Conscientiousness and Procrastination: The Mediating Role of Time Management Practices During Academic Study Sessions Among Undergraduate Students

by

Victoria Ashley Johnston
B.Sc., University of Northern British Columbia, 2022

A Thesis Submitted in Partial Fulfillment of the Requirements for the Degree of

MASTER OF ARTS

in the Department of Educational Psychology and Leadership Studies

We acknowledge and respect the Lək^{w}əŋən (Songhees and X^{w}sepsəm/ Esquimalt) Peoples on whose territory the university stands, and the Lək^{w}əŋən and W̱ SÁNEĆ Peoples whose historical relationships with the land continue to this day.

Supervisory Committee

Conscientiousness and Procrastination: The Mediating Role of Time Management Practices During Academic Study Sessions Among Undergraduate Students

by

Victoria Ashley Johnston
B.Sc., University of Northern British Columbia, 2022

Supervisory Committee

Dr. Allyson F. Hadwin, Supervisor
Department of Psychology

Dr. Mariel Miller, Departmental Member
Department of Educational Psychology and Leadership Studies

Abstract

The purpose of this study was to examine the relationship between conscientiousness and procrastination in undergraduate students and investigate whether time management practices (planning time and monitoring time), as a subset of self-regulated learning (SRL) strategies, mediate this relationship during academic study sessions. Participants were recruited from a population of undergraduate students attending a Western Canadian University (N=277) who were enrolled in a Learning to Learn (L2L) course during the fall 2021 semester. Participants completed self-assessments online. A seven-item conscientiousness subscale, a five-item procrastination subscale, and a time management scale, subdivided into a five-item planning time and a four-item monitoring time subscale. Path analysis with parallel mediation showed the total effect and direct effect of conscientiousness on procrastination to be significant and negative, and that this relationship was partially mediated by time management practices. Monitoring time emerged as a functional mediator— higher levels of conscientiousness predicted greater monitoring of time, which in turn reduced procrastination. In contrast, planning time showed a paradoxical effect: although higher levels of conscientiousness predicted greater planning of time, increased planning was associated with greater procrastination. The findings underscore the importance of viewing time management as a multidimensional construct. Future research should examine the conditions under which planning helps versus hinders academic performance.

Table of Contents

Supervisory Committee ii

Abstract iii

Table of Contents iv

List of Tables vi

List of Figures vii

Acknowledgement viii

Introduction 1

Literature Review 3

- Conscientiousness 3
  - The Stability of Conscientiousness 3
  - Measures of Conscientiousness 4
- Procrastination 5
  - Measures of Procrastination 8
- Time Management as a Mediator 9
  - Measures of Time Management Practices 10
- The Relationship between Conscientiousness and Procrastination 11
- Time Management Practices and Procrastination 13
- Time Management Practices and Conscientiousness 15

Purpose Statement and Hypotheses 16

Research Design 17

Methods 18

- Authors Positionality 18
- Participants 18
- Ethical Considerations 19
- Research Context 20

Measures 20

- Conscientiousness 20
- Procrastination 21
- Time Management 21

- Procedures 22

Analytic Approach 22
Data Analysis 22
Results 23
Descriptive Statistics 23
Assumption Testing 24
Mediation Analysis 27
Summary of Findings 28
Discussion 29
Conscientiousness is negatively associated with procrastination 29
Time management as a mediator 30
Monitoring time as a mediator 30
Planning time as a mediator 31
Significance and Implications 36
Limitations 38
Conclusion 39
References 40
Appendix A: ED-D 101 Consent Form 48
Appendix B: Ethics Approval Letter 50
Appendix C: Measurement Scales and Associated Items 51
Appendix D: Histograms for Variables of Interest 53
Appendix E: Time Management and Procrastination Self-Assessment 55
Appendix F: Motivation Self-Assessment 57

List of Tables

Table 1. Descriptive statistics for Procrastination, Time Management, Monitoring Time, Planning Time and Conscientiousness..... 26

List of Figures

Figure 1. Time management is expected to mediate the relationship between conscientiousness and procrastination. 16

Figure 2. Path Analysis with parallel mediation between planning time and monitoring time in the relationship of conscientiousness and procrastination. 28

Acknowledgement

The completion of this thesis marks the ending of a deeply rewarding and meaningful academic journey – one made possible by the support, encouragement and generosity of so many remarkable individuals. I am profoundly grateful for the financial support provided by the Social Sciences and Humanities Research Council (SSHRC) of Canada for their Insight Research Grant (PAR-IT; PI Allyson Hadwin, 435-2018- 0440), which made this research possible.

First and foremost, I am profoundly thankful to my supervisor, Dr. Allyson Hadwin, for her unwavering support, expertise and guidance. Her mentorship was instrumental throughout this process and my academic journey. Dr. Hadwin not only introduced me to the world of research but also challenged my thinking and encouraged me to grow as a scholar. Her thoughtful feedback, high standards, and genuine care created an environment that allowed me to reach new heights I didn't imagine possible.

I am also deeply thankful to my committee member, Dr. Mariel Miller. Her insightful comments, thoughtful questions, and constructive feedback have significantly enhanced the quality of this work. I am grateful for her time, expertise, and support throughout the process.

My sincerest thank you to Dr. Ramin Rostampour. His guidance and support during the data analysis phase of my thesis was invaluable. His expertise, patience and willingness to walk me through complex concepts provided me with immense clarity and understanding.

To my parents and big brother, thank you for your endless support and unconditional love. Even while being far from home, your encouragement and presence never felt out of reach. Your unwavering belief in me through every new challenge I've taken on has been the foundation throughout this journey.

Last, but certainly not least, to my fiancé, Joel – thank you for your unwavering love, patience and belief in me. Your steady presence through the highs, lows and inevitable stress-induced mood swings meant more than I can put into words. Thank you for listening, encouraging and walking alongside me on this journey; it has made all the difference.

Introduction

Procrastination is defined as the voluntary and needless delay of tasks, despite foreseeing the negative consequences thereof (Kim & Seo, 2015; Sirois, 2014; Steel, 2007; Svartdal et al., 2020). General procrastination is the delay of everyday tasks, whereas academic procrastination is when students delay the completion of their academic tasks, such as writing papers, studying for exams, or completing weekly readings (Kim & Seo, 2015; Miyake & Kane, 2022; Rad et al., 2023; Turner & Hodis, 2023; van Eerde & Klingsieck, 2018).

Procrastination is a widespread behavior, research shows that 20% of the general population of adults report procrastinating in their everyday lives (Rozental et al., 2018). Among post-secondary students, the number is even higher, with at least 50% reporting procrastination tendencies (Rozental et al., 2018). Procrastination is prevalent among students of all ages (Steel, 2007). In an academic setting, it has been estimated that 80 to 95% of post-secondary students procrastinate (Lee & Hall, 2020; Rad et al., 2023; Steel, 2010; Turner & Hodis, 2023). Steel's (2007) meta-analysis on procrastination revealed that among post-secondary students, approximately 75% consider themselves procrastinators, and almost 50% procrastinate consistently and problematically. Chronic procrastination is defined as students who habitually delay initiating and completing most, if not all, academic work and has been reported in 25-50% of post-secondary students (Turner & Hodis, 2023). Although estimates of procrastination tendencies among post-secondary students vary in the literature, academic procrastination remains a widespread issue.

Procrastination is highly prevalent among post-secondary students despite the negative effects it has on the emotional well-being of students. Well-established in the literature is that post-secondary students who procrastinate completing academic tasks have been found to experience emotional distress and a range of negative emotions, including guilt, shame, regret,

and anger (Lee & Hall, 2020; Pollack & Herres, 2020; van Eerde, 2003). A study conducted by Rozental et al. (2022) found that severe procrastination is characterized by high levels of anxiety, depression, and stress. They also reported that quality of life was negatively affected by procrastination; therefore, those higher in procrastination tendencies reported lower quality of life.

Academic procrastination not only negatively affects the emotional well-being of students but has been consistently cited as negatively affecting academic performance. When academic tasks are delayed, students may rush the assignments, leading to poorer quality work or incomplete assignments (Fentaw et al., 2022). Kim & Seo (2015) suggest it is inevitable that delaying assignments or putting off studying for an exam will limit coverage of course content and be reflected in poor academic performance. Students who postpone academic tasks encounter a variety of academic problems, including difficulties studying, plagiarism, lower academic scores, examination anxiety, and the development of a sense of inferiority (Fentaw et al., 2022). Literature supports that procrastination has negative effects on various evaluations of academic performance.

Conscientiousness, a Big Five personality trait, is consistently associated with responsibility, attentiveness, persistence, orderliness, and careful planning (Caspi et al., 2005). Conscientiousness has been reported as one of the strongest predictors of procrastination, with numerous studies reporting a significant negative association between the two (Ocansey et al., 2022; Steel, 2007; van Eerde, 2003; van Eerde, 2004). Therefore, individuals high in conscientiousness are less likely to procrastinate.

Although conscientiousness is known to be negatively associated with procrastination, the mechanisms underlying this relationship warrant further investigation. Time management

practices, a component of self-regulated learning, may serve as a behavioral pathway through which personality affects procrastination. Given the prevalence of academic procrastination and its negative impact on both performance and emotional well-being, gaining deeper insight into these mechanisms is essential.

Literature Review

Conscientiousness

Personality traits refer to a set of underlying traits that determine how an individual typically behaves, thinks, and feels (Ocansey et al., 2022). Contemporary personality psychologists agree that there are five main domains of traits: extraversion, agreeableness, conscientiousness, neuroticism, and openness to experience (Caspi et al., 2005; Meng et al., 2024; Ocansey et al., 2022; Roberts et al., 2006; Roberts et al., 2000). Conscientiousness, as defined in Steel's (2007) meta-analysis, is conformity, socially prescribed impulse control, achievement orientation, organization, thoroughness, and reliability. Individuals who are high in the trait of conscientiousness may be described as responsible, attentive, careful, persistent, orderly, and planful (Caspi et al., 2005). Whereas those low in conscientiousness are described as irresponsible, unreliable, careless, and distractible (Caspi et al., 2005). Individuals who show high conscientiousness show self-discipline, are methodical, and aim for achievement (Ghyasi et al., 2013; van Eerde, 2004). Among the five personality traits, conscientiousness was the only factor that significantly predicted students' academic achievement (Ocansey et al., 2022). Conscientiousness influences many domains but may play a particularly important role in the academic setting and student success.

The Stability of Conscientiousness

The stability of personality traits has been extensively studied. Historically, research has found that personality changes occur in young adults, rather than adolescence, as one might

expect (Caspi et al., 2005). Additionally, past studies report increasingly reliable and robust evidence that genetic factors substantially influence personality traits, suggesting that personality traits in adulthood are biologically based and less susceptible to the influence of the environment (Caspi et al., 2005). However, contemporary studies yield different results, which may be attributed to the availability of more advanced measures.

When examining the Big Five personality factors, Furnham & Cheng, (2019) found all five personality factors were stable over a six-year period, even when controlling for gender and age. Similar findings have been found using other measures of the Big Five personality (e.g., NEO-PI) (McCrae et al., 2002). When observing the stability of conscientiousness, it has been found to have a steady linear increase with age, following a pattern of normative change across the lifespan (Jones et al., 2022; Roberts et al., 2006; Roberts et al., 2000; Wortman et al., 2012). Meta-analyses of longitudinal studies examining the stability of conscientiousness have reported two main findings: (a) conscientiousness has little to no change in adolescence and college period, and (b) the rank-order consistency for conscientiousness is relatively high, especially over shorter periods (Roberts et al., 2006; Roberts et al., 2000; Wortman et al., 2012). Conscientiousness was found to increase from age 20 to 30, 30 to 40, and 40 to 50, displaying a linear increase with age (Jones et al., 2022; Roberts et al., 2006). The literature suggests that personality traits, more specifically conscientiousness, are stable over shorter periods and increase steadily over the lifespan.

Measures of Conscientiousness

When measuring personality, it is often measured using the Big Five personality traits of openness to experience, conscientiousness, extraversion, agreeableness and neuroticism. These measures typically rely on self-report questions, where individuals rate themselves on a Likert

scale. The *revised NEO Personality Inventory* (NEO-PI-R; Costa & McCrae, 1992) is a widely used instrument (Furnham & Cheng, 2019; McCrae et al., 2002; Stricker et al., 2019). The NEO-PI-R is a 240-item inventory assessing 30 specific traits that define the five personality factors, responded to on a five-point Likert scale (McCrae et al., 2002). The NEO-PI-R is a versatile instrument which has been adapted to a short version (60 items), as well as translated to other languages, with good reliability (Cronbach's alphas ranging from .86 to .92 across the five domains) (McCrae et al., 2002). The *Big Five Inventory* (BFI; John & Srivastava, 1999) is another commonly used measure of personality, which comprises of 44 items and has a Cronbach's alpha ranging from 0.55 to 0.71 (Furnham & Cheng, 2019). The *Ten-Item Personality Inventory* (TIPI; Gosling et al., 2003) is another measure of personality that shows good test-retest reliability. However, a limitation of the TIPI is that it may lack reliability in capturing the trait of openness, which encompasses qualities such as open-mindedness, curiosity and imagination (Jones et al., 2022).

A limitation of the measures that evaluate the Big Five personality is the aggregation of multiple personality characteristics into the five broad categories. The aggregation simplifies the measurement and enhances the ability to synthesize research findings, but potentially dilutes the more nuanced individual differences (Roberts et al., 2006). The grouping of various personality traits results in subtle aspects of personality being overlooked (Roberts et al., 2006).

Procrastination

Procrastination is defined as the voluntary and needless delay of tasks, despite foreseeing the negative consequences thereof (Kim & Seo, 2015; Sirois, 2014; Steel, 2007; Svartdal et al., 2020). General procrastination is the delay of everyday tasks, whereas academic procrastination is when students delay the completion of their academic tasks, such as writing papers, studying for exams, or completing weekly readings (Kim & Seo, 2015; Miyake & Kane, 2022; Rad et al.,

2023; Turner & Hodis, 2023; van Eerde & Klingsieck, 2018). Procrastination can be conceptualized as either state or trait-based. State procrastination is temporary and situation-specific, whereas trait procrastination is chronic and consistent across time and situations (Steel, 2007).

Procrastination is prevalent among students of all ages (Steel, 2007). In an academic setting, it has been estimated that 80 to 95% of post-secondary students procrastinate (Lee & Hall, 2020; Rad et al., 2023; Steel, 2010; Turner & Hodis, 2023). Steel's (2007) meta-analysis on procrastination revealed that among post-secondary students, approximately 75% consider themselves procrastinators, and almost 50% procrastinate consistently and problematically. Chronic procrastination is defined as students who habitually delay initiating and completing most, if not all, academic work and has been reported in 25-50% of post-secondary students (Turner & Hodis, 2023). Although estimates of procrastination tendencies among post-secondary students vary in the literature, academic procrastination remains a widespread issue.

Procrastination is highly prevalent among post-secondary students despite the negative effects it has on the emotional well-being of students. Well-established in the literature is that post-secondary students who procrastinate completing academic tasks have been found to experience emotional distress and a range of negative emotions, including guilt, shame, regret, and anger (Lee & Hall, 2020; Pollack & Herres, 2020; Van Eerde, 2003). A study conducted by Rozental et al. (2022) found that severe procrastination is characterized by high levels of anxiety, depression, and stress. They also reported that the quality of life was negatively affected by procrastination; therefore, those higher in procrastination tendencies reported lower quality of life. The negative emotions of procrastination, such as anxiety and depression, have been reported to be just as likely antecedents as they are consequences of procrastination

(Steel, 2007; Van Eerde, 2003). Students who have anxiety and depression may procrastinate to escape from the negative emotions (Van Eerde, 2003). In turn, when the time pressure of an academic task exceeds one's resources, it may lead to feelings of guilt, anxiety, and depression (Van Eerde, 2003). Similarly, Steel's (2007) meta-analysis reported procrastination as a temporary strategy to avoid negative emotions such as anxiety, offering short-term mood relief but ultimately leading to increased distress.

Academic procrastination not only negatively affects the emotional well-being of students but has been consistently cited as negatively affecting academic performance. When academic tasks are delayed, students may rush the assignments, leading to poorer quality work or incomplete assignments (Fentaw et al., 2022). Kim & Seo (2015) conducted a meta-analysis to examine the relationship between procrastination and academic performance. A significant relationship between procrastination and academic performance was found when performance was indicated by grade point average (GPA) (r = -.12), assignment grades (r = -.64), quiz score (r = -.29), or course grades (r = -.24) (Kim & Seo, 2015). The meta-analysis revealed that procrastination is negatively associated with academic performance. Kim & Seo (2015) suggest it is inevitable that delaying assignments or putting off studying for an exam will limit coverage of course content and be reflected in poor academic performance. Findings from Steel's (2007) meta-analysis support this claim evidencing that procrastination is associated with a decline in overall academic performance (r = -.19), assignment grade (r = -.21), course GPA (r = -.25), and final exams (r = -.17). Students who postpone academic tasks encounter a variety of academic problems, including difficulties studying, plagiarism, lower academic scores, examination anxiety, and the development of a sense of inferiority (Fentaw et al., 2022). Literature supports that procrastination has negative effects on various evaluations of academic performance.

Measures of Procrastination

Most studies on procrastination utilize self-report measures, which assess either general procrastination tendencies or procrastination specifically related to academic tasks.

Lay's General Procrastination Scale (GP; Lay, 1986) is a well-established and reliable measure of procrastination. Consisting of 20 items scored on a five-point Likert scale, Lay's GP scale measures procrastination across a range of tasks and is frequently employed to evaluate procrastination in an academic setting (Sirois, 2014). The GP scale includes 10 reverse-scored items and has demonstrated good internal consistency ($\alpha = .82$; Lay, 1986).

Tuckman Procrastination Scale (TPS; Tuckman, 1991) is another frequently used measure of procrastination, often applied in the context of academics (Kim & Seo, 2015; Limone et al., 2020; Ocansey et al., 2022). TSP consist of 16 self-reported items, which are rated on a four-point Likert scale. TPS accounts for two types of procrastination: general explanation of procrastination and likelihood to avoid difficult or unpleasant tasks (Limone et al., 2020). In the original study, Cronbach's alpha for the scale was reported as .86 (Rozental et al., 2018).

Both Lay's GP scale and TPS have been applied to many studies to evaluate academic procrastination, but a limitation is that they are not context-specific measures. The *Procrastination Assessment Scale Students* (PASS; Solomon et al., 1984) is a frequently used measure and is context-specific to academics. The PASS evaluates how often students procrastinate, to what extent such procrastination represents a problem, and the willingness of students to change their procrastination behaviors (Fentaw et al., 2022; Kim & Seo, 2015; Svartdal et al., 2020). Academic procrastination is evaluated across six dimensions: (a) writing an assignment, (b) oral presentation, (c) studying for an examination, (d) performing group work, (e) performing academic tasks in general, and (f) doing library work. The PASS contains 44 items, each answered on a five-point Likert scale (Fentaw et al., 2022).

Most researchers regard procrastination as a personality trait, making the TPS, PASS and Lay's GP scale good measures of trait-based procrastination. A shortcoming of all three of these measures is that they provide researchers with information on procrastination tendencies but do not provide feedback or guidance to learners on ways to improve their procrastination tendencies.

Time Management as a Mediator

Time management is a concept that encompasses various strategies and tools to organize work and life, enabling the effective and efficient accomplishment of tasks (van Eerde, 2015). Self-regulated learning (SRL) is defined as the efforts to initiate, direct, and strategically manage goal pursuit via metacognitively planning, monitoring, evaluating and adapting one's cognition, behavior, motivation and affect (Greene et al., 2023). Time management can be incorporated into self-regulation theory; it fosters the initiation of goal-directed behavior, increases persistence, helps resist distractions, and adjusts one's strategy appropriately while striving for goal achievement (Häfner et al., 2014). Time management practices may include increasing awareness of time use, setting goals, prioritizing, planning, monitoring, and organizing (van Eerde, 2015). Effective time management practices enable individuals to make more informed decisions about allocating their time efficiently. Effective time management enables more time and resources to be dedicated to current tasks.

Literature shows that time management can be understood to include distinct components, such as planning time and monitoring time (Häfner et al., 2014; van Eerde, 2015). Planning time refers to the amount of time an individual spends organizing, scheduling, and setting goals prior to beginning a task (van Eerde, 2015). This includes behaviors such as creating a to-do list or schedule, allocating specific time to tasks and prioritizing tasks. In contrast, monitoring time involves tracking and adjusting one's progress during task engagement

(van Eerde, 2015). It includes behaviors such as assessing time use, recognizing distractions, and modifying one's behavior to stay on track. While planning time is an SRL practice performed prior to commencing a task, monitoring time is employed during a task. Both are considered essential components of time management and self-regulated learning (Häfner et al., 2014; Limone et al., 2020; van Eerde, 2015).

Literature supports the notion that conscientiousness is positively associated with time management, while time management is negatively associated with procrastination. Additionally, conscientiousness has been consistently reported to have a strong negative relationship with procrastination. These findings suggest that time management may function as a mechanism through which conscientiousness affects procrastination, acting as a mediator.

In mediation, the predictor variable influences the mediator, which in turn affects the outcome variable. Learners high in conscientiousness tend to be higher in time management practices, which in turn decreases the levels of procrastination. Conversely, individuals low in conscientiousness tend to be disorganized, lack attention, and exhibit low goal-directed behavior, leading to poor time management practices, such as time allocation, task prioritization, and goal setting, resulting in increased procrastination tendencies. Conscientiousness influences the extent to which an individual deploys time management practices, which in turn impacts their tendency to procrastinate. Time management practices are a key component of SRL and may serve as a mechanism linking conscientiousness and procrastination.

Measures of Time Management Practices

Time management practices are typically measured using self-report questionnaires, which seek to assess how students manage their time and plan tasks. A commonly used measure of time management practices is the *Motivated Strategies for Learning Questionnaire* (MSLQ;

Pintrich, 1993). The MSLQ is comprised of 81 items, responded to on a seven-point Likert scale, designed to capture two broad dimensions of self-regulation: motivation and learning strategies (Bidjerano & Dai, 2007; Ghyasi et al., 2013; Limone et al., 2020). The *Time Management Behaviour Scale* (TMBS; Britton & Tesser, 1991) is another measure used to evaluate time management practices (Douglas et al., 2016). Consisting of 29 items, which are rated on a five-point Likert scale, the TMBS evaluates setting goals and priorities, mechanics of time management, and preference for organization (Douglas et al., 2016). Learning and study strategies can be evaluated via the *Learning and Study Strategies Inventory* (LASSI; Weinstein et al., 1987). The LASSI requires students to self-report their use of strategy and learning modes of SRL (Eilam et al., 2009; Limone et al., 2020). The 76-item inventory consists of five subscales: goals, time management, monitoring, self-efficacy and strategies (Eilam et al., 2009).

Self-report measures of time management practices (i.e., MSLQ, TMBS, LASSI) fail to provide diagnostic feedback to learners. Diagnostic feedback would provide learners the opportunity to align their beliefs and experiences with their strategic choices about which practices to deploy during academic tasks (Hadwin et al., 2025).

The Relationship between Conscientiousness and Procrastination

Personality traits are considered one of the key internal factors predicting academic procrastination (Ocansey et al., 2022). Specifically, conscientiousness has been found to be the strongest predictor of avoiding risky behavior (Caspi et al., 2005). Conscientiousness has been reported as one of the strongest predictors of procrastination and is negatively associated with procrastination (Ocansey et al., 2022; Steel, 2007; van Eerde, 2003; van Eerde 2004). Individuals low in conscientiousness are characterized by being disorganized, having a lack of attention to detail and being low in goal-directed behavior (Steel, 2007). These tendencies are associated with increased rates of procrastination (Meng et al., 2024; Steel, 2007; van Eerde, 2003; van

Eerde & Klingsieck, 2018). Those high in conscientiousness are organized, set goals, and complete tasks on time. Individuals high in conscientiousness are consistently found to be low in procrastination. Procrastination may be a symptom of low conscientiousness and self-regulatory failure (Steel, 2007).

The negative relationship between conscientiousness and procrastination has also been reported in several meta-analyses, yielding similar findings. When examining the relationship between conscientiousness and procrastination, it has been found that conscientiousness exhibits the largest effect size among the five personality traits, with correlations of r = -.65 (K= 41) and r = -.63 (K= 121) (van Eerde, 2003; van Eerde, 2004). Steel's (2007) meta-analysis reported similar findings, with an average correlation of -.62 (K= 20). Additionally, Steel (2007) reported that other factors of conscientiousness are related to procrastination. These factors include self-control/self-discipline (r = -.58), distractibility (r = .45), organization (r = -.36), achievement motivation (r = -.35), and dilatory behavior (r = .52). Finally, Meng et al.'s (2024) meta-analysis integrating the traditional Big Five personality traits and the darker traits, such as Machiavellianism, psychopathy and narcissism, known as the Dark Triad and reported that conscientiousness was negatively associated with procrastination ($\rho = -0.23$; K= 37).

One explanation for this weak-to-moderate relationship could be that time management practices serve as a mediator between conscientiousness and procrastination. Research suggests that individuals high in conscientiousness tend to have better time management skills, which in turn reduces procrastination. This implies that if the personality trait of conscientiousness is high, then procrastination tendencies will be low, and vice versa, if the personality trait of conscientiousness is low, then procrastination tendencies will be high. These findings have all

used measures of the Big Five personality traits, which have been stated as a limitation (Meng et al., 2024). Using a measure that evaluates all five facets of personality on one scale may obscure their subtle connections with procrastination. Specific personality traits, such as conscientiousness, may have a stronger or opposite effect on procrastination compared to others and combining traits into one scale may mask these nuanced relationships. Therefore, it has been suggested that future research should narrow its facets to specifically target and evaluate the identified area of interest, such as conscientiousness. This would allow for a more precise understanding of which aspect of personality are most relevant for predicting procrastination.

Time Management Practices and Procrastination

The relationship between procrastination and time management practices has been extensively studied. Time management and procrastination are logically related, as effective time management could serve as a strategy to overcome procrastination (van Eerde, 2015).

Zimmerman's Cyclic Phase Model of Self-Regulated Learning offers a useful framework for understanding the relationship between time management and procrastination. The model conceptualizes SRL in three phases: forethought, performance and self-reflection. In the forethought phase, students analyze the task, set goals and plan how to reach them – this phase closely aligns with planning time. During the performance phase, students carry out the task while monitoring their progress, using several self-control strategies. This phase involves monitoring time to ensure timely completion. Finally, in the self-reflection phase, students evaluate how they have performed the task and make attributions for success or failure (Panadero, 2017). Each phase contributes to how effectively students manage their time and ultimately their tendency to procrastinate.

Procrastination among students has been reported as a lack of time management (Chun Chu & Choi, 2005; Fentaw et al., 2022; Häfner et al., 2014; Limone et al., 2020). When

comparing non-procrastinators, passive procrastinators, and active procrastinators, differences in time management were identified. Passive procrastination involves delaying task completion due to indecision, avoidance or lack of SRL. It often leads to feeling out of control, failing to meet deadlines, and feeling dissatisfied with task performance. In contrast, active procrastination involves intentionally delaying task completion and is characterized by believing one can work better under pressure and feeling satisfied with tasks at completion (Chun Chu & Choi, 2005). Passive procrastinators reported a lower level of time structure than non-procrastinators and active procrastinators. Therefore, passive procrastinators are those who procrastinate due to being paralyzed by the indecision to complete an academic task and are associated with decreased perception of time control and increased avoidance-coping behavior (Chun Chu & Choi, 2005). Poor scheduling skills among students result in inefficient use of their time by engaging in social media, leisure, social events, and unplanned actions, increasing procrastination tendencies (Fentaw et al., 2022). The use of time and the regulation of metacognitive processes have a strong negative relationship with procrastination; either the lack of regulation of metacognitive processes or the lack of managing time may lead students to procrastinate (Limone et al., 2020). Time management interventions that focus on planning behavior, prevent procrastination and lead to a more equal distribution of work (Häfner et al., 2014).

Research consistently demonstrates a link between procrastination and time management practices. Individuals who demonstrate poor time management practices are more likely to procrastinate on academic tasks, whereas those who deploy time management practices procrastinate less. Interventions that employ time management practices have the potential to reduce procrastination behaviors and aid students in being more successful. When examining the

relationship between time management practices and procrastination, procrastination is often viewed as context-specific and temporary. Future research should explore the potential influence of underlying personality traits on the relationship between time management practices and procrastination.

Time Management Practices and Conscientiousness

The Big Five personality factors have demonstrated predictive power, influencing both the selection and effectiveness of SRL strategies (Ghyasi et al., 2013). Among these traits, conscientiousness is associated with a large range of SRL strategies and plays a critical role in shaping an individual's self-regulatory behavior. Individuals low in conscientiousness are characterized by being disorganized, having a lack of attention to detail and being low in goal-directed behavior (Steel, 2007). In contrast, individuals high in conscientiousness are better at deploying SRL strategies, which help them stay organized, set goals, and complete tasks on time (Bidjerano & Dai, 2007; Douglas et al., 2016; Eilam et al., 2009; Ghyasi et al., 2013). Specifically, individuals high in conscientiousness are more likely to engage in time management practices (Bidjerano & Dai, 2007; de la Fuente et al., 2020; Eilam et al., 2009; Ghyasi et al., 2013). A medium positive correlation has been found between conscientiousness and time management (r = .36) (Bidjerano & Dai, 2007). Moreover, facets of conscientiousness, including industriousness and orderliness, are significant predictors of time management practices (Douglas et al., 2016). These findings support the positive relationship between conscientiousness and time management practices.

Research shows that time management practices are positively associated with conscientiousness and negatively associated with procrastination. Given the theoretical importance of SRL practices and the role of time management as a key SRL strategy, time management practices emerge as a probable mediator in this relationship. By testing the

mediation, this study aims to clarify the underlying mechanism through which conscientiousness influences procrastination, providing a more nuanced understanding of the relationship.

Purpose Statement and Hypotheses

The purpose of this study is to examine the relationship between conscientiousness and procrastination in undergraduate students and investigate whether time management practices (planning time and monitoring time), as a subset of self-regulated learning (SRL) strategies, mediate this relationship during academic study sessions. Specifically, the study aims to explore how individual differences in conscientiousness may influence procrastination tendencies through the use of two types of time management practices (monitoring time and planning time).

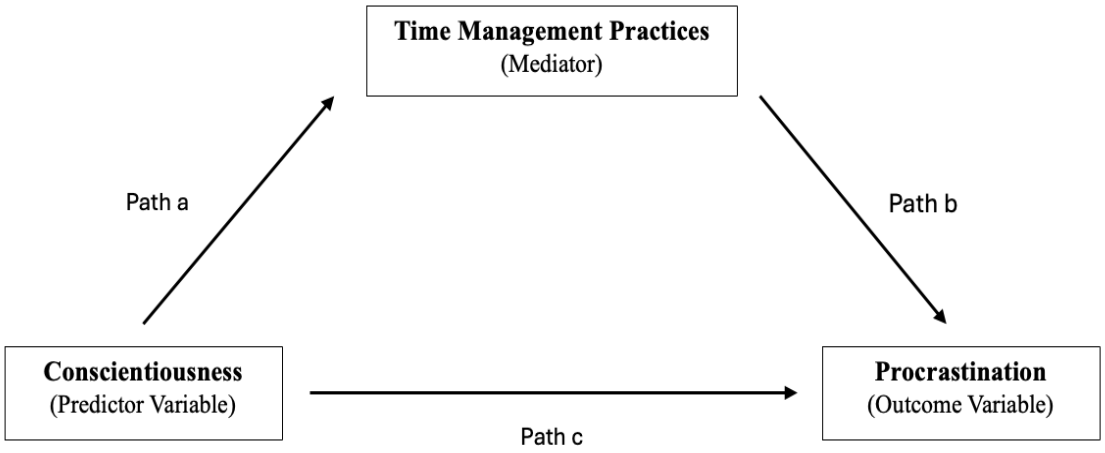
Research suggests that individuals who are higher in conscientiousness are more organized, responsible and self-disciplined, which tends to reduce procrastination. Therefore, it is hypothesized that conscientiousness will be negatively associated with procrastination (see Path c of *Figure* 1). Conscientious individuals are more likely to engage in effective planning, goal setting, and time management behaviors. Effective time management helps individuals prioritize tasks to meet deadlines. Thus, it is hypothesized that time management practices will mediate the relationship between conscientiousness and procrastination. Conscientiousness is expected to be positively associated with time management practices (see Path a of *Figure* 1) and time management practices are expected to be negatively associated with procrastination (see Path b of *Figure* 1).

This study enhances our understanding of how conscientiousness affects procrastination by highlighting time management as a key mediating factor. Previous research has consistently shown that conscientiousness is negatively related to procrastination; however, few studies have explored the processes that explain this relationship. By positioning time management as a mediator, this model moves beyond basic trait-outcome links and begins to explore the

behavioural expressions of conscientiousness that can actively reduce procrastination. Additionally, this model is novel as it considers time management as a multidimensional concept. The distinction between planning time and monitoring time allows for a more detailed analysis of how these different strategies influence the ongoing relationship with procrastination.

Figure 1

Time management is expected to mediate the relationship between conscientiousness and procrastination.



Research Design

This study will use a cross-sectional design to investigate the mediating effect of time management practices (monitoring time and planning time) on the relationship between conscientiousness and procrastination, within the theoretical framework of SRL. In this study, procrastination was conceptualized as trait-based, which is relatively stable across time and situations. Conceptualizing it this way allows the examination of how procrastination is consistently related to enduring personality characteristics, such as conscientiousness and to broader SRL processes. A cross-sectional design is appropriate, as it allows for the examination of the relationship between the variables at a single point in time.

Path analysis will serve as the primary analytic technique. This approach is suitable for examining multiple complex relationships simultaneously and is particularly effective for testing mediation models. Path analysis allows for the assessment of both direct and indirect effects, making it possible to evaluate whether time management practices (monitoring time and planning time) mediate the relationship between conscientiousness (predictor variable) and procrastination (outcome variable).

Methods

Authors Positionality

My experiences have shaped my worldview and how I engage with the world around me. This positionality statement is an attempt to become aware of my own biases and address them.

As a lifelong resident of British Columbia, I have been educated about the culture and ways of life of Indigenous Peoples in British Columbia. I strive to continuously learn from those who have come before me and the land I inhabit today. I respectively acknowledge the Lekwungen-speaking peoples on whose traditional territory the University of Victoria stands and the Songhees, Esquimalt, and WSÁNEĆ peoples whose historical relationships with the land continue to this day.

I am a twenty-six-year-old Caucasian Canadian who comes from a loving middle-class family. I recognize my privilege and the lack of struggles I have faced to reach where I am today. My positionality may affect how I read, interpret, and reflect on research, as much of the literature in educational psychology often aligns with the demographics I identify with. I am committed to ongoing critical reflection on my positionality and how it informs both my research practices and my engagement with existing research.

Participants

Participants were recruited from a population of undergraduate students attending a

Western Canadian University (N= 277) who were enrolled in a Learning to Learn (L2L) course during the fall 2021 semester. Five participants were excluded from the data set as they were teacher assistants completing the surveys as a trial. The sample comprised of 42.96% females (N= 119) and 57.04% males (N= 158). The average age of the participants was 18.79 (SD= 2.42, min= 16, max= 48). The immigration status of the participants included 84.84% (N= 235) Canadian, 11.91% (N=33) study permits, and 3.25% (N=9) permanent residents. The majority of participants were from the Faculty of Social Sciences (n = 102, 36.82%), followed by the Faculty of Engineering and Computer Science (n = 59, 21.29%) and the Peter B. Gustavson School of Business (n = 42, 15.16%). Other faculties represented included the Faculty of Science (n = 36, 12.99%), Faculty of Humanities (n = 27, 9.74%), Faculty of Human and Social Development (n = 7, 2.52%), Faculty of Fine Arts (n = 3, 1.08%), and the Faculty of Education (n = 1, 0.36%). Participants enrolled in the L2L course were enrolled in various programs of study. All data were from a sample of participants who provided consent prior to data collection.

Ethical Considerations

Approval for this study was obtained from the University of Victoria Human Research Ethics Board (#PREP H22-01164), titled *Examining student success: Promoting adaptive regulation with innovative technologies (PAR-it)*—UVIC Transfer.

Individuals who participated in this study provided written informed consent and informed consent for publication. Approval from the University of Victoria Human Research Ethics Board was granted for publication (Appendix A).

This research was supported by the Social Sciences and Humanities Research Council of Canada (SSHRC) Partnership Grant Development: Advancing educational theory, assessment, and practice in higher education collaborative regulatory training, the SSHRC Examining Student Success: Promoting adaptive regulation with innovative technologies (PAR-IT), and the

University of Victoria LTSI Learning and Teaching Development Grant: Supporting students to leverage learning analytics for self-regulating learning in a large, first year undergraduate course.

The data that support the findings of this study are available from the corresponding author upon reasonable request (Appendix B). The data are not publicly available due to privacy or ethical restrictions. Ethics approval was not granted for data sharing. The authors declare no conflicts of interest.

Research Context

Participants were enrolled in a semester-long credit course, offered to undergraduate students at a Western Canadian university. L2L uses an SRL framework to guide students to develop the knowledge and skills to regulate multiple areas of their learning. Course objectives include developing knowledge about SRL theories and research, as well as factors contributing to student success (e.g., metacognition, cognition, motivation, behavior, and socio-emotional engagement). The course aims to help students choose and use evidence-based strategies that are best aligned with their academic work, goals, and skills.

Students enrolled in L2L attended a lecture (1.5 hrs) and a lab (1.5 hrs) each week. The lectures provided an in-depth introduction to concepts, theories and research. Whereas the labs provided an opportunity for learners to complete self-assessments, monitor and evaluate personalized strategies for improving their learning. Each self-assessment completed was followed up by a personalized report about their responses. The personalized reports helped learners develop self-awareness of their behaviors, motivations, strategies, and beliefs.

Measures

Conscientiousness

A seven-item conscientiousness subscale from the Motivation Scale was used as a measure of conscientiousness; four items were reverse-coded (see Appendix C). Each statement

described something about students' effort or persistence (i.e., *I tend to be disorganized; I see myself as someone who perseveres until the task is finished*) (John & Srivastava, 1999). Students responded to items on a five-point Likert scale on how much they agreed or disagreed with the statement, ranging from (1) st*rongly disagree* to (5) *strongly agree*. Higher scores indicate that students possess higher traits of conscientiousness. The subscale demonstrated acceptable internal consistency with a Cronbach's alpha of .83 and moderate to high test-retest reliability (John & Srivastava, 1999).

Procrastination

A five-item procrastination subscale from the Time Use and Procrastination Scale was used as a measure of procrastination (see Appendix C). Procrastination is conceptualized as trait-based. Each statement describes how students might do or feel with completing work or assignments (i.e., *I promise I will do something for my course, then put it off anyways)* (Wolters, 2003). Students responded to items on a five-point Likert scale, ranging from (1) *never true to me* to (5) *always true to me.* Higher scores indicate higher levels of procrastination. The subscale demonstrated acceptable internal consistency with a Cronbach's alpha of .87 and moderate to high test-retest reliability (Wolters, 2003).

Time Management

The Time Management self-assessment was comprised of two validated subscales: planning time and monitoring time. A five-item planning time subscale and a four-item monitoring time subscale from the Time Use and Procrastination Scale was used as a measure of time management (see Appendix C). Each statement in the planning time subscale describes how students manage their time to complete their academic work (i.e., *I set deadlines for myself when I set out to accomplish an assignment*) (Won & Yu's, 2018). Each item in the monitoring time

subscale describes how students plan to use their time when completing an academic task (i.e., *I look at a planner, schedule or calendar every day to see what I need to get done*) (Won & Yu's, 2018). Students responded to items on a five-point Likert scale, ranging from (1) *never true to me* to (5) *always true to me.* Higher scores indicate higher use of time management practices. The subscale of 'planning time' demonstrated acceptable internal consistency with a Cronbach's alpha of .80, similarly the subscale of 'monitoring time' demonstrated acceptable internal consistency with a Cronbach's alpha of .86. The test-retest reliability for both the 'planning time' and 'monitoring time' subscales were moderate to high, indicating stability over time.

Procedures

Data for this study were previously collected during the L2L course offered in the fall of 2021 semester. All self-assessments were completed using an online platform (Lime Survey) as part of regular course activities. During Week 6, participants completed the Time and Procrastination self-assessment, which captured the variables related to planning time, monitoring time and procrastination. In Week 9, participants completed the Motivation Scale self-assessments, which captured the variable of conscientiousness.

Analytic Approach

This study employed Path analysis to examine the relationship between conscientiousness and procrastination, while testing the mediating role of time management practices. Mediation path analysis allows for the simultaneous evaluation of both direct and indirect effects, making it ideal for exploring a moderation model.

Data Analysis

Path analysis was conducted using RStudio and the lavaan package. The hypothesized model included paths from conscientiousness (predictor) to time management practices

(mediator), from time management (mediator) to procrastination (outcome), as well as a direct path from conscientiousness to procrastination.

The total effect of conscientiousness on procrastination was decomposed into direct and indirect effects. An indirect test of the mediation effect was computed to demonstrate the mediator was of central importance (i.e., that it carries most or all of the significant effect of the independent variable to the dependent variable). The indirect effect was computed as the product of the path from conscientiousness to time management (path *a*) and the path from time management to procrastination (path *b*):

$$\text{Indirect effect} = a \times b$$

The total effect was calculated as:

$$\text{Total effect} = \text{Direct effect} + \text{Indirect effect}$$

Additionally, the proportion of the total effect explained by the mediator was calculated as:

$$\text{Proportion mediated} = \frac{a \times b}{\text{Total effect}}$$

Results

The results are presented in two parts. First, descriptive statistics (means, standard deviations (SD), skewness, kurtosis, intercorrelations, and internal consistency) were examined for conscientiousness, time management, and procrastination to evaluate the suitability of the data for mediation Path analysis. Second, Path analysis was conducted using a parallel mediation to examine the mediating role of time management (planning time and monitoring time) in the relationship between conscientiousness and procrastination.

Descriptive Statistics

Descriptive statistics for the study variables, including means, standard deviations (SD), skewness, kurtosis, intercorrelations, and internal consistency (Cronbach's alpha), are shown in

Table 1. Participants reported moderate levels of procrastination (M = 3.01, SD = 0.87) and time management (M = 3.47, SD = 0.77), with similar patterns for the subscales of monitoring time (M = 3.53, SD = 0.98) and planning time (M = 3.42, SD = 0.71). Conscientiousness was also reported at a moderate level (M = 3.09, SD = 0.66).

To ensure data quality, participants were included in the analysis only if they met minimum completion thresholds for each scale: Procrastination required at least 4 out of 5 items completed for inclusion, Conscientiousness required 6 out of 7, Time Management required 8 out of 9, Planning Time required 4 out of 5, and Monitoring Time required 3 out of 4 items completed. These thresholds ensured adequate representation of each construct.

As hypothesized, procrastination was significantly and negatively correlated with conscientiousness ($r = –.59$, $p < .001$), time management ($r = –.37$, $p < .001$), planning time ($r = –.37$, $p < .001$), and monitoring time ($r = –.24$, $p < .001$). Conscientiousness was positively correlated with time management ($r = .46$, $p < .001$), monitoring time ($r = .42$, $p < .001$), and planning time ($r = .44$, $p < .001$). The positive association of both planning time and monitoring time with conscientiousness, along with their negative relationship with procrastination, provide preliminary support for testing the proposed mediation Path analysis.

All scales demonstrated acceptable to excellent internal consistency, with Cronbach's alpha values ranging from .74 (Monitoring Time) to .89 (Procrastination).

Assumption Testing

Prior to conducting the path analysis, the data was evaluated to ensure that the necessary assumptions were met to carry out a path analysis.

The assumption of linearity was supported by the significant correlations observed among the study variables (Table 1). For example, consciousness was significantly and negatively correlated with procrastination ($r = –.59$, $p < .001$), suggesting a linear relationship.

All variables demonstrated approximately normal distributions, with skewness and kurtosis values falling within acceptable ranges (±1), supporting the assumption of multivariate normality. Frequency distributions for each variable are presented in Appendix D.

Intercorrelations among variables were examined to assess multicollinearity, particularly between the parallel mediators. The correlation between planning time and monitoring time was moderate ($r = .33$); this correlation does not exceed the commonly accepted threshold of .80. Therefore, these findings suggest that multicollinearity is not a concern.

Path analysis assumes exogenous variables are measured without error. The internal consistency of conscientiousness is acceptable (Cronbach's alpha = .79), supporting the reliability.

The proposed model was theoretically grounded and included relevant mediators and pathways. The model accounted for a substantial proportion of variance in procrastination ($R^2 = .40$), indicating a good fit and supporting the adequacy of the model specification.

To ensure adequate sample size, a post hoc power analysis was performed. A Monte Carlo simulation (500 replications, bootstrap SEs = 1,000) was conducted in R using the lavaan package to estimate post hoc statistical power for the two indirect effects in the mediation model. The estimated power was 0.88 for the indirect effect via Planning Time was (a1 × b1) and 1.00 for the indirect effect via Monitoring Time (a2 × b2), indicating sufficient sensitivity to detect the hypothesized mediation effects given the observed parameter estimates and sample size.

All assumptions for a path analysis were met.

Table 1

Descriptive statistics for Procrastination, Time Management, Monitoring Time, Planning Time and Conscientiousness.

	M	SD	Skewness	Kurtosis	Cronbach Alpha	1	2	3	4	5
1. Procrastination	3.01	0.87	0.14	-0.37	0.89	1.00				
2. Time Management	3.47	0.77	-0.05	-0.69	0.87	-0.37***	1.00			
3. Monitoring Time	3.53	0.98	-0.17	-0.79	0.74	-0.24***	0.93***	1.00		
4. Planning Time	3.42	0.71	-0.15	-0.18	0.85	-0.37***	0.91***	0.71***	1.00	
5. Conscientiousness	3.09	0.66	-0.18	-0.27	0.79	-0.59***	0.46***	0.42***	0.44***	1.00

Note. SD=standard deviation; *** significant at the 0.001 level; **significant at the 0.01 level; * significant at the 0.05 level.

Mediation Analysis

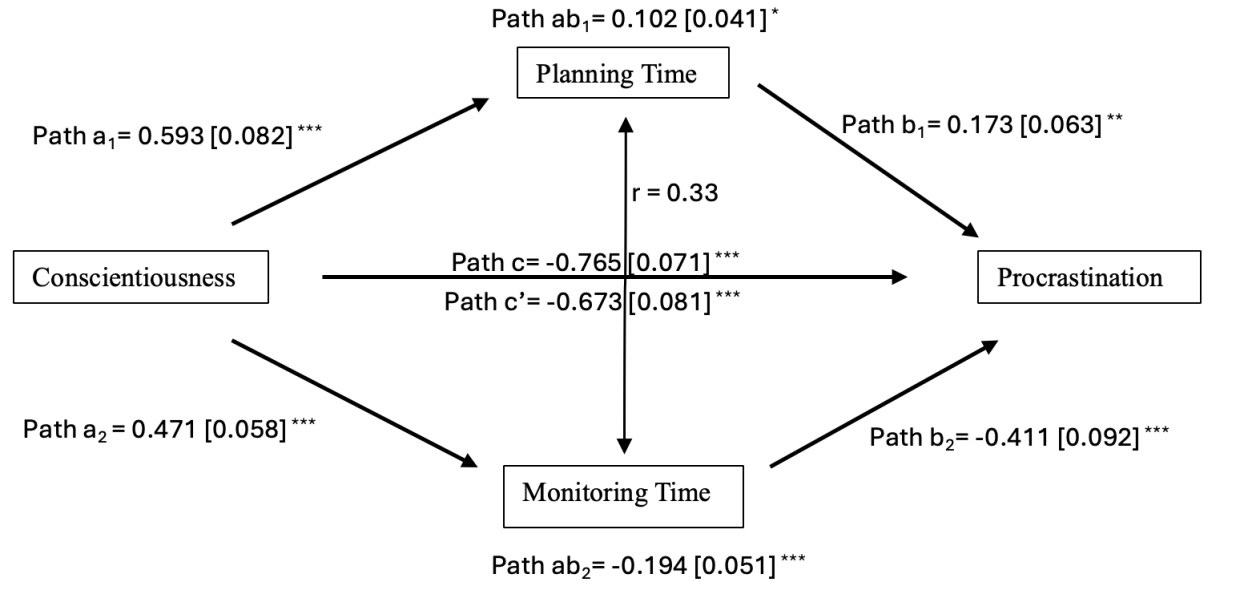
First, the total effect of conscientiousness on procrastination was examined. Conscientiousness was significantly and negatively related to procrastination (b = -0.765, SE = 0.071, $p < .001$; Path c). When the mediators were entered into the model, the direct effect of conscientiousness on procrastination remained significant and negative (b = -0.673, SE = 0.081, $p < .00$; Path c'), indicating partial mediation.

The indirect effect via monitoring time was significant and negative (b = -0.194, SE = 0.051, $p < .001$; Path ab_2), whereas the indirect effect via planning time was significant and positive (b = 0.102, SE = 0.041, p = .012; Path ab_1). Conscientiousness significantly predicted both planning time (b = 0.593, SE = 0.082, $p < .001$; Path a_1) and monitoring time (b = 0.471, SE = 0.058, $p < .001$; Path a_2). In turn, monitoring time significantly predicted lower procrastination (b = -0.411, SE = 0.092, $p < .001$; Path b_2), while planning time predicted greater procrastination (b = 0.173, SE = 0.063, p = .006; Path b_1). Monitoring time and planning time were moderately and positively correlated (r = .33, $p < .001$), indicating shared variance between the mediators.

Overall, the model accounted for a substantial proportion of variance in procrastination (R^2 = .40), a moderate amount of variance in monitoring time (R^2 = .20), and a moderate amount of variance in planning time (R^2 = .17).

Figure 2

Path Analysis with parallel mediation between planning time and monitoring time in the relationship of conscientiousness and procrastination.



Indirect Effect:
Conscientiousness on procrastination via Planning Time (Path ab_1): b = 0.102, SE = 0.041, p = .012*
Conscientiousness on procrastination via Monitoring Time (Path ab_2): b = -0.194, SE = 0.051, p = .001***
Total indirect effect: b = -0.091, SE = 0.042, p < .001***

Direct Effect:
Conscientiousness on procrastination (Path c'): b = -0.673, SE = 0.081, p < .001.

Total Effect:
Total effect (Path c): b = -0.765, SE = 0.071, p < .001***

Note. Solid lines represent significant paths, and dashed lines represent non-significant paths; *** significant at the 0.001 level; ** significant at the 0.01 level; * significant at the 0.05 level. Covariance between planning time and monitoring time was allowed. All estimates are unstandardized.

Summary of Findings

The results provide strong support for the hypothesized negative association between conscientiousness and procrastination. Conscientiousness is significantly and negatively associated with procrastination; therefore, those who are higher in conscientiousness will be lower in procrastination tendencies.

It was also hypothesized that time management practices would mediate the relationship between conscientiousness and procrastination. The total indirect effect was significant and negative, providing evidence of partial mediation. A significant and negative indirect effect via monitoring time was observed, indicating that higher consciousness predicted an increase in monitoring of time, which was associated with reduced procrastination. However, the indirect effect via planning time was significant but positive, suggesting that greater conscientiousness predicted increased planning, which unexpectedly associated with greater procrastination. Additionally, conscientiousness was also found to be positively associated with time management practices, both planning time and monitoring time, demonstrating that more conscientious individuals engage in more time management. Monitoring time significantly predicted lower procrastination, whereas planning time unexpectedly was positively associated with procrastination.

Discussion

This study aimed to examine the relationship between conscientiousness and procrastination in undergraduate students and investigate whether time management practices, including planning time and monitoring time, mediate this relationship during academic study sessions. Overall, the findings support the hypothesized association, with some nuanced outcomes offering new insight into the role of time management practices in academic procrastination.

Conscientiousness is negatively associated with procrastination

Consistent with previous research, conscientiousness was found to be a significant negative predictor of procrastination. This aligns with previous research that those high in the personality trait of conscientiousness are found to be lower in procrastination tendencies (Meng et al., 2024; Steel, 2007; van Eerde, 2003; van Eerde, 2004). Established personality theory

suggests that individuals higher in conscientiousness are organized, goal-oriented, and complete tasks on time, which in turn leads to lower procrastination tendencies (Bidjerano & Dai, 2007; Douglas et al., 2016; Eilam et al., 2009; Ghyasi et al., 2013). This relationship reinforces the understanding of conscientiousness as a key individual difference factor that contributes to effective academic behaviors and plays a vital role in minimizing procrastination.

Time management as a mediator

It was hypothesized that time management mediates the relationship between conscientiousness and procrastination. Planning time and monitoring time were found to play a meaningful role in explaining how an individual's level of conscientiousness influences procrastination.

Findings indicated that the relationship between conscientiousness and procrastination was partially mediated by the time management variables (planning time and monitoring), meaning that conscientiousness retained a significant negative direct effect on procrastination, part of its influence was transmitted indirectly through its association with planning and monitoring time, consistent with partial mediation. To better understand the nature of these findings, the next sections examine monitoring time and planning as potential mediators. Specifically, exploring how conscientiousness predicts each component and how each, in turn, is associated with procrastination.

Monitoring time as a mediator

The current study found that monitoring time was a significant mediator in the relationship between conscientiousness and procrastination, with a negative indirect effect. Individuals higher in conscientiousness were more likely to engage in monitoring time behaviors, such as tracking their progress and adjusting their actions during task completion,

which, in turn, was associated with lower procrastination. This finding reinforces previous research highlighting the role of monitoring time in effective SRL (van Eerde, 2015), suggesting that regularly assessing one's progress may help students stay focused, recognize distractions, and modify behavior to stay on track. The positive associations between conscientiousness and monitoring time supports the notion that conscientious individuals, who tend to be organized, disciplined, and goal-oriented, are better at deploying SRL strategies (Bidjerano & Dai, 2007; de la Fuente et al., 2020; Eilam et al., 2009; Ghyasi et al., 2013, Steel, 2007).

In line with theoretical expectations and prior findings, monitoring time retained a significant negative association with procrastination, even after controlling for conscientiousness and planning time. Individuals who regularly monitor their time appear better equipped to identify off-task behavior and redirect focus, thereby minimizing delays. This finding is consistent with past research demonstrating that time management practices reduce procrastination tendencies (Chun Chu & Choi, 2005; Fentaw et al., 2022; Häfner et al., 2014; Limone et al., 2020).

Taken together, these results highlight monitoring time as a key self-regulatory mechanism through which conscientiousness reduces procrastination. Adopting monitoring time strategies, particularly in those low in conscientiousness, may serve as a practical intervention aimed at reducing academic procrastination.

Planning time as a mediator

In contrast to monitoring time, planning time also partially mediated the relationship between conscientiousness and procrastination, but a positive indirect effect was observed. This unexpected finding suggests that greater conscientiousness predicted increased planning behavior, which in turn was associated with higher levels of procrastination. While planning time is typically viewed as an adaptive SRL strategy, this finding suggests a more complex and

potentially paradoxical dynamic. To better understand this mediating effect, it is helpful to first examine the relationship between conscientiousness and planning time, followed by the association between planning time and procrastination.

As expected, conscientiousness was found to be positively associated with planning time. This is consistent with prior research showing that individuals high in conscientiousness are better able to deploy SRL strategies (Bidjerano & Dai, 2007; de la Fuente et al., 2020; Eilam et al., 2009; Ghyasi et al., 2013). This finding is also consistent with the earlier finding about monitoring time, supporting claims that conscientious individuals are more organized, disciplined, and goal-oriented, traits that make them more inclined to plan their time effectively (Steel, 2007). This association underscores the role of conscientiousness as a foundational trait that predisposes individuals to use self-regulatory strategies, such as planning time.

Although bivariate correlation revealed the hypothesized negative associations between planning time and procrastination, when controlling for conscientiousness and monitoring time, what remained of planning time shared a positive association with procrastination in the parallel mediation model. While planning time is typically viewed as a productive behavior (Häfner et al., 2014; Limone et al., 2020; van Eerde, 2015), the current findings suggest that under certain conditions, planning time may serve as a maladaptive behavior and may facilitate rather than inhibit procrastination.

The finding that at least some portion of planning time is positively associated with procrastination may seem counterintuitive, given that planning time is traditionally viewed as a productive behavior. However, I posit that planning time can become dysfunctional and maladaptive when it ceases to function as a tool for productivity and shifts to a mechanism for avoidance, hindering action. In such cases, planning time may contribute to, rather than reduce,

procrastination. This paradoxical association can be better understood by examining psychological factors that can make planning maladaptive, particularly perfectionism-driven delays, fear of failure and paralysis stemming from overanalyzing and indecision. Under these conditions, planning ceases to function as a tool for actions and instead becomes a form of avoidance that contributes to procrastination.

Perfectionism is characterized by striving for flawlessness and setting excessively high standards for performance, accompanied by tendencies for overly critical evaluations of one's behavior (Jadidi et al., 2011; Smith et al., 2017). Research consistently shows that individuals scoring higher in perfectionism exhibit greater tendencies to delay academic tasks (Jadidi et al., 2011; Sirois et al., 2017; Smith et al., 2017). When the drive for flawless performance and excessively high standards is high (e.g., perfectionistic traits), it may result in overplanning without follow-through. Specific dimensions of perfectionism, including concern over mistakes, parental criticism, and doubts about actions, have been positively linked to academic procrastination, further illustrating how perfectionism may be linked to maladaptive time management, which can disrupt timely task engagement.

Fear of failure is another key factor that can contribute to maladaptive planning. It is characterized by a persistent concern with receiving negative evaluations from oneself and others that can have a paralyzing effect on goal-directed behavior (Sirois et al., 2017). Fear of failure is one of the primary reasons for procrastination (Onwuegbuzie, 2004; Solomon et al., 1984). Fear of failure can hinder individuals from starting or completing academic assignments for fear of not achieving the expected standard (Sudirman et al., 2023). Individuals may avoid starting a task that could result in judgment, rejection, or perceived inadequacy; therefore, planning becomes a safety behavior, an excuse to delay exposure to potential failure.

Paralysis stemming from overanalyzing and indecision, often referred to as analysis paralysis, is closely related to procrastination. This pattern involves excessive mental processing of tasks or decisions, which leads to preplanning without execution. Overanalyzing tasks and the inability to make decisions causes an individual to expend considerable cognitive efforts on evaluating options and planning next steps, failing to take action. It is a cognitive and emotional stall-out closely related to procrastination, especially in tasks requiring planning or decision-making. While procrastination often involves avoiding unpleasant tasks, analysis paralysis involves avoidance disguised as careful preparation.

This distinction between functional and dysfunctional planning can be supported by Zimmerman's (2000) Cyclic Phases Model, which places planning within the forethought phase of self-regulated learning. If students remain stuck in this phase—planning without transitioning to effective performance or self-monitoring—planning may contribute to delay. Moreover, certain students may use planning as a form of control or protection against anticipated failure.

These findings highlight the importance of examining qualitative differences in how time management strategies are employed, rather than assuming all planning is inherently adaptive. Time management should be viewed as a multidimensional construct, where the interplay of strategies such as planning and monitoring may be essential for reducing procrastination. The observed positive association between planning time and procrastination suggests some planning reflects maladaptive self-regulation. To better understand this relationship, future research should investigate the underlying psychological constructs, such as perfectionism**,** fear of failure, and analysis paralysis, that may shape how planning is enacted. These factors can impair the ability to translate plans into actions or promote planning as a form of avoidance rather than as an

effective SRL strategy. Examining such moderators could help distinguish between functional and maladaptive planning.

Additionally, future research should explore how different time management practices mediate the conscientiousness–procrastination relationship. The use of a more comprehensive measure of time management and subcomponents such as task management, time perspectives, and time use efficiencies may provide further insight into the mechanisms by which time management contributes to or inhibits procrastination.

Overall, the model accounted for a substantial proportion of the variance in procrastination (R^2=*.40),* but other variables may play a key role in explaining procrastination among undergraduate students. Future research should examine individual learning differences (e.g. ADHD, dyslexia, executive function deficits) among students, as they may impact the relationship between conscientiousness and procrastination. Past research shows that students with learning differences often face greater academic stress, lower self-efficacy and weaker emotional intelligence, all of which can increase procrastination (Hen & Goroshit, 2014; Niazov et al., 2022). Learning differences have also been tied to executive functioning difficulties – including attention, working memory, flexibility, temporal processing and self-regulation – which affect time management practices (Kreider et al., 2019). While strong executive functioning supports planning and monitoring time, deficits can disrupt these processes and, in turn, the link between conscientiousness and procrastination. Future research should investigate these individual learning differences as they may be a key factor in explaining the remaining variance in procrastination.

In addition to the theoretical and empirical explanations discussed, it is also important to consider potential methodological factors that may account for the observed associations,

particularly measurement error. Path analysis using observed variables assumes perfect reliability of the measured constructs, which is rarely achieved in practice. Unaccounted measurement error can lead to biased estimates, either underestimating or distorting true relationships, and may contribute to misleading indirect effects. Structural equation modelling (SEM) with latent variables offers a way to address these limitations by modelling the underlying constructs based on multiple observed indicators, thereby reducing the influence of measurement error. SEM also allows for testing construct validity via confirmatory factor analysis and evaluating model fit. Applying SEM with latent variables in this context could provide a more accurate and reliable understanding of how conscientiousness influences procrastination through time management practices like planning and monitoring.

Significance and Implications

This study advances the literature on SRL and procrastination, clarifying the mediating role of specific time management practices. While previous research has established the connection between time management and procrastination, as well as conscientiousness and procrastination, few studies have investigated how specific time management practices may mediate this relationship. By incorporating distinct time management behavior, such as planning time and monitoring time, this research provides a more nuanced understanding of how personality traits may influence procrastination through time management practices.

A key contribution of this study is its distinction between planning time and monitoring time. This distinction demonstrates that not all time management practices are equally effective at reducing procrastination tendencies. Independently planning time positively predicted procrastination, but when examining the total indirect effect with monitoring time, it was significant and negative. This underscores the importance of examining distinct time

management practices independently, rather than treating time management as a unitary construct.

The finding that planning time is associated with increased procrastination challenges the assumption that all time management practices are beneficial. This finding raises critical questions about when and how specific time management practices become counterproductive. Potential mechanisms, such as overplanning, perfectionism, and procrastination through planning, should be further explored.

From a practical standpoint, the findings have valuable implications for educational interventions. Demonstrating that time management practices mediate the effects of conscientiousness on procrastination, providing valuable insight into how interventions can be tailored to help minimize procrastination tendencies. Educators may find it more effective to focus on enhancing specific strategies, such as promoting realistic planning and monitoring, rather than general time management practices.

Despite self-report measures often being criticized, they serve as a strength in this study. Traditional self-report measures fail to provide timely feedback that learners can utilize to better align their beliefs and their strategies. The self-report data collected in this study provided participants with personalized reports, including reports summarizing subscale scores, a theoretical explanation of what the scores revealed about learning strengths and weaknesses, access to a debriefing session to support interpretation, and links to a strategy library (Hadwin et al., 2025). Personalized feedback provides students with the information and resources needed to foster greater academic self-awareness.

Methodologically, this study utilized parallel mediation, which demonstrates the value of analyzing mediators both individually and in combination to gain a better understanding of how time management practices contribute to the conscientiousness-procrastination dynamic. While the findings of this study are promising, there do exist limitations that must be considered when interpreting the results.

Limitations

Several limitations must be considered. First**,** the sample consists exclusively of first-year undergraduate students enrolled in an L2L course at a Western Canadian university, which may not reflect the broader university student population. These students opted into a course designed to enhance self-regulated learning skills, which may indicate a greater interest or motivation towards academic improvement compared to the broader student population. Therefore, the findings may not be generalized to all university students and should be interpreted with caution, acknowledging the potential for self-selection bias.

Another limitation is the use of self-report measures to assess procrastination, conscientiousness, and time management practices; while suitable for this study, they are subject to social desirability bias and recall bias. Participants may respond in the way they see most desirable or inaccurately recall their behaviors and tendencies. The data for this study was collected as a means of personal reflection of students' SRL skills, which may limit the extent to which the responses reflect actual behaviors.

Third, existing literature supports that personality traits, specifically conscientiousness, tend to be relatively stable over shorter periods. In the present study, conscientiousness was measured three weeks after the assessment for procrastination and time management practices. Despite this sequencing, the study should be considered cross-sectional in design. Given the temporal stability of conscientiousness over shorter periods, this delay is unlikely to have

introduced substantial bias. To improve methodological rigor, future research should aim to measure conscientiousness prior to or concurrently with the measures of procrastination and time management practices to more clearly establish directionality and reduce the influence of temporal confounds.

Finally, this study did not directly explore the underlying psychological mechanisms that may explain the observed relationship, particularly the unexpected association between planning time and increased procrastination. While the mediation model identified significant statistical pathways, it does not clarify why these associations emerged. Future research is needed to unpack these potential factors that may influence how planning time functions in relation to procrastination.

Conclusion

These findings underscore the importance of understanding how personality traits like conscientiousness interact with specific self-regulatory behaviors to influence procrastination. By examining planning and monitoring time as specific strategies of time management, this study offers a more nuanced understanding of how time management practices mediate the relationship between consciousness and procrastination.

References

Bidjerano, T., & Dai, D. Y. (2007). The relationship between the Big-Five model of personality and self-regulated learning strategies. *Learning and Individual Differences*, *17*(1), 69–81. https://doi.org/10.1016/j.lindif.2007.02.001

Britton, B. K., & Tesser, A. (1991). Effects of time-management practices on college grades. *Journal of Educational Psychology, 83*(3), 405–410. https://doi.org/10.1037/0022-0663.83.3.405

Caspi, A., Roberts, B. W., & Shiner, R. L. (2005). Personality development: Stability and change. *Annual Review of Psychology*, *56*, 453–484. https://doi.org/10.1146/annurev.psych.55.090902.141913

Chun Chu, A. H., & Choi, J. N. (2005). Rethinking procrastination: Positive effects of "active" procrastination behavior on attitudes and performance. *Journal of Social Psychology*, *145*(3), 245–264. https://doi.org/10.3200/SOCP.145.3.245-264

Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO–PI–R) and NEO Five-Factor Inventory (NEO–FFI) professional manual*. Psychological Assessment Resources.

de la Fuente, J., Paoloni, P., Kauffman, D. F., Soylu, M. Y., Sander, P., & Zapata, L. (2020). Big Five, self-regulation, and coping strategies as predictors of achievement emotions in undergraduate students. *International Journal of Environmental Research and Public Health*, *17*(10), 3602. https://doi.org/10.3390/ijerph17103602

Douglas, H. E., Bore, M., & Munro, D. (2016). Coping with university education: The relationships of time management behaviour and work engagement with the Five Factor Model aspects. *Learning and Individual Differences*, *45*, 268–274. https://doi.org/10.1016/j.lindif.2015.12.004

Eilam, B., Zeidner, M., & Aharon, I. (2009). Student conscientiousness, self-regulated learning, and science achievement: An explorative field study. *Psychology in the Schools*, *46*(5), 420–432. https://doi.org/10.1002/pits.20387

Fentaw, Y., Moges, B. T., Ismail, S. M., & Rezvani, E. (2022). Academic procrastination behavior among public university students. *Education Research International*, *2022*, 1–8. https://doi.org/10.1155/2022/1277866

Furnham, A., & Cheng, H. (2019). The change and stability of NEO scores over six-years: A British study and a short review. *Personality and Individual Differences*, *144*, 105–110. https://doi.org/10.1016/j.paid.2019.02.038

Ghyasi, M., Yazdani, M., & Farsani, M. A. (2013). The relationship between personality types and self-regulated learning strategies of language learners. *International Journal of Applied Linguistics and English Literature*, *2*(4), 74–82. https://doi.org/10.7575/aiac.ijalel.v.2n.4p.74

Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality*, *37*(6), 504–528. https://doi.org/10.1016/S0092-6566(03)00046-1

Greene, J. A., Bernacki, M. L., & Hadwin, A. F. (2023). Self-regulation. In A. A. Lipnevich, F. Preckel, & R. D. Roberts (Eds.), *Handbook of educational psychology* (pp. 314–334). Taylor & Francis. https://doi.org/10.4324/9780429433726-17

Hadwin, A. F., Rostampour, R., & Winne, P. H. (2025). Advancing self-reports of self-regulated learning: Validating new measures to assess students' beliefs, practices, and challenges. *Educational Psychology Review*, *37*(1), Article 8. https://doi.org/10.1007/s10648-024-09977-9

Häfner, A., Oberst, V., & Stock, A. (2014). Avoiding procrastination through time management: An experimental intervention study. *Educational Studies*, *40*(3), 352–360. https://doi.org/10.1080/03055698.2014.899487

Hen, M., & Goroshit, M. (2014). Academic procrastination, emotional intelligence, academic self-efficacy, and GPA: A comparison between students with and without learning disabilities. *Journal of Learning Disabilities, 47*(2), 116–124. https://doi.org/10.1177/0022219412439325

Jadidi, F., Mohammadkhani, S., & Tajrishi, K. Z. (2011). Perfectionism and academic procrastination. *Procedia - Social and Behavioral Sciences, 30*, 534–537. https://doi.org/10.1016/j.sbspro.2011.10.104

John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102–138). Guilford Press.

Jones, S. A., Van Fossen, R. P., Thompson, W. K., Baker, F. C., Clark, D. B., & Nagel, B. J. (2022). Developmental trajectories of Big Five personality traits among adolescents and young adults: Differences by sex, alcohol use, and marijuana use. *Journal of Personality*, *90*(5), 748–761. https://doi.org/10.1111/jopy.12694

Kim, K. R., & Seo, E. H. (2015). The relationship between procrastination and academic performance: A meta-analysis. *Personality and Individual Differences*, *82*, 26–33. https://doi.org/10.1016/j.paid.2015.02.038

Kreider, C. M., Medina, S., & Slamka, M. R. (2019). Strategies for coping with time-related and productivity challenges of young people with learning disabilities and attention-deficit/hyperactivity disorder. Children, 6(2), Article 28. https://doi.org/10.3390/children6020028

Lay, C. H. (1986). At last, my research article on procrastination. *Journal of Research in Personality, 20*(4), 474–495. https://doi.org/10.1016/0092-6566(86)90127-3

Lee, S. Y., & Hall, N. C. (2020). Understanding procrastination in first-year undergraduates: An application of attribution theory. *Social Sciences*, *9*(8), Article 136. https://doi.org/10.3390/SOCSCI9080136

Limone, P., Sinatra, M., Ceglie, F., & Monacis, L. (2020). Examining procrastination among university students through the lens of the self-regulated learning model. *Behavioral Sciences*, *10*(12), Article 184. https://doi.org/10.3390/bs10120184

McCrae, R. R., Costa, P. T., Terracciano, A., Parker, W. D., Mills, C. J., De Fruyt, F., & Mervielde, I. (2002). Personality trait development from age 12 to age 18: Longitudinal, cross-sectional, and cross-cultural analyses. *Journal of Personality and Social Psychology*, *83*(6), 1456–1468. https://doi.org/10.1037/0022-3514.83.6.1456

Meng, X., Pan, Y., & Li, C. (2024). Portraits of procrastinators: A meta-analysis of personality and procrastination. *Personality and Individual Differences*, 218, 112490. https://doi.org/10.1016/j.paid.2023.112490

Miyake, A., & Kane, M. J. (2022). Toward a holistic approach to reducing academic procrastination with classroom interventions. *Current Directions in Psychological Science*, *31*(4), 291–304. https://doi.org/10.1177/09637214211070814

Niazov, Z., Hen, M., & Ferrari, J. R. (2022). Online and academic procrastination in students with learning disabilities: The impact of academic stress and self-efficacy. Psychological Reports, 125(2), 890–912. https://doi.org/10.1177/0033294120988113

Ocansey, G., Addo, C., Onyeaka, H. K., Andoh-Arthur, J., & Oppong Asante, K. (2022). The influence of personality types on academic procrastination among undergraduate students.

International Journal of School and Educational Psychology, *10*(3), 360–367. https://doi.org/10.1080/21683603.2020.1841051

Onwuegbuzie, A. J. (2004). Academic procrastination and statistics anxiety. *Assessment and Evaluation in Higher Education, 29*(1), 3–19. https://doi.org/10.1080/0260293042000160384

Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology*, *8*, Article 422. https://doi.org/10.3389/fpsyg.2017.00422

Pintrich, P. R., Smith, D. A. F., Garcia, T., & McKeachie, W. J. (1993). Reliability and predictive validity of the motivated strategies for learning questionnaire (MSLQ). *Educational and Psychological Measurement*, *53*(3), 801–813. https://doi.org/10.1177/0013164493053003024

Pollack, S., & Herres, J. (2020). Prior day negative affect influences current day procrastination: A lagged daily diary analysis. *Anxiety, Stress and Coping*, *33*(2), 165–175. https://doi.org/10.1080/10615806.2020.1722573

Rad, H. S., Samadi, S., Sirois, F. M., & Goodarzi, H. (2023). Mindfulness intervention for academic procrastination: A randomized control trial. *Learning and Individual Differences*, *101*, 102244. https://doi.org/10.1016/j.lindif.2022.102244

Roberts, B. W., DelVecchio, W. F., & Eisenberg, N. (2000). The rank-order consistency of personality traits from childhood to old age: A quantitative review of longitudinal studies. *Psychological Bulletin*, *126*(1), 3–25. https://doi.org/10.1037/0033-2909.126.1.3

Roberts, B. W., Walton, K. E., & Viechtbauer, W. (2006). Patterns of mean-level change in personality traits across the life course: A meta-analysis of longitudinal studies. *Psychological Bulletin*, *132*(1), 1–25. https://doi.org/10.1037/0033-2909.132.1.1

Rozental, A., Forsström, D., Hussoon, A., & Klingsieck, K. B. (2022). Procrastination among university students: Differentiating severe cases in need of support from less severe cases. *Frontiers in Psychology*, *13*, Article 783570. https://doi.org/10.3389/fpsyg.2022.783570

Rozental, A., Forsström, D., Lindner, P., Nilsson, S., Mårtensson, L., Rizzo, A., Andersson, G., & Carlbring, P. (2018). Treating procrastination using cognitive behavior therapy: A pragmatic randomized controlled trial comparing treatment delivered via the internet or in groups. *Behavior Therapy*, *49*(2), 180–197. https://doi.org/10.1016/j.beth.2017.08.002

Sirois, F. M. (2014). Out of sight, out of time? A meta-analytic investigation of procrastination and time perspective. *European Journal of Personality*, *28*(5), 511–520. https://doi.org/10.1002/per.1947

Sirois, F. M., Molnar, D. S., & Hirsch, J. K. (2017). A meta-analytic and conceptual update on the associations between procrastination and multidimensional perfectionism. *European Journal of Personality, 31*(2), 137–159. https://doi.org/10.1002/per.2098

Smith, M. M., Sherry, S. B., Saklofske, D. H., & Mushqaush, A. R. (2017). Clarifying the perfectionism–procrastination relationship using a 7-day, 14-occasion daily diary study. *Personality and Individual Differences, 112*, 117–123. https://doi.org/10.1016/j.paid.2017.02.059

Solomon, L. J., & Rothblum, E. D. (1984). Academic procrastination: Frequency and cognitive-behavioral correlates. *Journal of Counseling Psychology*, *31*(4), 503–509. https://doi.org/10.1037/0022-0167.31.4.503

Steel, P. (2007). The nature of procrastination: A meta-analytic and theoretical review of quintessential self-regulatory failure. *Psychological Bulletin*, *133*(1), 65–94. https://doi.org/10.1037/0033-2909.133.1.65

Steel, P. (2010). Arousal, avoidant and decisional procrastinators: Do they exist? *Personality and Individual Differences*, *48*(8), 926–934. https://doi.org/10.1016/j.paid.2010.02.025

Stricker, J., Buecker, S., Schneider, M., & Preckel, F. (2019). Multidimensional perfectionism and the big five personality traits: A Meta-analysis. *European Journal of Personality*, *33*(2), 176–196. https://doi.org/10.1002/per.2186

Sudirman, S. A., Reza, F. A., Yusri, N. A., & Rina, R. (2023). Putting off until tomorrow: Academic procrastination, perfectionism, and fear of failure. *International Journal of Islamic Educational Psychology, 4*(1). https://doi.org/10.18196/ijiep.v4i1.17576

Svartdal, F., Dahl, T. I., Gamst-Klaussen, T., Koppenborg, M., & Klingsieck, K. B. (2020). How study environments foster academic procrastination: Overview and recommendations. *Frontiers in Psychology*, *11,* Article 540910. https://doi.org/10.3389/fpsyg.2020.540910

Tuckman, B. W. (1991). The development and concurrent validity of the procrastination scale. *Educational and Psychological Measurement*, *51*(2), 473–480. https://doi.org/10.1177/0013164491512022

Turner, M., & Hodis, F. A. (2023). A systematic review of interventions to reduce academic procrastination and implications for instructor-based classroom interventions. *Educational Psychology Review*, *35*(4), Article 118. https://doi.org/10.1007/s10648-023-09838-x

van Eerde, W. (2003). A meta-analytically derived nomological network of procrastination. *Personality and Individual Differences*, *35*(6), 1401–1418. https://doi.org/10.1016/S0191-8869(02)00358-6

van Eerde, W. (2004). Procrastination in academic settings and the Big Five model of personality: A meta-analysis. In H. C. Schouwenburg, C. H. Lay, T. A. Pychyl, & J. R. Ferrari (Eds.),

Counseling the procrastinator in academic settings (pp. 29–40). American Psychological Association. https://doi.org/10.1037/10808-003

van Eerde, W. (2015). Time management and procrastination. In M. D. Mumford & M. Frese (Eds.), *The psychology of planning in organizations: Research and application* (pp. 313-333). Routledge. https://hdl.handle.net/11245/1.465674

van Eerde, W., & Klingsieck, K. B. (2018). Overcoming procrastination? A meta-analysis of intervention studies. *Educational Research Review*, *25*, 73–85. https://doi.org/10.1016/j.edurev.2018.09.002

Weinstein, C. E., Schulte, A. C., & Palmer, D. R. (1987). *Learning and Study Strategies Inventory (LASSI): User's manual*. H & H Publishing.

Wolters, C. A. (2003). Understanding procrastination from a self-regulated learning perspective. *Journal of Educational Psychology*, *95*(1), 179–187. https://doi.org/10.1037/0022-0663.95.1.179

Won, S., & Yu, S. L. (2018). Relations of perceived parental autonomy support and control with adolescents' academic time management and procrastination. *Learning and Individual Differences*, *61*, 205–215. https://doi.org/10.1016/j.lindif.2017.12.001

Wortman, J., Lucas, R. E., & Donnellan, M. B. (2012). Stability and change in the Big Five personality domains: Evidence from a longitudinal study of Australians. *Psychology and Aging*, *27*(4), 867–874. https://doi.org/10.1037/a0029322

Appendix A: ED-D 101 Consent Form

EXPERIENTIAL LEARNING AND RESEARCH CONSENT

Why participate in research that evaluates student learning and the ED-D 101 Course?
In ED-D 101, you have the opportunity to experiment with your own learning in order to become a better learner. The information and practices that guide you through this process have been developed from theory and research about student learning. Each semester, ED-D 101 undergoes revisions based on findings from the ED-D 101 research. Learning experiences from a large number of students are needed to continue to improve the course. By participating in this research, you inform students, researchers, university instructors, and administrators who strive to help students succeed at university.

Purpose of the research

- To understand how to support students (like yourself) to become academically successful and develop lifelong learning skills.
- To compare learning processes and successes of ED-D 101 students with students who have not taken the course, and/or with students who received different types of support for developing their academic skills.
- To inform evidence-based decision making about ED-D 101 (expansion, course content, course activities).
- To inform theory and research about strategic regulation in educational psychology and educational technology.

Participation in this research involves:

- No additional work or time. Your regular coursework will be examined for research purposes after the course is completed and final grades have been submitted. Data include:
  - ED-D 101 course assignments, lab activities, tests, and discussions (online or audio/video recorded).
  - ED-D 101 Brightspace data including activity reports;
  - Data gathered through a mobile application, Metricwire, used for your studying and collaborative work in ED-D101, and
  - Institutionally collected performance indicators (e.g. GPA, yearly GPA, and exit surveys) throughout your undergraduate degree
- There are no known or anticipated risks.

Participation is voluntary: You can withdraw at anytime

By taking this course, you are automatically included in ED-D 101 research. However, you may withdraw anytime this semester by clicking on the electronic consent form in Brightspace and indicating "decline to participate" or copying and pasting this link into a browser: https://www.surveymonkey.ca/r/edd101202001. In the case of group work, withdrawal of participation will mean that an individual's contributions to the group will not be examined. When individuals cannot be removed completely from the data sets (e.g., group project grade or shared planning forms), data will be used in summarized form with no identifying information. Course instructors will not know that you have withdrawn consent until after course completion and grade submission. Your participation in this research will not influence your grade in the course.

Data will be confidential even though coursework is not anonymous
Course assignments and activities with your name or student ID are not anonymous. However, your confidentiality will be protected by (1) summarizing data in a spreadsheet with a random case number whenever possible and (2) summarizing data across many students or using pseudonyms when specific examples are used.

Course instructors will not know you are participating in this research
Instructors and teaching assistants will not know who has consented to participate in the research during the semester. Consent forms will be collected by a third party and released to the research team after course completion and grade submission.

What will happen to data and how will findings be reported and shared?
Electronic data will be archived and stored on a password protected server only accessible to the researchers. Files will be stored for approximately 10 years, after which they will be erased. Paper-based data will be stored in a locked filing cabinet in Maclaurin A210 for 10 years, after which they will be shredded. Data will be analyzed by Dr. Hadwin and her research collaborators. Findings will be presented through academic publications/presentations, the research website (http://allysonhadwin.wordpress.com/), student theses, and reports to university administrators. Identifying information will be removed whenever examples are used in ED-D 101 or presentations.

Social Networking Privacy Notice
Some activities/assignments in this course use social networking platforms such as Google. Please be advised that data collected within these platforms are likely stored on servers located outside of Canada. As a result, retention, access to, and the secondary use and disclosure of any personal information you disclose are subject to the social networking site's terms of use, privacy policies and

foreign law. You are encouraged to read the social networking site's terms and conditions on their website prior to starting any activities. Students are encouraged to use first name and last initial only when using these networking tools.
UVic cannot require students to disclose personal information to technologies or organizations which may store information on servers located outside of Canada because disclosure of personal information to vendors, systems or services storing or accessing that personal information outside of Canada is restricted by Section 30.1 of BC's Freedom of Information and Protection of Privacy Act (FIPPA). Personal information is information about an identifiable individual; for example, your name or your email address. If you are not comfortable with your personal information being stored outside of Canada, you may sign up for the tool using a nickname and non-identifying email. However, you will be required to inform your instructor of the nickname and non-identifying email.

Mobile and External Application Privacy Notice

Self-study activities will draw on survey tools that provide immediate feedback to learners. Two tools will be integrated in course activities for this purpose: (1) MetricWire is an app you use on your phone to plan and reflect on studying. (2) LimeSurvey is a web application used for questionnaires and surveys. Data are stored for a maximum of 1 year on a secure server in Canada built to comply with BC's Freedom of Information and Protection of Privacy Act (FIPPA). Data will be tied to a keycode without any personal identifiers. Data collected within this app cannot be sold to other third-party individuals or organizations If you choose not to use these tools, your self-study activities will be done in excel spreadsheets and you will generate your own summaries of scores for your SRL report.

Contacts

Feel free to contact any of the following with questions, comments, or concerns:

- During the course: Dr. Rose Vukovic (eplschr@uvic.ca) or Dr. Ralf St. Clair (deaneduc@uvic.ca)
- After the course: Dr. Allyson Hadwin (hadwin@uvic.ca) Mr. Ramin Rostampour (rostampour@uvic.ca) [Note: Do not contact us during the course because course instructors cannot know which students are participating until course grades are submitted.]
- Human Research Ethics Office at the University of Victoria (250-472-4545 or ethics@uvic.ca).

This research (Par-IT: Promoting Adaptive Regulation with Innovative Technologies) is led by Dr. Allyson Hadwin (Principal Investigator) and funded by the Social Sciences and Humanities Research Council of Canada (SSHRC) and the Canadian Foundation for Innovation (CFI-LOF).

By registering in ED-D 101, you are automatically included in research about student learning and success. You may withdraw anytime this semester by clicking on the electronic consent form [https://www.surveymonkey.ca/r/3JM5PHG?] in Brightspace and indicating "decline to participate Or, print and sign this form and send in campus mail to: PAR-IT research coordinator, MacLaurin Building, A210. Your signature below indicates that you would like to withdraw your consent from research in ED-D 101.

Name	Signature	Date

Appendix B: Ethics Approval Letter

University of Victoria
Office of Research Services | Human Research Ethics Board
Sedgwick A-142 | Victoria BC V8N 4V3 Canada
T 250-472-4545 | uvic.ca/research-services | ethics@uvic.ca

March 25, 2025

Dr. Allyson Hadwin
Department of Psychology

Dear Dr. Hadwin,

Re: Graduate student (Victoria Johnson) not included on research ethics approval H22-01164

You informed Human Research Ethics Office (HRE) that in your role as Principal Investigator (PI) you did not add Victoria Johnson to the research ethics approval for PREP H22-01164 *Examining student success: Promoting adaptive regulation with innovative technologies (PAR-it).* This means that Victoria Johnson did not have ethical approval when she was given access to data collected in this study to fulfill the requirements for her thesis.

This is considered a situation of ethical non-compliance. Non-compliance is the failure to follow applicable polices, guidelines and regulations governing research involving human participants including the university's obligations to federal regulators *Tri-Council Policy Statement for Ethical Conduct for Research Involving Humans* (TCPS2, 2022) and the *Tri-Agency Framework: Responsible Conduct of Research* (2021).

As Principal Investigator, you acknowledged and accepted responsibility for this oversight of not including this student on the research ethics approval (H22-01164).

The Human Research Ethics Board (HREB) cannot issue a retroactive research ethics approval for H22-01164 that includes this student.

However, in my capacity as Chair of HREB, I am issuing this letter to confirm that I accept your explanation of this oversight, and that Victoria Johnson followed all approved protocols associated with this study.

This ethical non-compliance situation is now considered resolved.

Sincerely,

Sandra Gibbons PhD
Chair, Human Research Ethics Board (HREB)

Cc Eugenie Lam Manager, Research Ethics

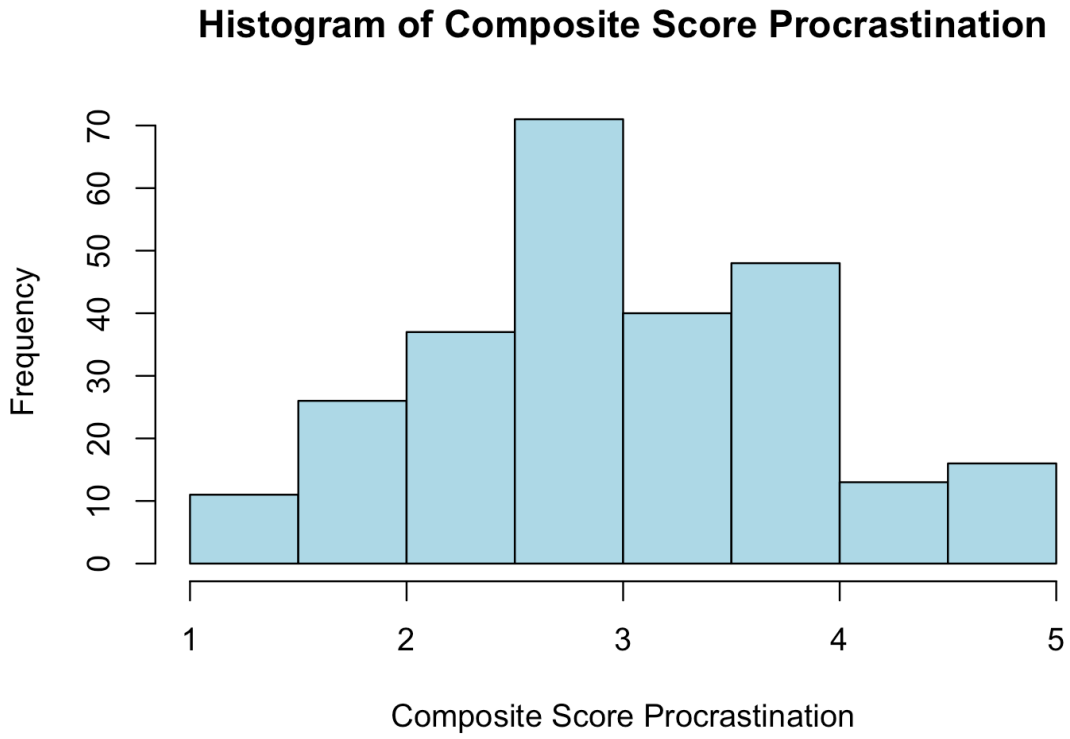
Appendix C: Measurement Scales and Associated Items

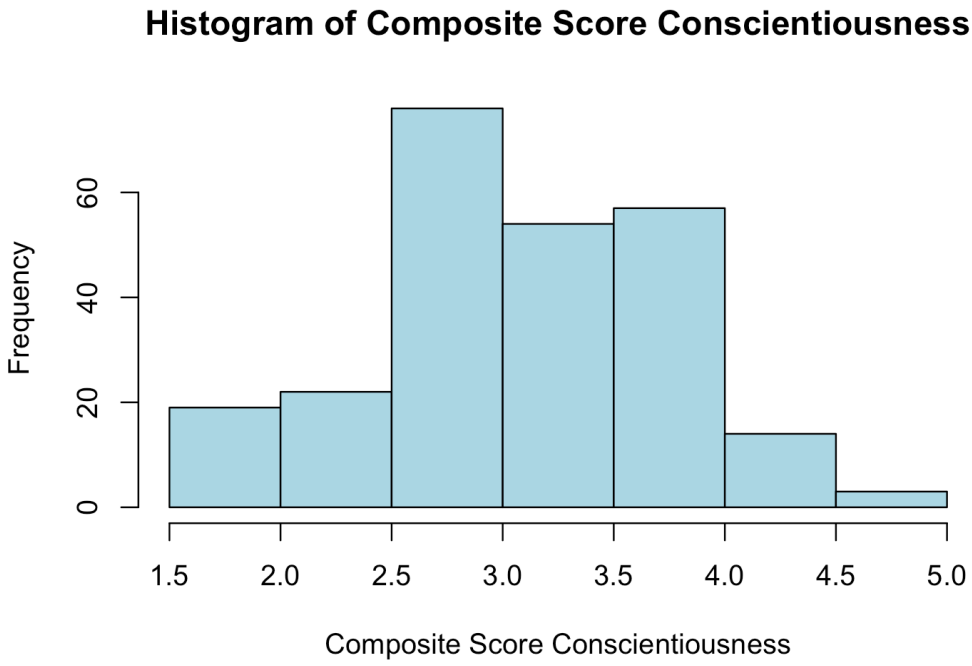
Construct	Scale	Item	Response Scales	Source
Conscientiousness	Motivation Scale	1. I can be somewhat careless. * 2. I tend to be disorganized. * 3. I am a reliable worker. 4. I consider myself as someone who tends to be lazy. * 5. I see myself as someone who perseveres until the task is finished. 6. When I make plans, I always follow through with them. 7. I am easily distracted. *	Five-point Likert, ranging from (1) str*ongly disagree* to (5) *strongly agree*	John & Srivastava (1999)
Procrastination	Time Use and Procrastination Scale	1. I promise myself I will do something for my course, then put it off anyway. 2. I frequently put off getting started on the readings and assignments for my course. 3. I often find excuses for not starting the work for my course. 4. I postpone doing the work for my course class until the last minute. 5. I delay studying for my course, even when it is important.	Five-point Likert scale, ranging from (1) *never true to me* to (5) *always true to me.*	Wolters, C. A. (2003)
Time Management	Time Use and Procrastination Scale	1. I set deadlines for myself when I set out to accomplish an assignment. 2. I set short-term goals for the studying I want to accomplish in a few days or weeks. 3. I have a system for managing the time I spend on my academic work.	Five-point Likert scale, ranging from (1) *never true to me* to (5) *always true to me.*	Won & Yu, 2018

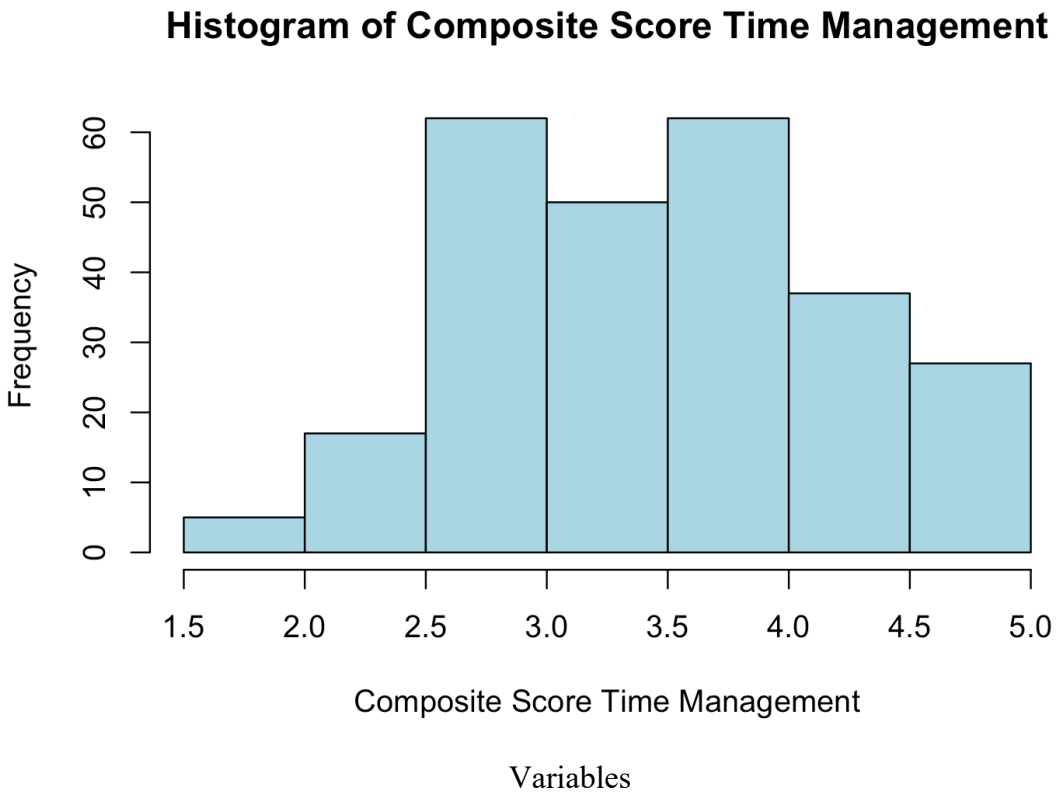
		4. I have specific times set aside during the week to get my schoolwork done. 5. I often set goals or make lists regarding what I need to get done each day. 6. I look at a planner, schedule or calendar every day to see what I need to get done. 7. I frequently use a planner, schedule or calendar to organize all my time commitments. 8. I make a list of things to do each day and check off each task as it is accomplished. 9. To make sure I don't forget to do my schoolwork, I often write myself notes or reminders.		

Note. * *Indicates reverse-coded items.*

Appendix D: Histograms for Variables of Interest






Histogram of Composite Score Time Management
Frequency
0
10
20
30
40
50
60
1.5
2.0
2.5
3.0
3.5
4.0
4.5
5.0
Composite Score Time Management
Variables

Appendix E: Time Management and Procrastination Self-Assessment

LimeSurvey

A1. **Each statement describes how students might do or feel with completing work or assignments. Read each statement carefully. Then, indicate how well it describes you. Be honest, there are no right or wrong responses.**

	Never true of me	Rarely true of me	Sometimes true of me	Usually true of me	Always true of me
I promise myself I will do something for my course, then put it off anyway.	☐	☐	☐	☐	☐
I frequently put off getting started on the readings and assignments for my course.	☐	☐	☐	☐	☐
I often find excuses for not starting the work for my course.	☐	☐	☐	☐	☐
I postpone doing the work for my course class until the last minute.	☐	☐	☐	☐	☐
I delay studying for my course, even when it is important.	☐	☐	☐	☐	☐
My performance tends to suffer when I have to race against deadlines.	☐	☐	☐	☐	☐
I don't do well if I have to rush through a task.	☐	☐	☐	☐	☐
If I put things off until the last moment, I'm not satisfied with their outcomes.	☐	☐	☐	☐	☐
I achieve better results if I complete a task at a slower pace, well ahead of a deadline.	☐	☐	☐	☐	☐
It's really a pain for me to work under upcoming deadlines.	☐	☐	☐	☐	☐
I'm upset and reluctant to act when I'm forced to work under pressure.	☐	☐	☐	☐	☐
I feel tense and cannot concentrate when there's too much time pressure on me.	☐	☐	☐	☐	☐
I'm frustrated when I have to rush to meet deadlines.	☐	☐	☐	☐	☐
To use my time more efficiently, I deliberately postpone some tasks.	☐	☐	☐	☐	☐
I intentionally put off work to maximize my motivation.	☐	☐	☐	☐	☐

LimeSurvey

	Never true of me	Rarely true of me	Sometimes true of me	Usually true of me	Always true of me
In order to make better use of my time, I intentionally put off some tasks.	☐	☐	☐	☐	☐
I finish most of my assignments right before deadlines because I choose to do so.	☐	☐	☐	☐	☐
I often start things at the last minute and find it difficult to complete them on time	☐	☐	☐	☐	☐
I often fail to accomplish goals that I set for myself.	☐	☐	☐	☐	☐
I'm often running late when getting things done.	☐	☐	☐	☐	☐
I have difficulty finishing activities once I start them.	☐	☐	☐	☐	☐

B1. **Each statement describes how students might do (or not do) in order to manage their environments, time, and effort for studying. Read each statement carefully. Then, indicate how well it describes you. Be honest, there are no right or wrong responses.**

	Never true of me	Rarely true of me	Sometimes true of me	Usually true of me	Always true of me
I usually study in a place where I can concentrate on my course work.	☐	☐	☐	☐	☐
I have a regular place set aside for when I need to study.	☐	☐	☐	☐	☐
I study in situations that allow me to avoid interruptions and distractions.	☐	☐	☐	☐	☐
When I study, I try to get rid of any distractions that are around me.	☐	☐	☐	☐	☐
I take steps to make sure I don't get disturbed when I am studying.	☐	☐	☐	☐	☐
I set deadlines for myself when I set out to accomplish an assignment.	☐	☐	☐	☐	☐
I set short-term goals for the studying I want to accomplish in a few days or weeks.	☐	☐	☐	☐	☐

LimeSurvey

	Never true of me	Rarely true of me	Sometimes true of me	Usually true of me	Always true of me
I have a system for managing the time I spend on my academic work.	☐	☐	☐	☐	☐
I have specific times set aside during the week to get my schoolwork done.	☐	☐	☐	☐	☐
I often set goals or make lists regarding what I need to get done each day.	☐	☐	☐	☐	☐
I look at a planner, schedule or calendar every day to see what I need to get done.	☐	☐	☐	☐	☐
I frequently use a planner, schedule or calendar to organize all my time commitments.	☐	☐	☐	☐	☐
I make a list of things to do each day and check off each task as it is accomplished.	☐	☐	☐	☐	☐
To make sure I don't forget to do my schoolwork, I often write myself notes or reminders.	☐	☐	☐	☐	☐

C1.
C2.
C3.
C4.
C5.
C6.
C7.
C8.
C9.

LimeSurvey

Time Management & Procrastination Self-Assessment

Scales

Scores

What does it mean?

Procrastination

{procrast.code}

Procrastination reflects individual's tendency to delay the decision making and behaviors that are necessary to complete required or necessary tasks in a timely manner. Although procrastination is common among college students, it is associated with a range of poor academic and personal outcomes. High scores (on a scale of 1 to 5) indicate a greater tendency to engage in procrastination.

Active Procrastination

{activepro.code}

Active procrastination describes students' intentional decision to delay initiating academic tasks with an affinity for the pressure of working under close deadlines, and the ability to get work done within specified deadlines and to achieve satisfactory outcomes. High scores (on a scale of 1 to 5) reflect a stronger tendency to engage in active procrastination.

Environment Management

{environ.code}

Appendix F: Motivation Self-Assessment

LimeSurvey

Hey {TOKEN:FIRSTNAME}!

Take a moment to do a quick self-assessment of your motivation. This self assessment assesses a number of aspects of motivation that are related to the chapter this week. It is great for getting an idea about where your own motivation is high or low.

A1. When I know I have to start reading an important chapter or doing an important assignment which I find boring:

- ☐ I find it easy to get started and over with
- ☐ I have a hard time pushing myself to get started and move on

A2. When writing an exam, if I do not know the answer to a question:

- ☐ I put it out of my mind quickly and move to the next question
- ☐ I can't stop thinking about it, even while I'm trying to concentrate on next questions

A3. When I am facing a big project that has to be done soon:

- ☐ I often spend too long thinking about where I should begin and how I should tackle it
- ☐ I get started quickly and will figure out how to tackle it as I am working on it

A4. When I receive negative feedback from my instructor:

- ☐ It takes me a long time to get over it
- ☐ It bothers me for a while, but then I don't think about it anymore

A5. When I have been busy for a long time working on an assignment or learning a content from a course I like:

- ☐ I sometimes think about whether what I'm doing is really worthwhile
- ☐ I usually get so involved in what I'm doing that I never think if it's worthwhile

LimeSurvey

A6. If I get some unexpected free time, when I have to make up my mind about what I am going to study:

- ☐ I can usually decide on something to do without having to think it over very much
- ☐ I have problems deciding what I should do during this free time

A7. When I put all my effort into doing a really good job on an exam, and the whole thing doesn't work out:

- ☐ The thought that I did poorly on the exam keeps running through my mind for a long time
- ☐ I can soon put the bad exam out of my mind

A8. When I get a poor grade on a midterm or a major assignment in an important course:

- ☐ I don't have too much difficulty thinking about how to improve my performance on the rest of assignments and final exam in this course
- ☐ I have trouble motivating myself to improve my studying for this course from then on

A9. When I am studying an interesting topic or working on a project I like:

- ☐ I usually remain so interested in it that I can stay focused on it until I am done
- ☐ I quickly get bored and am frequently distracted

A10. When I am busy working on an interesting project or learning an interesting topic:

- ☐ I still like to do other things in between working on it
- ☐ I get into it so much that I can work on it for a long time

A11. When I am getting ready to tackle a difficult assignment such as writing an essay:

- ☐ It feels like I am facing a big mountain that I don't think I can climb
- ☐ I quickly look for a way to approach the task in a manageable manner

A12. During a study session, when I am going to learn a new content:

- ☐ I'll keep at it as I planned until I learn it
- ☐ I often feel like I need to take frequent breaks to go do something else for a while

LimeSurvey

B1. **Each statement describes something about the nature of intelligence. Read each statement carefully and rate how much you agree or disagree with the statement. Be honest; there are no right or wrong responses.**

	strongly disagree	disagree	neutral	agree	strongly agree
You have a certain amount of intelligence, and you can't really do much to change it.	☐	☐	☐	☐	☐
Your intelligence is something about you that you can't change very much.	☐	☐	☐	☐	☐
No matter who you are, you can significantly change your intelligence level.	☐	☐	☐	☐	☐
To be honest, you can't really change how intelligent you are.	☐	☐	☐	☐	☐
You can always substantially change how intelligent you are.	☐	☐	☐	☐	☐
You can learn new things, but you can't really change your basic intelligence.	☐	☐	☐	☐	☐
No matter how much intelligence you have, you can always change it quite a bit.	☐	☐	☐	☐	☐
You can change even your basic intelligence level considerably.	☐	☐	☐	☐	☐

C1. **Each statement describes something about your effort or persistence. Read each statement carefully and rate how much you agree or disagree with the statement.**

Be honest; there are no right or wrong responses.

	strongly disagree	disagree	neutral	agree	strongly agree
I can be somewhat careless	☐	☐	☐	☐	☐
I tend to be disorganized	☐	☐	☐	☐	☐
I am a reliable worker	☐	☐	☐	☐	☐

LimeSurvey

	strongly disagree	disagree	neutral	agree	strongly agree
I consider myself as someone who tends to be lazy	☐	☐	☐	☐	☐
I see myself as someone who perseveres until the task is finished.	☐	☐	☐	☐	☐
When I make plans, I always follow through with them	☐	☐	☐	☐	☐
I am easily distracted	☐	☐	☐	☐	☐
New ideas and projects sometimes distract me from previous ones.	☐	☐	☐	☐	☐
I have been obsessed with a certain idea or project for a short time but later lost interest.	☐	☐	☐	☐	☐
I often set a goal but later choose to pursue a different one.	☐	☐	☐	☐	☐
I have difficulty maintaining my focus on projects that take more than a few months to complete.	☐	☐	☐	☐	☐
Setbacks don't discourage me.	☐	☐	☐	☐	☐
I am a hard worker.	☐	☐	☐	☐	☐
I finish whatever I begin.	☐	☐	☐	☐	☐
I am diligent.	☐	☐	☐	☐	☐

LimeSurvey

D1. **Each statement describes something about your goals or motivation for the courses you are taking this semester. Read each statement carefully and rate how much you agree or disagree with the statement. Be honest; there are no right or wrong responses.**

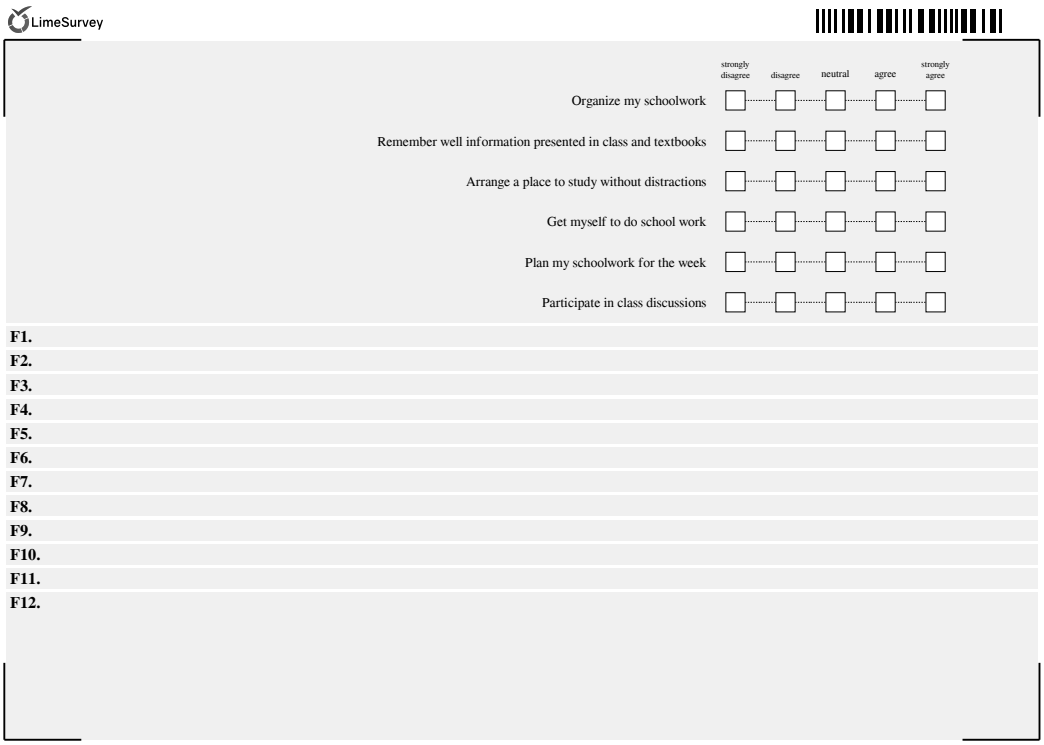
	strongly disagree	disagree	neutral	agree	strongly agree
What I am learning in my courses this semester is relevant to my life.	☐	☐	☐	☐	☐
I can apply what we are learning in my courses to real life.	☐	☐	☐	☐	☐
I think what we are studying in my courses this term is useful for me to know.	☐	☐	☐	☐	☐
I can apply what we are learning in my courses this semester to courses I will take later.	☐	☐	☐	☐	☐
This semester my aim is to completely master the material presented in my courses.	☐	☐	☐	☐	☐
I am striving to understand the content of my courses as thoroughly as possible.	☐	☐	☐	☐	☐
My goal is to learn as much as possible this semester.	☐	☐	☐	☐	☐
My aim this semester is to avoid learning less than I possibly could.	☐	☐	☐	☐	☐
I am striving to avoid an incomplete understanding of the material in my courses.	☐	☐	☐	☐	☐
This semester, my goal is to avoid learning less than it is possible to learn.	☐	☐	☐	☐	☐
My aim this semester is to perform well relative to other students.	☐	☐	☐	☐	☐
I am striving to do well compared to other students this semester.	☐	☐	☐	☐	☐

LimeSurvey

	strongly disagree	disagree	neutral	agree	strongly agree
This semester, my goal is to perform better than the other students.	☐	☐	☐	☐	☐
My aim is to avoid doing worse than other students this semester.	☐	☐	☐	☐	☐
This semester, I am striving to avoid performing worse than others.	☐	☐	☐	☐	☐
My goal this semester is to avoid performing poorly compared to others.	☐	☐	☐	☐	☐
When I take a test I think about how poorly I am doing compared with other students.	☐	☐	☐	☐	☐
When I take a test I think about items on other parts of the test I can't answer.	☐	☐	☐	☐	☐
When I take tests I think of the consequences of failing.	☐	☐	☐	☐	☐
I have an uneasy, upset feeling when I take an exam.	☐	☐	☐	☐	☐
I feel my heart beating fast when I take an exam.	☐	☐	☐	☐	☐

E1. **Read each statement carefully and indicate how confident you are that you can do each of these things successfully. Be honest; there are no right or wrong responses.**

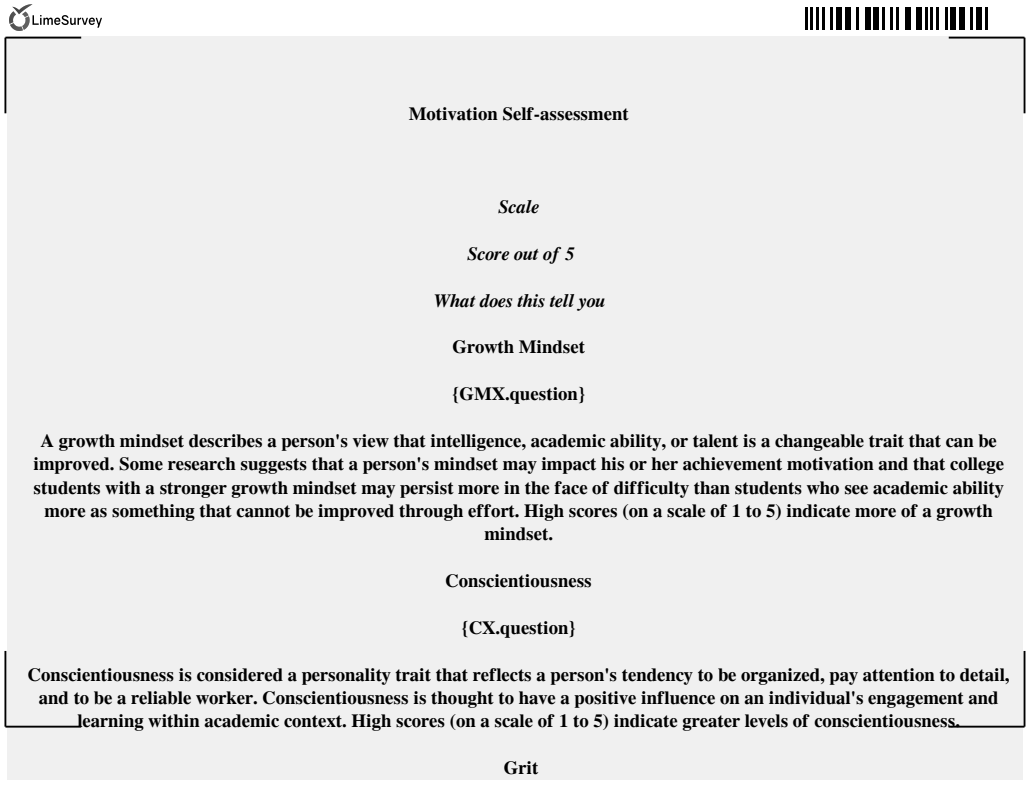
	strongly disagree	disagree	neutral	agree	strongly agree
Finish my homework assignments by deadlines	☐	☐	☐	☐	☐
Get myself to study when there are other interesting things to do	☐	☐	☐	☐	☐
Always concentrate on school subjects during class	☐	☐	☐	☐	☐
Take good notes during class instruction	☐	☐	☐	☐	☐
Use the library or electronic resources to get information for class assignments	☐	☐	☐	☐	☐



LimeSurvey

	strongly disagree	disagree	neutral	agree	strongly agree
Organize my schoolwork	☐	☐	☐	☐	☐
Remember well information presented in class and textbooks	☐	☐	☐	☐	☐
Arrange a place to study without distractions	☐	☐	☐	☐	☐
Get myself to do school work	☐	☐	☐	☐	☐
Plan my schoolwork for the week	☐	☐	☐	☐	☐
Participate in class discussions	☐	☐	☐	☐	☐

F1.
F2.
F3.
F4.
F5.
F6.
F7.
F8.
F9.
F10.
F11.
F12.



LimeSurvey

Motivation Self-assessment

Scale

Score out of 5

What does this tell you

Growth Mindset

{GMX.question}

A growth mindset describes a person's view that intelligence, academic ability, or talent is a changeable trait that can be improved. Some research suggests that a person's mindset may impact his or her achievement motivation and that college students with a stronger growth mindset may persist more in the face of difficulty than students who see academic ability more as something that cannot be improved through effort. High scores (on a scale of 1 to 5) indicate more of a growth mindset.

Conscientiousness

{CX.question}

Conscientiousness is considered a personality trait that reflects a person's tendency to be organized, pay attention to detail, and to be a reliable worker. Conscientiousness is thought to have a positive influence on an individual's engagement and learning within academic context. High scores (on a scale of 1 to 5) indicate greater levels of conscientiousness.

Grit