significant mediator between coping self-efficacy and motivation challenges, however this

association showed an increase in motivation challenges which was an unexpected finding and will be reviewed further in the discussion.

Specifically, the effect of coping self-efficacy on monitoring ($B = 0.35, p < .001$), on adapting ($B = .38, p < .001$) and on academic social engagement was significant ($B = .47, p < .001$). Refer to Figure 2 and Table 4 for complete results. The effect of monitoring on motivation challenges ($B = -.53, p = .01$), adapting on motivation challenges ($B = .40, p = .03$), and academic social engagement on social emotional challenges ($B = -.34, p = .01$) were significant also. The direct effect of coping self-efficacy to motivation challenges ($B = -.41, p = .002$) and coping self-efficacy to social emotional challenges ($B = -.42, p < .001$) were both significant. The total effect (indirect + direct effect) of coping self-efficacy on motivation challenges ($B = -.47, p < .001$) and social emotional challenges ($B = -.49, p < .001$) were both significant. The R squared for motivation challenges was .23 indicating 23% of variability in motivation challenges was accounted for by the predictors and mediators in the model. The R squared for social emotional challenges is .24, indicating 24% of the variability in social emotional challenges was accounted for by the model's predictors and mediators. The mediation from coping self-efficacy to motivation challenges through monitoring ($B = -.18, p = .04$), coping self-efficacy to motivation challenges through adapting ($B = .15, p = .05$) and coping self-efficacy social emotional challenges through academic social engagement ($B = -.16, p = .02$) were all significant (Table 4).

Figure 2

Model One: Coping Self-Efficacy to SRL Practices to Academic Challenges



Note: denotes significance level of $^ < .05$, $^{**} < .01$, $^{***} < .001$*

Note: CSE=coping self-efficacy; PFC – problem focused coping; EFC – emotion focused coping; MOT_CH = motivation challenges; SE_CH = social emotional challenges; MON = monitoring; AD=adaptation; ASE=academic social engagement.

Table 4

Model One: Coping Self-Efficacy to SRL Practices to Academic Challenges Indirect and Total Effects

Mediation Relationships	<i>B</i>	<i>SE</i>	<i>p</i>
CSE to Mon to MOT_CH	-.18	.09	.04*
CSE to AD to MOT_CH	.15	.08	.05*
CSE to ASE to MOT_CH	-.03	.07	.70
CSE to MOT_CH total effect	-.47	.13	<.001***
CSE to MON to SE_CH	.03	.05	.62
CSE to AD to SE_CH	.06	.06	.33
CSE to ASE to SE_CH	-.16	.07	.02*
CSE to SE_CH total effect	-.49	.12	<.001***

*Note: denotes significance level of *<.05, **<.01, ***<.001*

CSE – coping self-efficacy; MON – SRL practices monitoring; AD – SRL practices adapting; ASE – SRL practices academic social engagement; MOT_CH – SRL Motivation challenges; SE_CH – SRL social emotional challenges.

Model Two: Coping Self-Efficacy, Regulatory Practices, and Academic Wellbeing

The fit indices of the model were indicative of an acceptable fit of the model to the data ($\chi^2=845.05$, $df= 582$, $p<.001$; $CFI=.90$, $TLI=.89$, $RMSEA=.05$; $SRMR=.07$).

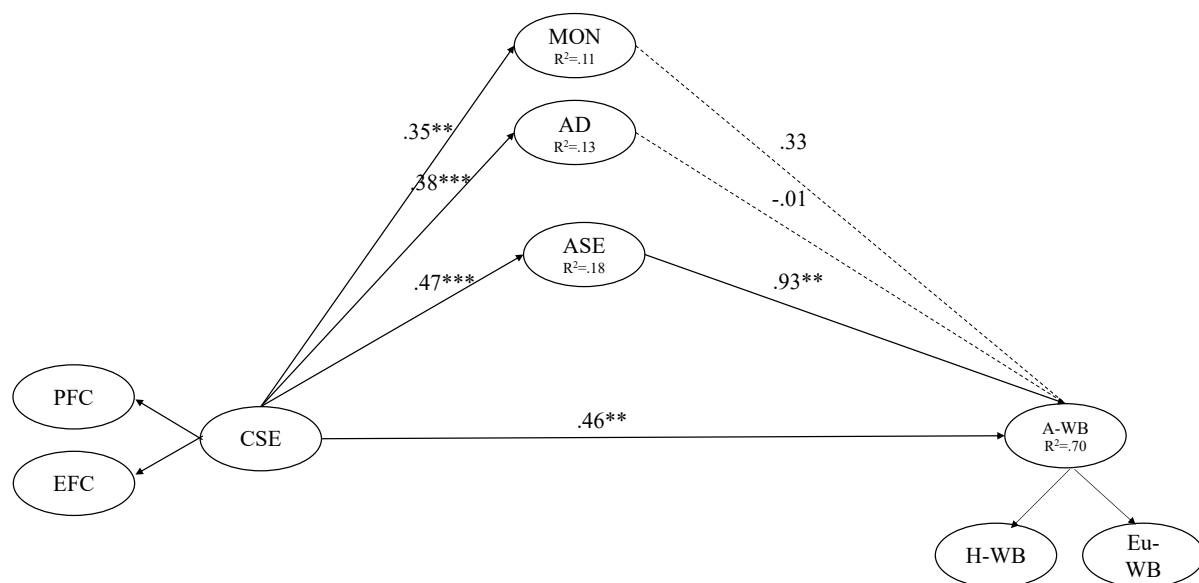
Examining the direct effect, coping self-efficacy predicted an increase in academic wellbeing and had a significant positive association with the three regulatory practices. One

indirect effect was also evident (see Figure 3, Table 5), academic social engagement mediated the effect of the positive association between coping self-efficacy and academic wellbeing.

Specifically, the effect of coping self-efficacy on monitoring ($B = 0.35, p=.002$), on adapting ($B = .38, p<001$) and on academic social engagement were all significant ($B = .47, p<001$). Refer to Figure 3, Table 5 for complete results. The effect of academic social engagement on academic wellbeing was significant ($B = .93, p=.002$). The indirect effect of coping self-efficacy on academic wellbeing through academic social engagement was significant ($B = .55, p=.003$). The direct effect of coping self-efficacy to academic wellbeing ($B = .46, p=.003$) was also significant resulting in a total effect of ($B = 1.01, p<.001, R^2 = .70$). The R squared for academic wellbeing is .70 indicating that the model including coping self-efficacy and academic social engagement is capable of predicting about 70% of the variability in student academic wellbeing (see Table 5).

Figure 3

Model Two: Coping Self-Efficacy to SRL Practices to Academic Wellbeing



*Note: denotes significance level of *<.05, **<.01, ***<.001*

Note: *CSE* – coping self-efficacy; *PFC* – problem focused coping; *EFC* – emotion focused coping; *MON* – SRL practices monitoring; *AD* – SRL practices adapting; *ASE* – SRL practices academic social engagement; *A-WB* – academic wellbeing; *H-WB* – hedonic wellbeing; *Eu-WB* – eudaimonic wellbeing.

Table 5

Model Two: Coping Self-Efficacy to SRL Practices to Academic Wellbeing Indirect and Total Effects

Mediation Relationships	<i>B</i>	<i>SE</i>	<i>p</i>
CSE to Mon to AWB	.11	.09	.23
CSE to AD to AWB	-.004	.09	.96
CSE to ASE to AWB	.44	.17	.01**
CSE to AWB total indirect effect	.55	.18	.003**
CSE to AWB total effect	1.01	.25	<.001***

Note: denotes significance level of *<.05, **<.01, ***<.001

CSE – coping self-efficacy; *MON* – SRL practices monitoring; *AD* – SRL practices adapting; *ASE* – SRL practices academic social engagement; *AWB* – academic wellbeing

Model Three: Stress Mindset, Regulatory Practices, and Academic Challenges

The fit indices of the model were indicative of adequate fit of the model to the data ($\chi^2=550.311$, $df= 361$, $p<.001$; CFI=.90, TLI=.88, RMSEA=.05; SRMR=.07).

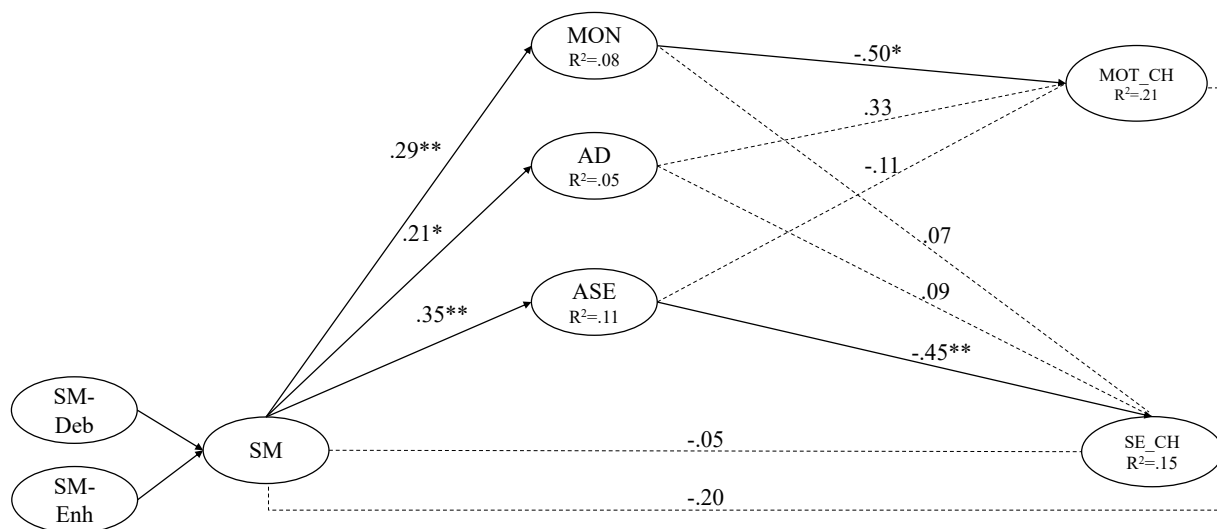
Findings indicate stress mindset did not have a significant direct association with either motivation or social emotional challenges but had a significant positive association with the three regulatory practices. Two significant indirect effects were also evident (see Figure 4, Table 6). First, academic social engagement mediated the effect of stress mindset on social emotional

challenges, meaning that when mediated by academic social engagement, a stress is enhancing mindset was associated with a decrease in social emotional challenges. Second, monitoring mediated the association between stress mindset and motivation challenges, indicating that when mediated by monitoring, a stress is enhancing mindset was associated with a decrease in motivation challenges.

Specifically, the effect of stress mindset on monitoring ($B = 0.29, p=.005$), the effect of on adapting ($B = .21, p=.03$) and on academic social engagement were all significant ($B = .35, p=.004$) (see Table 6). The effect of monitoring on motivation challenges is significant ($B = -.50, p=.02$). The effect of academic social engagement on social emotional challenges is also significant ($B = -.45, p=.002$). The indirect effect of stress mindset on motivation challenges through monitoring was significant ($B = -.15, p=.046$). The indirect effect of stress mindset on social emotional challenges through academic social engagement was significant ($B = -.16, p=.03$). The total effect of stress mindset on social emotional challenges was significant ($B = -.31, p=.01$) (Table 6). The R squared for motivation challenges is .21 and social emotional challenges is .15 indicating 21% of variability in motivation challenges and 15% of variability in social emotional challenges were accounted for by the predictors and mediators in the model.

Figure 4

Model Three: Stress Mindset to SRL Practices to Academic Challenges



Note: denotes significance level of * $<.05$, ** $<.01$, *** $<.001$

Note: SM – stress mindset; SM-Deb – stress is debilitating mindset; SM-Enh – stress is enhancing mindset; MON – SRL practices monitoring; AD – SRL practices adapting; ASE – SRL practices academic social engagement; MOT_CH – SRL Motivation challenges; SE_CH – SRL social emotional challenges.

Table 6

Model Three: Stress Mindset to SRL Practices to Academic Challenges Total and Indirect Effects

Mediation Relationships	<i>B</i>	<i>SE</i>	<i>p</i>
SM to Mon to MOT_CH	-.15	.07	.05
SM to AD to MOT_CH	.07	.05	.14
SM to ASE to MOT_CH	-.04	.05	.45
SM to MOT_CH total indirect effect	-.11	.06	.06
.SM to MOT_CH total effect	-.31	.13	.01**
SM to MON to SE_CH	.03	.05	.62
SM to AD to SE_CH	.02	.04	.60
SM to ASE to SE_CH	-.16	.07	.03*
SM to SE_CH total indirect effect	-.12	.06	.05*
SM to SE_CH total effect	-.17	.12	.16

*Note: denotes significance level of *<.05, **<.01, ***<.001*

SM – stress mindset; SM-DB – stress is debilitating mindset; SM-Enh – stress is enhancing mindset; MON – SRL practices monitoring; ASE – SRL practices academic social engagement; MOT_CH – SRL Motivation challenges; SE_CH – SRL social emotional challenges.

Model Four: Stress Mindset, Regulatory Practices, Academic Wellbeing

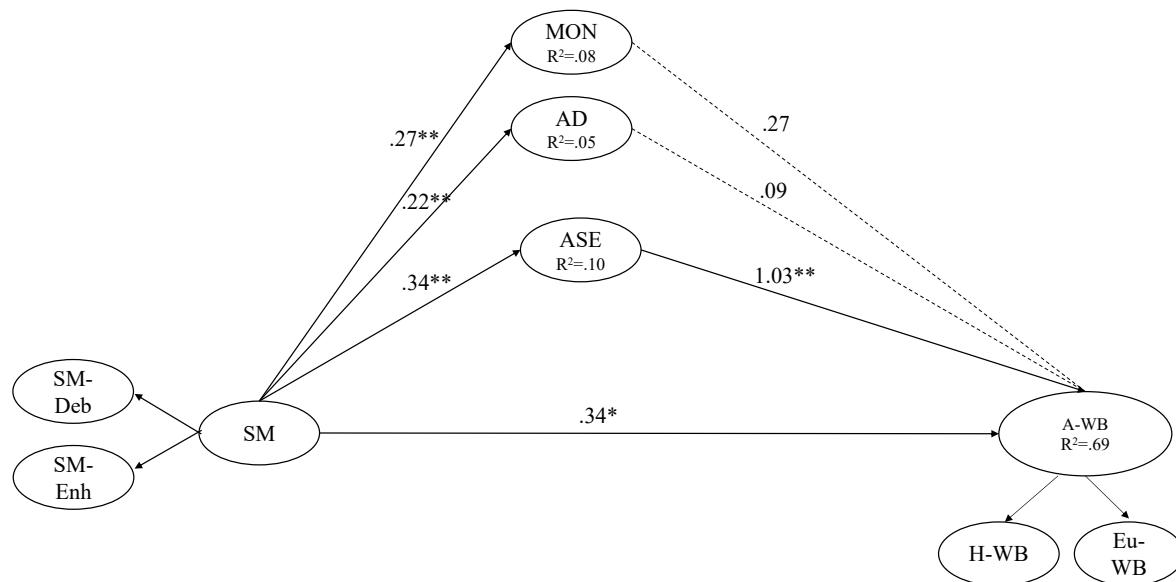
The fit indices of the model were indicative of adequate fit of the model to the data ($\chi^2=491.66$, $df= 338$, $p<.001$; CFI=.91, TLI=.90, RMSEA=.05; SRMR=.06).

Findings indicate stress mindset predicted an increase in academic wellbeing directly and had a significant positive association with the three regulatory practices. One significant indirect effect was also evident (see Figure 5, Table 11), academic social engagement mediated the effect of stress mindset on academic wellbeing. A stress is enhancing mindset had an impact on the outcome academic wellbeing directly and as mediated by the regulatory practice academic social engagement.

Specifically, the effect of stress mindset on monitoring ($B = 0.27, p = .01$), on adapting ($B = .22, p = .03$) and on academic social engagement ($B = .47, p < .001$) were all significant. Refer to Figure 5, Table 7 for complete results. The effect of academic social engagement on academic wellbeing was significant ($B = .34, p = .01$). The indirect effect of stress mindset on academic wellbeing through academic social engagement was significant ($B = .44, p = .01$). The direct effect of stress mindset on academic wellbeing was significant ($B = 1.03, p = .001$) resulting in a significant total effect ($B = .78, p = .002$). The R squared for academic wellbeing is .69 indicating that the model including stress mindset and academic social engagement predicted about 69% of the variability in student academic wellbeing (see Table 7).

Figure 5

Model Four: Stress Mindset to SRL Practices to Academic Wellbeing



*Note: denotes significance level of * $<.05$, ** $<.01$, *** $<.001$*

Note: SM – stress mindset; SM-DB – stress is debilitating mindset; SM-Enh – stress is enhancing mindset; MON – SRL practices monitoring; ASE – SRL practices academic social engagement; A-WB – academic wellbeing; H-WB – hedonic wellbeing; Eu-WB – eudaimonic wellbeing.

Table 7

Model Four: Stress Mindset to SRL Practices to Academic Wellbeing Indirect and Total Effects

Mediation Relationships	<i>B</i>	<i>SE</i>	<i>p</i>
SM to Mon to AWB	.07	.07	.31
SM to AD to AWB	-.02	.05	.72
SM to ASE to AWB	.35	.16	.03*
SM to AWB total indirect effect	.44	.18	.01**
SM to AWB total effect	.78	.25	.002**

*Note: denotes significance level of * $<.05$, ** $<.01$, *** $<.001$*

SM- stress mindset; MON – SRL practices monitoring; SD – SRL practices Adapting; ASE – SRL practices academic social engagement; AWB – academic wellbeing

Discussion

Student success is facilitated by effectively navigating academic demands and the inevitable stress that is experienced in the academic context. When managed well, stress is an important resource in navigating academic demands and goals (de la Fuente, 2020) and integral to wellbeing (Ng et al., 2009). Consequently, it is not possible to eliminate either academic stress or demands in support of student success, the focus therefore shifts to how students are managing both.

This research examined how stress appraisals contribute to student success directly as well as the mediating role of metacognitive and social regulatory practices on the relationship between stress appraisals and student success outcomes. Stress mindset and coping self-efficacy capture broad beliefs about stress and specific perceptions of coping with the academic context respectively. A primary purpose of this research was to examine the utility of coping self-efficacy and stress mindset, which are not well established in academic settings, in predicting student success outcomes. A second purpose was to examine how regulatory practices are associated with the relationship between stress appraisals and student success outcomes. Finally, this research acknowledges that a truly successful student and education system will support both social emotional and academic flourishing within conceptualizations of student success. Findings show that adaptive responses to stress and academic demands that support student success are impacted by: (a) adaptive stress appraisals, (b) metacognitive regulatory practices, and (c) social regulatory practices.

Adaptive Stress Appraisals

Appraisals are a person's evaluative judgment of the situation shaped by individual and contextual factors and a key component of stress responses (Epel et al., 2018). Prior findings indicate that appraisals regarding stress determine whether stress: (a) is experienced as a resource or detriment (Crum et al., 2017; Jamieson et al., 2022), (b) facilitates approach over avoidance motivation and behaviour (Blascovich et al., 1999; Freire et al., 2016), and (c) facilitates higher levels of mental health (Crum et al., 2013, 2017; Yaeger et al., 2022). Consistent with extant research on stress appraisals, this research hypothesized that adaptive appraisals regarding stress (e.g., stress is enhancing mindset, higher levels of coping self-efficacy) will predict higher levels of student success. Findings were consistent with this hypothesis for both coping self-efficacy and stress mindset and their impact on student experiences (e.g., academic well-being, motivation and social emotional challenges) but not for academic performance.

Coping Self-Efficacy

This research was exploratory regarding the role of coping self efficacy (CSE) in student success. While coping self-efficacy has been studied in other motivated performance contexts (e.g., Benight & Harper, 2002; Melato et al., 2017; Midkiff et al., 2018; Singer, Humphreys, & Lee, 2016; Wissing et al., 2011), utility has only recently been established in educational settings (Kapil et al., 2024). Overall, findings confirm the expectation that coping self-efficacy has considerable utility in student success research. Coping self-efficacy predicted higher levels of academic wellbeing and lower social emotional and motivational challenges directly. Findings in this study add to the growing literature linking different types of self-efficacy with social emotional outcomes (e.g., Caprara et al., 2006; Cattellino et al., 2021; Freire et al., 2019; Melato et al., 2017; Won et al., 2023).

While links have been established between different types of self-efficacy, including coping self-efficacy, and social emotional outcomes in prior research (e.g., Caprara et al., 2006; Cattellino et al., 2021; Delahaij & VanDam, 2017; Freire et al., 2019; Melato et al., 2017) coping self-efficacy is not typically used in student success research. The assertion in this research is that coping self-efficacy is overlooked in educational settings and well suited to student success research that encompasses both student experiences and performance. With the inclusion of emotion-focused and problem focused components of coping, coping self-efficacy has the potential to support students' adaptive coping and subsequent student success through capturing perceptions of being able to cope with stress (emotion-focused coping) and academic demands (problem-focused coping).

While coping self-efficacy did predict student success outcomes in this study, contributions were modest and there was no significant association with GPA. It is likely that the link from coping self-efficacy to regulatory practices would be stronger if examined over time, given the expected role of mastery experiences in other types of self-efficacy (e.g., Usher & Pajares, 2009). In addition, GPA is a distal outcome performance measure with multiple contributions (Richardson et al., 2012; Robbins et al., 2004; Zollanvari et al., 2017). There was a small positive correlation between academic wellbeing and GPA, as well as a small negative correlation between motivation challenges and GPA. Thus, it is possible that over a longer time interval, GPA would be impacted indirectly by coping self-efficacy through the association from coping self-efficacy to student experiences (e.g., academic wellbeing, academic challenges). It is also possible that the cross-sectional approach did not capture recursive and iterative cycles of stress optimization and self-regulated learning that would only be evident with longitudinal design, an area for future research to examine.

Stress Mindset

This study also examined the impact of stress mindset on student success. Extant research has shown the predictive capacity of stress mindset for wellbeing, performance and health (Crum et al., 2013; Crum et al., 2017; Keech et al, 2018; Jenkins et al., 2021). Findings in this study were consistent with this prior research and showed stress mindset predicted aspects of student success directly, namely academic well-being. Stress mindset was also associated with lower levels of social emotional challenges when mediated by academic social engagement. In keeping with the assertion that stress mindset is not a ‘panacea’ (Crum et al., 2017), stress mindset has variable contributions to student success outcomes. In a previous study on stress and student success, stress mindset was not predictive of either mental health or motivation challenges (Kapil et al., 2024). Although significant associations with student success and stress mindset were found in the current study, the strength of the association was small.

In keeping with the assertion that stress mindset is not a ‘panacea’ (Crum et al., 2017), stress mindset has variable contributions to student success outcomes. In a previous study on stress and student success, stress mindset was not predictive of either mental health or motivation challenges (Kapil et al., 2024). Although significant associations with student success and stress mindset were found in the current study, the strength of the association was small.

To explore the variable findings further, consider that stress mindset is portrayed as assessing general beliefs about stress itself (Crum et al., 2013). However, items in the Stress Mindset Scale refer to general beliefs about stress (e.g., Item 1. *The effects of stress are negative and should be avoided*) and self-referent beliefs regarding personal experiences of stress (Item 2. *Experiencing stress facilitates **my** learning and growth*). This assumes that self-referent and general beliefs about stress are the same, and this may not be the case. For example, it is possible

for a person to believe stress is enhancing in general, but stress does not facilitate learning and growth for them personally. A person may hold a self-referential belief that stress is debilitating for them and simultaneously hold a general belief that stress is enhancing for others, even if that is not their personal experience. These dissonant perceptions may be informed by personal prior experiences which in turn shape perceptions (e.g., see Barrett, 2017). The context against which the stress mindset beliefs are being assessed, self-referential versus general beliefs, may be an important consideration in how stress mindset functions and may account for inconsistent research findings and the underwhelming effect of stress mindset on student success in this research.

Although not specifically about stress mindset, there has also been recent criticism levelled at intelligence mindset research regarding: (a) effect size (Macnamara & Burgoyne, 2023; Sisk et al., 2018), (b) construct validity (Macnamara & Burgoyne, 2023), and (c) overstating claims of importance for academic performance and wellbeing (Burnette et al., 2023; Macnamara & Burgoyne, 2023; Yan & Schuetze, 2023). These may be additional explanations for the small impact of stress mindset on student success in this study.

Metacognitive Regulatory Practices

Adaptive appraisals of stress are expected to facilitate approach motivation and behaviour, which in turn enhance self-regulatory actions (e.g., see Freire et al., 2016; Jamieson et al., 2022; Karademas & Kalantzi-Azizi, 2017). While stress optimization is informative regarding stress responses, this theory includes minimal specific information regarding adaptive regulatory practices expected to enhance student success. We turn to self-regulated learning (SRL) literature to inform expectations in this area.

Central to effective SRL is a student who actively monitors and regulates (e.g., adapts) cognitive, affective, motivational, and behaviours processes in their pursuit of academic goals. For this reason, metacognitive monitoring and adapting was essential for adaptive self-regulatory capacity (Panadero, 2018; Perfect & Schwartz, 2002). This research hypothesized that: (a) stress appraisals, through facilitation of approach motivation and behaviours, will have positive associations with monitoring and adapting and (b) metacognitive regulatory practices will mediate the association between stress appraisals and student success. Findings confirmed the hypotheses, specifically: (a) coping self-efficacy and stress mindset were positively associated with monitoring and adapting, (b) metacognitive monitoring provided a moderate partial inverse mediation between CSE and motivation challenges as well as between stress mindset and motivation challenges, and (c) adapting provided a moderate partial positive mediation between CSE and motivation challenges. Thus, self-regulatory practices can promote student success beyond what is provided by stress appraisals, indicating both are important to student success and thriving.

One unexpected finding was the positive mediation exerted by adapting on the association between coping self-efficacy and motivation challenges. This association was significant but resulted in an increase in motivation challenges. The increased effort or drain on resources required to adapt and change may explain this finding, even when the change leads to a desired outcome. Stress optimization provides two additional explanations for this finding. First, a psychological construction theory of emotion perspective references biological processes that explain how demands for change adaption can drain resources (e.g., homeostasis, allostasis) (Barrett, 2017a, Barrett, 2017b), which may elicit an increase in motivation challenges. Second, the biopsychosocial perspective denotes that stress is impacted by the perceived ratio of

resources and demands, with adaptation likely increasing perceived demands and subsequently increasing motivation challenges (e.g., see Jamieson et al., 2018).

Social Regulatory Practices

How a student engages with and regulates the social elements of their academic context is linked with a range of positive outcomes. Social and emotional regulatory factors encompass overall psychological, social, and physical wellbeing, including managing stress (Hadwin et al., 2022). Social regulatory practices are expected to contribute to: (a) mental health and well-being (Elmer et al., 2020), (b) academic practices and performance (Hadwin et al., 2011; Lobczowski, 2020; Won et al., 2018, 2021; van der Zanden et al., 2018), and (c) buffer against the detrimental impacts of stress (Cohen & Willis, 1985; Southwick et al., 2016).

In addition to self-regulatory practices, the social-regulatory practice *academic social engagement* emerged as particularly impactful. Consistent with hypothesized results, academic social engagement provided: (a) a moderate full positive mediation between stress mindset and academic well-being, (b) a strong partial mediation between CSE and academic well-being, and (c) a small partial inverse mediation between CSE and social emotional challenges. Thus, social regulatory practices like academic social engagement can promote student success beyond what is provided by coping self-efficacy or stress mindset alone. These findings are consistent with a growing consensus that social regulatory processes are important for understanding what students need to be successful.

Summary

In the challenging and stressful university context, feeling capable of coping with academic stress and academic demands and engaging in adaptive self and social regulatory practices contributes to student success. Findings from this research indicated stress appraisals

and regulatory practices contribute to the student experience aspect of student success, which includes academic wellbeing and academic challenges. Eliminating stress is not a realistic option and may even be counter to overall mental health and performance, which are supported by adaptive responses to stress and achieving goals (e.g., see Ng et al., 2009; Ryff, 1989; Yaman-Sözbir et al., 2019). Thus, supporting students to regulate both stress and learning is integral to student success.

Limitations

Findings from this research provide important information in student success research, there are some notable limitations. First, the sample size is adequate but still relatively small, especially considering the multiple variables included. Future research should replicate these findings with larger samples. Second, this study is cross-sectional. The study is exploratory as coping self-efficacy is not well established in academic or student success research. Thus, a cross sectional design is appropriate for establishing associations between coping self-efficacy, regulatory practices, and student success outcomes. However, given the multifaceted and recursive nature of the variables, generalize results with caution. It is recommended future research examines change over time and include measurement at multiple time points. Third, this study used a variable centered approach. Conceptualizations of stress, SRL, and mental health are complex and contain individual differences. Future research can address this with the inclusion of person-centered analytic methods and qualitative analysis to examine individual variability. Fourth, only three regulatory practices were included given the modest sample size. Additional research can examine how additional SRL informed regulatory practices impact the associate between stress appraisals and student success. Fifth, within stress optimization stress is conceptualized as embodied but only appraisals were measured in this research. Future research

on stress, SRL, and student success should include measurement of physiological aspects of stress (e.g., cortisol, breathing, heart rate, self-report descriptions) to better represent the embodied aspects of stress in the research. Sixth, some of the scales used are recently developed. Specifically, the AWBS (Rostampour et al., 2023) and SRL-PSD (Hadwin et al., 2022) have yet to be tested with a range of participants and contexts, raising potential concerns regarding validity and reliability until these scales are more widely used. In addition, some of the subscales consisted of relatively few items and were used separately from the larger scale (e.g., academic social engagement) which has the potential to impact validity of findings.

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Appendix G: Ethics Certificate



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Certificate of Approval - Annual Renewal

	ETHICS PROTOCOL NUMBER 19-0038
PRINCIPAL Allyson Hadwin INVESTIGATOR:	Expedited review - delegated
UVIC DEPARTMENT: Educational Psychology and Leadership Studies EPLS	ORIGINAL APPROVAL DATE: APPROVED ON: APPROVAL EXPIRY DATE:
	20-Sep-2019 07-Sep-2022 19-Sep-2023
PROJECT TITLE: PAR-IT: Developing metacognitive awareness of adaptive and maladaptive study patterns	
RESEARCH TEAM MEMBERS: Dr. Todd Milford - Collaborator, UVic (EDCI) Mariel Miller - Collaborator, UVic (TIL) Meg Kapil - PhD Researcher, UVic Alex Warrington - MA Researcher, UVic Safoura Askari - PhD Researcher, UVic Leslie Bahena Olivares - Researcher, UVic Ramin Rostampour - PhD Researcher, UVic Rikka Paular - MA Researcher, UVic Muqing Nie - MA Researcher, UVic Louise Chim - Researcher, UVic Jessica Rourke - Researcher, UVic Annie Wu - Researcher, UVic Paweena Sukhawathanakul - Collaborator, Uvic	
DECLARED PROJECT FUNDING: Social Sciences and Humanities Research Council, University of Victoria COVID 19 Research emergency Fund, University of Victoria	
DOCUMENTS INCLUDED IN THIS APPROVAL: None	
Conditions of approval	

This Certificate of Approval is valid for the above term provided there is no change in the protocol.

Amendments

To make changes to the approved research procedure in your study, please submit "Amendments" or "Annual renewal with amendments" form. You must receive research ethics approval before proceeding with your amended protocol.

Renewals

Your ethics approval must be current for the period during which you are recruiting participants or collecting data. To renew your protocol, please submit a "Request for Renewal" form before the expiry date on your certificate. You will be sent an emailed reminder prompting you to renew your protocol about six weeks before your expiry date.

Project Closures

When you have completed all data collection activities and will have no further contact with participants, please notify the Human Research Ethics Board by submitting a "Notice of Project Completion" form.

Certification

This certifies that the UVic Human Research Ethics Board has examined this research protocol and concluded that, in all respects, the proposed research meets the appropriate standards of ethics as outlined by the University of Victoria's policies for research involving human participants.

Dr. Sandra Gibbons Dr. Matthew Murphy
Chair, Human Research Ethics Board Vice-chair, Human Research Ethics Board

Certificate Issued On: 07-Sep-2022