

Coping with Stress in Undergraduate University Students: Development and Validation of the
Coping Inventory for Academic Striving (CIAS) to Examine Key Educational Outcomes in
Correlational and Experimental Studies

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Thesis submitted to the
Faculty of Graduate and Postdoctoral Studies
in partial fulfillment of the requirements
for the Doctor in Philosophy degree in Psychology

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Abstract

This doctoral thesis aimed to better understand the relationship between coping and achievement in the post-secondary academic setting within the classic transactional model of stress and coping (Lazarus, 1991, 1999). Article 1 included the development of the Coping Inventory for Academic Striving (CIAS). The CIAS was developed to address limitations in the measurement of coping in the post-secondary setting. The results of two studies supported a psychometrically sound questionnaire measuring 11 coping strategies organized within task-oriented and disengagement-oriented coping dimensions. Tests of the concurrent, predictive, and incremental validity examining the relationships between the antecedents and outcomes of coping supported the conceptual independence of the task- and disengagement-oriented coping dimensions. Using this conceptual framework in Article 2 and 3, two daily diary studies were conducted in university students to examine the relationship between coping and goal progress. Individual differences in coping exist because not all students are coping the same way (i.e., between-person level). However, coping behaviours are also likely to vary from one day to the other during a typical week of the academic year (i.e., within-person level). Therefore in Article 2, new research questions pertaining to appraisal, coping, and goal progress were examined at both the between-person and within-person levels of analysis. While most effects were homologous, different within-person and between-person associations were found. Importantly, individual tendencies toward threat appraisal related to goal disengagement, but the momentary appraisal of threat can bring awareness to goal interferences redirecting goal directed behaviour. Finally, Article 3 tested an experimental coping skills training program whereby students in the experimental condition set if-then coping plans to manage negative emotions detrimental to the pursuit of daily studying goals. Daily over the course of a week, students in the experimental

group reported lower levels of stress and negative emotions and higher levels of studying time in comparison to students in the control group. However, the effect of the intervention on some indicators of performance and emotions were only applicable to students with a limited coping repertoire. The development of this coping training skills program aimed to create bridges between coping theory and preventive coping interventions.

Table of contents

Abstract.....	ii
Dedication page	x
Acknowledgements.....	xi
Contributions to Each Article	xii
List of Figures	xiv
List of Tables	xv
List of Appendices	xvi
CHAPTER 1	1

The Problem Area

The importance and current status of post-secondary education.....	1
Predictors of post-secondary success.....	3
Academic success	5
The demands of post-secondary goals and stress	7
Thesis goals.....	9
CHAPTER 2	11

A Review of Key Findings in the Coping Literature

What is coping?	11
Conceptual organization of the coping construct	12
Academic coping	15
Transactional model of stress and coping.....	16

Why is coping important?	17
Achievement outcomes	17
Academic psychological adjustment	19
What are the predictors of coping?	21
Cognitive appraisals	21
Personality	22
Motivation	23
Goals and organization of the doctoral thesis	24
Article 1: Measurement of post-secondary academic coping	25
Article 2: Dispositional and Situational coping	26
Article 3: Experimental coping intervention	28
CHAPTER 3	32

Article 1

Revisiting the Measurement of Coping in the Post-secondary School Domain: Development and Validation of the Coping Inventory for Academic Striving

The Coping Construct	33
Historical Overview of the Measurement of Coping	34
Rationale for the development and validation of the Coping Inventory for Academic Striving (CIAS)	36
The Present Studies	39
Study 1	43
Methods	43

Development of the CIAS.....	43
Sampling procedure	44
Study design.....	44
Participants.....	45
Measures	46
Analytical Plan.....	48
Results	50
Four-stage sequential confirmatory factor analyses	50
Hierarchical confirmatory factor analyses (HCFA).....	52
Convergent validity.....	53
Concurrent and incremental validity.....	53
Brief Discussion.....	54
Study 2	55
Methods	55
Sampling procedure	55
Study design.....	56
Participants.....	56
Measures	58
Results	62
Cross-validation of CIAS first order factor structure	62
Cross-validation of CIAS hierarchical factor structure (HCFA)	62

Concurrent and predictive validity	63
Incremental validity	64
Brief Discussion.....	65
General Discussion	65
Limitations and Future Research Directions	69
Conclusion	70
The development of the Brief CIAS used in subsequent doctoral research	71
CHAPTER 4	95

Article 2

Some Days Are Better than Others: A Multilevel Examination of Appraisals, Coping, and Academic Goal Progress of University Students

Challenge and Threat Appraisals.....	95
Task-Oriented and Disengagement-Oriented Coping.....	97
Dispositional and Situational Coping: A Unified Multilevel Perspective	99
This Study	100
Methods	101
Sampling procedure	101
Study design.....	102
Participants.....	103
Measures	103
Analytical plan.....	105

Results	109
Preliminary Analyses	109
Full Mediation Analyses	110
Partial Mediation Analyses	110
Indirect Effects.....	111
Discussion	112
Similarities and Differences across Levels of Analyses	113
Limitations and Subsequent research	115
Conclusion	118
CHAPTER 5.....	134

Article 3

Implementing Task-Oriented Coping with If-Then Coping Plans: Main and Moderated Effects on the Daily Studying behaviour and Academic Psychological Adjustment of University Students

Coping and performance and academic psychological adjustment	135
If-then coping plans	136
This Study	137
Methods.....	138
Sampling procedure	139
Study design.....	139
Participants.....	142
Measures	143

Plan of Analyses	147
Results	148
Randomization checks	148
Data screening.....	148
Intervention	149
Discussion	153
Effects of Implementing Task-Oriented Coping with If-Then Plans	153
Limitations	155
Conclusion	156
CHAPTER 6	172

A Discussion of Key Findings, Limitations, and Implications

Summary and Theoretical Implications	172
Methodological & Theoretical Limitations & Future Research	183
Practical Implications and Conclusions	189

This thesis is dedicated to my family and friends, my partner Mike Davidson, and my little
writing partner, Remington

Acknowledgements

The completion of this doctoral thesis would not be possible without the contribution of several people. I would like to thank the students of the University of Ottawa who participated in this research. I would also like to thank all my fellow lab mates and the volunteers who contributed to collecting these data and providing feedback along the way.

Of greatest importance, I would like to acknowledge the work of my thesis supervisor, Dr. Patrick Gaudreau. His guidance, teaching, effortless work, and drive has taught me a lot. I have never learned more from one individual. Both his instrumental and emotional support throughout my entire PhD is appreciated more than he will ever know. I would also like to thank the administration committee at the University of Ottawa for their assistance throughout my doctoral thesis. I also must acknowledge Dr. Jennifer Hurst for her time and resources making it possible to conduct research at Truman State University. Finally, I would like to thank my doctoral thesis committee including Céline Blanchard, Sylvain Chartier, and Cameron Montgomery for all their feedback and time.

This research was supported an Ontario Graduates Scholarship along with a SSHRC Doctroal Fellowship.

Contributions to Each Article

Article 1

Revisiting the Measurement of Coping in the Post-secondary School Domain: Development and Validation of the Coping Inventory for Academic Striving (CIAS)

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My role in these two studies included the ethics proposal, the preparation of all the questionnaires, the testing of participants in study 1 and 2 at the Canadian university, and the analyses in both Study 1 and 2. My supervisor and I both contributed to the design of the project, development of the Coping Inventory of Academic Striving and the preparation of the manuscript. Jennifer Hurst was responsible for the recruitment of university students at Truman State University in study 2. I also received assistance from other lab members and volunteers in the recruitment of participants in both Study 1 and 2.

Article 2

Some Days Are Better than Others: A Multilevel Examination of Appraisals, Coping, and Academic Goal Progress of University Students

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My role in this study included the ethics proposal, the preparation of all the questionnaires, the recruitment and daily testing of participants and the analyses. My supervisor and I both contributed to the preparation of the manuscript. I again also received assistance from other lab members and volunteers in the recruitment of participants.

Article 3

Implementing Task-Oriented Coping with If-Then Coping Plans: Main and Moderated Effects on the Daily Studying behaviour and Academic Psychological Adjustment of University Students

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List of Figures

1. Chapter 1: A theoretical framework of the antecedents and outcomes of task-oriented and disengagement-oriented coping in the university setting	31
2. Article 1: The hypothesized relationships between task and disengagement coping and the antecedents and outcomes of coping in the university setting.....	76
3. Article 2: Unified multilevel model.....	121
4. Article 2: Results of the multilevel structural equation models.....	122
5. Article 3: Effect of the coping intervention on daily perceived stress.....	158
6. Article 3: Effect of the coping intervention on daily goal progress.....	159
7. Article 3: Effect of the coping intervention on daily hopelessness	160

List of Tables

1. Article 1: Study 1: Descriptive statistics and test-retest correlation of CIAS	73
2. Article 1: Study 1: Convergent validity of the CIAS.....	74
3. Article 1: Study 1: Incremental validity of CIAS with Brief COPE	75
4. Article 1: Study 2: Standardized factor loadings and variances of the first-order factor structure CIAS	76
5. Article 1: Study 2: Error free correlations of CIAS.....	78
6. Article 1: Study 2: Concurrent validity of CIAS	79
7. Article 1: Study 2: Predictive validity of CIAS	80
8. Article 1: Study 2: Incremental validity of CIAS with personality	81
9. Article 2: Descriptive statistics and bivariate correlations	119
10. Article 2: Estimates of the total, direct, and indirect effects.....	120
11. Article 3: Descriptive statistics	161
12. Article 3: Results of multilevel model daily stress	162
13. Article 3: Results of multilevel model daily study time	163
14. Article 3: Results of multilevel model daily goal progress	164
15. Article 3: Results of multilevel model daily anxiety	165
16. Article 3: Results of multilevel model daily anger	166
17. Article 3: Results of multilevel model daily shame.....	167
18. Article 3: Results of multilevel model daily hopelessness	168
19. Article 3: Results of multilevel model daily boredom.....	169

List of Appendices

A. Article1: Supplementary file.....	225
A1. Table 1. Definition of each coping strategies CIAS	226
A2. Table 2. Initial fit of the CIAS and fit after item deletion	227
A3. Table 3. Final version of the CIAS	229
B. The development of the Brief Coping Inventory for Academic Striving (Brief CIAS)	231
B1. A Short note on the development of the Brief CIAS	232
B2. Table 1. Convergent validity of Brief CIAS	237
B3. Table 2. Incremental validity Brief CIAS development	238
B4. Table 3. The Brief CIAS	239
C. Questionnaires used in Article 1	240
C1. Questionnaires used in Study 1	241
C2. Questionnaires used in Study 2	251
D. Questionnaires used in Article 2	269
D1. Baseline questionnaires.....	270
D2. Daily questionnaires.....	272
E. Questionnaires used in Article 3	276
E1. Lab component questionnaires.....	277
E2. Experimental manipulation	282
E3. Control text.....	304
E4. Daily measures	309

CHAPTER 1

PROBLEM AREA

The importance and current status of post-secondary education

According to Statistics Canada in (2012-2013), approximately 1.25 million individuals were enrolled in a Canadian university and approximately 70% of these students were enrolled in an undergraduate bachelor degree . This doctoral thesis focused on undergraduate students in order to better understand how they manage the many academic challenges encountered on their way to attaining a bachelor degree. Post-secondary attainment –or the capacity to obtain a degree from a university – has been shown to directly impact quality of life outcomes. Obtaining a post-secondary education has been shown to play an important role in promoting health behaviours while preventing disease (2010), and has been shown to related to several indicators of psychological adjustment including well-being (Helliwell, 2003), life-satisfaction (Fernandez-Ballesteros, Zamarron, & Ruiz, 2001), and depression (Ladin, 2008). Educational attainment has been shown to directly impact labour force status and participation including personal income, job satisfaction, and employment stability (Pennington, 2004). For example, tracking the activity of Canadian post-secondary graduates in the labour force three years after graduation revealed that 84% of university graduates with a bachelors degree were employed full-time with a median yearly income of 53,000 dollars (Statistics Canada, 2010). To compare, over the course of an adults working years, adults with a post-secondary bachelors degree earn about twice as much as high school graduates (Frenette, 2014). Furthermore, post-secondary educational achievement is a common goal pursued by young adults. In 2009, 56% of young Canadian adults aged 18 to 24 were currently enrolled in a post-secondary institution (Statistics Canada, 2009). In addition, research has also shown that self-worth is contingent on the successful achievement of a post-

secondary education (Crocker & Luhtanen, 2003; Crocker, Luhtanen, Cooper, & Bouvrette, 2003). In young adults, post-secondary performance has been shown to be important to feelings of self-worth, and the threat to the attainment of academic goals has been shown to relate not only to stress but also to be detrimental to well-being (Crocker, Karpinski, Quinn, & Chase, 2003; Crocker, Luhtanen et al., 2003).

Given the implications of obtaining a post-secondary education, it is disheartening that 1 in 7 students who pursue a postsecondary education drop out before they graduate (Shaienks & Gluszynski, 2007). Turning to educational success, post-secondary attainment in students in the United States remains a major concern, with drop out rates ranging up to 45% and the average number of years to attain a bachelor's degree well over 6 years (Lotkowski, Robbins, & Noeth, 2004). The situation in Canada is somewhat better but could still be improved on several grounds. Nationally across Canada, a 16% post-secondary drop out rate has been reported (Shaienks & Gluszynski, 2007). At the University of Ottawa, recent data examining the 2012-13 completion rates indicates that approximately 14% of students will drop out of university prior to graduation (Ontario Ministry of Training, 2012-2013). Likewise, in 2010, very few University of Ottawa undergraduates -approximately 35% - graduated in the expected four years with a bachelors degree (University of Ottawa, 2012). On average, the grades of Canadian university students decrease by 9% during the transition from high-school to the end of the first year of university (Finnie & Martinnello, 2010). These performance difficulties, often observed in the first year, are creating many challenges in the lives of students who are in jeopardy of losing their scholarships and dropping out of post-secondary education as early as after their first semester.

Predictors of post-secondary success

Not surprisingly, several streams of research have tried to identify and understand the factors that predict school success and the capacity of university students to attain their personal academic goals. Researchers and educators alike have made efforts to identify students at risk of post-secondary drop out and intervene on risk factors shown to relate to university drop out. Existing research on post-secondary educational pursuit in Canada reveals that no single risk factor can predict post-secondary withdrawal; rather, a wide range of background factors have been identified (Barr-Telford, Cartwright, Prasil, & Shimmons, 2003). These factors, among many others include socioeconomic status, visibility minority status, gender, familial structure, parental support, academic and social high school engagement, and high school grade point average (Shaienks & Gluszynski, 2007). While socioeconomic status and high school grade point average have been shown to be salient predictors, accounting for approximately 25% of variance in predicting school success, these are stable risk factors not subject to change and may only isolate a specific subgroup of students more or less likely at risk of post-secondary drop out (Robbins et al., 2004). Instead, in efforts to identify protective factors applicable to all students, researchers have more recently focused on the role that psychological processes play in academic achievement (Richardson, Abraham, & Bond, 2012; Robbins, Oh, Le, & Button, 2009).

Understanding the psychological factors that predict academic success in students is important because it can help promote retention, timely graduation, and educational attainment. Robbins and colleagues (2004) carried out a meta analysis focusing on the integration of 15 years of research examining approximately 50 psychosocial and study skill factors related to grade point average and university dropout. Both student characteristics including motivational, goal setting, and studying skills along with institutional factors were significant predictors of grade point average and retention across research. Achievement motivation included constructs

aimed at the drive for success and the enjoyment students experience completing academic tasks. In the same vein, academic goal factors measured commitment and confidence in ability towards the goal of obtaining a degree. Furthermore, academic studying skills included activities necessary to organize and complete schoolwork tasks and tests. Finally, institutional characteristics included financial support and enrolment standards along with the connection and commitment with the enrolled academic institution. After controlling for socioeconomic factors and past performance, Robbins and colleagues (2004) found that institutional commitment, academic self-efficacy, and academic goals remained positive predictors of retention while achievement motivation and academic self-efficacy remained positive predictors of grade point average. Similarly, Richardson and colleagues (2012) conducted a systematic review and meta-analyses synthesizing the psychosocial antecedents of grade point average across over a decade of academic performance research. This meta-analysis also examined whether psychosocial factors could predict grade point average after controlling for sociodemographic and past performance. The results revealed that after controlling for sociodemographic factors and past academic performance, effort regulation was the strongest positive predictor of grade point average. Other factors predicting academic success included conscientiousness, test anxiety, academic self-efficacy, and grade goal. Together, the findings of both meta-analyses suggest that while sociodemographic factors and past performance are important predictors of academic achievement, personality traits and dynamic self-regulatory and motivational factors offer a point of intervention and may serve as protective factors to promote the academic success of university students.

While these meta-analyses provided insight regarding psychosocial and study behaviours shown to relate to academic achievement, several important psychological factors were not

included in these reviews. Although perceived stress appeared to be an important predictor of academic success, these reviews did not consider *how students are coping* with the stressfulness of their academic experience. Nonetheless, effort regulation, study skills, and social support were identified as important predictors of academic success. These constructs are tied to coping and point to the potential role of coping in predicting academic achievement

Academic success

While attaining a post-secondary degree is the ultimate indicator of academic success, other indicators of academic success exist which can serve as indicators of academic success in order to track the progress as students work toward the completion of their academic program. However, a lack of conceptual clarity exists in the measurement and examination of post-secondary academic success (Robbins et al., 2004). According to the APA dictionary of psychology (VandenBos, 2007), achievement or success is defined as “the level of performance of an individual on a task as determined by *objective* and/or *subjective* criteria” (p. 9). Consistent with this definition, in the proposed doctoral thesis, both objective standards of achievement and subjective self-reported evaluations of achievement were examined as indicators of academic success. Traditional measures of academic success focus mainly on objective measures of academic performance including, but not limited to, performance on standardized tests, exam performance, grade point average, and program retention (Bretz, 1989; Robbins et al., 2004; Zeider, 1995). These outcomes measure academic success in relation to the performance of other students. However, not all students value the same standards of achievement. For example, while some students may be driven to verify their academic success by outperforming other students, other students may instead focus on mastering the material, assignments, and skills related to their academic program (L. M. Daniels et al., 2008; Elliot, McGregor, & Gable, 1999;

Harackiewicz & Linnenbrink, 2005). Examining the success that students have in the pursuit of their own academic goals offers an alternative approach to measuring academic success. Goals are defined as a cognitive representation organizing specific desires and wants according to desired end states (Fischbach & Ferguson, 2007). Students set educational achievement goals in line with their wants and desires allowing them to tailor their educational goals based on personal preferences for post-secondary achievement. Subjective self-reported evaluations of the progress made by students on their own achievement goals provide an alternative measurement of academic success taking into account students' individual standards of achievement. The evaluation or measurement of post-secondary achievement then is evaluated solely by students' perception of goal progress and goal attainment. Goal progress denotes all successful steps towards goal attainment while goal attainment refers to the prescribed end state to the goal striving process (Schunk, 2010). In this doctoral thesis, academic success was mainly assessed using self-evaluative assessments of academic goal progress. This approach provided a novel and complementary way to define academic success in order to investigate the extent to which students are moving toward the attainment of their own academic goals.

Debate also exists concerning the importance of academic and psychological adjustment in the conceptualization of academic success (Robbins et al., 2004). Psychological adjustment reflects "the relative adaptation of an individual to changing environmental conditions in the context of education and denotes positive mental health" (Seaton, 2009). Some researchers suggest that academic psychological adjustment is a key determinant of academic success while others suggest it is a separate outcome but inter-related with academic performance and goal progress (Robbins et al., 2004). In the lives of university students, indicators of psychological adjustment can include academic satisfaction as well as positive and negative emotions

(Gaudreau & Thompson, 2010). According to the transactional model of stress and coping, emotions are an indication of the success of goal-directed behaviour and the rate of goal progress (Lazarus, 1991; Lazarus & Folkman, 1984). In return, emotions can influence the subsequent attention and efforts redirected toward goal pursuit. Academic satisfaction represents a cognitive evaluation of the quality of the conditions within the educational domain (Diener, Oishi, & Lucas, 2003). In this doctoral thesis, academic performance and academic psychological adjustment were examined as separate but inter-related indicators of academic success. The relationships between coping and academic performance and academic psychological adjustment are discussed in depth in the discussion of the transactional model of stress and coping developed by Lazarus and colleagues (1986; 1980; 1978) in Chapter 2.

The demands of post-secondary goals and stress

Post-secondary students encounter a variety of task demands and associated thoughts and emotions during academic goal pursuit in a new environment marked with increasing academic independence, new academic tasks, and changing social networks (Mainhard, Brekelmans, Brok, & Wubbels, 2010; Parker, Summerfeldt, Hogan, & Majeski, 2004; Struthers, Perry, & Menec, 2000). In school, task demands reported by post-secondary students include time constraints, ability and knowledge, studying skills, work overload, and distractions from competing goals, to name a few (Abouserie, 1994; Frazier & Schauben, 1994; Larson, 2006; Ross, Neibling, & Heckert, 1999). Inner states can include emotions and self-efficacy beliefs representing one's ability to manage the demands of academic achievement (Gunthert, Cohen, & Armeli, 1999; Pekrun, Goetz, & Titz, 2002). Directly, the inability to manage goal task demands and inner states also contributes to the perception of stress (Abouserie, 1994; Frazier & Schauben, 1994; Larson, 2006; Ross, Neibling, & Heckert, 1999).

Psychological stress is a product of the interaction an individual has with his or her environment (Lazarus, 1999). In academia, students assess the task, cognitive, and emotional demands encountered during goal-striving situations, and the experience of stress is dependent on the availability of resources to manage the demands of these situations (e.g., Lazarus, 1966). Stress occurs when an individual perceives they do not possess appropriate resources to manage the task demands and emotional demands of goal pursuit. The experience of stress in students has been negatively associated with both academic performance including grade point average (Lumley & Provenzano, 2003) and program completion (Meilman, Manley, Gaylor, & Turco, 1992) and positively with drop out (Tinto, 1998). Stress also relates to psychological adjustment, including lower academic satisfaction (Alimoglu, Gurpinar, Mamakli, & Aktekin, 2011) and higher depression and burnout (C. Gibbons, 2010), and somatic complaints (K. J. Edwards, Hershberger, Russell, & Markert, 2001). Research has shown that 75 to 85 percent of students experience moderate levels of stress while 52 percent of students experience high levels of stress over the course of a semester (Abouserie, 1994; Hudd et al., 2000; Pierceall & Keim, 2007). These results provide evidence that the majority of students experience difficulties to some extent managing post-secondary goal demands. Research has also shown that in their first year of post-secondary education, students who later dropped out were already struggling to manage goal demands and reported higher levels of stress (Shaienks & Gluszynsk, 2007).

Despite the many challenges and stressors associated with post-secondary education, students can try to regulate their stress with coping strategies. A plethora of research has provided evidence identifying coping as a salient tool that students can use to manage task demands and internal states and corresponding stress encountered during post-secondary goal pursuit (e.g., Drumheller, Eicke, & Scherer, 1991; Zeidner, 1995). Furthermore, research had

identified coping as a salient mediator in the relationship between stress and both academic performance and academic psychological adjustment. To illustrate, after controlling for the use of coping to manage the sources of stress (i.e., task and emotional demands), the negative association between stress and academic performance (N. Skinner & Brewer, 2002) was significantly reduced (Struthers et al., 2000). Overall, coping appears like a promising self-regulatory mechanism to alleviate the negative effects of stress during the pursuit of post-secondary education.

Thesis goals

The goal of the proposed doctoral thesis was to better understand the relationship between coping and academic achievement in the post-secondary academic setting. Article 1 included the development of a new coping questionnaire designed specifically to measure academic coping during goal pursuit in university students. On the basis of a conceptual framework defined *a priori*, this coping questionnaire was proposed as a means to improve on limitations in the measurement of how post-secondary students are coping with the stress and the demands of pursuing academic goals. Using this conceptual framework in Article 2 and 3, two daily diary studies were conducted to examine the relationship between coping and the progress of students on their academic goals. Individual differences in coping (i.e., between-person level) exist because not all students are coping the same way. However, situational differences in coping (i.e., within-person level) also exist as the coping behaviours of students are also likely to vary from one day to the other during a typical week of the academic year (Lazarus & Folkman, 1984). Therefore, new research questions pertaining to appraisal, coping, and goal progress were examined at both the between-person and within-person levels of analysis. Additionally, Article 3 focused on the development and implementation of a coping skills training program designed

as a brief and cost-effective activity targeting the negative achievement emotions students encounter during the pursuit of a goal to increase daily studying time over the course of one week. The training program targeted all first-year students along with second, third, and fourth year students who were identified as having academic difficulties. Educational interventions targeting the management of emotions have been found to be most effective in the early stages of learning such as when students are setting and pursuing new academic goals. Failure to control emotions in novel tasks can in fact divert resources and attention away from goal-directed behaviour (Kanfer, Ackerman, & Heggestad, 1996). The learning environment in university is different from high school involving new responsibilities, less one on one teacher support and monitoring of academic progress, and the management of simultaneous demands and time constraints (Struthers et al., 2000). Given, this coping skills training program was designed specifically to help first year university students who are adjusting their studying goals to match the academic demands of university and those who may have struggled to attain their studying goal in the past. The coping skills training program was implemented using experimental methods testing the causal effect of coping on goal progress and achievement emotions. The development and test of this coping training skills program aimed to create bridges between coping theory and preventive coping interventions.

CHAPTER 2

A REVIEW OF KEY QUESTIONS IN THE COPING LITERATURE

What is coping?

Coping, in the proposed doctoral dissertation, was conceptualized as outlined within the classic transactional model of stress and coping developed by Lazarus and colleagues (1986; 1980; 1978). This theoretical framework focuses on coping during goal pursuit in achievement settings, and the inter-related processes ongoing between the antecedents and outcomes of coping. Based on considerable research on stress management mechanisms, Lazarus and Folkman (1984) defined coping as the “constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (p. 141). For example in school, when a student perceives that academic goal demands exceed their current ability, knowledge, and level of effort to name a few, he or she can utilize coping actions to manage goal demands (Chemers, Hu, & Garcia, 2001; Stewart et al., 1997). This definition of coping emphasizes coping as a dynamic process whereby the use of coping changes to manage changes in the demands of stressors. This may include changes in coping across different domains, across different stressors, and across time within a single stressful transaction. In fact, research has shown that post-secondary students cope differently with academic and general stressors such as social, academic, and financial stressors (as cited in Ebata & Moos, 1994; Griffith, Dubow, & Ippolito, 2000; Sullivan, 2010). Research has also provided evidence that students use different coping strategies over the course of managing the demands of a single academic examination (Drumheller et al., 1991).

Coping actions may be directed towards the environment involving managing the demands of a stressor or toward the self managing the inner states triggered by a stressor. As discussed, the transactional model of stress and coping proposes that stressful situations trigger thoughts and emotions. Examples of inner states include emotions, distress, and self-efficacy (Gunthert et al., 1999; Pekrun et al., 2002). Consistently, three functions of coping have been identified aimed toward managing stressful goal demands by altering the frequency or the intensity of detriments to psychological adjustment and/or by altering the recovery from exposure to a stressor (Zeidner & Hammer, 1990). Coping was also distinguished from automatic and involuntary thoughts and behaviour which do not require effort. Instead, coping was defined as conscious efforts aimed at managing perceived stressors (Endler & Parker, 1994; Lazarus & Folkman, 1984). Lazarus and Folkman (1984) also propose that coping actions are independent from outcomes and not defined by their outcome. Instead, coping represents any effort used to manage the source of a stressor regardless of the effectiveness of the coping efforts. In line with this distinction, research supports that the effectiveness of a coping strategy and the ensuing performance and adjustment implications must be judged within the context of the stressor (Martin, Wethington, & Kessler, 1990; Tennen, Affleck, Armeli, & Carney, 2000). In fact, the context of a stressor dictates the nature, duration, controllability of the stressor, and personal meaning and impact of the stressor for well-being, all of which should impact the effectiveness of a coping strategy in managing a stressor (Carver & Connor-Smith, 2010). In summary, coping efforts are not always adaptive insofar as they can relate to desirable, neutral, and undesirable outcomes depending on the context in which they are used by an individual.

Conceptual organization of the coping construct. As highlighted by Skinner and colleagues in a review of the coping construct, coping is a multidimensional construct that can be

conceptualized at three levels of analysis and organized within a hierarchical structure including *coping instances, coping strategies, and coping dimensions* (Compas, Connor-Smith, Saltzman, Thomsen, & Wadsworth, 2001; E.A. Skinner, Edge, Altman, & Sherwood, 2003). An example of the hierarchical organization of the COPE inventory (Carver, Scheier, & Weintraub, 1989) measuring academic coping in university students is provided, hereafter (Dunkley, Zuroff, & Blankstein, 2003). At the lowest level, the instances of coping subsume the countless coping behaviours or cognitions. For example, coping instances used to assess academic coping measured by the COPE include making a plan of action, taking direct action to get around the problem, avoiding getting distracted by other thoughts or activities, giving up on trying to reach one's goal, and turning to work or other substitute activities to take one's mind off the situation. In psychometric parlance, the instances of coping are items of a questionnaire or behavioral indicators in an observation grid. These countless instances of coping can be organized into coping strategies (*i.e., the micro-analytical factor structure*). All coping instances that have a comparable function are organized within the same coping strategy. In reference to the COPE, the measured coping instances were organized within 6 coping strategies each with a unique function. For instance, all coping instances aimed at thinking about the steps required to cope with a stressor organized within the planning coping strategy and included the following: trying to come up with a strategy about what to do, making a plan of action, thinking hard about what steps to take, and thinking about how to best handle the problem. At the final level, all coping strategies that serve to fulfill a common goal in dealing with a stressor are organized within a coping dimension (*i.e., the macro-analytical factor structure*). The hierarchical organization of the COPE grouped the coping strategies within two coping dimensions, problem-focused coping and avoidant coping. The problem-focused coping dimension organized all strategies that served

to actively alter the source of stress and included the following coping strategies: active coping, planning, and suppression of competing activities. The avoidant coping dimension organized all strategies aimed at disengaging the self from the source of stress and included the following coping strategies: denial, behavioural disengagement, and mental disengagement.

Adopting a hierarchical and multidimensional conceptualization of coping has both theoretical and methodological benefits. Methodologically, the measurement of coping dimensions facilitates coping research by reducing the necessary statistical power which would otherwise be needed in the same analyses conducted using the corresponding coping strategies. Additionally, the likelihood of multicollinearity and suppression effects is reduced in research examining coping dimensions compared to coping strategies or coping instances because the former approach regroups highly correlated variables together in a theoretically-driven manner rather than treating them separately to explore their unique role through a rather data-driven approach. Theoretically, coping strategies and coping dimensions offer a more parsimonious account of the infinite cognitive and behavioural coping instances organizing coping strategies with a similar role in the stress process. In addition, the organization of coping instances within consistent coping strategies and in particular the organization of coping strategies within consistent coping dimensions facilitates the comparison of coping research across contexts, stressors, and age and within similar life domains (E.A. Skinner et al., 2003).

Based on a considerable amount of research in coping, three traditional coping dimensions organizing strategies with similar functions of coping have been conceptualized (Endler & Parker, 1994; Lazarus, 1991; E.A. Skinner et al., 2003). *Problem-focused coping* includes efforts aimed at actively managing the task demands of goal pursuit and can include coping strategies such as active coping, planning, increased effort, and seeking support. *Emotion-*

focused coping includes efforts aimed at minimizing or eliminating the internal states associated with a stressful situation and can include strategies such as relaxation, mental imagery, thought control, and logical analysis. *Avoidant-focused coping* includes efforts aimed at avoiding task demands and internal states by disengaging or distracting the self from goal-directed behaviour and can include coping strategies such as venting, social distancing, mental distraction, and behavioural disengagement. However, the hierarchical and multidimensional organization of these functions of coping varies considerably across domains.

Academic coping. Two higher-order coping dimensions organizing problem, emotional, and avoidant coping strategies have traditionally been examined in the academic setting. First, *task-oriented coping* encompasses coping strategies aimed at actively managing the source of stress and the resulting thoughts and emotions (Carver & Connor-Smith, 2010; Lazarus, 2006). Task-oriented coping regroups the problem-focused coping strategies with active forms of emotion-focused coping strategies (i.e., secondary control, approach emotion-focused). Task-oriented coping has emerged from the literature based on evidence highlighting the benefits of strategies aimed at actively managing emotions. Research by Stanton and colleagues (2000) provided evidence that strategies aimed at actively processing and expressing stress-related emotions are positively related to problem-focused strategies and positive outcomes. The function of problem-focused and active emotion-focused coping strategies are complementary, and these coping strategies can facilitate one another (Carver & Connor-Smith, 2010). Indeed, the active management of stressful task demands reduces the threat of a stressor simultaneously diminishing the emotions triggered by the stress. At the same time, the active management of emotions reduces feelings of distress diminishing the interference of emotions in the active management of task demands. As such, a contemporary approach to coping measurement

considers that problem-focused coping and active emotion-focused coping are better conceived together in a broad dimension of task-oriented coping (e.g., Carver & Connor-Smith, 2010).

Second, *avoidance-oriented coping* includes strategies by which individuals are disengaging and distracting themselves from the task at hand (Moos & Schaefer, 1993; E.A. Skinner et al., 2003). Bifurcation of *disengagement-oriented coping* and *distraction-oriented coping* in two forms of avoidance coping has sometimes been proposed and empirically supported as independent in the coping literature (Ayers, Sandler, West, & Roosa, 1996; Doron et al., 2014; Molinero, Salguero, & Marquez, 2010). *Disengagement-oriented coping* includes actions and cognitions aimed at disengaging the self from goal-directed behavior while *distraction-oriented coping* encompasses strategies used to direct attention momentarily from a stressful situation. Yet, research with students in the school domain has yet to conclude whether the distinction is absolutely needed insofar as distraction-oriented and disengagement-oriented coping appear to be hard to empirically separate on both a structural and functional account (e.g., Cook & Heppner, 1997; Endler & Parker, 1994; Zuckerman & Gagné, 2003).

Transactional model of stress and coping. The current doctoral thesis, examines coping as a tool undergraduate university students can utilize to manage the demands encountered during post-secondary goal pursuit. As discussed, the processes ongoing during coping with academic goal pursuit were studied within the classic transactional model of stress and coping developed by Lazarus and colleagues (1986; 1980; 1978). This framework focuses on coping during goal pursuit, and the inter-related processes ongoing between the antecedents and outcomes of coping. The theory suggests that personality, motivation, and cognitions are influencing coping utilization which, in turn, relates differentially to goal performance and academic psychological adjustment (Lazarus, 1993). The relationships between task-oriented and

disengagement-oriented coping and the antecedents and outcomes of coping tested in the proposed doctoral thesis are depicted in Figure 1 and are discussed next.

Why is coping important?

Two functions of coping important across essentially all stressful encounters impact the success and outcomes of coping. First, coping depends on the management of the source of a stressor, in an achievement setting often aimed at task demands. Second, coping works by managing the emotions and thoughts triggered by the stressor. While the success of coping actions is dependent on both functions equally, the use of task- and disengagement-oriented coping to manage task demands and emotions relate differentially to outcomes (Lazarus & Folkman, 1984). Based on a review of the literature outlining the outcomes of coping, task-oriented has been identified as a “good news” function of coping while disengagement-oriented coping has been identified as a “bad news” function of coping (E.A. Skinner et al., 2003). Within the context of education, the relationships between task- and disengagement-oriented and academic achievement and academic psychological adjustment support the “good news” and “bad news” function of coping.

Achievement outcomes. Objective indicators of academic achievement reflect a rating of students’ performance in reference to other students’ performance. These objective measures of performance may be general or global providing an indication of overall academic performance or may be task specific such as examination performance. In the context of education, task-oriented coping strategies are aimed toward active and effortful attempts toward skill acquisition and mastering goal demands (Zeider, 1995). For example, Klinger (1984) reported that task-oriented coping behaviours used to manage the demands of an upcoming exam included reading and reviewing the course material prior to the exam. Similarly, task-oriented coping efforts have

been shown to relate to task engagement (Maier, Waldstein, & Synowski, 2003). Research provides evidence supporting the positive relationship between the use of task-oriented coping efforts and exam performance (Doron, Stephan, Maiano, & Le Scanff, 2011; Endler & Parker, 1994; Folkman & Lazarus, 1985). In fact, Edwards and Trinnble (1992) reported that task-oriented coping was a significant predictor of exam performance after controlling for the influence of sociodemographic factors and stress. Similarly, the use of task-oriented coping efforts has been shown to positively relate to grade point average (J. M. Edwards & Trimble, 1992; MacCann, Fogarty, Zeidner, & Roberts, 2011). In contrast, students engaging in disengagement-oriented strategies do not delegate adequate time to prepare for academic demands and may be deficient in their mastery of academic skills. As evidence, disengagement-oriented coping has been shown to relate to procrastination (Lay, Edwards, Parker, & Endler, 1989). For these reasons, disengagement-oriented coping has been shown to relate to lower grade point average (Lumley & Provenzano, 2003) and poor exam performance (Doron et al., 2011; Dunkley et al., 2003; Weiner & Carton). Importantly, disengagement-oriented coping has been found to be a negative predictor of semester grade point average after controlling for sociodemographic variables and personality (J. M. Edwards & Trimble, 1992).

Subjective indicators of performance are an alternative measure of academic achievement. Evaluations of academic achievement shift away from the performance standards of other students and instead focus on individual standards of achievement defined by personally set academic goals. Subjective academic performance instead represents the self-evaluations of students concerning how their performance differs from their own goal expectations. Similar with studies that have looked at objective indicators of achievement, indicators of task-oriented coping have been shown to predict successful goal striving progress and attainment (e.g., Levy,

Nicholls, & Polman, 2011; Soucy-Chartier, Gaudreau, & Fecteau, 2011; Thompson & Gaudreau, 2008). For example, research has shown that task-oriented coping efforts positively predict exam goal performance (Elliot et al., 1999), attainment of goals related to course grades (Brdar, Rijavec, & D., 2006; Harackiewicz, Barron, Tauer, Carter, & Elliot, 2000), and personally set academic goals pursued over the course of a semester (Gaudreau, Carraro, & Miranda, 2012). To compare, disengagement-oriented coping efforts have been shown to relate to lower levels of goal progress and attainment (Levy et al., 2011; Thompson & Gaudreau, 2008) and exam goal performance (Elliot et al., 1999). While task- and disengagement-oriented coping dimensions differentially relate to academic achievement, the pattern of relationships is similar in predicting academic and psychological adjustment.

Academic psychological adjustment. Research on psychological adjustment has mainly focused on the relationship between coping and negative emotions (Folkman, 2008, see for a review). Within the context of education -apart from test anxiety - academic emotions have been relatively ignored (Pekrun et al., 2004). Nonetheless, advances in coping and emotion research have emphasized the co-occurrence of positive and negative emotions during stressful situations (Folkman, 2008). Achievement emotions- defined as emotions that are directly linked to achievement activities – provide insight into the array of emotions students experience while engaging in their academic endeavours including attending class, studying, and writing tests and exams (Pekrun, Goetz, & Perry, 2005). These include positive emotions- enjoyment, hope, and pride- and negative emotions - anger, anxiety, shame, hopelessness, and boredom. On one hand, task-oriented coping has been shown to relate to positive emotions including hope (Halamandaris & Power, 1999), happiness (Saklofske, Austin, Mastoras, Beaton, & Osborne, 2011), excitement (N. Skinner & Brewer, 2002), and general measures of positive affect (MacCann et al., 2011).

On the other hand, task-oriented coping has been shown to decrease the experience of negative emotions including distress and anxiety (Achtziger, Gollwitzer, & Sheeran, 2008; Bayer, Gollwitzer, & Achtziger, 2010; Niemi & Vainiomaki, 1999; Terry, 1994). In contrast, the use of strategies to disengage and distract the self from stressful demands and emotions actually relate to an increase in intrusive thoughts about the stressor and an increase in negative mood and anxiety (Najimi & Wegner, 2008). Likewise, disengagement- oriented coping has been shown to positively relate to test anxiety (Zeidner, 1994), negative affect (Dunkley et al., 2003; Fugate, Harrison, & Kinicki, 2011), depression and burnout (C. Gibbons, 2010), and somatic complaints (K. J. Edwards et al., 2001).

The use of coping to manage academic demands also differentially relates to psychological growth and the integration of academic achievement within students' existing priorities, goals, and values. On one hand, Amiot and colleagues (2008) found that the use of task-oriented coping to manage academic demands related to increases in well-being and increases in identification as a university student over the course of a semester. Also, the use of task-oriented coping has also been shown to relate to performance satisfaction (Haney & Long, 1995) and school satisfaction (Stoeber & Janssen, 2011). On the other hand, the use of disengagement-oriented coping relates to lower levels of well-being and identification with university life (Amiot et al., 2008; Thompson & Gaudreau, 2008; Weinstein, Brown, & Ryan, 2009) and academic satisfaction (Alimoglu et al., 2011). These results suggest that the use of disengagement-oriented coping limits the integration of post-secondary goal striving within the self potentially reducing the personal importance and priority of post-secondary attainment. These results are consistent with findings outlining the association between disengagement-oriented coping and lower levels of post-secondary commitment (Braxton, Hirschy, &

McClendon, 2004) and higher levels of undergraduate academic dropout (Blanc, DeBuhr, & Martin, 1983; Gerdes & Mallinckrodt, 1994). Together, these results support the categorization of task-oriented coping as “good news” coping and disengagement-oriented coping as “bad news” coping in the context of academic achievement and academic psychological adjustment.

What are the predictors of coping?

Cognitive appraisals. At the core of the transactional model of stress and coping (Lazarus et al., 1980; 1978), the experience of stress and the execution of coping responses during goal pursuit results directly from the cognitive appraisal process. First, *primary appraisal* is an assessment of the task and emotional demands of a goal-specific situation, and its impact on well-being and goal pursuit. Second, *secondary appraisal* is an assessment of the coping resources a person has to manage task demands and internal states. Available coping efforts are then executed to manage the task and emotional demands of a stressor. Central to this framework, and consistent with much of the coping literature, the nature of the appraisal of the stressor influences the type of coping actions that should be used by individuals during the stressful encounter.

Two main indicators of primary appraisal – challenge and threat appraisals – have been conceptualized and examined in the academic setting (Folkman, Lazarus, Dunkel-Schetter, DeLongis, & Gruen, 1986; Lazarus, 1991; Lazarus & Folkman, 1984). *Challenge appraisal* occurs when a situation is interpreted as goal relevant inasmuch as the person perceives opportunities to master and overcome demands and obstacles during goal progress. *Threat appraisal* occurs when a situation is goal relevant, but the individual perceives that the demands of goal pursuit may exceed their resources. Consistent with the transactional model of stress and

coping, a plethora of research in academia has provided evidence in support of the relationship between challenge appraisal and the subsequent use of task-oriented coping and threat appraisal and the subsequent use of disengagement-oriented coping (Drumheller et al., 1991; Hammermeister & Burton, 2001; Lazarus & Folkman, 1984; Levy-Shiff, Dimitrovsky, Shulman, & Har-Even, 1998; N. Skinner & Brewer, 2002). For example, in university students, challenge appraisal stemming from the perception that one's ability or motivation equals or exceeds curriculum demands has been shown to relate to the use of task-oriented coping (N. Skinner & Brewer, 2002; Stewart et al., 1997). Similarly, self-efficacy or an individual's belief in their ability to handle a stressor has been shown to relate to task-oriented coping (Diehl, Semegon, & Schwarzer, 2006). In contrast, threat appraisal stemming from the perception of time constraints or the belief that the difficulty of curriculum exceeds one's ability has been shown to relate to the use of disengagement coping (N. Skinner & Brewer, 2002; Stewart et al., 1997). Additionally, Weinstein and colleagues (2009) found that students who reported threat to an academic goal were more likely to disengage themselves from school demands and daily hassles.

Personality. Appraisal of stressors and coping do not occur in a vacuum. In the school domain, personality and motivation have been proposed to play a unique role in the choice of coping during educational goal pursuit (Lazarus, 1993). Personality traits have been defined as “the dynamic organization within the person of the psychological and physical systems that underlie that person's patterns of actions, thoughts, and feelings” (Carver & Connor-Smith, 2010, p. 680). The Five Factor model of personality represents a hierarchical taxonomy organizing personality traits within five unique personality dimensions (Digman, 1986; McCrae & Costa, 2003). Extroversion represents “the tendency to be sociable and experience positive affect” (Carver & Connor-Smith, 2010, p. 683). Agreeableness includes “the tendency to be

interpersonally present” while conscientiousness reflect a tendency to be “dependable, responsible, and orderly” (Carver & Connor-Smith, 2010, p. 683). Finally, openness represents characteristics such as “creativity, interest in intellectual issues, and the need for variety” while neuroticism reflects “the ease and frequency with which a person becomes upset and distressed” (Carver & Connor-Smith, 2010, p. 683). Research has identified the role of personality in predicting coping actions (see Carver & Connor-Smith, 2010 for a review). Results from a meta-analytical review revealed that extraversion, conscientiousness, and openness all positively relate to task-oriented coping (Connor-Smith & Flachsbart, 2007). In contrast, neuroticism has been shown to relate to the tendency to use disengagement-oriented coping (Connor-Smith & Flachsbart, 2007).

Other personality traits shown to be important in the stress and coping process include optimism and pessimism. Optimism has been defined as the tendency to hold positive expectations for the future whereas pessimism represents the tendency to hold negative expectations for the future (Scheier & Carver, 1985). Meta-analytic findings have shown that optimism relates to task-oriented coping efforts while pessimism relates to the use of disengagement-oriented coping (Nes & Segerstrom, 2006). Within the educational context, optimistic undergraduate students have been shown to be more likely use task-oriented coping whereas students with higher pessimism have been found to be more likely to engage in disengagement-oriented coping (Thompson & Gaudreau, 2008).

Motivation. The transactional model of stress and coping has outlined the importance of considering the motivation of individuals to fully understand their effort to manage the demands of stressful situations. Self-determined theory offers an interesting conceptual framework to investigate motivation because it reflects the various and differential reasons guiding

engagement in activities (Deci & Ryan, 2008). Within the educational setting, self-determination motivation and non self-determination have been shown to differentially relate to coping. Self-determined motivation involves engaging in an activity because the activity or its underlying goals are pleasurable, important, and consistent with the values of the person (Vallerand, Pelletier, Blais, Briere, & et al., 1993). The engagement in academic activities and academic goals out of self-determined reasons has been shown to relate to task-oriented coping in undergraduate students (Amiot et al., 2008; Thompson & Gaudreau, 2008). In contrast, non self-determined motivation reflects the engagement in an academic activity or its underlying goals because of perceived social pressure from parents or friends, to obtain external rewards, to avoid feelings of guilt and shame, or whenever one is no longer foreseeing a specific valuable reason to maintain his or her engagement (Vallerand et al., 1993). Research has shown that university students holding non self-determined motivation for school activities or their academic goals were more likely to use disengagement-oriented coping (Amiot et al., 2008; Thompson & Gaudreau, 2008). Together, these results suggest that the cognitions, personality traits, and the academic motivation of undergraduate students may predispose students' to utilize particular forms of coping.

Goals and organization of the doctoral thesis

A large body of research has provided evidence for the potential role of coping in helping post-secondary students manage academic demands in order to improve their academic performance and foster positive academic and psychological adjustment. However, this line of research has suffered from both conceptual and methodological shortcomings that were addressed in the current doctoral thesis. The following sections describe each of the three articles included in this thesis while providing an overview of the general purpose and specific objectives

of each article. Each of the three articles is presented in a separate chapter using the format of a scientific article. Therefore, each article contains a specific review of the relevant literature needed to setup the rationale for the specific hypotheses of each study.

Article 1: Measurement of post-secondary academic coping. Within the context of post-secondary education, quite often, across different studies, coping has been examined using coping questionnaires with hardly comparable multidimensional and hierarchical frameworks. Even when using the same questionnaire, researchers have often failed to replicate the factor structure of their coping instrument across studies and samples. For instance, both the number and content of the coping strategies measured by the Ways of Coping Questionnaire (Folkman & Lazarus, 1985) has been shown to fluctuate across samples examining academic coping in undergraduate university students (e.g., Aldwin & Revenson, 1987; Folkman & Lazarus, 1986, 1988; Parker & Endler, 1992; Parker, Endler, & Bagby, 1993). The inconsistency in the factor structure of coping questionnaires across studies limits the comparison of coping findings across research. In that, differences found in coping across studies cannot be confidently attributed to true differences in coping but instead may be the product of methodological biases stemming from inconsistent factor structures of coping. Furthermore, coping in post-secondary students has frequently been measured using general measures of coping (e.g., Brougham, Zail, Mendoza, & Miller, 2009; Moneta, Spacia, & Rost, 2007). However, general questionnaires of coping may not capture the specific coping cognitions and behaviours that post-secondary students use to manage post-secondary stressors. Moreover, the use of general questionnaires do not ask participants to report their coping in relation to specific academic stressful events but rather ask students how they cope with daily stress or negative events (Sullivan, 2000). In their daily lives, research has shown that post-secondary students cope differently with academic and general

stressors such as social, academic, and financial stressors (as cited in Ebata & Moos, 1994; Griffith et al., 2000; Sullivan, 2010). As such, there is a clear need to create a coping questionnaire designed specifically to measure coping strategies widely applicable and used by university students in the context of academic goal pursuit.

Based on these limitations, the goal of Article 1 was the development and validation of a coping questionnaire - the Coping Inventory for Academic Striving (CIAS) - designed to measure how students manage the demands of post-secondary goal pursuit. The CIAS was developed using a theoretical approach in which the development of the number, nature, and organization of coping was guided by existing coping theory identified *a priori*. This approach has been advocated as a suitable method to develop coping questionnaires in order to maximize the likelihood that the hierarchical and multidimensional factor structure of coping can replicate across samples (Carver et al., 1989; E.A. Skinner et al., 2003). Two studies with independent samples of university students were recruited to develop the CIAS and test the psychometrics of the hierarchical factor structure of the CIAS, cross-validate the factor structure, and test the construct validity of the questionnaire. The construct validity of the CIAS was tested within the confines of the transactional model of stress and coping (Folkman et al., 1986; Lazarus & Folkman, 1980; Lazarus & Launier, 1978), testing both the antecedents and outcomes of coping both concurrently and prospectively. The proposed relationships are depicted in Figure 1.

Article 2: Dispositional and Situational coping. Article 2 aimed to extend theory related to the classic transactional model of stress and coping (Lazarus, 1991, 1999) determining which students and when students are more likely to make successful daily academic goal progress. Despite their strong interest for a situational approach, in the transactional model of stress and coping, Lazarus and Folkman (1984) originally presented coping as a multilevel construct that

can be conceived both at the dispositional and situational levels. The between-level or dispositional approach measures the preferred coping strategies that students use to deal with the demands of an academic stressful situation (Anshel & Kaissidis, 1997; Carver et al., 1989). Consistent with this view, students possess a preferred set of coping strategies which remain relatively constant across time and situations. The generalized tendency of students to cope in a relatively stable manner can be measured by asking them to report their general usage of coping strategies during their goal pursuit or by aggregating the daily coping efforts across multiple days. The later approach was used in the context of Study 2. The within-level or situational approach (Lazarus & Folkman, 1984; Gaudreau & Miranda, 2010) measures the use of coping as it changes across different situations (Lazarus & Folkman, 1984). Academic goal pursuit is a dynamic process whereby goal demands change as goal pursuit unfolds from one day to the next in the lives of students. In response, students appraise changing goal demands initiating coping efforts deemed appropriate in the situation. Both individual preferred appraisals of goal demands and changes in the appraisal of goal demands play a role initiating dispositional and situational coping with goal demands, respectively (Carver et al., 1989). Research provides support for both the stability of cognitive appraisals and coping (Garner & Fletcher, 2009; Grant, Long, & Willms, 2002; Larsson, Kempe, & Starrin, 1988; Ramirez-Maestre, Esteve, & Lopez, 2008; N. Skinner & Brewer, 2002) and the fluctuation of appraisal and coping across situations and time (Folkman & Lazarus, 1985; Folkman et al., 1986; Holt & Dunn, 2004; Levy-Shiff et al., 1998; Long & Schutz, 1995; Scherer, Drumheller, & Owen, 1993). In recent years, this conceptual positioning – acknowledging both the relative stability and change – has gained in popularity with growing evidence that both the average and the ongoing level of a construct can provide complementary rather than contradictory understanding of personality and self-regulation

(Fleeson, 2004; Roberts & Pomerantz, 2004). However, the examination and comparison of the between-level and within-level coping processes has remained sparse, particularly in the study of post-secondary students in educational psychology. Article 2 of the proposed doctoral thesis, examined a unified multilevel level perspective which combined both individual between-person and within-person fluctuations in appraisals, coping, and academic goal progress. To our knowledge research has yet to examine and compare the between-level and within-level relationships between appraisal, coping, and indicators of school success. The multilevel model was tested in a sample of undergraduate university students who completed a one week daily diary study evaluating cognitive appraisals, coping, and progress every day for 6 consecutive days in reference to the daily pursuit of a personally set academic goal.

Article 3: Experimental coping intervention. Article 1 and Article 2 relied on correlational non-experimental designs to investigate the relationship between coping and academic goal progress. A large body of research provides evidence in support of the association between task coping and emotions and goal progress in university students (see MacCann et al., 2011; Zeidner, 1995 for reviews). However, the majority of these studies have been correlational limiting the inference of causality. Often, what works in fundamental research often fails to translate and replicate into applied interventions. Applied interventions using experimental methods offer the opportunity to replicate correlational findings within the confines of a stronger and more stringent research methodology. Additionally, these interventions are needed to offer universities with empirically validated tools to facilitate the success and emotional adjustment of students. Article 3 involved the development of a coping skill training program. The proposed implementation coping skills manipulation was an interactive program guiding first year and struggling second, third, and fourth year students to set task-oriented coping plans in efforts to

manage negative emotions that interfere with the pursuit of a specific studying goal. Research has shown that struggling students and first year students may hold low levels of self-efficacy toward managing emotional demands of goal pursuit and have difficulties identifying opportunities to actively manage academic emotional demands (Sandler, Tein, Mehta, Wolchik, & Ayers, 2000; Wood & Locke, 1987). The proposed intervention aims to help first year and struggling students to increase the use of task strategies by helping students identify instances to enact task coping efforts to manage negative emotions using if-then coping plans implementation framework (Gohm & Clore, 2002).

Implementation intentions work to protect goal intentions from self-regulation problems via the formation of a link between specific cognitive or behavioural action plans and how, when, and where an intended goal will be pursued (Gollwitzer, 1996; Gollwitzer, 1999; Gollwitzer & Brandstätter, 1997; Gollwitzer, Heckhausen, & Steller, 1990; Gollwitzer & Sheeran, 2006). Implementation intentions can be used to shield goal pursuit from task demands, but also interfering inner states including emotions, physiological states, and disruptive cognitions (Gollwitzer & Sheeran, 2006). If-then coping plans work by identifying a cue to initiate coping actions- in this case negative emotions- and follow the format “if situation X arises, then I will do Y”. Research supports that goal intentions are strengthened -increasing the likelihood of success- when goal intentions are paired with specified situations to act, increasingly automating goal efforts by reducing the cognitive demands of goal pursuit (Gollwitzer & Schaal, 1998). The beneficial effects of implementation intentions have been established with direct behavioural measures of goal attainment (Sheeran & Orbell, 1999) and for periods of time as long as 3 months (Sheeran, Webb, & Gollwitzer, 2006). Two recent experimental studies – have highlighted the potential benefit of short but theoretically-driven

stress interventions using if-then coping plans to improve sport performance (Achtziger et al., 2008; Stern, Cole, Gollwitzer, Oettingen, & Balcetis, 2013). Using a coping implementation framework, participants were trained to identify potentially internally distressful states or stressors and to proactively create personalized *if-then coping plans* using task-oriented coping strategies. Participants who were trained to create coping plans (e.g., “If I get frustrated, then I will slow down and breathe”) were significantly more likely to obtain better task performance and were also less likely to be perceived as anxious by neutral observers compared to individuals randomized in a goal setting control condition. Many routes to goal attainment exist and implementation intentions allow students the opportunity to set personally relevant coping strategies that are compatible with the specific goal striving situation.

As part of the coping skills training program, students were asked to set a goal to increase the number of minutes spent studying each day over the course of one week. Random assignment was used to place participants in either the experimental condition- who received the implementation of the coping skills program- or the control condition-who received information concerning resources facilitating academic success on campus. Students in the experimental condition formed if-then coping plans to manage negative emotions deemed detrimental to making progress on their studying goal. A one week daily diary study was then conducted in order to examine the effectiveness of the implementation coping exercise by examining short-term daily academic studying behaviour, perceived goal performance, and emotions.

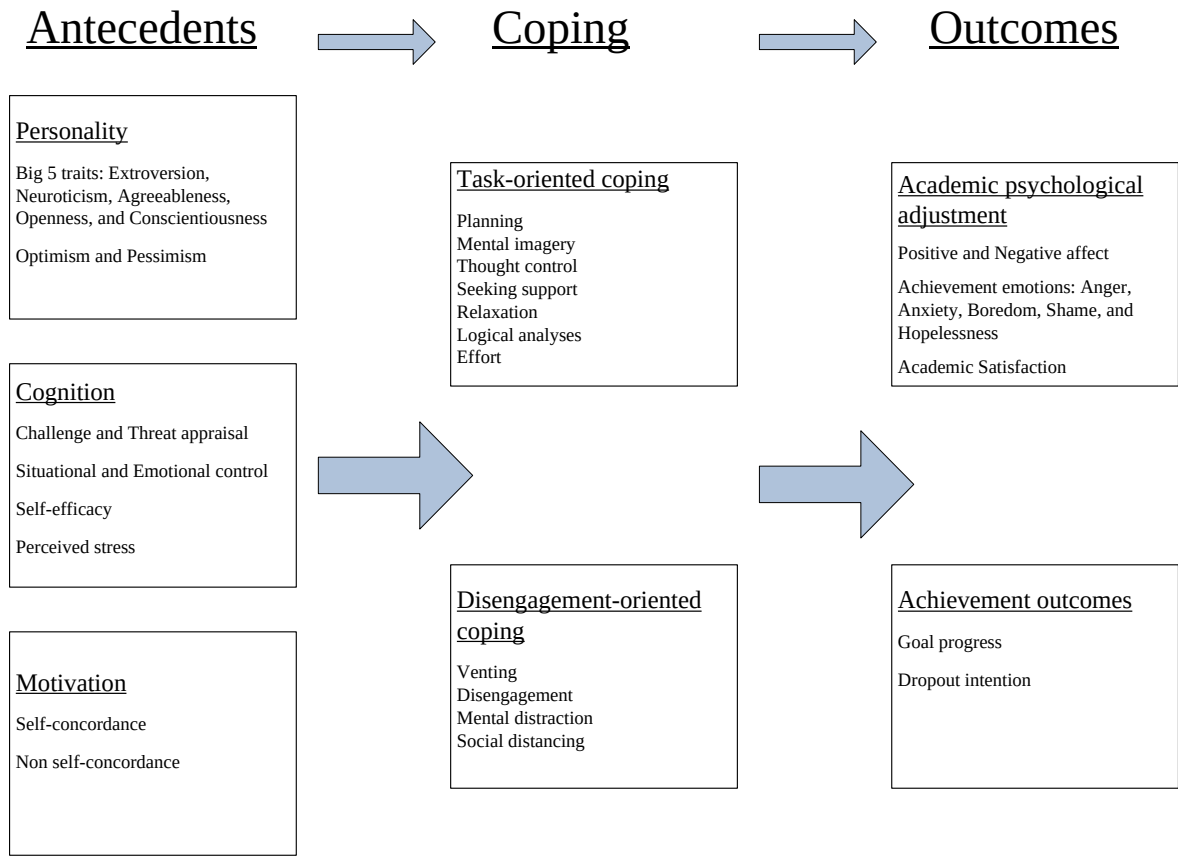


Figure 1. A theoretical framework of the antecedents and outcomes of task-oriented and disengagement-oriented coping in the university setting.

CHAPTER 3

Article 1

Revisiting the Measurement of Coping in the Post-secondary School Domain: Development and Validation of the Coping Inventory for Academic Striving (CIAS)

The mere fact of setting and pursuing educational goals creates new challenges and demands that require the usage of strategies to handle the stress associated with post-secondary academic life. In fact, research has shown that 75 to 85 percent of university students experience moderate levels of stress while 52 percent of students experience high levels of stress during a semester (Abouserie, 1994; Hudd et al., 2000; Pierceall & Keim, 2007). Research has also shown that, in their first year of post-secondary education, students who later dropped out were already beginning to report higher levels of stress (Shaienks & Gluszynsk, 2007). Time demands, insufficient resources, poor studying skills, work overload, and insufficient support from both peers and faculty – to name just a few – have all been identified by students as sources of stress (Struthers et al., 2000). A plethora of research has provided evidence for the importance of coping as a salient tool that students use to manage task demands and corresponding stress encountered during post-secondary goal pursuit (Drumheller et al., 1991; Zeidner, 1995). The coping behaviours of university students have been shown to influence grade point average (Lumley & Provenzano, 2003) and post-secondary drop out (Meilman et al., 1992) along with educational and psychological adjustment including academic satisfaction (Alimoglu et al., 2011), depression and burnout (C. Gibbons, 2010), and somatic complaints (K. J. Edwards et al., 2001).

The goal of this research program was the development and validation of a coping questionnaire – the *Coping Inventory for Academic Striving* (CIAS) – designed to measure how students manage the demands of post-secondary goal pursuit. This research was guided by a review of the literature pointing to shortcomings in the measurement of coping during the pursuit of post-secondary goals, including issues of content validity, reliability, and construct validity. A theoretically based approach to scale development (K. K. Clark, Bormann, Cropanzano, & James, 1995) was used to develop and test the psychometrics and validate the CIAS in two independent samples of students.

The Coping Construct

Based on considerable research on stress management mechanisms, Lazarus and Folkman (1984) have defined coping as the behavioural and cognitive processes used in the attempt to manage the internal and external demands of a stressful situation. A consensus exists that coping is a multidimensional construct that can be conceptualized at three levels of analysis and organized within a hierarchical structure (Compas et al., 2001; E.A. Skinner et al., 2003). At the lowest level, the instances of coping subsume the countless coping cognitions and behaviours (Lazarus & Folkman, 1984). The instances of coping can be organized into coping strategies (*i.e., the micro-analytical factor structure*). All coping instances that represent a comparable, conceptually recognizable, and mutually exclusive way of coping are organized within the same coping strategy. At the final level, all coping strategies that serve to fulfill a common goal or function in dealing with a stressor are organized within a coping dimension (*i.e., the macro-analytical factor structure*). The conceptualization and measurement of coping dimensions provides a more parsimonious account of coping strategies playing a similar role in the stress process. The dimensions facilitate coping research as the statistical power is increased in

comparison to what would otherwise be needed in analyses conducted using the corresponding coping strategies. The likelihood of multicollinearity and suppression effects is also reduced in research examining coping dimensions. Additionally, the organization of coping strategies within consistent coping dimensions facilitates the comparison of the findings of coping research across contexts, stressors and ages and the comparison of the antecedents and outcomes of coping (E.A. Skinner et al., 2003). While, this conceptualization of coping is widely accepted, its implementation in the measurement of coping has remained limited.

Historical Overview of the Measurement of Coping

Different approaches – either empirical or theory-based – have been employed in the development of the hierarchical and multidimensional structure of academic coping. In the empirical method, the number and nature of the coping strategies and dimensions was established using factor analysis, and the identified coping strategies or dimensions were then tied back to the theory *post hoc* (Carver et al., 1989). An empirical approach was used by the developers of the original version and the many adaptations of the Ways of Coping Questionnaire (Folkman & Lazarus, 1985). Particularly relevant, the original scale was developed to measure test anxiety. It was relatively unclear whether the questionnaire was measuring coping strategies, dimensions, or a mixture of both. As a result, both the number of coping strategies and the organization of the coping strategies within coping dimensions have differed across studies (e.g., Aldwin & Revenson, 1987; Folkman & Lazarus, 1986, 1988; Parker & Endler, 1992; Parker et al., 1993). This approach persisted for a few years but was rapidly replaced by a theoretically-driven hierarchical approach in which researchers were determining, *a priori*, the number of coping strategies and dimensions along with the organization of strategies within coping dimensions.

Still, most of the coping questionnaires available in the literature have focused either on the macro-analytical (coping dimensions) or on the micro-analytical (coping strategies) definitions of coping. In their systematic review of the literature, Skinner et al. (2003) have identified and evaluated 89 coping questionnaires. A total of 34 questionnaires have measured coping dimensions within the confines of the macro-analytical approach. Some of the questionnaires include well known and frequently used questionnaires such as the CSI (Amirkhan, 1990), the CISS (Endler & Parker, 1994), and the CHIP (Endler, Courbasson, & Fillion, 1998). Other researchers have embraced this approach to measure coping in achievement-related domains (Kowalski & Crocker, 2001; Park, 2000). This macro-analytical approach is rather incomplete because it bypasses coping strategies to directly regroup coping instances into coping dimensions. Yet, it offers a rapid evaluation of coping dimensions such as problem-focused coping, emotion-focused coping, and avoidance coping.

In contrast, a total of 38 questionnaires have used a micro-analytical approach in which coping instances are regrouped into distinct coping strategies. Some of the questionnaires include well-known and frequently used questionnaires such as the COPE (Carver et al., 1989), the Brief COPE (Carver, 1997), and the Adolescent COPE (Phelps & Jarvis, 1994). This measurement approach offers an enriched and more precise account of the different and recognizable ways through which individuals are coping. Yet, it lacks parsimony insofar as it does not address how similar and dissimilar coping strategies are conceptually and functionally linked. Several versions of the COPE have been modified to measure how individuals, such as students and athletes, are coping with achievement-related demands (e.g., Amiot et al., 2008; Crocker & Graham, 1995). Several post hoc attempts have also been made to reorganize the coping strategies of the COPE and Brief COPE Inventories into two, three or four theoretically

meaningful and replicable coping dimensions. Although some researchers have managed to obtain a decent factorial structure (Hasking & Oei, 2002; Segerstrom, Taylor, Kemeny, & Fahey, 1998; Zautra, Sheets, & Sandler, 1996), the results are inconsistent. Instead, it may be more appropriate to employ the COPE Inventories as a very good measure of coping strategies because it was not designed and validated purposefully to measure coping within the confines of a hierarchical approach.

Finally, Skinner et al. (2003) have identified 17 questionnaires that were developed using a hierarchical framework. However, only three of these frameworks, at that time, had received some form of empirical scrutiny: (a) *Children's Coping Strategies Checklist* (Ayers et al., 1996), (b) *Pain Response Inventory* (Walker, Smith, Garber, & Van Slyke, 1997), and (c) *the Responses to Stress Questionnaire* (Connor-Smith, Compas, Wadsworth, Thomsen, & Saltzman, 2000). Although none of these questionnaires has been developed to measure how students are coping with the achievement-related demands and challenges of their academic lives, they have nonetheless offered the conceptual and methodological foundations to measure coping within the confines of a hierarchical approach.

Rationale for the development and validation of the Coping Inventory for Academic Striving (CIAS)

Three interrelated goals were proposed in an effort to develop and validate a new academic coping questionnaire. First, the coping questionnaire was developed as part of a research program which has focused on goal pursuit in different achievement-related domains (e.g., sport, school, work). Quite often, in the study of coping in different domains and across different studies, coping has been examined using coping questionnaires with hardly comparable

underlying conceptual frameworks, making the comparison of findings across research limited (Gaudreau, Gunnell, Hoar, Thompson, & Lelièvre, in press). Therefore, the present research proposes the development of a questionnaire that could facilitate the comparison of research findings across different achievement domains. In recent years, a mounting research literature has emanated from the development of a hierarchical coping questionnaire designed to measure both coping strategies and coping dimensions of athletes before and during sport competition (e.g., Gaudreau & Blondin, 2002; Levy et al., 2011; Molinero et al., 2010; Nicholls, Polman, Levy, & Backhouse, 2008). This questionnaire has recently been qualified as the best available questionnaire to measure coping in the sport domain (Lidor, Crocker, & Mosewich, 2012). This questionnaire, called the Coping Inventory for Competitive Sport (CICS), was created after an extensive review of the sport and performance psychology literatures. In an effort to harmonize content, the CIAS development involved an examination as to whether the coping strategies proposed in the CICS could serve as an applicable and meaningful framework for the measurement of students' coping with the demands of their academic lives. Some of the demands of sport and academic goals are quite similar insofar as they both involved the necessity to learn, self-improve, and to compete to obtain limited resources within a structured and organized environment. A review of the academic coping literature revealed that the coping strategies measured by the CICS (e.g., relaxation, logical analysis, thought control, seeking social support, and mental imagery) were highly relevant in the academic lives of university students.¹ The CIAS was developed to measure the CICS coping strategies, but items were tailored to measure the academic specific behaviours used by students during academic goal

¹ In addition, a review of the academic coping literature identified planning as a pertinent coping strategy post-secondary students use to actively manage academic stressors.

pursuit. The operational definitions of the 11 coping strategies included in the newly created CIAS are presented in Table 1 in the supplementary file located in Appendix A.

Second, past experience in coping measurement has highlighted the importance of face validity. Items designed to measure coping instances are rarely applicable across multiple contexts (e.g., Ben-Porath, Waller, & Butcher, 1991; Richaud & Sacchi, 2001). Although the overarching conceptual structure of the CICS served as the backbone for the development of the CIAS, a pool of items were generated that would be specifically applicable and relevant in the lives of university students.

Third, we wanted to create a multidimensional questionnaire within the confines of a hierarchical model of coping. Some empirical evidence in the sport domain has already shown that coping strategies measured in the CICS can be regrouped in either two (e.g., Amiot, Gaudreau, & Blanchard, 2004; Fletcher, 2008) or three (e.g., Gaudreau & Antl, 2008; Molinero et al., 2010) coping dimensions. *Task-oriented coping* (also labeled engagement coping (see Carver & Connor-Smith, 2010) encompasses the coping strategies by which individuals are trying to deal directly with the source of stress and its resulting thoughts and emotions. It is often difficult to know whether relaxation, mental imagery, thought control, logical analysis, planning, increased effort, and seeking support are being used to directly manage the stressful situation and/or the psychological experience generated by these situations. As such, task-oriented coping regroups the more typical problem-focused coping strategies (i.e., primary control) with some active forms of emotion-focused coping strategies (i.e., secondary control and approach emotion-focused) to create a family of “good news coping” (E.A. Skinner et al., 2003) known to be positively linked with active task engagement (Austenfeld & Stanton, 2004; Connor-Smith et al., 2000). In contrast, *avoidance-oriented coping* includes strategies by which individuals are

disengaging and distracting themselves from the task at hand. Bifurcation of *disengagement-oriented coping* and *distraction-oriented coping* in two forms of avoidance coping has sometimes been proposed and empirically supported as independent in the coping literature (Ayers et al., 1996; Doron et al., 2014; Molinero et al., 2010). *Disengagement-oriented coping* includes actions and cognitions aimed at disengaging the self from goal-directed behavior while *distraction-oriented coping* encompasses strategies used to direct attention momentarily from a stressful situation. In the sporting domain, research supports the conceptual independence of distraction- and disengagement-oriented coping (Gaudreau & Antl, 2008). While the use of disengagement-oriented coping strategies was found to be negatively related to goal attainment and life satisfaction, the use of distraction-oriented coping strategies was found to be unrelated to goal attainment and life satisfaction. Yet, research with students in the school domain has yet to conclude whether the distinction is absolutely needed insofar as distraction-oriented and disengagement-oriented coping appear to be hard to empirically separate on both a structural and functional account (e.g., Cook & Heppner, 1997; Endler & Parker, 1994; Zuckerman & Gagné, 2003).

The Present Studies

The overarching purpose of this article was to develop and validate a newly created questionnaire – the CIAS – to measure how students cope with the demands of their academic strivings. A first goal was to examine the structural validity of the CIAS across two studies designed to pilot and refine the pool of items (Study 1) and to cross-validate the final pool of items in a second independent sample of participants (Study 2). It was expected that coping instances would be organized into 11 conceptually distinct yet empirically related coping strategies. The definition of the coping behaviours and cognitions captured within each coping

strategy are presented in Table 1 of the supplementary file, Appendix A. In turn, these 11 coping strategies were expected to be regrouped in two or three broader dimensions of coping within a well-fitted and integrative, yet parsimonious, hierarchical model of coping.

A second goal was to test the construct validity of the coping strategies and dimensions of the CIAS within a nomological network of covariates generally studied in the both the general and academic coping literature. Coping has been studied extensively over the last thirty years, and it has attracted a fair amount of empirical research looking at various correlates of coping. Theoretical frameworks have also been proposed to organize the correlates of coping into larger families of variables playing different roles in the coping process (for a review see Folkman, 2011). Most of these frameworks were inspired, at least to some extent, by the transactional framework of Lazarus and Folkman (1984) and by a more recent version often referred to as the Cognitive Motivational Relational Theory (Lazarus, 1991). Although space precludes a comprehensive explanation of these models, it is important to highlight that most coping researchers have assumed that coping dimensions and their respective correlates are mutually involved in a complex relationship (i.e., a transaction) in which they are developmentally influencing each other in a reciprocal manner. Nonetheless, most coping research has typically divided correlates of coping into categories representing “coping antecedents” such as personality, motivation, and cognitive appraisals and “coping outcomes” loosely organized into affective, physical, and achievement outcomes (see Figure 2).

	Task-oriented coping	Disengagement-oriented coping
Personality	Extroversion (+) Neuroticism (-) Agreeableness (+) Openness (+) Conscientiousness (+) Optimism (+)	Extroversion (-) Neuroticism (+) Agreeableness (-) Openness (-) Conscientiousness (-) Pessimism (-)
Cognition	Challenge appraisal (+) Situational control (+) Emotional control (+) Self-efficacy (+) Perceived stress (-)	Test anxiety (+) Fear of failure (+) Situational control (-) Emotional control (-) Self-efficacy (-) Perceived stress (+)
Motivation	Autonomous goal motivation (+)	Controlled goal motivation (+)
Academic and psychological adjustment	Positive affect (+) Negative affect (-) Academic satisfaction (+)	Positive affect (-) Negative affect (+) Academic satisfaction (-)
Achievement outcomes	Goal progress (+) Dropout intention (-)	Goal progress (-) Dropout intention (+)

Figure 2. The hypothesized relationships between task-oriented coping and disengagement-oriented coping and the antecedents and outcomes of coping in the university setting. (+) = positive relationship; (-) = negative relationship.

On the basis of past theoretical and empirical knowledge, the coping strategies and dimensions of our newly created questionnaire were expected to be associated with known correlates of coping. Different forms of construct validity were examined as part of the validation of the CIAS. The *convergent validity* of the CIAS was investigated by testing the relationship between the CIAS and selected subscales of a general coping questionnaire, in this case the Brief COPE (Carver, 1997). It was expected that coping subscales tapping onto a similar

dimension of coping should significantly correlate across the two questionnaires. Moreover, the *concurrent validity* was tested by examining the cross-sectional correlations between the coping strategies and dimensions of the CIAS with a series of personality, cognitive, and motivational antecedent constructs of coping and with a series of academic and psychological adjustment and academic achievement outcome constructs of coping. Specific hypotheses about the associations between the CIAS and these constructs are presented in Figure 2. As part of the construct validity, we also investigated the *predictive validity* by examining whether the coping strategies and dimensions of the CIAS measured at Time 1 could predict known coping outcomes at Time 2.

The third goal of the present research included two tests of the *incremental validity* of the CIAS. The first test of the incremental validity examined whether the coping dimensions of the CIAS remained significantly associated with coping outcomes and accounted for a significant portion of unique variance in the outcomes after controlling for a general measure of coping, the Brief COPE (Carver, 1997). This test was important to establish whether the items of the CIAS – which were written specifically for the school context – measured unique cognitive and behavioural instances of coping not fully captured and/or contextualized in a general measure of coping. The second test of the incremental validity examined whether the coping dimensions of the CIAS remained significantly associated with coping outcomes after accounting for the influence of basic personality dimensions. Existing research has shown that while personality dimensions relate to emotional reactivity to stressful situations including coping, personality also directly relates to educational outcomes (Bolger & Zuckerman, 1995; Connor-Smith & Flachsbart, 2007; Gunthert et al., 1999; Saklofske et al., 2011). For example, neuroticism has shown to relate to pre-examination anxiety, coping, and exam performance

(Bolger, 1990; Chamorro-Premuzic & Furnham, 2003). This test of incremental validity appeared pivotal in order to provide empirical evidence that coping, in and of itself, is an influential predictor of academic success and academic and psychological adjustment after controlling for the role of personality during coping.

Study 1

Study 1 included three goals. Specifically, the development of the pool of items for the CIAS, item selection and a test of the psychometrics of the proposed hierarchical and multi-dimensional factor structure of the CIAS, and the test of the concurrent validity along with the test of the convergent and incremental validity of the CIAS with an established general measure of coping.

Methods

Development of the CIAS

The first two authors examined and adapted the 39 items of the CICS in order to make them applicable for students engaged in coping in the school domain. A theory-driven approach to scale development was used in order to write items designed to specifically measure one of the eleven coping strategies of the CIAS. An initial pool of 83 items was written using a series of scale development guidelines (L. A. Clark & Watson, 1995; DeVellis, 2003). Using these guidelines, each item was designed to be short, specific, and clear, assessing only one coping action written in simple language. Expressions pertaining to specific school disciplines and colloquialisms were avoided to broaden the applicability of the questionnaire. Six items each were developed to measure the planning, mental distraction, and effort expenditure subscales; nine items to measure the disengagement-oriented subscale; and eight items each to measure the

mental imagery, thought control, seeking support, relaxation, logical analysis, venting, and social distancing subscales. Three graduate students were asked to assess the clarity of each item. They were also given the definition of each coping scale in order to assign each item into a specific coping scale. The pool of items was refined and improved on the basis of the feedback gleaned in this small-scale piloting.

Sampling procedure

Students enrolled in Introductory Psychology courses at a Canadian University were recruited from the Integrated System for Participation in Research and received course credit for their participation. In efforts to recruit students from other disciplines and years of study, undergraduate students were also recruited through in-class recruitment presentations and received \$5 monetary compensation for their participation. Eligibility criteria for this study included the willingness to pursue an academic goal over the course of the semester. No restrictions were placed on participant's age, gender, year of study, academic program or ethnic identity. Students were informed their responses were anonymous, they could withdraw at any point from the study, and their participation in the study had no bearing on their course evaluation or performance. This study received full approval from the University of Ottawa research ethics board, and all participants were treated in accordance with the guidelines put forth by the Canadian Psychological Association. They all provided electronic informed consent.

Study design

A sample of undergraduate students was recruited to participate in a two-part study. At Time 1, two weeks following a mid-term period, students completed a first questionnaire

package. At Time 2, approximately four weeks later during a second mid-term period, students recruited in class ($n = 172$) were again contacted to complete a follow-up questionnaire.

Participants

Time 1. At Time 1, 350 students responded to the survey. Preliminary analyses were conducted to assess the response pattern on the CIAS, and mean substitution was chosen as the method to handle missing scores for the CIAS. Less than one percent of cases on the CIAS were replaced using mean substitution. In addition, 33 participants were identified as multivariate outliers, Mahalanobis χ^2 (83) = 128.565, $p < .001$. They were removed from the Time 1 sample (Myers, Gamst, & Gaurino, 2006).² The final Time 1 sample included 299 participants to test the factor structure of the CIAS (females = 210; males = 88; unspecified = 1) with 172 students recruited in class and 127 students recruited through the ISPR. Students identified as being Aboriginal (0.7%), Caucasian (66.6%), Afro-American (2.3%), Asian (17.7%), Hispanic (3.0%), and non-specified ethnicity membership (9.1 %) with less than one percent of students failing to specify ethnicity membership (0.7%). The mean age of the students was approximately 20 years of age ($M = 9.83$, $SD = 3.36$), and the sample included first year ($n = 88$), second year ($n = 112$), third year ($n = 67$), and fourth year students ($n = 32$). Students identified as being enrolled in arts (25.1%), health sciences (34.4%), and natural science (37.1%) programs of study with a few students failing to specify program of study (3.4%).

Time 2. Four weeks following the initial assessment, the 172 students recruited in class were invited to complete a follow-up questionnaire. A total of 108 students completed the entire

² Participants excluded from the Time 1 sample reported a similar grade point average, goal priority, and goal commitment compared to participants retained for analyses (Wilks' Lambda = .97, $F(3,342) = 3.56$, $p > .05$). The differences on coping items were not compared between excluded participants and the final sample because the coping items were in the process of being analyzed for validation purposes.

follow-up questionnaire while 64 students who did not complete all measures or did not participate at Time 2 were not included in the final sample. Participants excluded from the final Time 2 sample reported at Time 1 a similar grade point average, goal priority, and goal investment compared to participants retained for analyses at Time 2 (Wilks' Lambda = .99, $F(3,163) = .56, p > .05$). This sample was used to test the convergent and incremental validity of the CIAS and included 36 males and 72 females with a mean age of 19.71 ($SD = 3.47$).

Measures

All measures for study 1 in Article 1 can be found in Appendix C.

Demographic information (Time 1). Participants were asked to provide their age, gender, ethnic identity, year of study, academic program, and grade point average.

Academic goal (Time 1). Participants were asked to report a specific, meaningful, and measurable academic goal that they had been pursuing and would continue to pursue over the course of the semester. Personal goals were defined as “projects and concerns that people think about, plan for, carry out, and sometimes (though not always) complete or succeed at” (Koestner, Lekes, Powers, & Chicoine, 2002). Students were also asked to rate separately on a Likert scale ranging from 0 (*not at all*) to 100 (*totally*) how confident they were in the successful attainment of the reported academic goal, how committed they were to the academic goal, and the current priority of the reported goal in their life. These questions were asked to ensure that students were engaged in their academic goal in efforts to facilitate the applicability of the measure of the CIAS, coping with the set academic goal. Examples of goals set by students included “Study everyday for material covered in lectures that day, so there is less stress before exams” and “Increase my grade point average by at least one level (i.e., B+ to A-).” Students in this study,

reported high levels of goal confidence ($M = 70.79$, $SD = 21.57$), goal commitment ($M = 79.60$, $SD = 21.16$), and priority ($M = 79.70$, $SD = 22.88$) measured on a 100 point scale.

Coping with the newly developed CIAS (Time 1 & Time 2). Students were asked to “rate the extent to which each item corresponds to what you thought about or did while pursuing your academic goal during your preparation for your midterm exams”. The items were measured on a 5-point Likert scale ranging from 1 (*does not correspond at all*) to 5 (*corresponds totally*).

Perceived stress (Time 1 & Time 2). Perception of stress within the last week was measured using the 10 item version of the Perceived Stress scale (Cohen, Kamarck, & Mermelstein, 1983). Each item was assessed on a 5-point Likert scale ranging from 1 (*never*) to 5 (*very often*). Research has provided evidence that this is a reliable measure of stress (Cohen, Tyrell, & Smith, 1993). The internal consistency was acceptable ($\alpha = .90$).

Positive and Negative Affect (Time 2). General positive affect and negative affect states experienced within the last few days were assessed using the 20 adjectives from the Positive and Negative Affective Schedule (Watson, Clark, & Tellegen, 1988). Each item was assessed on a 5-point scale ranging from 1 (*does not correspond at all*) to 5 (*corresponds totally*). The internal consistency of this measure has been reported as excellent (Crawford & Henry, 2004). The internal consistency of positive affect ($\alpha = .91$) and negative affect was acceptable ($\alpha = .84$).

Coping with the Brief Cope (Time 2). Coping was also assessed using eight subscales measuring eight coping strategies (i.e., active coping, planning, acceptance, seeking instrumental support, mental disengagement, behavioral disengagement, blame, and denial) from the Brief COPE (Carver, 1997). Each subscale was measured using two items. The eight coping strategies were reorganized within the task-oriented coping (i.e., active coping, planning, acceptance, and

seeking instrumental support) and disengagement-oriented coping dimensions (i.e., behavioral disengagement, mental disengagement, denial, and blame) consistent with the conceptualization of task- and disengagement-oriented coping from research in the academic setting (e.g., Amiot et al., 2008). Students were asked to “rate the extent to which each item corresponds to what you did before and during the mid-term exams period”. The 16 items were rated on a 5-point Likert scale ranging from 1 (*does not correspond at all*) to 5 (*corresponds totally*). This questionnaire has been shown to be a valid and reliable measure of academic coping (Thompson & Gaudreau, 2008). In this sample, the internal consistency of the coping subscales active coping ($\alpha = .69$), planning ($\alpha = .80$), positive reappraisal ($\alpha = .79$), seeking instrumental support ($\alpha = .90$), behavioral disengagement ($\alpha = .78$), venting ($\alpha = .83$), and distraction ($\alpha = .80$) were acceptable given that each subscale included only two items. The internal consistency for the task-oriented coping dimension ($\alpha = .85$) and disengagement-oriented coping dimension were also acceptable ($\alpha = .77$).

Analytical Plan

A four-stage sequential confirmatory factor analysis (CFA) was conducted with the goal of identifying the best four items per coping strategy (Jöreskog, 1993). In the first stage, separate CFAs were conducted for each subscale to identify and eliminate items deemed to be poor indicators of a given subscale. In the second stage, CFAs pairing all possible combinations of subscales were conducted to identify items that cross-loaded onto other subscales. In the third stage, three separate CFAs were conducted to test the fit of separate models combining the strategies proposed to belong to a coping dimension. The correlations among subscales proposed to be organized within a coping dimension were also examined to assess the suitability of each coping dimension (see Table 5). In the fourth stage, one CFA was conducted to test the fit of the

identified best fitting items measuring the 11 coping subscales. Following, a hierarchical confirmatory factor analysis (HCFA) was conducted to test if the selected 44 items measuring the 11 coping strategies of the CIAS best organized within the three coping dimensions, task-, disengagement-, and distraction-oriented coping. Alternative models examined the tenability of the organization of the 11 coping strategies within two higher-order dimensions of coping combining the distraction-oriented and disengagement-oriented coping dimensions.

The sample was deemed to be non-normally distributed (Mardia's normalized estimate = 29.38). Confirmatory factor analyses using EQS 6.1 was then conducted using maximum likelihood estimation with robust statistics and standard errors along with parameter estimates rescaled for non-normality. Satorra and Bentler (2001) rescaled χ^2 ($SB\chi^2$) and robust fit indices (i.e., CFI, NNFI, RMSEA) were reported. Based on previous recommendations, acceptable model fit was interpreted when the CFI and NNFI values ranged between .90 and .94 whereas values greater than .95 were interpreted as strong evidence for model fit (Hu & Bentler, 1995; Kline, 2011). Furthermore, RMSEA values less than .08 suggested acceptable model fit whereas values smaller than .06 suggested relatively good model fit. In an attempt isolate the best pool of items, standardized first-order factor loadings less than .60 were deemed unacceptable. Modification indices were examined to identify items that may cross-load significantly on unintended subscales or items with significantly correlated error terms, an indication of item redundancy. Model re-specifications were considered only in the case where modification indices were highly significant ($LM\chi^2 < .01$). Items significantly cross-loading on other subscales with standardized factor loadings greater than .20, and items cross-loading on several subscales were deemed to be unacceptable indicators of the proposed coping strategy. Finally, the Target Coefficient (Marsh & Hocevar, 1985) was examined to evaluate the macro-analytical

model fit. The target coefficient is an indication of the degree to which the macro-analytical factor structure of the coping dimensions fits the micro-analytical covariation between the coping strategies. Values range from 0 to 1 with values approaching 1 signifying that the macro-analytical model is a good fit to the covariation of the micro-analytical model.

Results

Four-stage sequential confirmatory factor analyses

Stage 1 to stage 3. The purpose of these three steps was to eliminate problematic items. At stage 1, a total of 18 items were removed because they had smaller standardized factor loadings ($< .60$) and significant modification indices ($LM\chi^2 < .01$). Results for the models before and after the items' deletion are shown in Table 2 in the supplementary file, Appendix A. At stage 2, the modification indices from 55 different two-factor CFAs pointed to 21 items which significantly cross loaded on unintended strategies and/or had correlated error terms with other items indicating item redundancy. At this point, 44 items – four items per coping subscale – were selected as clear indicators of their respective subscale. The fit of the subsequent two-factor models was acceptable and all items had strong factor loadings with no significant item cross-loadings and no correlated error terms. At stage 3, we tested three separate models in which (a) 28 items loaded on the seven task-oriented coping subscales ($\chi^2 = 517.08$, $SB\chi^2 = 453.99$, $df = 303$, $p < .01$, CFI = .97, NNFI = .96, RMSEA = .041); (b) eight items loaded on two disengagement-oriented strategies ($\chi^2 = 48.99$, $SB\chi^2 = 30.75$, $df = 26$, $p < .001$, CFI = .99, NNFI = .99, RMSEA = .05); and (c) eight items loaded on two distraction-oriented strategies ($\chi^2 = 56.31$, $SB\chi^2 = 51.72$, $df = 26$, $p < .001$, CFI = .98, NNFI = .97, RMSEA = .06). We also tested a fourth model in which sixteen items loaded on four disengagement-oriented strategies ($\chi^2 =$

251.97, $SB\chi^2 = 194.76$, $df = 113$, $p < .001$, CFI = .97, NNFI = .97, RMSEA = .05). No item was identified as problematic at stage 3.

Stage 4: 11-factor model. The complete CFA model in which the 44 selected items loaded on the 11 coping subscales offered a good fit to the data ($\chi^2 = 1320.72$, $SB\chi^2 = 1187.64$, $df = 847$, $p < .001$, CFI = .96, NNFI = .95, RMSEA = .037). All items were good indicators of their associated subscale as evidenced by significant and strong standardized loadings greater than .60 with explained variance (R^2) ranging from .51 to .83. The range of standardized factor loadings and the alpha of Cronbach for each subscale were as follows: .83 to .91 for planning ($\alpha = .90$); .72 to .88 for mental imagery ($\alpha = .89$); .75 to .89 for thought control ($\alpha = .89$); .75 to .92 for seeking support ($\alpha = .90$); .73 to .89 for relaxation ($\alpha = .88$); .67 to .83 for logical analysis ($\alpha = .87$); .75 to .90 for effort ($\alpha = .91$); .79 to .84 for disengagement ($\alpha = .92$); .79 to .91 for venting; .75 to .89 for social distancing ($\alpha = .88$); .76 to .86 for mental distraction ($\alpha = .93$). The error-free correlations between the 11 latent factors are presented in Table 5. The two distraction-oriented coping strategies (i.e., social distancing, mental distraction) were only weakly correlated whereas the disengagement-oriented and distraction-oriented coping subscales were highly inter-correlated (i.e., social distancing, mental distraction, venting, disengaging). The first-order factor structure of the CIAS was a good fit to the data, a prerequisite to the test of the second-order factor structure.

The test-retest correlation of the first-order factor structure was tested and the results are presented in Table 1. A strong correlation was found between each coping strategy, thus suggesting that individual differences in rank-ordering of coping were stable across four weeks.

Hierarchical confirmatory factor analyses (HCFA)

Three dimensions of coping. A first HCFA tested a model with 44 items regrouped into 11 coping strategies regrouped into task-, disengagement-, and distraction-oriented coping dimensions. The fit of this model was poor ($\chi^2 = 1775.63$, $SB\chi^2 = 1582.56$, $df = 890$, $p < .001$, CFI = .91, NNFI = .83, RMSEA = .051). This finding is consistent with the weak correlation between the two distraction-oriented coping strategies and the high inter-correlation between the disengagement-oriented and distraction-oriented coping subscales (see Table 5).

Two dimensions of coping. A second HCFA tested a model with 44 items regrouped into 11 coping strategies regrouped into task-oriented and disengagement-oriented coping dimensions. The fit of this model was acceptable ($\chi^2 = 1677.70$, $SB\chi^2 = 1497.78$, $df = 891$, $p < .001$, CFI = .93, NNFI = .920, RMSEA = .048). All the factor loadings of coping strategies on their intended second-order coping dimension were significant. The standardized loadings for the task-oriented second-order dimension of coping were as follows: mental imagery .79, planning .66, thought control .84, seeking support .47, relaxation .63, logical analysis .93, and effort expenditure .59. The standardized loadings for the disengagement-oriented second-order dimension of coping were as follows: disengagement .78, venting .81, social distancing .64, and mental distraction .56. The target coefficient comparing the fit of the first-order and second-order model indicated that 79% of the covariance between the first-order coping strategies was explained by the two second-order coping dimensions. The composite reliability was .88 for task- and .80 for disengagement-oriented coping. The bidimensional structure the CIAS appears to provide a good fitting, sufficiently detailed, and parsimonious account of the 11 coping strategies included in the questionnaire. This model was therefore retained as our final hierarchical CFA model.

Convergent validity

The convergent validity of the CIAS was tested by assessing the Bivariate Pearson correlations between the Brief COPE and CIAS measured at Time 2, and the results are presented in Table 2. As expected, the task-oriented and disengagement-oriented coping subscales of the CIAS were significantly and moderately related to the task-oriented and disengagement-oriented coping subscales of the Brief COPE, respectively (Carver, 1997). These results provide evidence that the subscales of the CIAS are measuring something comparable to the subscales of another widely used measure of coping. Meanwhile, the moderate amount of convergence also suggests that the CIAS measures unique cognitive and behavioural instances of coping not fully depicted and/or contextualized by the general measure of coping.³

Concurrent and incremental validity

The relationship between each coping strategy and positive affect and negative affect are presented in Table 2. As expected, the task-oriented coping dimension and associated coping strategies were positively linked to positive affect whereas the disengagement-oriented coping and associated strategies were positively linked to negative affect, thus providing evidence of concurrent validity.

The results of the series of hierarchical regressions conducted to test the incremental validity of the CIAS can be found in Table 3. As hypothesized, the results revealed that the CIAS

³ In an effort to offer a balanced test and to control for measurement error, the convergent and incremental validity were also tested using the Brief-CIAS (22 items). The Brief-CIAS includes two items per subscale – a comparable number of items as the Brief COPE. See Appendix B for these analyses. The results using the CIAS and Brief CIAS did not differ.

task-oriented coping and disengagement-oriented coping were significant predictors of positive affect and negative affect after controlling for the Brief COPE (Carver, 1997). The CIAS task-oriented and disengagement-oriented dimensions accounted for a significant portion of unique variance in positive and negative affect over and above the Brief COPE. The results also revealed that the Brief COPE task-oriented and disengagement-oriented coping dimensions were not significant predictors of positive affect and negative affect after controlling for the CIAS task- and disengagement-oriented dimensions.

Brief Discussion

Study 1 provided preliminary evidence that a model with 44 items regrouped in 11 coping strategies provides a good fit to the data. Internal consistency of the 11 coping strategies was acceptable and they correlated in expected strength and direction with subscales from a widely used questionnaire of coping (i.e., convergent validity). Results of the HCFA also revealed that the 11 coping strategies can be regrouped in a bidimensional model of task-oriented coping and disengagement-oriented coping with acceptable composite reliability. Coping strategies and dimensions exhibited acceptable test-retest stability over a four week period. Scores of task-oriented and disengagement-oriented coping were significantly associated with positive and negative affect in a way that matched our hypotheses of concurrent validity (see Table 2). Finally, the scores of the newly created CIAS were capable of predicting unique variance in positive and negative affect, even after controlling for the coping scores of a widely used questionnaire of coping (i.e., incremental validity, Table 3). These results provided additional evidence that the items of the CIAS – which were written specifically for the school context – are measuring unique cognitive and behavioural instances of coping that were not fully captured and/or contextualized in a more general measure of coping. Overall, evidence was

provided for the reliability, structural validity, concurrent validity, and incremental validity of the CIAS. While the CIAS was developed using a theoretically-driven approach and tested using four-stage sequential confirmatory factor analyses, this method may limit the validity of the questionnaire. MacCallum, Roznowski, and Newcowitz (1992) have criticized sequential methods to scale testing and development in suggesting that these testing procedures may be particularly influenced by the testing sample (as cited in Gaudreau & Blondin, 2002). Hence, the generalizability of the CIAS may be limited highlighting the need to replicate the factor structure of the CIAS in additional academic samples.

Study 2

The goal of Study 2 was threefold. First, the hierarchical factor structure of the CIAS was cross-validated using a second independent sample of students. Second, the construct validity of the CIAS was investigated by examining both its concurrent and predictive association with known correlates of coping. Finally, additional tests of incremental validity were performed to examine whether the scores of the CIAS could predict some coping outcomes over and above the influence of the basic dimensions of the Five Factor model of personality (McCrae & Costa, 1987). The overall construct validity hypotheses investigated in Study 2 are summarized in Figure 2.

Methods

Sampling procedure

Undergraduate students were recruited from a Canadian university through in-class recruitment presentations and from a mid-sized American university using an online recruitment system. Students from the Canadian University received \$5 for participating in each

questionnaire while participating students from the American University were eligible for a draw for a \$25 gift certificate. At both universities, an email was sent to interested students explaining the purpose and requirements of the study, a contact email for questions, and an assigned confidential code to anonymously complete the study online. No restrictions were placed on participant's age, gender, year of study, academic program or ethnic identity. Eligibility criteria for this study included the willingness to set an academic goal to be pursued over the course of the semester. Participants were informed their responses were anonymous, they could withdrawal at any point from the study, and their participation in the study had no bearing on their course evaluation or performance. This study received full ethical approval from both the Canadian and American university research ethics boards. Participants were treated in accordance with the guidelines put forth by the Canadian and American Psychological Association. All participants provided electronic consent.

Study design

At Time 1, during the mid-term exam period, both participants from the Canadian and American university completed an online 60 minute questionnaire. At Time 2, approximately three weeks later during a second mid-term period, the participants from the Canadian university ($n = 133$) were again contacted to complete an additional 30 minute online questionnaire. At Time 1 and Time 2, students were asked to complete measures in relation to their experience during the ongoing mid-term period.

Participants

Time 1. Five hundred and eighteen students responded to the survey. Preliminary analyses were conducted to assess the response pattern on the CIAS, and mean substitution was used to manage missing scores for the CIAS. Less than one percent of cases on the CIAS were

replaced using mean substitution. Fifty seven participants with missing data on more than three items or occurring on the same subscale were removed from the Time 1 sample (American $n = 48$ and Canadian $n = 9$). Forty participants were identified as multivariate outliers and removed from the final sample (Myers et al., 2006).⁴

The final Time 1 sample included 421 students. The factor structure of the CIAS and the concurrent, predictive, and incremental validity was tested using this sample of 421 undergraduate students. The sample included 288 students from the American university and 133 participants from the Canadian university.⁵ This sample had a mean age of 20 years ($SD = 1.91$) and included 120 males and 300 females with one participant failing to report his or her gender. Students identified as being Aboriginal (0.5%), Caucasian (84.3%), Afro-American (2.6%), Asian (8.8%), Hispanic (1.2%), and undeclared (2.6 %). The sample included first year ($n = 88$), second year ($n = 112$), third year ($n = 67$), and fourth year students ($n = 32$). Students identified as being enrolled in arts (37.3%), health sciences (33.0%), and natural science (24.0%) programs of study with a few students undeclared (1.4%) and failing to specify program of study (4.3%). Students in the Time 1 sample reported moderate levels of perceived stress ($M = 3.46$, $SD = .31$) rated on a 5-point Likert scale ranging from 1 (*does not correspond at all*) to 5 (*corresponds totally*).

⁴ Participants excluded from the final sample and those retained in the final sample reported a similar year of study, grade point average, goal investment, and goal priority (Wilks' Lambda = .99, $F(3,499) = .68$, $p > .05$). Coping item differences between the excluded and the final sample participants were not tested as the coping items were currently being validated.

⁵ Students from the American and Canadian university reported similar goal priority and goal commitment and comparable levels of perceived stress (Wilks' Lambda = .99, $F(3,397) = 1.85$, $p > .05$). Differences in coping items across samples were not tested because the coping items were being validated.

Time 2. Students from the Canadian university sample ($n = 133$) were also invited to complete a questionnaire at Time 2, approximately three weeks later. Seventy-seven students chose to participate at Time 2. The final sample for the predictive validity analyses included 77 participants with 14 males and 63 females with a mean age of 19.62 ($SD = 2.25$)⁶. Students in the Time 2 sample reported moderate levels of perceived stress ($M = 3.10$, $SD = .42$).

Measures

The internal consistency for all measures are presented in Table 6. All measures for study 2 in Article 1 can be found in Appendix C.

Demographic information (Time 1). As per Study 1.

Academic goal (Time 1). As per Study 1. Examples of goals set by students included “To attend all of my classess regularly” and “To achieve an average of over 80% in all of my courses.” Students in this study, reported high levels of goal investment ($M = 84.47$, $SD = 19.93$), priority ($M = 82.21$, $SD = 20.68$), and confidence ($M = 78.81$, $SD = 19.91$) measured on a 100 point scale.

Coping Inventory for Academic Striving (Time 1 & 2). As per Study 1.

Perceived stress (Time 1). As per Study 1.

Positive and Negative Affect (Time 1 & Time 2). As per Study 1.

⁶ Students who participated at Time 2 reported similar levels of grade point average, goal priority, goal commitment, and perceived stress in comparison to students who opted not to participate at Time 2 (Wilks' Lambda = .98, $F(4,121) = .79$, $p > .05$). Again, coping item differences between excluded participants and the final sample were not examined.

Personality factors (Time 1). Personality dispositions were measured using the 10-Item Personality Inventory (Gosling, Rentfrow, & Swann Jr, 2003), a short questionnaire measuring the Five Factor Model of personality (McCrae & Costa, 1987). Two items measured each dimension of conscientiousness, extroversion, agreeableness, openness, and neuroticism. Students indicated the extent to which each personality item corresponded to how they felt about themselves. The items were rated on a 7-point Likert scale ranging from 1 (*not at all agree*) to 7 (*totally agree*). The internal consistency estimates for the separate dimensions measured by this brief measure of personality were not computed. Brief scales place an emphasis on content validity over an emphasis on item congruency. This focus on fewer items with different content results in lower inter-item correlations and Cronbach internal consistency estimates (Gosling, 2014; Gosling et al., 2003).

Dispositional Optimism and Pessimism (Time 1). The Life Orientation Test (Scheier & Carver, 1985) was used to measure dispositional optimism and pessimism with four items measuring optimism and four items measuring pessimism. The items were rated on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). Participants rated each item in relation to how it corresponded to their life in general. Prior research supported the internal consistency for both the optimism and pessimism factors (e.g., Kubzansky, Kubzansky, & Maselko, 2004).

Challenge appraisal (Time 1). The extent to which students perceived the goal demands as challenges was measured using four items from the Flow State Scale-2 (Jackson & Eklund, 2002). Participants were asked to rate the extent to which they believed each item corresponded to the academic goal they had set to pursue over the course of the academic semester. Each item was assessed on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*).

Test Anxiety (Time 1). The extent to which students appraise goal demands as threatening was measured using the 5-item version of the Test Anxiety subscale from the Motivated Strategies for Learning Questionnaire Manual (Pintrich, Smith, Garcia, & McKeachie, 1993). Items were rated on a 7-point Likert scale ranging from 1 (*not at all true of me*) to 7 (*very true of me*). Tests of reliability for this questionnaire suggest that the test anxiety subscale has satisfactory internal consistency (Pintrich et al., 1993).

Fear of failure (Time 1). Fear of failure was assessed using five items from the Performance Failure Appraisal Inventory (Conroy, 2001). Participants rated the extent to which they believed each item corresponded to their academic experience. Each item was assessed on a 5-point scale ranging from -2 (*do not believe at all*) to 2 (*believe 100% of the time*). Research supports the reliability and stability of the Performance Failure Appraisal Inventory (Conroy & Metzler, 2003).

Perceived situational and emotional control (Time 1). Six items were administered to assess students' perceptions of control over task demands and emotions (Kowalski, Crocker, Hoar, & Niefer, 2005). Items were rated on a 5-point Likert scale ranging from 1 (*not at all*) to 5 (*totally agree*).

Self-efficacy (Time 1). Students' current feelings of capability for their school activities were measured using the 5 item academic efficacy subscale from the Patterns of Adaptive Learning Scales (Midgley et al., 2000). The items were rated using a 7-point Likert scale ranging from 1 (*does no correspond at all*) to 7 (*corresponds totally*).

Academic satisfaction (Time 1 & Time 2). Satisfaction with university was assessed with 8-item school satisfaction subscale of the Multidimensional Students' Life Satisfaction Scale

(Huebner, Laughlin, Ash, & Gilman, 1998). Students rated the extent to which items corresponded to their current feelings towards the university. The items were rated using a 7-point Likert scale ranging from 1 (*not at all*) to 7 (*totally*). Gilman and colleagues (2000) reported satisfactory internal consistency scores for the school satisfaction subscale.

Goal Self-concordance (Time 1). The reasons for which students were pursuing their individually set academic goal were assessed with 4 items commonly used in self-determination theory (e.g., Gaudreau et al., 2012). Students rated the following reasons on a 9-point Likert scale ranging from 1 (*not at all for this reason*) to 9 (*totally because of this reason*): External (i.e., “Somebody else is putting pressure on me; I will get something from somebody if I do”); Introjection (i.e., “I would feel ashamed, guilty or anxious if I didn’t; I feel obligated to have this goal”); Identified (i.e., “Because I am valuing this goal wholeheartedly; It is important for my personal development”); Intrinsic (i.e., “Because of the fun and enjoyment that this goal provides me; simply for the interest in the experience itself”). Reasons were categorized in autonomous goal motivation (average of intrinsic and identified) and controlled goal motivation (average of external and introjection) which has previously been shown to be a reliable measure of why students are pursuing academic goals (Carraro & Gaudreau, 2011; Sheldon, in press).

Social desirability responding (Time 1). Social desirability measures the tendency to exaggerate responses to present a positive image of the self. Social desirability responding was measured using the Marlowe-Crowne 2(10) Social Desirability Scale (Strahan & Gerbasi, 1972). This questionnaire included 10 true or false statements.

Dropout Intention (Time 1 & Time 2). Three items were adapted from prior items (Vallerand, Fortier, & Guay, 1997) used to measure the intention to dropout of university. Items were rated on a 7-point Likert scale ranging from 1 (*not at all agree*) to 7 (*totally*).

Goal Progress (Time 1 & Time 2). Five items were used to measure the extent to which students progressed on their academic goals (Dugas, Gaudreau, & Carraro, 2012). Students rated their progress on their personally set academic goal. Each item was assessed on a 9-point Likert-type scale ranging from 1 (*not at all*) to 9 (*totally*). The reliability of the goal progress measure has been shown to be excellent (e.g., Carraro & Gaudreau, 2011).

Results

Cross-validation of CIAS first order factor structure

Consistent with the results of Study 1, the proposed 11-factor 44-item first-order CFA model was a good fit to the data ($\chi^2 = 1565.055$, $SB\chi^2 = 1400.95$, $p < .01$, CFI = .95, NNFI = .95, RMSEA = .039). All standardized factor loadings were significant and are presented along with the explained variances (R^2) in Table 4. The error-free correlations between latent factors are presented in Table 5. Moderate positive inter-correlations were found between task-oriented coping strategies, on the one hand, and between disengagement-oriented strategies, on the other hand.

Cross-validation of CIAS hierarchical factor structure (HCFA)

The fit of the HCFA model regrouping the 11 first-order coping strategies in the second-order task-oriented coping and disengagement-oriented coping dimensions was acceptable ($\chi^2 = 1971.47$, $SB\chi^2 = 1799.59$, $df = 890$, $p < .01$, CFI = .92, NNFI = .92, RMSEA = .049). The target coefficient indicated that 80% of the covariance between the coping strategies was explained by the task-oriented and disengagement-oriented coping dimensions. All standardized second-order factor loadings were significant. The standardized loadings on the second-order dimension of task-oriented coping were as follows: mental imagery .79, planning .58, thought control .83,

seeking support .60, relaxation .73, logical analysis .90, and effort expenditure .63. The loadings on the second-order dimension of disengagement-oriented coping were as follows: disengagement .89, venting .62, social distancing .45, and mental distraction .52. The internal consistency for each coping subscale is presented in Table 6. The composite reliability was .89 for task- and .72 for disengagement-oriented coping.

Concurrent and predictive validity

The hypotheses and results of the test of the concurrent relationships between the CIAS coping dimensions and corresponding coping strategies with known correlates of coping are presented in Figure 1 and Table 6, respectively. The results of the predictive validity testing the relationship between coping and outcomes measured three weeks later are presented in Table 7. A summary of these findings are presented here.

Personality. Task-oriented coping and several of its corresponding subscales were significantly correlated, and in the expected direction, with optimism and several personality traits from the Five-Factor Model of personality including conscientiousness, extroversion, agreeableness, and openness. The disengagement-oriented coping dimension and several of the corresponding subscales correlated positively and significantly with pessimism and neuroticism.

Cognition and motivation. Task-oriented coping and several of the task subscales were significantly and positively related to the following cognitive processes: challenge appraisal, situational control, emotional control, and self-efficacy both concurrently at Time 1 and prospectively at Time 2, three weeks after exams. Disengagement-oriented coping and several of its subscales were significantly and positively concurrently related to the following processes: perceived stress, test anxiety, and fear of failure. Furthermore, the task-oriented coping

dimension and its subscales were significantly concurrently related to autonomous goal motivation whereas the disengagement-oriented dimension and corresponding strategies were significantly concurrently related to controlled goal motivation.

Academic and psychological adjustment and academic success. Task-oriented coping and its subscales were positively related to positive affect and academic satisfaction both concurrently at Time 1 and prospectively at Time 2 and goal progress prospectively at Time 2. The results also revealed that disengagement-oriented coping and its subscales were positively related to negative affect and drop out intention both concurrently at Time 1 and prospectively at Time 2, three weeks after exams.

Social desirability. Additionally, social desirability was not related to task-oriented coping. However, the tendency to exaggerate responses to present a positive image of the self was related to a decreased tendency to report disengagement-oriented coping.

Incremental validity

The results for each hierarchical regression analysis corresponding to each of the different academic and psychological adjustment outcomes measured at Time 1 (i.e., academic satisfaction, positive affect, negative affect, and perceived stress) are presented in Table 8. The results revealed that task-oriented coping ($\beta = .29, p < .05$) and disengagement-oriented coping ($\beta = -.38, p < .001$) were significant predictors accounting for 17% of the variance in academic satisfaction after controlling for the five personality dimensions. These analyses also revealed that task-oriented coping ($\beta = .39, p < .05$) and disengagement-oriented coping ($\beta = -.15, p < .05$) were significant predictors accounting for 13% of the variance in positive affect after controlling for personality. The results also revealed that disengagement-oriented coping ($\beta = .28, p < .05$) but not task-oriented coping ($\beta = .07, p < .05$) was a significant predictor of negative affect

accounting for 7% of the variance in negative affect after controlling for the personality dimensions. The results showed that task-oriented coping was negatively related to ($\beta = -.10, p < .05$) while disengagement-oriented coping ($\beta = .34, p < .05$) was positively related to perceived stress accounting for 10% of the variance in stress after controlling for the Five factor personality dimensions.

Brief Discussion

The factor structure of the CIAS was cross-validated in an independent sample of students. The results provided subsequent evidence that the 11 coping strategies can be organized within two coping dimensions: task-oriented and disengagement-oriented coping. Further support for the CIAS stemmed from its relationships with correlates known to be antecedents and outcomes of coping (see Figure 2). That is, relationships between educational coping and personality, cognition, motivation, and academic and psychological adjustment and indicators of academic goal performance and success were in line with Lazarus and colleagues' (1986; 1991; 1980; 1978) classic transactional model of stress and coping. Additionally, academic coping was found to be a unique predictor of outcomes after controlling for personality. The final version of the CIAS is presented in Table 3 in the supplementary file in Appendix A.

General Discussion

An important goal of the CIAS was to provide a measurement model in which coping strategies can be organized in a parsimonious number of higher-order coping dimensions. The Coping Inventory for Academic Striving (CIAS) was designed to measure instances of coping that are commonly used by university students when facing academic stressors and challenges. The results of two studies, using a confirmatory factor analytical approach, have provided

evidence for the factorial validity of the proposed measurement model of the CIAS. Each subscale, measured a distinct coping strategy, regrouping similar coping instances in a conceptually and statistically homogeneous manner. The internal consistency ($\alpha > .75$) as well as the test-retest reliability ($r > .60$) reached acceptable level, thus providing evidence of reliability of the newly created questionnaire across two samples. These values are acceptable considering that each subscale contains only four items and because the rank-ordering of individual differences in coping are presumed to be relatively stable yet amenable to some amount of within-person fluctuations across time (Gaudreau & Miranda, 2010). Furthermore, and as expected, the correlations between the subscales of the CIAS were significant, but not to extent of suggesting that some coping strategies are redundant ways of coping (see Table 5). It can therefore be concluded that the 11 coping strategies of the CIAS are conceptually distinct but empirically related.

The results of hierarchical confirmatory factor analyses revealed that the 11 coping strategies organized hierarchically within two coping dimensions. More specifically, we proposed that seven of the strategies would be regrouped in a task-oriented coping dimension measuring the strategies used to actively alter the task demands of a stressor and associated emotions and thoughts. The task-oriented subscales of the CIAS and those of the Brief COPE were correlated to a large extent, thus providing evidence of convergent validity of our newly created questionnaire. These task-oriented coping strategies were only weakly and mostly not significantly related to the avoidance-oriented subscales of the Brief COPE, thus providing evidence of divergent validity of our new questionnaire. Of even greater importance, most strategies included in task-oriented coping of the CIAS manifested a comparable pattern of correlation with external criteria (e.g., optimism, challenge appraisal, academic satisfaction,

positive affect), both concurrently and prospectively. Overall, these findings provided evidence for the construct validity of the task-oriented coping subscales of the CIAS.

The remaining four coping strategies of the CIAS are measuring different types of avoidance-oriented coping. Debate still exist in the literature regarding whether avoidance coping can and should be organized within a bifurcated model distinguishing disengagement- and distraction-oriented coping (e.g., Ayers et al., 1996; Cook & Heppner, 1997; Doron et al., 2014; Endler & Parker, 1994; Zuckerman & Gagné, 2003). Results of our HCFA, across two samples, have shown support for a model in which disengagement/resignation, mental distraction, venting of unpleasant emotions, and social distancing are regrouped into one broad dimension of disengagement-oriented coping that represents the strategies used to disengage from or distract momentarily from a goal related stressor. These findings are comparable to other studies conducted with university students (e.g., Cook & Heppner, 1997; Endler & Parker, 1994; Zuckerman & Gagné, 2003). The disengagement-oriented subscales of the CIAS and those of the Brief COPE were correlated to a large extent, thus providing evidence of convergent validity of our newly created questionnaire. These disengagement-oriented strategies were only weakly and mostly not significantly related to the task-oriented subscales of the Brief COPE, thus providing evidence of divergent validity of our new questionnaire. Of even greater importance, all of the strategies included in disengagement-oriented coping dimension of the CIAS manifested a comparable pattern of correlation with external criteria (e.g., pessimism, neuroticism, test anxiety perceived stress, and negative affect), both concurrently and prospectively. Overall, these findings provided evidence for the construct validity of the disengagement-oriented coping subscales of the CIAS.

The final version of the CIAS measures 44 coping instances organized into 11 conceptually distinct yet empirically related coping strategies. In turn, these 11 coping strategies can be used as both reliable and valid indicators of two broader dimensions of coping within a well-fitted and integrative, yet parsimonious, hierarchical model of coping. The composite reliability ($CR > .70$) as well as the test-retest reliability ($r > .75$) reached an acceptable level, thus providing evidence of reliability of the newly created questionnaire across two samples. On the one hand, task-oriented coping was also able to predict unique variance in positive affect (over and above the scales of the Brief COPE; Study 1) and in both academic satisfaction and positive affect (over and above the dimensions of the Five-Factor model of personality; Study 2). On the other hand, disengagement-oriented coping was also able to predict unique variance in negative affect (over and above the scales of the Brief COPE; Study 1) and in perceived stress, negative affect, and academic satisfaction (over and above the dimensions of the Five-Factor model of personality; Study 2). Items of the CIAS were worded to capture some of the contextual specificities of coping in the academic domain. As such, it is reassuring to report that the scores of the CIAS were capable of predicting unique variance in external criteria over and above those of a general coping questionnaire and general personality dimensions.

Consistent with important assumptions regarding hierarchical models of coping (E.A. Skinner et al., 2003), many of the results showed coping strategies encompassed in a particular coping dimension appear to be serving the same goal in dealing with a stressor (i.e., functional homogeneity). For example, the seven task-oriented coping strategies mostly manifested a highly comparable pattern of correlations with coping antecedents (e.g., personality, cognition, motivation) and both measures of academic attainment and students' psychological adjustment. A similar amount of functional homogeneity was also found for the four disengagement-oriented

coping. Consistent with the important assumption of Skinner et al. (2003) as well as past empirical research, the two coping dimensions were distinctively associated with external criteria (i.e., functional distinctiveness). On theoretical grounds, task- and disengagement-oriented coping can respectively be seen as the allocation of self-regulatory resources toward or away from academic demands, respectively (Beale et al., 2005). Overall, our findings generally support the idea that task-oriented coping relates to positive outcomes (e.g., goal progress, academic satisfaction and positive affect), which suggests that its usage by university students can be taken as “good news coping” (E.A. Skinner et al., 2003). In contrast, disengagement-oriented coping generally relates to negative outcomes (e.g. negative affect and dropout intention). These findings indicate that the use of disengagement-oriented coping could potentially be taken as “bad news coping” likely to be detrimental for university students dealing with academic stress.

Limitations and Future Research Directions

Students reported only moderate levels of perceived stress related to their academic goal strivings. However, even moderate levels of stress can impede the goal-directed behaviour of complex tasks (Dunham, 1984). The learning environment in university can be characterized as complex in that it continuously involves new responsibilities, the mastery of new concepts, the management of simultaneous demands, and time constraints (Struthers et al., 2000). To facilitate academic success, it is essential that students use coping strategies to manage academic demands related to even moderate levels of stress. Additionally, the test of the construct validity of the CIAS involved the examination of the relationships between academic coping and short-term academic performance and academic psychological adjustment measured less than a month after coping. However, future research is necessary to examine the longitudinal validity of the CIAS

with important longer-term academic outcomes such as abandoning courses during a semester and semester grade point average, university drop out, change in program, graduation, and graduation grade point average.

The cross-validation of the CIAS in study 2 was tested with post-secondary students recruited from both a Canadian and American university. Future work is needed to compare both the reliability and the factor structure of the measurement of academic coping using the CIAS across different universities in different countries. Subsequent research is also needed to determine if the CIAS is an equally efficient measure of academic coping across a variety of different groups of students. Multi-group invariance testing can be used to assess the applicability of the CIAS as a reliable measure of academic coping in different groups of students. Characteristics of students which may relate to differences in the methods of coping include the enrolment in different postsecondary institutions (i.e., trade schools, college, and university), year of study, level of study (undergraduate and graduate students), part-time versus full-time status, gender, and program of study.

In this study, the mean imputation method was used to handle the missing data on the CIAS. This method can result in the underestimation of variances and overestimation of covariance within the imputed data (Brown, 2006). Nonetheless, less than one percent of cases in each study were imputed, thus minimizing the risk that our treatment of missing data significantly biased our findings. Alternatively, the use of either the full information maximum likelihood or multiple imputation methods should be considered in future studies, particularly to analyze data from longitudinal studies.

Conclusion

The development of the Coping Inventory for Academic Striving was shown to be a psychometrically sound and valid measure of post-secondary coping across two independent samples of undergraduate students. The CIAS improves on existing limitations in the measurement of coping in the university setting including inconsistent coping strategies and dimensions and the lack of domain specific coping questionnaires for the university setting. Moving forward, this questionnaire will be a valuable tool for researchers, universities, and educational psychologists pursuing the development of research and intervention programs focusing on the role of coping to promote the academic success of students. Additionally, the use of the theoretically developed CIAS in the examination of coping in the post-secondary setting may facilitate the comparison and synthesis of academic coping research across studies conducted on different campuses across the country.

The development of the Brief CIAS used in subsequent doctoral research

Coping can be studied at both the dispositional level (i.e., the coping strategies individuals prefer to use) and situational level (i.e., how coping changes over the course of a situation). Goals are psychological constructs dynamic in nature meaning that goal demands constantly change over the course of goal pursuit. Changing goal demands provides the opportunity to examine if post-secondary students alternate from their preferred coping style and initiate different coping strategies to manage changing goal demands. In fact, research has shown that while post-secondary students hold a preferred style of coping, their use of coping changes over time (e.g., Raffety, Smith, & Ptacek, 1997; Stewart et al., 1997). Additionally, the relationships between dispositional coping in comparison to situational coping and the antecedents and outcomes of coping have been shown to differ (Fugate et al., 2011; S. L. Gibbons, Ebbeck, Concepcion, & Li, 2010). For example, the long-term preferred use of

disengagement-oriented coping has been shown to be unrelated to goal progress, whereas the short-term situation specific use of disengagement-oriented coping has been shown to negatively relate to goal progress in the academic setting (Gaudreau et al., 2012; Suls & Fletcher, 1985). These results suggest that the temporary disengagement from a stressful goal may provide a needed break to recharge, assess goal status, or enact more effective strategies in subsequent goal attempts (Carver, Scheier, & Pozo, 1992; Janoff-Bulman, 1999; Suls & Fletcher, 1985). These findings highlight the importance of examining the implications of the use of dispositional and situational coping. Article 2 in this doctoral thesis involved a daily diary study comparing the relationships between dispositional and situational academic coping with both cognitive appraisal and goal performance.

Longitudinal studies require multiple assessments of a construct to capture a change in a construct following different events and/or at specific intervals of time such as daily, weekly, or monthly (Hektner, Schmidt, & Csikszentmihalyi, 2007). Multiple assessments of a single construct have been shown to place a burden on participants which often results in high attrition rates and non compliance (Stone, Shiffman, Schwartz, Broderick, & Hufford, 2002). In response, researchers often develop or adapt shorter versions of existing questionnaires in an attempt to reduce the burden of longitudinal sampling. In efforts to facilitate an examination of the changes in academic coping as goal pursuit unfolds or as students progress through their program of study, the Brief CIAS was developed for use in Article 2 and 3 both involving daily diary designs, see Appendix B.

Table 1

Test-retest reliability of the Coping Inventory for Academic Striving, internal consistency, and relationship between affect and coping

	Time 1	Time 2	Time1/Time2 correlation	Time 1 (α)	Time 2 (α)
	<i>M (SD)</i>	<i>M (SD)</i>			
1. Mental imagery	2.84 (0.98)	3.02 (0.98)	.76*	.89	.76
2. Planning	3.03 (1.02)	3.13 (0.91)	.65*	.90	.89
3. Thought control	3.00 (0.92)	3.13 (0.93)	.75*	.89	.91
4. Seeking support	2.65 (1.03)	2.78 (1.06)	.79*	.90	.93
5. Relaxation	3.05 (0.87)	3.17 (0.89)	.64*	.88	.87
6. Logical analysis	3.24 (0.80)	3.41 (0.75)	.60*	.87	.87
7. Effort	3.74 (0.84)	3.82 (0.82)	.79*	.91	.93
8. Disengagement	1.81 (0.88)	1.71 (0.76)	.69*	.92	.81
9. Venting	2.66 (1.12)	2.50 (1.08)	.79*	.89	.92
10. Social distancing	2.17 (0.99)	2.16 (1.06)	.86*	.88	.94
11. Mental distraction	2.31 (0.89)	2.32 (0.78)	.61*	.93	.87
Task coping	3.08 (0.66)	3.12 (0.67)	.79*	.80	.86
Disengagement coping	2.24 (0.67)	2.17 (0.66)	.82*	.80	.79

* $p < .05$, ** $p < .01$.

Table 2

Convergent validity examining the relationship between the Coping Inventory for Academic Striving subscales, the Brief COPE subscales, and Positive and Negative Affect

		Brief COPE strategies								Affect	
		Active	Planning	Acceptance	Seeking support	Behavioural Disengagement	Mental Disengagement	Denial	Blame	Positive Affect	Negative Affect
CIAS coping strategies	Planning	.44**	.61**	.35**	.14	-.07	-.17*	.01	.002	.35***	-.03
	Mental imagery	.36**	.38**	.30**	.28**	-.08	.01	.06	-.06	.35***	.02
	Thought control	.41**	.46**	.37**	.12	-.19*	-.04	-.07	-.06	.50***	-.20*
	Seeking support	.45**	.28**	.22*	.75**	.11	-.02	.22*	.10	.09	.06
	Relaxation	.40**	.40**	.39**	.35**	-.13	.10	.02	.13	.31***	.04
	Logical analysis	.64**	.71**	.51**	.23*	-.13	-.02	-.07	.12	.30**	-.05
	Effort	.67**	.66**	.41**	.16	-.24**	-.30**	-.10	.01	.35**	-.14
	Disengagement	-.08	-.21*	.06	.26**	.68**	.30**	.56**	.57**	-.43**	.51***
	Venting	-.04	-.16	.13	.33**	.29**	.33*	.35**	.43**	-.25**	.40***
	Social distancing	.16	.12	.25*	.12	.27**	-.04	.24*	.31**	-.14	.34***
	Mental distraction	-.23	-.23	.10	.04	.39**	.77**	.42**	.39**	-.11	.28**

* $p < .05$; ** $p < .01$.

Table 3

Test of incremental validity of the Coping Inventory for Academic Striving with an existing measure of academic coping

	Positive Affect	Negative Affect	Step 1	Positive Affect	Negative Affect
Step 1	$R^2 = .12, F(2,105) = 8.07^{**}$	$R^2 = .21, F(2,105) = 15.41^{**}$		$R^2 = .28, F(2,105) = 21.39^{**}$	$R^2 = .28, F(2,105) = 21.99^{**}$
Brief COPE TOC	$\beta = .27^*$	$\beta = -.29^*$	CIAS TOC	$\beta = .48^{**}$	$\beta = -.24^*$
Brief COPE DOC	$\beta = -.28^*$	$\beta = .46^{**}$	CIAS DOC	$\beta = -.32^{**}$	$\beta = .54^{**}$
Step 2	$R^2 = .27, F(4,103) = 10.67^{**}$	$R^2 = .31, F(4,103) = 12.94^{**}$	Step 2	$R^2 = .29, F(4,103) = 10.67^{**}$	$R^2 = .31, F(4,103) = 12.94^{**}$
Brief COPE TOC	$\beta = .08$	$\beta = -.06$	CIAS TOC	$\beta = .45^{**}$	$\beta = -.23^*$
Brief COPE DOC	$\beta = -.08$	$\beta = .17$	CIAS DOC	$\beta = -.30^*$	$\beta = .39^{**}$
CIAS TOC	$\beta = .45^{**}$	$\beta = -.23^*$	Brief COPE TOC	$\beta = .08$	$\beta = -.06$
CIAS DOC	$\beta = -.30^*$	$\beta = .39^{**}$	Brief COPE DOC	$\beta = -.08$	$\beta = .17$

Note. TOC = Task-oriented coping, DOC= Disengagement-oriented coping.

* $p < .05$, ** $p < .01$.

Table 4

Study2 standardized factor loadings and variances for the forty-four items and eleven factor model of the Coping Inventory for Academic Striving

Strategies	Standardized Factor Loading	R ²
Mental Imagery		
I tried to visualize that I was in total control.	.647	.418
I visualized myself performing well.	.821	.674
I visualized myself doing my best academic performance.	.910	.828
I tried to picture myself successfully completing my school work.	.905	.819
Planning		
I followed a schedule.	.829	.687
I created a plan of action for my school work.	.837	.701
I developed timetable for when I would perform my school work.	.792	.627
I tried to manage my time.	.826	.682
Thought Control		
I eliminated my doubts about my school work by thinking positively.	.796	.634
I replaced my negative thoughts about my school work with positive thoughts.	.793	.629
I tried to interpret the situation in a positive manner.	.907	.823
I maintained a positive focus when thinking about my school work.	.891	.793
Seeking Support		
I asked for advice.	.858	.736
I asked my peers for advice concerning my school work.	.879	.773
I asked for help to determine how to best accomplish my school work.	.903	.815
I tried to seek out advice of knowledgeable people.	.912	.831
Relaxation		
I attempted to calm myself down.	.736	.542
I tried to reduce the stress I was feeling.	.767	.588
I used some techniques in an attempt to relax.	.815	.664
I tried to manage my nervousness by relaxing.	.855	.731
Logical Analysis		
I tried to identify the potential challenges of the situation.	.639	.408
I analyzed the situation in order to improve my performance.	.720	.518
I sought to understand the situation in order to manage my academic work.	.809	.654
I attempted to identify the demands of my school work.	.781	.611

Strategies	Standardized Factor Loading	R ²
Effort Expenditure		
I was determined to put a high level of effort in my academic activities.	.725	.525
I gave my best effort.	.839	.705
I put effort in my work.	.876	.767
I gave a quality effort.	.894	.800
Venting		
I expressed my irritation about school.	.826	.683
I voiced my discontent with the academic situation.	.835	.698
I expressed my displeasure regarding school.	.928	.861
I expressed my annoyance with my school work.	.933	.871
Social Distancing		
I distanced myself from my peers.	.781	.610
I avoided having to talk to other students.	.818	.669
I refrained from social interactions with other students.	.861	.742
I kept everyone at a distance.	.864	.747
Mental distraction		
I distracted myself from my school work by thinking about other activities.	.736	.542
I tried to think about things other than my school work.	.772	.596
I diverted my attention from the academic situation.	.791	.626
I occupied myself, so I did not have to think about my school work.	.797	.635
Disengagement		
I lost all hope of completing my school work.	.780	.608
I became dejected and felt that all efforts exerted in my school work were futile.	.837	.701
I quit believing in my ability to manage my school work.	.836	.700
I let myself feel hopeless and discouraged.	.833	.694

Table 5

Error-free correlations among the eleven strategies of the Coping Inventory for Academic Striving

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Mental imagery	--	.44**	.76**	.40**	.52**	.72**	.33*	-.09	-.02	.13*	.04
2. Planning	.34*	--	.49**	.33*	.33*	.66**	.54*	-.19*	-.06	.16*	-.24*
3. Thought control	.78**	.40**	--	.30*	.56**	.75**	.50*	-.38**	-.29*	.02	-.12
4. Seeking support	.48**	.34*	.52**	--	.42**	.46**	.28*	.12	.23*	.11	.01
5. Relaxation	.53**	.40**	.62**	.55**	--	.59**	.29*	-.01	.17*	.10	.15*
6. Logical analysis	.69**	.62**	.69**	.53**	.71**	--	.59*	-.13*	.01	.20*	-.16*
7. Effort	.45**	.63**	.48**	.27*	.33*	.65**	--	-.30*	-.13	.12	-.50**
8. Disengagement	-.22*	-.10	-.34*	.06	.01	-.20*	-.32*	--	.63**	.49**	.51**
9. Venting	-.08	.09	-.22*	.07	.11*	.01	-.03	.52**	--	.31*	.43**
10. Social distancing	.06	.22*	-.03	.02	.06	.10	.08	.42**	.34*	--	.10
11. Mental distraction	-.10	-.22*	-.06	-.03	.17*	-.10	-.37*	.46**	.40**	.09	--

Note. Study 1 correlation above diagonal, Study2 correlations below diagonal.

* $p < .05$, ** $p < .01$.

Table 6

Concurrent relationships between the CIAS coping dimensions and strategies and personality, cognitive, motivational and affect variables

	n	α	TOC	DOC	PLAN	MI	THO	SUP	LOG	EFF	RLX	DIS	VEN	S OCD	MEND
Conscientious	397	--	.26**	-.31**	.37**	.15*	.20**	.001	.19**	.40**	.09	-.33**	-.12	-.09	-.35**
Extroversion	397	--	.21**	-.02	.09	.15*	.19**	.25**	.14*	.11	.12	-.01	.07	-.11	-.04
Agreeableness	397	--	.27**	-.18**	.14*	.21**	.25**	.16*	.22**	.18**	.27**	-.15*	-.09	-.21**	-.09
Neuroticism	397	--	-.12	.22**	.01	-.09	-.20**	-.05	-.11	-.12	-.05	.31**	.15*	.14*	.02
Openness	397	--	.19**	-.03	.08	.12	.18**	.13*	.16*	.14*	.20**	.03	-.02	.02	-.09
optimism	132	.86	.51**	-.20	.18	.40**	.57**	.36**	.46**	.29**	.40**	-.27**	-.10	-.11	-.08
pessimism	132	.88	-.18	.47**	-.12	-.13	-.25*	-.003	-.25*	-.14	-.08	.56**	.18	.29**	.31**
Challenge appraisal	397	.90	.31**	-.23**	.22**	.25**	.31**	.04	.28**	.34**	.20**	-.38**	.10	-.10	-.09
Test anxiety	132	.83	.01	.43**	-.05	.05	-.11	.10	.03	-.07	.07	.45**	.34**	.13	.25*
Fear of failure	132	.81	-.02	.31**	.05	-.05	-.15	.02	-.02	-.06	.10	.32**	.25*	.11	.16
Situational control	397	.77	.20**	-.27**	.08	.20**	.30**	.07	.20**	.12	.08	-.32**	-.24**	-.10	-.12
Emotional control	397	.87	.28**	-.26**	.15*	.23**	.29**	.15*	.25**	.21**	.16*	-.32**	-.20**	-.07	-.19**
Perceived stress	397	--	-.18**	.45**	-.10	-.21**	-.28**	-.01	-.15*	-.22**	-.01	.52**	.33**	.20**	.23**
Self-efficacy	397	.94	.29**	-.34**	.20**	.25**	.33**	-.01	.29**	.36**	.16*	-.51**	-.23**	-.09	-.14*
Academic satisfaction	397	.87	.39**	-.45**	.16*	.34**	.45**	.20**	.31**	.32**	.24**	-.42**	-.41**	-.18**	-.23**
Autonomous goal motivation	397	.68	.42**	-.13*	.19**	.33**	.40	.32**	.35**	.33**	.29**	-.20**	-.19*	.09	-.11
Controlled goal motivation	397	.45	-.03	.26**	.01	-.05	-.09	.03	-.03	-.06	.02	.19**	.23**	.22*	.26**
Positive affect	397	.89	.50**	-.24**	.30**	.39**	.48**	.26**	.41**	.46**	.31**	-.32**	-.12	-.08	-.18**
Negative affect	397	.87	-.05	.39**	-.06	-.07	-.12	.04	-.02	-.12	.07	.38**	.30**	.21**	.20**
Social desirability	132	--	-.03	-.25*	-.10	-.05	.08	.03	-.02	.02	-.12	-.07	-.32**	-.06	-.20
α Time 1	--	--	.89	.72	.89	.89	.91	.94	.83	.90	.84	.89	.94	.90	.86
α Time 2	--	--	.92	.85	.87	.89	.90	.89	.78	.92	.87	.89	.89	.91	.88

Note. TOC = Task-oriented coping, DOC= Disengagement-oriented coping, PLAN = Planning, MI = Mental imagery, THO= Thought control, SUP = Seeking support, LOG = Logical analysis, EFF = Effort, RLX = Relax, DIS = Disengagement, VENT = Venting, SOCD = Social distancing, MEND = Mental distraction.

* $p < .05$; ** $p < .01$.

Table 7

Predictive relationships between the CIAS and academic psychological adjustment and goal performance

	n	α	Time 1												
			TOC	DOC	PLAN	MI	THO	SUP	LOG	EFF	RLX	DIS	VEN	SOCD	MEND
Time 2															
Goal progress	77	.96	.25**	-.09	.31**	.12	.02	.14	.23*	.41**	.12	-.16	.08	.13	-.35**
Academic satisfaction	77	.86	.39**	-.42**	.10	.25**	.42**	.37**	.32**	.16	.33**	-.38**	-.29*	-.32**	-.18
Positive affect	77	.87	.39**	-.23*	.19	.37**	.41**	.13	.29**	.30**	.29**	-.22	-.18	-.04	-.19
Negative affect	77	.90	-.07	.40**	.05	.01	.01	.09	.04	-.03	.18	.27*	.32**	.15	.33**
Dropout intention	77	.80	-.11	.40**	-.09	-.09	-.15	.05	-.12	-.05	-.15	.44**	.17	.29*	.25*

Note. TOC = Task-oriented coping, DOC= Disengagement-oriented coping, PLAN = Planning, MI = Mental imagery, THO= Thought control, SUP = Seeking support, LOG = Logical analysis, EFF = Effort, RLX = Relax, DIS = Disengagement, VENT = Venting, SOCD = Social distancing, MEND = Mental distraction.

* $p < .05$; ** $p < .01$.

Table 8

Test of the incremental validity of the Coping Inventory for Academic Striving with trait personality

	Academic Satisfaction	Positive Affect	Negative Affect	Perceived stress
Step 1: Big Five Personality	$R^2 = .17$ $F(5,398) = 16.13, p < .05$	$R^2 = .20$ $F(5,399) = 20.64, p < .05$	$R^2 = .22$ $F(5,399) = 23.87, p < .05$	$R^2 = .31$ $F(5,397) = 37.59, p < .05$
Neuroticism	$\beta = -.12^*$	$\beta = -.12^*$	$\beta = .40^{**}$	$\beta = .50^{**}$
Extroversion	$\beta = .10^*$	$\beta = .25^{**}$	$\beta = -.07$	$\beta = -.06$
Agreeableness	$\beta = .22^*$	$\beta = .18^*$	$\beta = -.05$	$\beta = -.03$
Openness	$\beta = .08$	$\beta = .07$	$\beta = -.004$	$\beta = .05$
Conscientiousness	$\beta = .22^*$	$\beta = .21^*$	$\beta = -.16^*$	$\beta = -.19^*$
Step 2: Coping	$R^2 = .34$ $F(7,396) = 30.27, p < .05$	$R^2 = .33$ $F(7,397) = 29.84, p < .05$	$R^2 = .29$ $F(7,397) = 24.57, p < .05$	$R^2 = .41$ $F(7,395) = 41.49, p < .05$
Neuroticism	$\beta = -.05$	$\beta = -.08$	$\beta = .37^{**}$	$\beta = .44^{**}$
Extroversion	$\beta = .06$	$\beta = .18^*$	$\beta = -.08$	$\beta = -.04$
Agreeableness	$\beta = .11^*$	$\beta = .07$	$\beta = -.03$	$\beta = .04$
Openness	$\beta = .06$	$\beta = .04$	$\beta = -.02$	$\beta = .06$
Conscientiousness	$\beta = .06$	$\beta = .09^*$	$\beta = -.10^*$	$\beta = -.08$
Task coping	$\beta = .29^{**}$	$\beta = .39^{**}$	$\beta = .07$	$\beta = -.10^*$
Disengagement coping	$\beta = -.38^{**}$	$\beta = -.15^*$	$\beta = .28^{**}$	$\beta = .34^{**}$

* $p < .05$; ** $p < .01$.

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CHAPTER 4

Article 2

Some Days Are Better than Others: A Multilevel Examination of Appraisals, Coping, and Academic Goal Progress of University Students

Pursuing academic goals is an ongoing process that requires sustained effort and engagement on a daily basis. Along the way, students are likely to experience setbacks, obstacles, and distractions that could minimize their likelihood of making significant progress in the pursuit of their goals. Despite the complexity and inherent stress associated with academic strivings, some students perceive these situations as challenges and actively cope with the demands of their school endeavors in ways that can facilitate the attainment of their academic goals. Although some students might be more likely to progress on their academic goals, recent empirical evidence suggests that goal success fluctuates on a daily basis (Harris, Daniels, & Briner, 2003). Even for individuals who are, on average, more successful than others in the pursuit of their goals, some days might be better than others. This study adopted a multilevel perspective to investigate the role of cognitive appraisals and coping in predicting between-person differences and within-person daily fluctuations in the academic goal progress of university students.

Challenge and Threat Appraisals

Self-regulation involves active efforts to control behaviour, cognitions and emotions with the purpose of facilitating the attainment of a personal goal (Carver & Scheier, 1998). The classic transactional model of stress and coping developed by Lazarus and colleagues (1986; 1980; 1978) offers a useful framework to explain the cognitive and self-regulatory processes

ongoing during stressful situations often experienced by university students during goal-relevant performance episodes. This theoretical framework suggests that how an individual appraises the demands of a stressful situation influences the coping efforts used to manage the demands of the situation. *Primary appraisal* is an assessment of a stressful situation in relation to the goals, well-being, and resources of a person. In academia, resources can include effort, ability, knowledge, and the availability of support networks including academic peers and faculty members (Chemers et al., 2001; Stewart et al., 1997). Two core indicators of primary appraisal – challenge and threat appraisals – have been conceptualized and studied in achievement settings (Folkman et al., 1986; Lazarus, 1991; Lazarus & Folkman, 1984).

Challenge appraisal occurs when a situation is interpreted as goal relevant inasmuch as the person perceives opportunities to master and overcome the demands and obstacles encountered during goal progress. *Threat appraisal* occurs when a situation is goal relevant, but the individual perceives that the demands of goal pursuit may exceed their resources. Cognitive appraisals of challenge and threat can be attached to a larger system of approach and avoidance motivational tendencies, respectively (Blascovich, 2008; Carver, 2003; Carver & Scheier, 1998). Challenge and threat are thus presumed to be associated with differential antecedents and outcomes, while being linked with distinct subjective experiences and patterns of physiological activation, particularly cardiovascular indicators (Blascovich, 2008; Blascovich, Seery, Mugridge, Norris, & Weisbuch, 2004; Blascovich & Tomaka, 1996; Tomaka, Blascovich, Kelsey, & Leitten, 1993). Perceiving a situation as a challenge creates inner resources capable of helping individuals propel themselves toward the realization of a task in ways that reduce discrepancy between actual and expected outcomes. More precisely, challenge appraisals have been associated with an increased likelihood of reaching higher levels of task success in the

work, sport, and school domains (Drumheller et al., 1991; Gaudreau & Blondin, 2002; Hammermeister & Burton, 2001; Holt & Dunn, 2004; Moore, Wilson, Vine, Coussens, & Freeman, 2013; Ohly & Fritz, 2010; N. Skinner & Brewer, 2002; Stewart et al., 1997). Past studies have also linked challenge appraisals with positive emotions (N. Skinner & Brewer, 2002), task engagement (Maier et al., 2003), academic performance and adjustment (Chemers et al., 2001), intrinsic motivation (Elliot & Harackiewicz, 1996), performance in sport (Blascovich et al., 2004), and job satisfaction and retention (Boswell, Olson-Buchanan, & LePine, 2004).

Perceived threat can create a rather unfocused form of behavioral activation that may *generally* predispose individuals to pull themselves away from stressful situations. Past studies have linked threat appraisals with negative emotions (N. Skinner & Brewer, 2002), perceived stress (Maier et al., 2003), anxiety (Hammermeister & Burton, 2001), depression and somatic complaints (Portello & Long, 2001), extrinsic motivation (Blais, Sabourin, Boucher, & Vallerand, 1990), and poor task and sport performance (Blascovich et al., 2004; Mendes, Major, McCoy, & Blascovich, 2008). During the momentary involvement in a goal-relevant or performance episode, however, threat appraisal has been found to activate a pattern of physiological and behavioral arousal associated with effortful task engagement (Blascovich, Mendes, Tomaka, Salomon, & Seery, 2003; Tomaka et al., 1993). It has been argued that task engagement during performance episodes is common to both challenge and threat appraisals (Blascovich et al., 2003). Therefore, on days or moments during which individuals have higher levels of threat appraisals, it can be expected that their efforts will be characterized by a mixture of efforts oriented *toward and away* from task demands.

Task-Oriented and Disengagement-Oriented Coping

Coping has often been portrayed as a central aspect of a larger motivational system (e.g., Heckhausen, Wrosch, & Schulz, 2010; Ntoumanis, Edmunds, & Duda, 2009) playing a central role in human development (Amiot et al., 2008; E. A. Skinner & Zimmer-Gembeck, 2007) and successful goal striving (e.g., Achziger, Gollwitzer, & Sheeran, 2008; Gaudreau, Carraro, & Miranda, 2012). *Task-oriented coping* – defined as strategies used to actively alter a goal related stressor and manage stress related internal states – can be seen as self-regulatory efforts aimed at the allocation of resources *toward* the specific task and resulting thoughts and emotions of a particular performance episode (Beal, Weiss, Barros, & MacDermid, 2005). *Disengagement-oriented coping* – defined as strategies used to disengage or distract attention momentarily from a goal related stressor – can be seen as the allocation of self-regulatory resources *away* from the stressful situation.

Empirical evidence in academia, health, disease, work, and parenting support the positive association between challenge appraisal and the use of task-oriented coping, on the one hand, and threat appraisals and the use of disengagement-oriented coping, on the other hand (Drumheller et al., 1991; Hammermeister & Burton, 2001; Lazarus & Folkman, 1984; Levy-Shiff et al., 1998; N. Skinner & Brewer, 2002; Stanton & Snider, 1993). The transactional model of stress and coping also proposes that coping mediates the relationship between cognitive appraisals and consequential life outcomes such as goal progress (Lazarus, 1991, 1999). In fact, coping has been shown to be an intermediate step in the relationship between appraisal and exam performance (N. Skinner & Brewer, 2002), subjective goal performance (Levy et al., 2011), performance satisfaction (Haney & Long, 1995), academic motivation (Struthers et al., 2000), emotion and intention to quit (Fugate et al., 2011), mental health (Victor, Mikulincer, & Taubman, 1995), and psychological adjustment (Jose & Huntsinger, 2005).

Dispositional and Situational Coping: A Unified Multilevel Perspective

For long, researchers have argued whether coping should be studied as a stable trait or a state that fluctuates across situations and time (Gaudreau & Miranda, 2010). Research has provided support for both the stability of appraisals and coping (Garner & Fletcher, 2009; Grant et al., 2002; Larsson et al., 1988; Ramirez-Maestre et al., 2008; N. Skinner & Brewer, 2002) and the fluctuation across situations and time (Folkman & Lazarus, 1985; Folkman et al., 1986; Holt & Dunn, 2004; Levy-Shiff et al., 1998; Long & Schutz, 1995; Scherer et al., 1993). Despite their strong interest for a situational approach, Lazarus and Folkman (1984) originally presented coping as a multilevel construct that can be conceived both at the dispositional and situational levels. In recent years, this conceptual positioning has gained in popularity with growing evidence that both the average and the ongoing level of a construct can provide complementary rather than contradictory understanding of personality and self-regulation (Fleeson, 2004; Roberts & Pomerantz, 2004). The current study proposed a unified multilevel level perspective that would combine both individual differences (between-person level) and within-person fluctuations in appraisals, coping, and consequential educational outcomes.

Cognitive appraisals provide motivational relevance to a particular situation or goal-related episode. As such, conceiving cognitive appraisals at the dispositional and the situational levels might offer distinct but complementary information about their respective role in coping and self-regulation. At the within-person level, it may be the case that feeling more challenged than usual about the demands of an academic goal can be a driving force for the momentary initiation of task-oriented action. On days during which students appraise their goals in a more threatening manner than their own average, students might be more likely to use both task- and disengagement-oriented coping to a larger extent than their own average. These within-person

associations are consistent with past experimental research showing that both challenge and threat appraisal are related to task engagement during performance episodes (Blascovich et al., 2003).

Despite these within-person associations, a generalized tendency or predisposition to appraise goal related situations as challenging or threatening could respectively result in orienting one's self-regulatory resources towards or away from the goal in a way that could distinctively influence the discrepancy between actual and desired outcomes. As such, students who more generally evaluate their academic goals as threatening might be more susceptible than others to use higher levels of disengagement-oriented coping. In contrast, students with a higher generalized level of perceived challenge might be more likely than others to use higher task-oriented coping.

This Study

A one week daily diary study was conducted to evaluate cognitive appraisals, coping, and progress on a personally set academic goal, each day for seven consecutive days in the lives of university students. Daily diary studies also offer the opportunity to study the behaviour of individuals as they engage in personally relevant and freely chosen goals over the course of days or weeks in real life settings (Giacobbi Jr, Tuccitto, & Frye, 2007). Observational research provides an opportunity to study the processes ongoing while students strive to attain an academic goal. More importantly, the daily diary design allowed us to examine the variance in goal progress accounted for by the between-person effect of coping and appraisals while controlling for the variance attributed to the within-person effect of coping and appraisals and vice versa (Preacher, Zyphur, & Zhang, 2010).

The specific goal of this study was to examine the unified multilevel model of appraisal, coping, and goal progress as depicted in Figure 3. As can be seen in this figure, it was hypothesized that the relationship between challenge appraisal and task coping as well as the relationship between threat appraisal and disengagement coping would be similar at both the within-person and between-person levels of analysis. Additionally, it was hypothesized that threat appraisal would be significantly related to both task-oriented coping and disengagement-oriented coping, but only at the within-person level. Second, testing the mediational role of academic coping, it was hypothesized that task coping would mediate the relationships between challenge appraisal and goal progress whereas disengagement coping would mediate the relationship between threat appraisal and goal progress at both levels of analyses. Additionally, extending current research and theory, it was hypothesized that both task- and disengagement-oriented coping would mediate the within-person relationships between threat appraisal and goal progress.

Methods

Sampling procedure

Participants were recruited during the fall 2009 and winter 2010 semesters. Students enrolled in Introductory Psychology courses at a Canadian University were recruited from the Integrated System for Participation in Research and were granted two points in their Introductory Psychology course for their participation. In efforts to recruit students from other disciplines and years of study, undergraduate students were also recruited through in-class presentations and were eligible to receive a maximum of \$17 for their participation. No restrictions were placed on participant's age, gender, year of study, academic program or ethnic identity. Eligibility criteria

for this study included the willingness to set an academic goal to be pursued each day over the course of a one-week period. This study received full approval from the University of Ottawa research ethics board. All participants provided written informed consent and were treated in accordance with the ethical guidelines of the Canadian Psychological Association.

Study design

An *interval-contingent* sampling design was used in this study (Hektner, Schmidt, & Csikszentmihalyi, 2007) in which participants completed a questionnaire at approximately the same time everyday, specifically at the end of a typical day. Daily assessments of constructs were deemed appropriate to minimize the influence of retrospective bias during recall of daily events while still capturing the range of experiences in each period (Bolger, Davis, & Rafaeli, 2003). Studies in the academic domain examining cognitive appraisal, coping, and academic goal pursuit have also employed a similar daily diary design (Giacobbi Jr et al., 2007; Gunthert, Cohen, & Armeli, 1999). In this study, participants first completed a baseline questionnaire at the outset of the week (i.e., Monday). This questionnaire measured demographic information and also contained instructions regarding setting a personal academic goal to be pursued each consecutive day over the course of the week. For the next consecutive six days (i.e., Tuesday to Sunday), participants were sent a reminder email to complete a 10 to 12 minutes daily survey between 19:00 and midnight each evening.

Daily diary studies place a high burden on participants often resulting in high attrition rates and non compliance. To improve compliance rates, an electronic sampling method was employed in this study. Research suggests that compliance rates are higher in internet-based daily diary studies compared to the paper and pencil method (Stone, Shiffman, Schwartz,

Broderick, & Hufford, 2002). With electronic sampling, daily surveys can be automatically opened and closed at specified times during the day. Plus, a timestamp of the survey log in and log out time for each participant can be saved. Participants were also sent a reminder email to complete the daily survey each night, which has been suggested to reduce study attrition (Hektner et al., 2007). Additionally, participants were advised that if they were to miss a daily questionnaire, they were eligible to continue to complete the remaining daily surveys. Finally, a draw for a \$25 gift certificate was also added for participants who completed five or more daily diary studies as an incentive to reduce attrition.

Participants

Two hundred and eighty-six participants were initially recruited; however, 50 of these participants dropped out of the study after the baseline questionnaire failing to complete any of the daily surveys and were not included in the final sample. The final sample included 51 males and 185 females and the average age of participants was 19 years of age ($M=19.4$, $SD = 2.14$). The sample consisted of 66.5% first year students, 21.2% second year students, 10.2% third year students, and 2.1 % fourth year students, and students were enrolled in arts ($n = 40$, 17.0%), social sciences ($n = 105$, 44.5%), and science ($n = 89$, 37.7%) programs, with two participants (0.8 %) failing to reveal their program of study. All participants were eligible and retained for analyses regardless of the number of daily diaries completed (Hox, 2010). Participants completed on average 4.01 ($SD = 1.503$) daily surveys: one daily diary ($n = 22$, 9.3%), two daily diaries ($n = 20$, 8.5%), three daily diaries ($n=34$, 14.4%), four daily diaries ($n = 55$, 23.3%), five daily diaries ($n = 67$, 28.4%), and six daily diaries ($n = 38$, 16.1%).

Measures

The baseline and daily questionnaires can be found in Appendix D. Refer to Table 9 for the within-person and between-person reliability of the daily measures and the descriptive information for all measures.

Demographic information (Baseline). Participants were asked to provide their age, gender, ethnic identity, year of study, academic program, and grade point average.

Academic goal (Baseline). Participants were asked to report a specific, meaningful, and measurable academic goal that they would like to pursue each day over the course of the next six days. Personal goals are defined as “projects and concerns that people think about, plan for, carry out, and sometimes (but not always) complete or succeed at” (Koestner et al., 2002). Examples of goals set by students included “This week, I would like to type up my lecture notes each day after class to better study for exams” and “This week, my goal is to study for at least 1-2 hours everyday for the cell biology lab exam.”

Challenge appraisal (Daily). Four items from the Flow State Scale-2 (Jackson & Eklund, 2002) were used to measure the extent to which students perceived the demands they encountered in the pursuit of their academic goal as challenges. Participants were asked to rate the extent to which they believed each item corresponded to their pursuit of their academic goal each day. Each item was assessed on a 5-point Likert-type scale (1=not at all to 5=totally).

Threat appraisal (Daily). Five items were specifically designed to measure the degree to which students felt threatened by the demands of their academic goals. Participants were asked to rate the extent to which they believed each item corresponded to the pursuit of their academic goal each day. Each item was assessed on a 5-point Likert-type scale (1=not at all to 5=totally). The development of this five item measure was guided by other well established threat appraisal

measures (Hammermeister & Burton, 2001; N. Skinner & Brewer, 2002). The within-level and between-level reliability was acceptable (see Table 9).

Academic coping (daily). Coping with the demands of academic goal pursuit was measured using the Brief CIAS, which includes 22 items measuring 11 coping strategies organized within task-oriented coping (i.e., planning, logical analyses, thought control, positive reappraisal, relaxation, effort, and seeking support) and disengagement-oriented coping (behavioural disengagement, mental distraction, venting, and social distancing). In this study, students were asked to rate the extent to which items corresponded to what they thought about or did while pursuing their academic goal each day. Each item was assessed on a 5-point Likert-type scale (1= does not correspond at all to 5= corresponds totally). The within-person and between-person reliability for task- and disengagement-oriented coping in this sample was good (see Table 9).

Goal Progress (daily). Five items were used to measure the extent to which students progressed on their academic goals (Dugas et al., 2012). Students were sent an email including the academic goal they had chosen to pursue over the course of the week. Students rated their progress on their personally set academic goal each day. Each item was assessed on a 9-point Likert-type scale (1=Not at all to 9=Totally).

Daily perceived stress (daily). Stress was assessed using the stress thermometer (Kowalski & Crocker, 2001). Participants were asked to report how much stress they experienced during each day with a scale ranging from 0 (no stress) to 100 (most stress ever experienced).

Analytical plan

Overview of main analyses. This study used multiple assessments of appraisal, coping and goal progress, referred to as level 1 variables, nested within each individual. The assumption of independence was thus violated, and the use of multilevel modeling was deemed appropriate (Raudenbush & Bryk, 2002). Multilevel Structural Equation Modeling (MSEM) is an analytical technique that can be used to assess mediation models at both the between-person and within-person level. MSEM has emerged as an improvement over the unconflated method of estimating between-person and within-person effects with traditional multilevel models. The unconflated method entails the use of a mean score as a proxy for the between-level variables (Snijder & Bosker, 1999; Zhang, Zyphur, & Preacher, 2009). However, simulation studies have provided evidence that the unconflated method (i.e., calculating the mean across daily observations on a variable as the between-level effect) results in bias in between-group estimates (Lüdtke et al., 2008; Manci, Leroux, & DeRouen, 2000; Neuhaus & McCulloch, 2006). MSEM directly assesses the variance in the outcome accounted for by the between-person while controlling for the within-person variance and vice versa (Preacher et al., 2010).

Different approaches and steps can be taken to estimate mediation models (e.g., Hayes, 2009; James, Mulaik, & Brett, 2006). In a first model, the total effect of the relationship between the independent variable (i.e., appraisal) and the dependent variable (i.e., goal progress) was estimated at both levels of analysis (Holmbeck, 1997). The total effect was estimated in a model in which the paths from the independent variables to the mediators and the paths from the mediators to the dependent variable were all fixed to zero. Although indirect effects can still reach statistical significance in the absence of a significant total effect (e.g., Hayes, 2009), a significant total effect is generally taken as a prerequisite to subsequently test substantive mediation hypothesis proposed in a mediation model. In a second model, a *full mediation* model

was tested in which the direct paths between each of independent variables and the dependent variable were fixed to zero. Then, each direct effect was freely estimated in a separate model to determine whether the mediation effect was best modeled by a *partial mediation* model in comparison to *full mediation*. A *partial mediation* model also enables the partitioning of the total effect into both direct and indirect effects. The direct effect corresponds to the relationship between the independent and dependent variables (controlling for the effects of the mediators) while the indirect effect represents the effect of the mediating variables (Mackinnon, Lockwood, Hoffman, West, & Sheets, 2002). Support for the *full mediation* model is provided if the fit of the *partial mediation model* is not significantly superior to the fit of the *full mediation model*. Evidence for a *fully mediated relationship* between an independent and a dependent variable is supported by a significant indirect effect and a non significant direct effect whereas support for a *partially mediated relationship* includes a significant direct effect accompanied by a significant indirect effect.

All reported parameter estimates (i.e., total, indirect, and direct effects) were unstandardized (see Figure 4). Ninety-five percent confidence intervals (CIs) of the estimates for the relationships between appraisal, coping, and goal progress were examined to assess whether differences exist at the between- and within-person level of analysis. Differences in the magnitude of the mediational role of coping were compared by examining the 95% CIs for the indirect effect. In all analyses, stress was entered as a correlate of challenge and threat appraisal and a predictor of task-oriented coping, disengagement-oriented coping and goal progress. Perceived stress has been shown to play a significant role in the appraisal, coping, and goal progress of students (Carver & Scheier, 1994; Drumheller et al., 1991; Stewart, Lam, Betson, Wong, & Wong, 1999; Stewart & Schwarzer, 1996).

Data analyses were performed using MPLUS 6.0 (Muthéun & Muthéun, 1998-2010). Maximum likelihood estimation with robust standard errors was used to estimate the fit of the model (Muthéun & Muthéun, 1998-2010). The CFI and RMSEA was used to interpret if the model had an acceptable fit to the data (Hu & Bentler, 1995). In addition, the Standardized Root Mean Square Residual (SRMR) at both the within-level and between-level of analyses was used as a measure of model fit. The SRMR is a measure of absolute fit which assesses the model residuals at both the within-person and between-person level of analyses, values less than .08 are considered good fit (Hu & Bentler, 1999). Unstandardized parameter estimates and standard errors were provided. Initially, a random slopes model⁷ was tested to determine if these relationships differed; however, this model would not converge, so fixed effects were estimated.

Data screening and descriptive analyses. Variables measured at Level 1 have both a between- and within-person variance component which are not inter-correlated (Raudenbush & Bryk, 2002). The decision to assess both the between-level and within-level components of a relationship depends on the existence of substantial variation of between-person variance in the within-person Level 1 variables. The intra-class correlation coefficient (ICC) reflects the amount of variance attributable to between-person differences in a Level 1 variable (Raudenbush & Bryk, 2002). Convergence of the model may be problematic, and the estimation of the indirect effect may be unstable if ICCs for variables in a hypothesized model are low (Preacher et al., 2010). It has been recommended that variables have an ICC of at least .05 for testing within-person and between-person differences in MSEM (Preacher et al., 2010). In this study, all our

⁷ A random slopes model allows the explanatory variables to have a different effect for each individual.

variables had an adequate amount of between-person level variance, thus making them amenable to MSEM analyses (see Table 9).

Study variables were examined at both the within-person and between-person level for deviations from the assumption of multivariate normality and no extreme cases were found. This included an examination of the univariate and bivariate scatterplots of the study variables at both the daily level and a calculated weekly average to approximate a between-person effect. The internal consistency at the within-level and between-level for each measure can be found in Table 9. Group mean centering of Level-1 predictors is unsuitable in MSEM as between-level effects are of theoretical interest. Group mean centering around the mean of a variable for each individual removes all between-level variance in an observed variable (Endlers & Davood, 2007; Nezlek, 2001; Preacher et al., 2010). In this study, the between-level effect was of interest. Therefore, consistent with traditional applications of MSEM, the Level 1 and Level 2 variables were not centered.

Results

Preliminary Analyses

A preliminary model was tested to ascertain the existence of significant total effects of the independent variables on the dependent variable. At the within-level of analyses, the results revealed that challenge appraisal ($B = 1.18, p < .001$; 95% CI = .98 to 1.29) and threat appraisal ($B = 0.23, p < .001$; CI = .04 to 0.43) were significantly related to goal progress. At the between-level of analyses, challenge appraisal ($B = 1.60, p < .001$; CI = .085 to 1.86) was a significant predictor, while threat appraisal ($B = 0.06, p > .05$; CI = -0.21 to 0.33) was not a significant predictor of goal progress. Stress was also included a covariate in our analyses, but it was not a

significant predictor of goal progress at the within-person level ($B = 0.005$, $p > .05$; $CI = -0.001$ to 0.010) or at the between-person level ($B = 0.05$, $p > .05$; $CI = -0.005$ to 0.016).⁸

Full Mediation Analyses

The full *mediation* model offered a marginal fit to the data ($\chi^2 = 101.19$, $df = 8$, $p < .0001$, $CFI = .91$, $SRMR_{within} = .067$, $SRMR_{between} = .036$). All the relationships reached statistical significance and were in the expected directions at both levels of analysis, with the exception of disengagement-oriented coping which was not significantly related to goal progress ($B = -0.063$, $p > .05$; $CI = -.44$ to $.32$) at the between-person level. Coupled with the non-significant total effect of threat appraisal on goal progress at the between-person level of analyses, our subsequent analyses did not test the mediating role of disengagement coping in the between-person relationship between threat appraisal and goal progress.

Partial Mediation Analyses

Three *partial mediation models* were tested to determine if direct paths between appraisal and goal progress could reach statistical significance. These included a first model adding a direct path between challenge appraisal and goal progress at the within-person level of analyses, a second model adding a direct path between threat appraisal and goal progress at the within-person level of analyses, and a third model adding a direct path from challenge appraisal and goal progress at the between-person level of analyses. A direct path was retained if the addition

⁸ Stress was included as a covariate in all our analyses. As shown in Figure 2, it was unrelated to coping and goal progress at both the within-person and between-person levels. It was nonetheless kept in our analyses because it was a significant covariate of threat appraisal at both the within-person ($B = 0.14$, $p < .01$; $CI = 0.11$ to 0.20) and the between-person levels ($B = 0.19$, $p < .05$; $CI = 0.11$ to 0.26) of analyses.

of the direct path resulted in a significant increase in model fit. In the *first partial mediation model*, we added a direct path between challenge appraisal and goal progress at the within-person level of analysis. This model resulted in a significant improvement in model fit ($\Delta \chi^2 = 65.12$, $df = 1$, $p < .001$) and the overall fit of this model was good: $\chi^2 = 36.067$, $df = 7$, $p < .0001$, CFI = .97, SRMR_{within} = .052, SRMR_{between} = .033. The significant direct path between challenge appraisal and goal progress ($B = 0.66$, $p < .001$; CI = 0.489 to 0.836) at the within-person level was therefore retained in subsequent models. In the *second partial mediation model*, we added a direct path between threat appraisal and goal progress at the within-person level of analyses. Although the fit of this model was good, $\chi^2 = 34.021$, $df = 6$, $p < .001$, CFI = .97, SRMR_{within} = .049, SRMR_{between} = .033, it was not significantly better in comparison to the first partial mediation model ($\Delta \chi^2 = 2.046$, $df = 1$, $p > .05$). The direct effect between threat appraisal and goal progress at the within-person level of analyses was not significant ($B = 0.12$, $p > .05$; CI = -0.06 to 0.30) and was not included in subsequent models.

In the *third partial mediation model*, a direct path from challenge appraisal and goal progress at the between-person level of analyses was added. Although the fit of this model was good, $\chi^2 = 33.84$, $df = 6$, $p < .001$, CFI = .97, SRMR_{within} = .052, SRMR_{between} = .026, it did not significantly improve the fit of the data: $\Delta \chi^2 = 2.23$, $df = 1$, $p > .05$. The direct effect between challenge appraisal and goal progress at the between-person level of analyses was not significant ($B = 0.42$, $p > .05$; CI = -0.13 to 0.96) and was not included in subsequent models. Overall, the first partial mediation model was retained as the most parsimonious and best fitting model.

Indirect Effects

Total, direct, and indirect effects are presented in Table 9 to facilitate the interpretation of our mediation hypotheses. Both the direct effect of challenge appraisals and the indirect effect of task-oriented coping were significant, thus showing that task-oriented coping was a partial mediator in the within-person association between challenge appraisals and goal progress. The indirect effect of both disengagement-oriented coping and task-oriented coping reached significance, thus revealing the role of both forms of coping in the full mediation of the within-person association between threat appraisals and goal progress. Finally, the indirect effect of task-oriented coping was significant, thus indicating its full mediating role in the between-person association between challenge appraisals and goal progress. The indirect effect of disengagement-oriented coping in the between-person association between threat appraisals and goal progress was not estimated because the path from disengagement-oriented coping to goal progress was not significant at the between-person level. Parameter estimates of the between-person level and within-person level model are presented in Figure 4. Confidence intervals for all parameter estimates, direct, and indirect effects were examined to determine if an effect significantly differed across levels of analysis.

Discussion

In the academic domain, students are continuously striving to pursue academic goals in their pursuit of higher education, and coping plays a critical role as students manage the external and internal demands of their academic goals. In this study, we tested a unified model (see Figure 1) to examine the central role of coping in determining *which students and when students* are more likely to make successful progress on a daily academic goal. A multilevel perspective was adopted to simultaneously examine whether the within-person fluctuations and between-person differences in coping behaviors mediated the differential association of challenge and

threat appraisals with goal progress at both levels of analysis. The results of this 7-day daily diary study provided evidence for the importance of considering both the similarities and differences that characterize the set of associations among appraisals, coping, and goal progress at the within- and between-person levels of analysis.

Similarities and Differences across Levels of Analyses

There is no doubt that some students appear to make more progress, in general, in the pursuit of their academic goals. Yet, in this study, 69% of the variance in academic goal progress was attributable to daily fluctuations. Of particular interest, task-oriented coping significantly explained why some students are doing better than others as well as why students are doing better on some days compared to other days. Similarly, the relationship between challenge appraisal and task-oriented coping was significant across both levels of analysis. To note, the magnitude of the positive relationship between challenge appraisal and task coping was significantly greater at the between-level of analyses in comparison to the within-level of analyses.⁹ Following, at the between-person level, task-oriented coping was a significant and full mediator of the positive relationship between challenge appraisal and goal progress. In contrast, daily coping was a significant but partial mediator at the within-person level because daily challenge appraisal had a significant direct effect on daily academic goal progress. In their transactional model of coping, Lazarus and Folkman (1984) explained that ongoing variations in cognitive appraisals and coping are likely to be experienced hand-in-hand. The ongoing task-oriented coping efforts during the day – predominantly set forth by challenge appraisals – are

⁹ Relationship between challenge appraisal and task-oriented coping at the between-level ($B = .81, p < .001, 95\% \text{ CI} = .62 \text{ to } 1.06$) and at the within-level ($B = .41, p < .001, 95\% \text{ CI} = .34 \text{ to } .47$).

likely to reciprocate with appraisals to create a momentarily co-occurring dialectic relationship (Sameroff, 2009). The inherent transactional association between appraisals and coping at the daily level could explain why daily challenge appraisals have a direct effect on daily academic goal progress. Experience sampling method, with various measures taken during the day, appears like a promising research avenue to illuminate the complexity of the dialectic linkage among challenge appraisals and task-oriented coping.

Threat appraisal was, as expected, differentially associated to coping across the levels of analysis. Threat appraisal is predominantly attached to a broader system of avoidance motivation. Consistent with past studies, university students with higher levels of threat appraisals were more likely to use more disengagement-oriented coping (i.e., between-person level). *In situ*, threat can signal to the student that “something is wrong”, thus making them aware of personal and/or situational interferences capable of preventing goal progress. As such, threat appraisal can set forth the mechanisms involved in task engagement to help the student in momentarily investing efforts to reduce the discrepancy. For example, threat appraisal of a goal-relevant episode is known to activate a cardiovascular pattern of physiological effortful task engagement (Blascovich et al., 2003; Blascovich et al., 2004; Jones, Meijen, McCarthy, & Sheffield, 2009; Tomaka et al., 1993). Task-oriented coping has also been observed following a threat to a sporting goal and a threat to the development of interpersonal relationships with co-workers (Jones et al., 2009; Portello & Long, 2001). Yet, threat appraisals are likely to be experienced as unpleasant and undesirable. All in all, daily threat appraisal is likely to implicate a mixture of coping efforts oriented *toward and away* from the demands of the task. Our results indeed revealed that daily threat appraisal was positively associated with both daily task-oriented coping and daily disengagement-oriented coping.

Contrary to task-oriented coping, the relationship between disengagement-oriented coping and goal progress was not homologous across levels of analysis. The goal progress of students was lower on days during which students used more disengagement-oriented coping than their own average. This within-person association was consistent with past studies with competitive athletes (Gaudreau & Miranda, 2010) and workers in public hospitals (K. Daniels & Harris, 2005). Contrary to our hypothesis, the relationship between disengagement-oriented coping and academic goal progress did not reach significance at the between-person level. Some studies have shown that the effect of disengagement-oriented coping on performance depends on whether the individuals generally use it alone or in combination with task-oriented coping (e.g., Martinent & Decret, 2013). A recent study with university students has also shown a non significant association between disengagement-oriented coping and academic goal progress (Gaudreau et al., 2012). Such findings are echoing, to a certain degree, an emerging stream of research demonstrating that disengagement from unattainable goals can set the stage for reinvesting the self into more personally meaningful and attainable personal goals (Wrosch, Scheier, & Miller, in press). Overall, this unexpected finding should not overshadow the fact that students struggled more to progress on their academic goals on days characterized by higher usage of disengagement-oriented coping.

Limitations and Subsequent research

In our study, all variables were measured with the self-report method. Common-method variance is known to artificially increase the size of effects and future research should try to replicate our findings with alternative measurement methods (Podsakoff, MacKenzie, & Podsakoff, 2012). Although challenge and threat can be assessed with self-report measures, it has been suggested that physiological measures can be used to assess cognitive appraisals in a more

objective manner (Blascovich et al., 2003). Daily cognitive appraisals could be measured with both physiological and self-reports at various points during a day to determine how within-person fluctuations of cardiovascular responses are associated with perceived appraisals, coping efforts, and the subjective experience of goal progress. Goal progress is inherently subjective. However, measuring performance-goal discrepancy more objectively would be possible by asking students to set a grade goal (e.g., A+) and associating it with the subsequent performance obtained across multiple assessments over a semester. Complementing our measure of perceived stress with daily measures of cortisol would also offer an interesting, yet financially costly, methodological solution to circumvent issues of shared-method variance. Daily diary designs, like the one used in our study, are time consuming for participants and labour intensive for researchers. Therefore, it appears pivotal to strike a balance between methodological rigor and practical concerns whenever designing studies that are demanding for research participants.

It is important to highlight that the MSEM may have underestimated the size of the effects because the analyses were performed using manifest rather than latent variables – a justifiable decision in such complex multilevel models with relatively small sample size. As such, future work should try to incorporate multilevel factor analysis (i.e., measurement model) within the confines of MSEM in order to estimate the tenability of the proposed measurement model while correcting for measurement error in the analysis of mediation (e.g., Roesch et al., 2010). Similarly, maximum likelihood requires a computational demanding data integration algorithm that typically fails to properly incorporate random effects in MSEM. In contrast, the Bayesian estimator inherently assumes and enables the estimation of random effects. Therefore, future research should explore the extent to which the within-person effects reported in our

MSEM are likely to vary across people using a less conventional but methodologically advantageous Bayesian estimator.

Perceived stress was included as a covariate in all of our analyses. Our results indicated that perceived stress, which was assessed using a single-item measure, was unrelated to coping and goal progress. Future research should try to replicate our findings using more comprehensive assessments of daily stress that are more frequently used in daily diary studies (Almeida, Wethington.C., & Kessler, 2002). More importantly, however, the within-person association between daily stress and daily adjustment has sometimes been found to be moderated by time-invariant variables such as neuroticism (e.g., Mroczek & Almeida, 2004; Neupert, Mroczek, & Spiro, 2008). As such, our unified multilevel model of academic coping appears to offer a useful platform to start exploring the moderating role of personality characteristics in the within-person relationships between stress, appraisals, coping, and academic goal progress.

The transaction model of coping suggests that during goal pursuit individuals continually reappraise the status of their goal and adjust coping efforts depending on the status of their goal pursuit (Lazarus, 1991). It may be the case that the reappraisal of goal progress at the end of each day could predict the consecutive day cognitive appraisals, coping efforts, and goal progress. Future research should try to incorporate lagged effects within the confine of the MSEM approach. Studies on personality variations have indicated that although the behavioral patterns immensely fluctuate from one moment to the next, they do seem to display high levels of stability from one week to the next (e.g., Fleeson, 2004). Although the variables involved in the coping process fluctuate within individuals across days, it would be important to investigate whether the effects of coping stabilize at the weekly and the monthly level. As such, future research should either implement a daily diary design across successive weeks (e.g., 14-day) or

incorporate monthly 7-day diaries within longitudinal studies tracking the academic adjustment of students over a school year. On a final note, university students are multidimensional individuals. Future research should also take into account their broader context to examine, for example, how cumulative daily stressors (e.g., working outside of school, school-life conflicts) could influence the daily experience of school-related stress and coping processes.

Conclusion

A multilevel approach was taken in this study to compare and contrast the role of cognitive appraisals and coping in predicting between-person differences and within-person daily fluctuations in the academic goal progress of university students. The findings of this research, which were in line with the transactional theory of stress and coping developed by Lazarus and colleagues (1986; 1980; 1978), have provided evidence for our unified multilevel model of appraisals, coping, and goal progress. Although most of the effects were homologous across levels of analysis, some associations appear to be specific either to the within-person or between-person level. As such, a unified multilevel model appears necessary to shed light on how the interplay between the person and the situation shapes the consequential life outcomes associated with the coping process. Future research should examine the applicability of this multilevel model in other achievement-related domains (e.g., sport, work) and motivational contexts along with domains where action related to stress requires immediate action such as natural disasters and illness.

Table 9

Descriptive statistics and bivariate correlations

	Between-level	Within-level range		ICC	α_1	α_2	1	2	3	4	5	6
	<i>M (SD)</i>	High <i>M (SD)</i>	Low <i>M (SD)</i>									
1.Challenge appraisal	3.10 (0.99)	3.27 (0.84)	2.77 (1.10)	.31	.75	.72	-----	-.06	0.66	-.06	0.63	-.11
2.Threat appraisal	2.36 (0.99)	1.98 (0.95)	2.65 (0.99)	.53	.83	.85	0.21	----	0.11	0.50	0.05	0.43
3.Task-oriented coping	2.91 (0.96)	3.14 (0.80)	2.53 (1.04)	.57	.84	.83	0.58	0.31	----	0.17	0.78	0.03
4.Disengagement-oriented coping	2.17 (0.68)	2.01 (0.67)	2.22 (0.65)	.53	.82	.82	0.10	0.34	0.25	----	0.11	0.45
5.Academic goal progress	4.38 (2.07)	3.60 (2.22)	4.73 (1.94)	.31	.89	.86	0.58	0.25	0.64	0.08	----	0.06
6.Perceived stress	43.38 (27.58)	30.32 (27.04)	52.44 (27.65)	.34	n/a	n/a	0.20	0.47	0.28	0.24	0.24	----

Note. α_1 = Reliability at Level 1. α_2 = Reliability at Level 2. Correlations at Level 1 are displayed below the diagonal whereas correlations at Level 2 are displayed above the diagonal.

Table 10

Estimates of the total, direct, and indirect effects and their 95% confidence intervals

Effects	Total	Direct	Indirect
<u>Within-person level</u>			
Challenge → Goal progress	1.18 [0.98 – 1.29]	0.66 [0.49 – 0.84]	
Task-oriented coping			0.52 [0.40 – 0.63]
Threat → Goal progress	0.23 [0.04 – 0.43]	0.12 [-0.06 – 0.30]	
Task-oriented coping			0.173 [0.06 – 0.29]
Disengagement-oriented coping			-0.06 [-0.11 – 0.01]
<u>Between-person level</u>			
Challenge → Goal progress	1.60 [0.85 – 1.86]	0.42 [-0.13 – 0.96]	
Task-oriented coping			1.18 [0.80 – 1.55]
Threat → Goal progress	0.06 [-0.21 – 0.33]	-----	
Disengagement-oriented coping			-----

Note. Effects for which the 95% CI does not include zero are significant at $p < .05$.

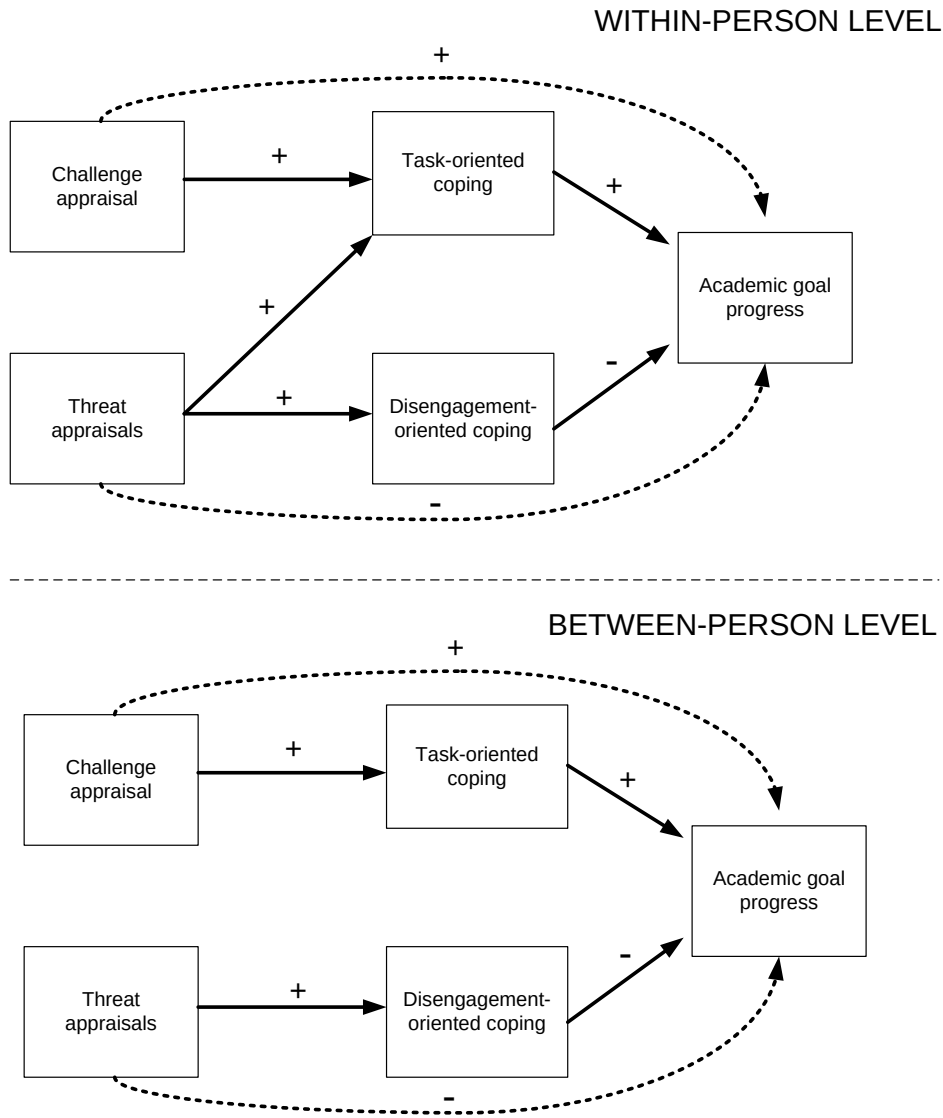


Figure 3. Unified multilevel model of appraisals, coping, and goal progress. Continuous lines denote effects included in a full mediation model. Perforated lines denote direct effects added in a partial mediation model.

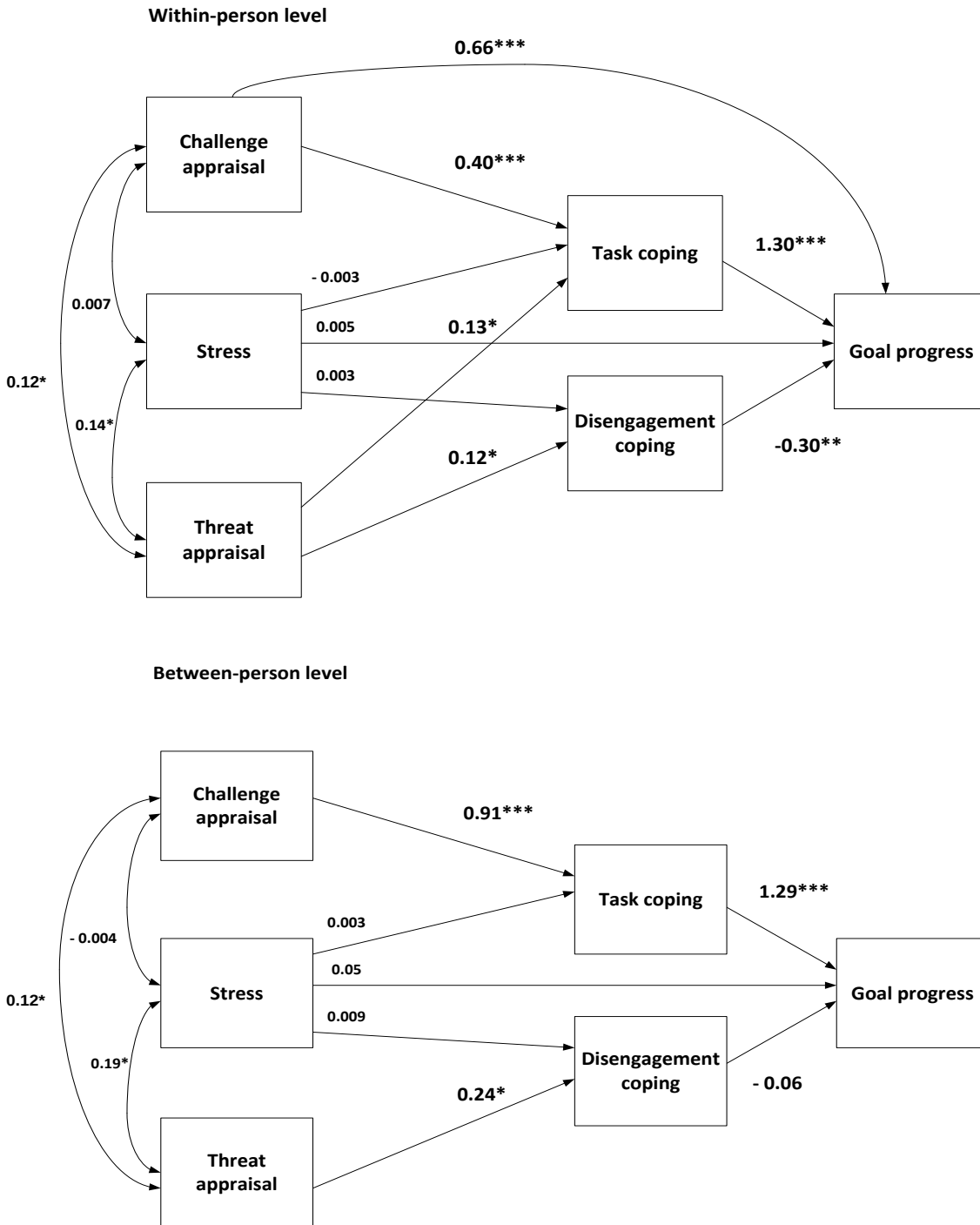


Figure 4. Results of the multilevel structural equation models.

* $p < .05$. ** $p < .01$. *** $p < .001$.

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CHAPTER 5

Article 3

Implementing Task-Oriented Coping with If-Then Coping Plans: Main and Moderated Effects on the Daily Studying Behaviour and Academic Psychological Adjustment of University Students

The primary goal of the current study was to examine the effect of a coping skills training program aimed at helping students manage distressful internal states in their daily academic lives.¹⁰ Students are facing numerous demands in the pursuit of their academic goals. A plethora of empirical research has already provided evidence that coping can explain why some students are doing better than others in their academic lives (see MacCann et al., 2011; Zeidner, 1995 for reviews). Many researchers, like us, undertook these correlational investigations with the hope of building a strong core of evidence to inform the development of brief interventions. In recent years, novel social psychological interventions have been proposed to promote the success and psychological adjustment of students (e.g., Robbins et al., 2009; Yeager & Walton, 2011). Despite their empirically proven effectiveness, these experimental manipulations have been developed and evaluated with limited attention toward building bridges with the extant theoretical and empirical literature on coping. These interventions probably work because they are based on robust and replicable evidence garnered through labor intensive investigations of coping theorists and researchers. The learning and implementation of self-regulatory strategies that occur through these interventions probably reciprocates with already existing strengths

¹⁰ This article was written as a short not to facilitate publication. Therefore, while empirical support for the intervention is presented an in depth overview of the core constructs was not included.

and/or weaknesses of the students (Yeager & Walton, 2011). As such, creating clearer connections between new interventions and well-established theoretical knowledge is essential to determine for whom and under which circumstances coping may produce desirable outcomes. As eloquently stated by Folkman and Moskowitz (Folkman & Moskowitz, 2004, p. 746), coping theories and research have much to offer not only to “explicate variability in response to stress, but also as a portal for interventions”.

Coping and performance and academic psychological adjustment

The seminal work of Lazarus and Folkman (1984) starts with an explicit statement that coping is neither inherently adaptive nor maladaptive. The association between coping and coping outcomes -often referred to as coping effectiveness- need to be evaluated in light of the characteristics of the context in which they occur (Folkman & Moskowitz, 2004). *Task-oriented coping* represents coping strategies aimed at actively managing the source of stress and the resulting thoughts and emotions (Carver & Connor-Smith, 2010; Lazarus, 2006). In contrast, *disengagement-oriented coping* represents coping strategies aimed at disengaging and distracting the self from the task at hand. In the context of education, task-oriented coping has typically been found to facilitate performance and emotional adjustment whereas disengagement-oriented coping has often been associated with lower performance and negative adjustment outcomes (see MacCann et al., 2011; Zeidner, 1995 for reviews). These findings, however, need to be understood within the context in which they occur.

Post-secondary education is inherently an achievement driven context. Although individual differences do exist, university students are engaging in an extensive education in which they progressively become responsible and accountable for their school achievement. The

standards and goals of the schooling system create a dialectical person-environment transaction in which task-oriented efforts are likely to be socially reinforced and personally valued. In such contexts, task-oriented efforts are likely to facilitate goal attainment and positive affectivity *for most students under most academic situations*. Therefore, it is not surprising that task-oriented coping efforts positively correlate with indicators of task success because they reciprocate, match or fit with the agendas that constrain and shape the situational demands and the social identity of university students (Lazarus & Folkman, 1984, p. 188). Task-oriented coping efforts create the needed conditions to facilitate the demonstration of competence and mastery over time (e.g., learning, self-improvement) and to experience a positive academic experience.

If-then coping plans

Despite this dialectical relation between task-oriented coping and academic success, important individual differences exist in the extent to which university students are using both task-oriented coping and disengagement-oriented coping (e.g., Carver & Connor-Smith, 2010). Some students possess the needed coping repertoire to effectively handle the demands of their academic lives. However, other students appear to be struggling to actively cope and keep up with the demands of their academic lives. Experiencing negative emotions such as anxiety, anger, shame, hopelessness, and boredom is not uncommon in the daily lives of students (Pekrun, 2006). Intervening to help students identify these potentially detrimental and distressful internal states and the creation of proactive coping plans to manage them appears to be warranted to optimize the academic experience of some students under certain circumstances. Recent experimental studies – one conducted with tennis players (Achtziger et al., 2008) and one conducted with research participants in the lab focusing on dart and golfing tasks (Stern et al., 2013) – have highlighted the potential of short but theoretically-driven stress interventions to

improve sport performance. Using a coping implementation framework, participants were trained to identify potentially internally distressful states or stressors and to proactively create personalized *if-then coping plans* using a predefined list of examples of task-oriented coping strategies taken from the Brief Coping Inventory for Academic Striving. Participants who were trained to create coping plans (e.g., “*If I get frustrated, then I will slow down and breathe*”) were significantly more likely to obtain better task performance compared to individuals randomized in a goal setting control condition. They were also less likely to be perceived as anxious by neutral observers and to perceive the target (golf hole, dartboard) to be significantly closer which, in turn, explained their improved performance on the golf putting and dart throwing tasks (Stern et al., 2013).

This Study

The primary goal of the current study was to examine the effect of a coping implementation intervention (i.e., if-then coping plans) to help students manage distressful internal states in their daily academic lives. Such interventions appear promising for university students because they are short, cost effective, and built on the basis of two strong streams of scientific inquiry. On the one hand, students are encouraged to adopt task-oriented coping strategies that have been shown to reduce stress and to facilitate the success and the academic adjustment of students. On the other hand, these coping strategies are implemented using a strong core of evidence showing the effectiveness of if-then planning (i.e., implementation intention) in a variety of life contexts (e.g., Carraro & Gaudreau, 2013; Gollwitzer & Sheeran, 2006). Up to now, however, the coping implementation intervention has been tested in lab experiments limited to the context of sport (Achtziger et al., 2008; Stern et al., 2013). It appears important to examine whether the effect of such an intervention can generalize to predict

desirable outcomes in the real lives of university students. Our primary hypothesis was that students undergoing such a coping implementation intervention would experience lower daily perceived stress compared to students in a control condition. We also expected that students in the intervention group will experience less distressful negative achievement emotions (i.e., anxiety, shame, anger, hopelessness, and boredom) while spending more time studying and achieving higher levels of daily progress on their academic goals.

Students who already possess a good repertoire of task-oriented coping skills might be less likely to benefit from a coping implementation intervention. However, such interventions could prove to be effective to reduce the stress and improve the goal progress of students with a more limited repertoire of task-oriented coping and with a tendency to use more disengagement-oriented forms of coping. Prevention sciences and school practitioners are typically interested in these latter students who, for some reason, appear to possess a potentially detrimental coping repertoire (i.e., less task-oriented coping and more disengagement-oriented coping). However, limited coping interventions have been implemented in the academic setting that focus specifically on this sub group of students. Our secondary goal was to explore whether the effect of the intervention could depend on the extent to which students are in need of a coping intervention. It can be expected that students who generally use task-oriented coping and do not generally use disengagement-oriented coping *might be less likely* to benefit from a coping intervention. In contrast, university students with a more limited pool of task-oriented coping and those with a stronger propensity toward disengagement-oriented coping *might be more likely* to benefit from an intervention designed to learn how to implement task-oriented coping in their daily academic lives.

Methods

Sampling procedure

Participants were recruited during the 2010 and 2011 fall and winter academic sessions via two methods. Participants were recruited from the Integrated System for Participation in Research (ISPR) and through in-class recruitment presentations. Participants recruited from the ISPR were granted two points in their Introductory Psychology courses whereas those recruited in classes were eligible to receive a maximum of \$17 for their participation. Monetary compensation was provided to cover potential expenses (e.g., internet access) and inconveniences (e.g., lost of studying time, boredom) resulting from participation in the study.

The aim of this study was to provide tools to help new students currently adjusting to university and those experiencing academic difficulty. Therefore, eligibility criteria were set to recruit students more likely to be struggling with their academic goals. All first year students along with second, third, and fourth year students with a university GPA of B+ or lower were eligible to participate in this study. Similar methodology has been adopted elsewhere with goal setting interventions in academia (Morisano, Hirsh, Peterson, Pihl, & Shore, 2010). Students interested in this study must have also been interested in setting a goal to increase their studying time each day. No restrictions were placed on participant's age, gender, year of study, academic program or ethnic identity. This study received full approval from the University of Ottawa research ethics board, and all participants provided written informed consent and were treated in accordance with the guidelines put forth by the Canadian Psychological Association.

Study design

At the outset of the study on a Monday, participants initially completed a lab component. Participants were randomly assigned to either the experimental coping group or the control group. This was a single blind study where the participants were unaware but the researcher was aware of group membership. All tasks included in the lab component for both the experimental coping condition and control condition took place mainly on a computer with paper and pen prompts in a private room. Therefore, influence, guidance, and interference from the researcher were not an issue. As part of the lab component, participants in both groups first completed a series of demographic, negative achievement emotion, task coping, and studying behaviour questionnaires and were asked to set a studying goal related to increasing or maintaining the amount of minutes spent studying each day over the course of the week. Next, participants in the experimental coping condition and control condition completed separate exercises on the computer. Together, the lab component took approximately 30 to 45 minutes. Refer to Appendix E for the experimental manipulation and control text, respectively. Following the lab component, participants were instructed to complete six consecutive daily diaries, Tuesday to Sunday.

Experimental group. Participants were instructed to rate how detrimental a list of the negative achievement emotions would be to the pursuit of their studying goal (Pekrun , Goetz & Perry 2005). Then, based on their ratings, students were asked to pick the two emotions they felt would be most detrimental to their studying goal. In relation to their two chosen emotions, students were asked to rate a list of task-oriented coping actions taken from the Brief CIAS in terms of how effective they felt the coping actions would be in helping them deal with each of their two chosen negative emotions. Students were then instructed to pick two coping actions for each emotion that they felt would be the most effective in helping them deal with the emotion.

Finally, students were asked to elaborate on how each coping action would help them deal with the chosen emotion while pursuing their studying goal over the course of the one-week period. The process of elaboration was proposed to increase the frequency to which the coping behaviour would be enacted when the emotion is elicited (Achtziger et al., 2008; Gollwitzer & Brandstätter, 1997). The following is an example of the elaboration for the academic emotion boredom and the choice of the social support coping action. “IF I would rather put off this boring work till tomorrow THEN I will ask for help to determine how to best accomplish my school work.”

Control group. Participants were instructed to read a text and answer questions related to information about several resources and services offered by the University of Ottawa that may help facilitate their studying goals and academic success. This reading exercise was used to ensure that participants in the control group would spend an approximately comparable amount of time in the lab. Furthermore, this control condition was designed to recreate the natural environment of the campus in which students have access to a variety of services available to promote their academic success.

Daily diary survey. All participants completed the same daily diary measures each evening for six consecutive days. Each daily questionnaire measured daily studying minutes, goal progress, perceived stress, and achievement emotions. Daily survey measures and instructions can be found in Appendix E. Daily assessments of constructs were a suitable method to reduce the influence of retrospective bias during the recall of daily events while still capturing the range of experiences (Bolger et al., 2003). An *interval-contingent* sampling design was used in this study (Hektner et al., 2007) in which participants in each group were asked to complete a 10 to 12 minute online daily survey between 19:00 and midnight each evening for six

consecutive evenings, Tuesday to Sunday. As in article 2, an electronic sampling method with each daily survey was used to improve compliance rates (Stone et al., 2002). The electronic sampling method allowed for the daily surveys to only be available within the specified completion time each day, and a timestamp of the time it took each participant to complete each daily survey was saved. Participants were also sent a reminder email to complete the daily survey each night, which has been suggested to reduce study attrition (Hektner et al., 2007). Additionally, participants were advised that if they were to miss a daily questionnaire, they were eligible to continue to complete the remaining daily surveys. Finally, a draw for a \$20 gift certificate was also added for participants who completed five or more daily diary studies as an incentive to reduce attrition.

At the end of the week, participants in the control group were informed that they had been randomly assigned to a neutral group. They were immediately offered the option to receive the information and program that was offered to participants who had been randomly assigned in the experimental condition, to eliminate prejudice that could have been caused by the random assignment in the control condition.

Participants

One hundred and fifty-eight students were initially recruited, but 14 participants failed to adequately complete the lab component of the study and were excluded from the analyses. One hundred and forty four participants completed both the lab study and daily measures with 80 students (55.6%) in the experimental group and 64 students (44.4%) in the control group. All participants who completed the lab component of the study were eligible and retained for analyses regardless of the number of daily diaries completed (Hox, 2010). The proportion of

daily diaries completed was as follows: Participants completed on average 4.76 ($SD = 1.45$) daily surveys: one daily diary (4.9%), two daily diaries (6.3%), three daily diaries (7.6%), four daily diaries (11.1%), five daily diaries (29.8%), and six daily diaries (40.3%). The number of daily diaries completed did not significantly differ between the control group and experimental group ($\chi^2 (5, N = 144) = 6.43, p > .05$).

The final sample included 29 males and 115 females, and the average age of students was 20 years of age ($M = 20.34, SD = 4.87$). The sample consisted of 62.9% first year students, 30.1% second year students, 5.6% third year students, and 1.4 % fourth year students. Students were enrolled in arts (17.4%), social sciences (47.9%), business (4.8%), and science (29.9%) faculties of study. The mean current grade point average was a C+ (66% – 69%). The proportion of males and females ($\chi^2 (1, N = 144) = .14, p > .05$), the year of study ($\chi^2 (3, N = 144) = .22, p > .05$), faculty of study ($\chi^2 (3, N = 144) = .80, p > .05$), and mean current grade point average ($F(1, 140) = 2.52, p > .05$) did not significantly differ between the control group and experimental group. However, the mean age did significantly differ ($F(1, 141) = 3.95, p = .049$) across the control group ($M = 21.24, SD = 6.60$) and experimental group ($M = 19.62, SD = 2.65$). Finally, the ethnicity of the students in the final sample was as follows: Caucasian (59.0%), Afro-American (9.0%), Hispanic (13.9%), Asian (2.8%) and other ethnicity (15.3%).

Measures

Refer to Table 11 for the descriptive information and reliability for all measures.

Lab component

Demographic information. Participants were asked to provide their age, gender, ethnic identity, year of study, academic program, and grade point average.

Academic goal. Participants were asked to first report on a typical day the number of minutes spent studying each day. Studying was defined to participants as any academic activities outside of attending class such as preparing for upcoming exams, working on course assignments, reading course readings, reading course notes, etc. The mean studying time reported was 118.36 minutes (SD = 93.18, 25% quartile = 51.88 min., 50% quartile = 90.00 min., 75% quartile = 180.00 min.).¹¹ Next, participants were asked to set a goal related to either increasing or maintaining the number of minutes spent studying on each day during the current one-week period. Only 3.5% of the sample chose to maintain their current goal. For the remainder of participants, the average increase in minutes was 51.14 minutes (SD = 38.89, 25% quartile = 25 min., 50% quartile = 40 min., 75% quartile = 60.00 min., Range= 3.5min. to 247.50 min.). Students were also asked to rate separately on a Likert scale ranging from 0 (*not at all*) to 100 (*totally*) how confident they were in the daily attainment of their studying goal, how committed they were, and the current priority of their studying goal in their life.

Achievement emotions. Achievement negative emotions were measured using the Achievement Emotions Questionnaire (AEQ) (Pekrum, Goetz, & Perry, 2005). While the AEQ assesses both positive and negative emotions associated with attending class, studying, and writing tests and exams, only the subscales used to assess negative emotions related to studying were used in this study. Twenty items tapped the physiological, cognitive, motivational, and affective components of the experience of anger, anxiety, shame, hopelessness, and boredom. Students were asked to rate how detrimental each of the negative academic emotions would be to the pursuit of their studying goal. Each item was assessed on a 5-point Likert-type scale (1=*not*

¹¹Guidelines set forth by the the Canadian University where students were recruited, recommend that students study one hour per week for each hour of course lecture per week. For full-time students taking 5 classes, this equates to approximately 130 minutes of daily studying time split evenly over the course of a 7 day week.

at all to 5=*totally*). Then, based on their ratings, students in the experimental group were asked to pick two negative emotions most likely to be detrimental to the pursuit of their academic goal over the course of the week. Anxiety and boredom were the two most frequently chosen negative emotions. The breakdown was as follows: anger (16.2%), anxiety (37.0%), shame (9.7%), hopelessness (10.3%), and boredom (26.8%).

Academic coping. Coping with the demands of academic goal pursuit was measured using the Brief CIAS, which includes 22 items measuring 11 coping strategies organized within task-oriented coping and disengagement-oriented coping dimensions. The Brief Coping Inventory for Academic Striving was adapted from the Coping Inventory for Academic Striving, a recently developed hierarchical and multidimensional measure of coping. This questionnaire measures 11 coping strategies organized within task coping (i.e., planning, logical analyses, thought control, positive reappraisal, relaxation, effort, and seeking support) and disengagement coping (behavioural disengagement, mental distraction, venting, and social distancing). During the lab component, all students were asked to rate the extent to which item corresponded to what they thought about or did while pursuing their academic goals in general. The items were measured on a 5-point scale ranging from 1 =*does not correspond at all* to 5 = *corresponds totally*. Then, based on their ratings, students in the experimental group were asked to pick two task coping actions for each chosen negative academic emotion. Planning and effort expenditure were the two most frequently chosen coping actions. The breakdown was as follows: planning (35.7%), mental imagery (10.1%), thought control (11.0%), logical analyses (7.1%), effort expenditure (16.6%), relaxation (8.9%), and seeking support (10.6%).

Control group text. The control text covered information about several services offered by the University of Ottawa that are freely available to students to facilitate progress on their

studying goal and academic success. These included services offering beneficial academic, social, career, and personal support. Examples and the frequency of reports are as follows: academic writing centre (9.9%), academic success service (14.3%), study skill counselling (5.4%), personal counselling (2.6%), peer mentoring programs (1.8%), peer help centre (3.4%), and career services (3.8%)¹². The academic success service and the academic writing service were the university service most frequently reported. Participants were also required to answer two comprehension questions. Refer to Appendix E.

Daily diary

Number of minutes spent studying. Students were asked to report each day the number of minutes they had spent studying, defined as any academic behaviour outside of going to class. Across all days, 56.9% of participants exceeded their studying goal, 12.0% of participants met their studying goal while 31.1% of participants failed to meet their studying goal.

Goal Progress. Students rated their progress on their personally set academic goal each day. Five items were used to measure the extent to which students perceived they had progressed on their academic goals (Dugas et al., 2012). Each item was assessed on a 9-point Likert-type scale (1=*Not at all* to 9=*Totally*).

Academic coping. Coping with the demands of academic goal pursuit each day was also measured using the Brief CIAS. Students were asked to rate the extent to which items corresponded to what they thought about or did while pursuing their studying goal each day.

¹² 2.7% of students in the control condition failed to specify the university service they would be most likely to use.

Achievement emotions. Achievement negative emotions were again measured using the 20 items measuring the five negative emotions (i.e., anger, anxiety, shame, hopelessness, and boredom) associated with studying from the Achievement Emotions Questionnaire (AEQ) (Pekrum et al., 2005). Students were asked to rate the extent to which they experienced each of the items emotions on a 5-point Likert-type scale (1=*not at all* to 5=*totally*).

Perceived stress. Perception of daily stress was measured using the 10 item version of the Perceived Stress scale (Cohen et al., 1983). Each item was assessed on a 5-point Likert scale ranging from 1 (*never*) to 5 (*very often*).

Plan of Analyses

For each of the dependent variables, five nested multilevel models were tested to estimate (a) the intra-class correlation (null model), (b) the main effect of the intervention (c) the unique effect of the intervention while controlling for baseline task-oriented and disengagement-oriented coping, as well as the moderating role of (d) baseline task-oriented coping and (e) baseline disengagement-oriented coping. The moderating role of task-oriented coping was examined before disengagement-oriented because our coping intervention focused specifically on the implementation of task-oriented coping. All models were estimated using HLM 7.0 with robust maximum likelihood estimation. The intervention variable was centered with the control group (i.e., 0 = control group, 1 = experimental group). Therefore, intercepts should be interpreted as the grand mean estimate of participants in the control group. Baseline coping variables were grand mean centered. The two coping $\times$ coping variables were entered uncentered. Significant moderating effect were probed at high (+1SD) and low (-1SD) levels of the moderator using simple slope analyses and their significance test. Effect size (*d*) was estimated using the effect of

the intervention (difference between experimental and control groups) divided by the standard deviations of the dependent variable (see Table 11).

Results

Randomization checks

A total of 80 and 64 students were randomized in the experimental and control condition, respectively. The two groups did not differ with respect to gender, $\chi^2 = 0.14$, $df = 1$, $p = .71$ and years into the program, $\chi^2 = 0.20$, $df = 3$, $p = .98$. Participants in the control group ($M = 21.24$, $SD = 6.60$, range 17 to 48) were older than those in the experimental group ($M = 19.61$, $SD = 2.63$, range 17 to 31), $F(1, 141) = 4.04$, $p = .046$, because the former group had a few older students; as such, median age was equivalent across groups (19.00 in both groups). No difference was found for ratings of goal confidence, $F(1, 141) = 2.22$, $p = .14$, goal commitment, $F(1, 141) = 1.48$, $p = .23$, and goal priority, $F(1, 141) = 0.13$, $p = .72$. The time invested studying on a typical day, $F(1, 142) = 0.72$, $p = .40$, and goal set by the participants to increase their study time, $F(1, 142) = 1.25$, $p = .29$, did not significantly differ across groups. Participants in both groups completed the same number of daily questionnaires, $F(1, 142) = 0.05$, $p = .83$. A significant difference was found across groups for baseline boredom, $F(1, 142) = 4.33$, $p = .04$ (control, $M = 2.60$, $SD = 0.92$; experimental, $M = 2.28$, $SD = 0.92$), and hopelessness, $F(1, 142) = 6.66$, $p = .01$ (control, $M = 2.32$, $SD = 1.08$; experimental, $M = 1.90$, $SD = 0.84$), but not on baseline perceived stress, $F(1, 142) = 0.70$, $p = .41$, anxiety, $F(1, 142) = 1.93$, $p = .17$, anger, $F(1, 142) = 1.47$, $p = .23$, and shame, $F(1, 142) = 0.05$, $p = .82$. Groups were also compared on baseline task-oriented coping, $F(1, 142) = 0.01$, $p = .93$, and disengagement-oriented coping, $F(1, 142) = 0.23$, $p = .64$.

Data screening

Before running our multilevel analyses, we examined whether the outcome variables were impacted by influential cases by averaging the data of each participants across days. A combination of multivariate (Mahalanobis distance) and univariate (Z score > 3) statistics were used to determine whether a participant could be an outlier. The responses of four participants (two from the control and two from the experimental groups) were identified as multivariate outliers and univariate outliers on several variables. Their score departed from the centroid of the overall sample as well as the centroid of their respective group. These four participants were excluded from further analyses to avoid distorting the effect of the coping intervention. Further analyses were conducted with a sample of 140 participants (experimental and control, $n = 78$ and $n = 62$).

Intervention

Perceived stress. As shown in Table 12, 49.9% of the variance in perceived stress was attributable to daily fluctuations ($ICC = .501$). The main effect of the intervention was significant, and it explained 5.2% of the variance in perceived stress (Model 2; control group = 2.64, intervention group = 2.38, $d = -0.34$). The effect remained significant after controlling for baseline coping (Model 3). Baseline DOC was positively associated with perceived stress (Model 3) and it was a marginally significant moderator of the intervention effect (Model 5). Model 5 was retained as the best explanatory model. The intervention $\times$ baseline DOC, which explained 1.9% of unique variance, revealed that the effect of the intervention was significant for students with high levels of baseline DOC (Intercept = 2.880; Slope = -0.452, $S.E. = 0.130$, $p < .001$, $d = -0.58$) whereas it was null for those with low levels of baseline DOC (Intercept =

2.400; Slope = -0.050, *S.E.* = 0.132, *p* = .702, *d* = -0.06). The simple slopes are depicted in Figure 5.

*Study time*¹³. As shown in Table 13, 61% of the variance in study time was attributable to daily fluctuations (*ICC* = .390). The main effect of the intervention was marginally significant and it explained 1.8% of the variance in study time (Model 2; control group = 106 minutes, experimental group = 131 minutes, *d* = 0.22). The effect remained marginally significant after controlling for baseline coping (Model 3). Baseline TOC was positively associated with study time (Model 3). Model 3 was retained as the best explanatory model because neither Model 4 nor Model 5 did explain unique variance in study time.

Goal progress. As shown in Table 14, 69.3% of the variance in goal progress was attributable to daily fluctuations (*ICC* = .307). The main effect of the intervention was not significant neither before (Model 2; control group = 4.88, experimental group = 4.70, *d* = 0.08) or after controlling for baseline coping (Model 3). Baseline TOC was positively associated with goal progress (Model 3) and it was a marginally significant moderator of the intervention effect (Model 4). Model 4 was retained as the best explanatory model because Model 5 did not explain unique variance in goal progress. The intervention × baseline TOC, which explained 2.4% of unique variance, revealed that the effect of the intervention was marginally significant for students with low levels of baseline TOC (Intercept = 3.935; Slope = 0.619, *S.E.* = 0.331, *p* = .064, *d* = 0.26) whereas it was null for those with high levels of baseline TOC (Intercept = 5.805; Slope = -0.254, *S.E.* = 0.349, *p* = .468, *d* = -0.11). The simple slopes are depicted in Figure 6.

¹³ Two participants (one from each group) were detected as univariate outliers on study time (*Z* = 3.03 and 3.15) and they were excluded from these analyses (*N* = 138). Main effect of the intervention would have been non-significant with these participants in the analysis (*p* > .10).

Anxiety. As shown in Table 5, 48.2% of the variance in anxiety was attributable to daily fluctuations (ICC = .518). The main effect of the intervention was significant and it explained 5.2% of the variance in anxiety (Model 2; control group = 2.33, intervention group = 2.00, $d = -0.34$). The effect remained significant after controlling for baseline coping (Model 3). Baseline DOC was positively associated with anxiety (Model 3). Neither TOC nor DOC at baseline significantly moderated the effect of the intervention. Model 3 was retained as the best explanatory model because neither Model 4 nor Model 5 did explain unique variance in anxiety.

Anger. As shown in Table 16, 47.1% of the variance in anger was attributable to daily fluctuations (ICC = .529). The main effect of the intervention was marginally significant ($p = .09$) and it explained 2% of the variance in anger (Model 2; control group = 1.98, intervention group = 1.77, $d = -0.23$). The effect remained significant after controlling for baseline coping (Model 3). Baseline DOC was positively and significantly associated with anger. Baseline TOC was marginally ($p = .07$) negatively associated with anger (Model 3). Neither TOC nor DOC at baseline significantly moderated the effect of the intervention for anger. Model 3 was retained as the best explanatory model because neither Model 4 nor Model 5 did explain unique variance in anger.

*Shame*¹⁴. As shown in Table 17, 39.4% of the variance in shame was attributable to daily fluctuations (ICC = .616). The main effect of the intervention was marginally significant ($p = .081$) and it explained 1.7% of the variance in shame (Model 2; control group = 1.67,

¹⁴ One participant from the control group was detected as a univariate outlier on shame ($Z = 4.02$) and was excluded from these analyses ($N = 139$). Main effect of the intervention would have reached significance with this participant in the analyses ($p < .05$).

intervention group = 1.48, $d = -0.25$). The effect remained significant after controlling for baseline coping (Model 3). Baseline DOC was positively and significantly associated with shame (Model 3). Neither TOC nor DOC at baseline significantly moderated the effect of the intervention. Model 3 was retained as the best explanatory model because neither Model 4 nor Model 5 did explain unique variance in shame.

*Hopelessness*¹⁵. As shown in Table 18, 44.9% of the variance in hopelessness was attributable to daily fluctuations (ICC = .551). The main effect of the intervention was not significant ($p = .15$) and it explained 1.1% of the variance in hopelessness (Model 2; control group = 1.77, intervention group = 1.59, $d = -0.20$). Baseline DOC was positively associated with hopelessness (Model 3) and it was a marginally significant moderator of the intervention effect (Model 5). Model 5 was retained as the best explanatory model. The intervention $\times$ baseline DOC, which explained 1.4% of unique variance, revealed that the effect of the intervention was significant for students with high levels of baseline DOC (Intercept = 2.180; Slope = -0.397, $S.E. = 0.196$, $p = .045$, $d = -0.44$) whereas it was null for those with low levels of baseline DOC (Intercept = 1.377; Slope = 0.030, $S.E. = 0.138$, $p = .831$, $d = 0.03$). The simple slopes are depicted in Figure 7.

*Boredom*¹⁶. As shown in Table 19, 46% of the variance in boredom was attributable to daily fluctuations (ICC = .540). The main effect of the intervention was not significant ($p = .13$)

¹⁵ One participant from the control group was detected as a univariate outlier on hopelessness ($Z = 3.08$) and was excluded from these analyses ($N = 139$). Main effect of the intervention would have been marginally significant with this participant in the analyses ($p < .05$).

¹⁶ One participant from the experimental group was detected as a univariate outlier on boredom ($Z = 3.50$) and was excluded from these analyses ($N = 139$). Main effect of the intervention remained unchanged with and without this participant in the analyses.

and it explained 1.3% of the variance in boredom (Model 2; control group = 2.12, intervention group = 1.91, $d = -0.21$). Baseline TOC and DOC were negatively and positively associated with boredom (Model 3). Neither TOC nor DOC at baseline significantly moderated the effect of the intervention. Model 3 was retained as the best explanatory model because neither Model 4 nor Model 5 did explain unique variance in boredom.

Discussion

The goal of this study was to examine the short-term effect of an intervention designed to help university students implement task-oriented coping with if-then coping plans. In this study, we followed the short-term perceived stress, goal progress, study time, and negative achievement emotions in the real life of university students using a seven-day daily diary. We also accounted for how students originally coped with the demands of their academic lives at baseline, while examining whether baseline coping tendencies could moderate the effects of the intervention. The primary hypothesis of this study was supported insofar as students randomly assigned in the intervention group experienced lower level of daily stress compared to students in the control condition. Other effects not having reached statistical significance, were at least trending toward statistical significance, or were moderated by baseline levels of coping. No evidence of iatrogenic effects was reported on any of the eight dependent variables.

Effects of Implementing Task-Oriented Coping with If-Then Plans

The effect of the intervention on daily perceived stress –our primary dependent variable – reached statistical significance with a medium effect size ($d = -0.34$). This effect remained

significant while accounting for individual differences in coping utilization prior the start of the intervention. Furthermore, our results indicated that baseline disengagement-oriented coping moderated the effect of the coping intervention. Of particular interest, it appears that students who were using high levels of disengagement-oriented coping before the intervention benefited the most from an intervention designed to implement task-oriented coping strategies with if-then planning. For those students, the effect of the intervention was large ($d = -0.58$) and quite consequential in reducing their daily level of perceived stress.

Our participants were instructed to set a goal aimed at trying to increase their daily investment in studying time. The time spent on studying each day is an important precursor of achievement insofar as it enables students to optimally distribute their learning periods into manageable sessions throughout the semester. On a daily basis, the students who participated in the coping intervention ended up spending more time studying than their counterparts who were randomly assigned in the control condition. Although the effect was only marginally significant and can only be qualified as weak-to-medium ($d = 0.22$), it is worth highlighting that students in the coping intervention, on average, have studied 25 more minutes every day than the students in the control condition. Such a difference, if maintained over the course of an entire semester, could help students in securing the needed time to adhere to good study habits while minimizing the burden of having to invest in condensed and exhausting studying periods. Higher time spent on studying, when coupled with proper learning strategies, could facilitate learning, achievement, and academic satisfaction of university students.

Making regular and steady progress on academic goals is important to facilitate the attainment of semester goals and to obtain a good semester grade point average. Making daily progress on academic goals is a challenging task that requires effort and dedication as well as

optimal self-regulatory capacities. Although our coping intervention did not produce a significant main effect on daily academic goal progress ($d = 0.08$), it nonetheless was effective for students who were using low levels of task-oriented coping before the intervention. For those students, the effect of the intervention on daily academic goal progress was significant ($d = 0.26$). It does seem like the coping intervention can be useful to facilitate daily goal progress for those university students who were initially less susceptible to reach high levels of goal progress because of their limited task-oriented coping repertoire.

Achievement emotions have received increasing empirical attention during the last decade because they are known to contribute to and be influenced by achievement (Pekrun, 2006; Pekrun, Hall, Goetz, & Perry, 2014). Therefore, knowing the factors that contribute to reducing negative achievement emotions is a pivotal task to promote both success and a quality experience in university students. Our findings have shown that implementing task-oriented coping with if-then plans was associated with significantly lower daily anxiety ($d = -0.34$) and marginally significant lower levels of daily anger ($d = -0.23$) and shame ($d = -0.25$). In this study, we found no significant effect of the intervention on daily boredom ($d = -0.21$) and the effect on daily hopelessness was moderated by baseline levels of disengagement-oriented coping. For students with higher baseline levels of disengagement-oriented coping, the effect of the intervention was large ($d = -0.44$) and quite consequential in reducing their daily level of hopelessness.

Limitations

In this study, we adopted a strong design in which the perceived stress, goal progress, and achievement emotions were assessed every day during a week in the real lives of university

students. Our participants were only followed during the week following the intervention in order to assess its short-term effects on key indicators of stress, goal progress, and achievement emotions. Future research should try to combine the features of a daily diary design within the confines of a semester-long study in order to investigate whether a coping intervention can predict important academic outcomes such as semester grade point average and diminished absenteeism. Another avenue of improvement would be to obtain physiological measures of stress (e.g., cortisol) during the days of the mid-term periods in order to determine whether or not implementing task-oriented coping with if-then plans can reduce both the perceived and physical stress of university students. Depression and other mental disorders are susceptible to appear and to develop during emerging adulthood. Our results revealed that coping interventions could contribute to lowering the experience of anxiety and hopelessness of some university students. However, more research is needed to examine the effectiveness of this coping intervention with questionnaires specifically designed to measure the whole spectrum of clinical depression and anxiety disorders.

Conclusion

Most coping and self-regulation research starts with the assumption that coping can be learned and shaped through proper interventions. Thus far, research on coping has informed us that several students possess the needed coping repertoire to effectively handle the demands of their academic lives. However, other students appear to be struggling to actively cope to keep up with the demands of their academic lives. Prevention sciences and school practitioners are typically interested in the latter students who, for some reasons, appear to possess a potentially detrimental coping repertoire (i.e., less task-oriented coping and more disengagement-oriented coping). Our intervention has shown some evidence of effectiveness, most particularly for those

students who needed some guidance to improve their capacity to implement task-oriented coping in their daily academic lives. No evidence of iatrogenic effect was found, which indicates that further research could be safely conducted to examine the longer-term effects of similar interventions designed to implement task-oriented coping with if-then plans.

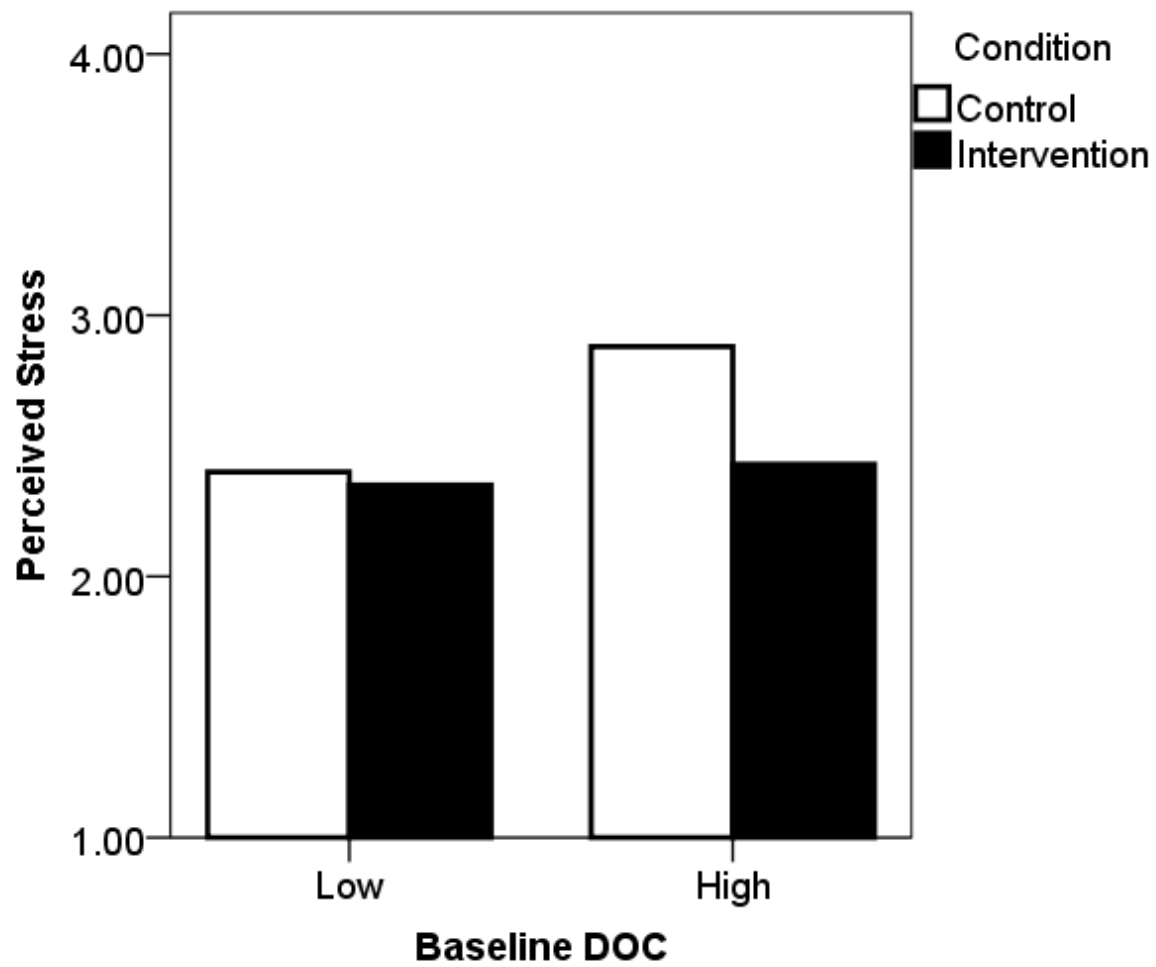


Figure 5. Effect of the coping intervention on daily perceived stress for students with low versus high disengagement-oriented coping (DOC) at baseline.

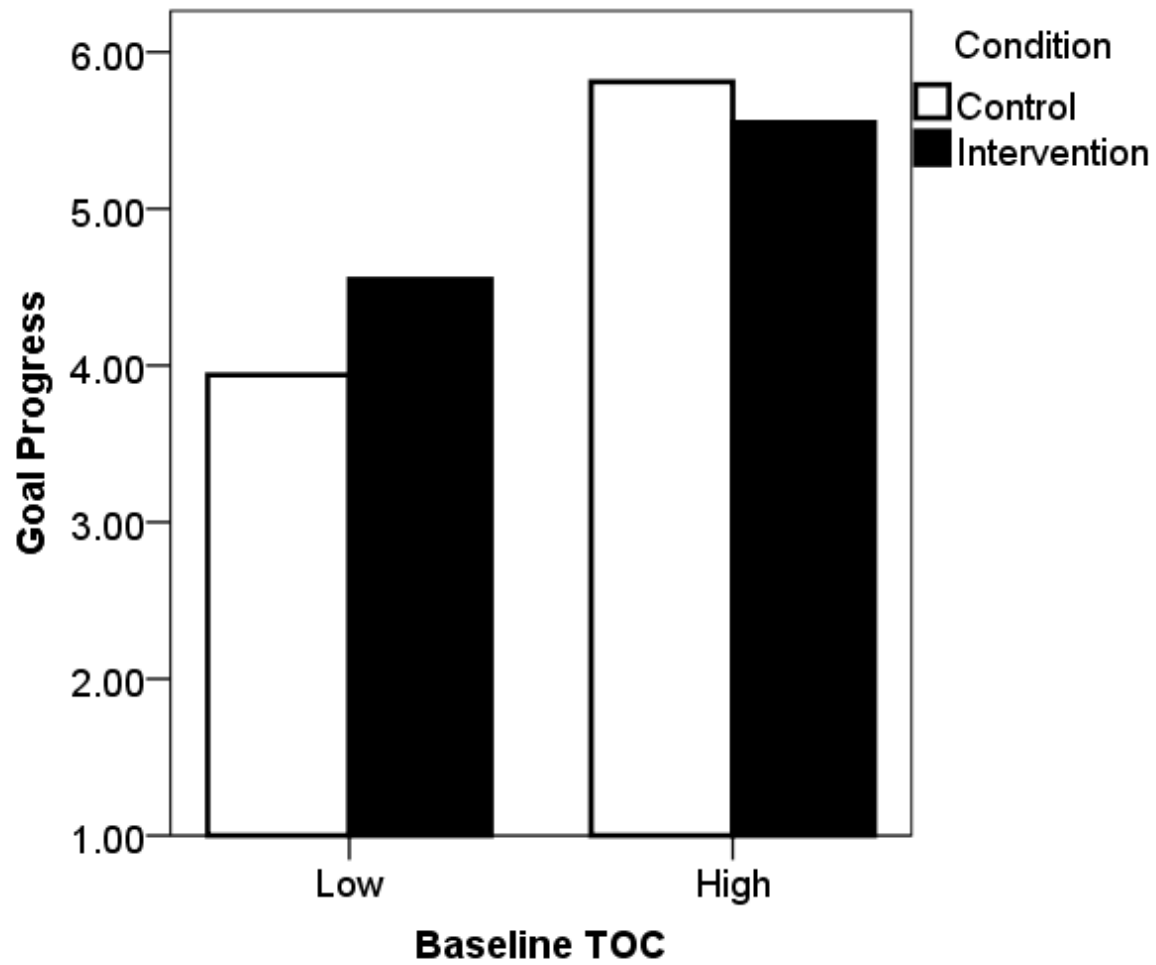


Figure 6. Effect of the coping intervention on daily goal progress for students with low versus high task-oriented coping (TOC) at baseline.

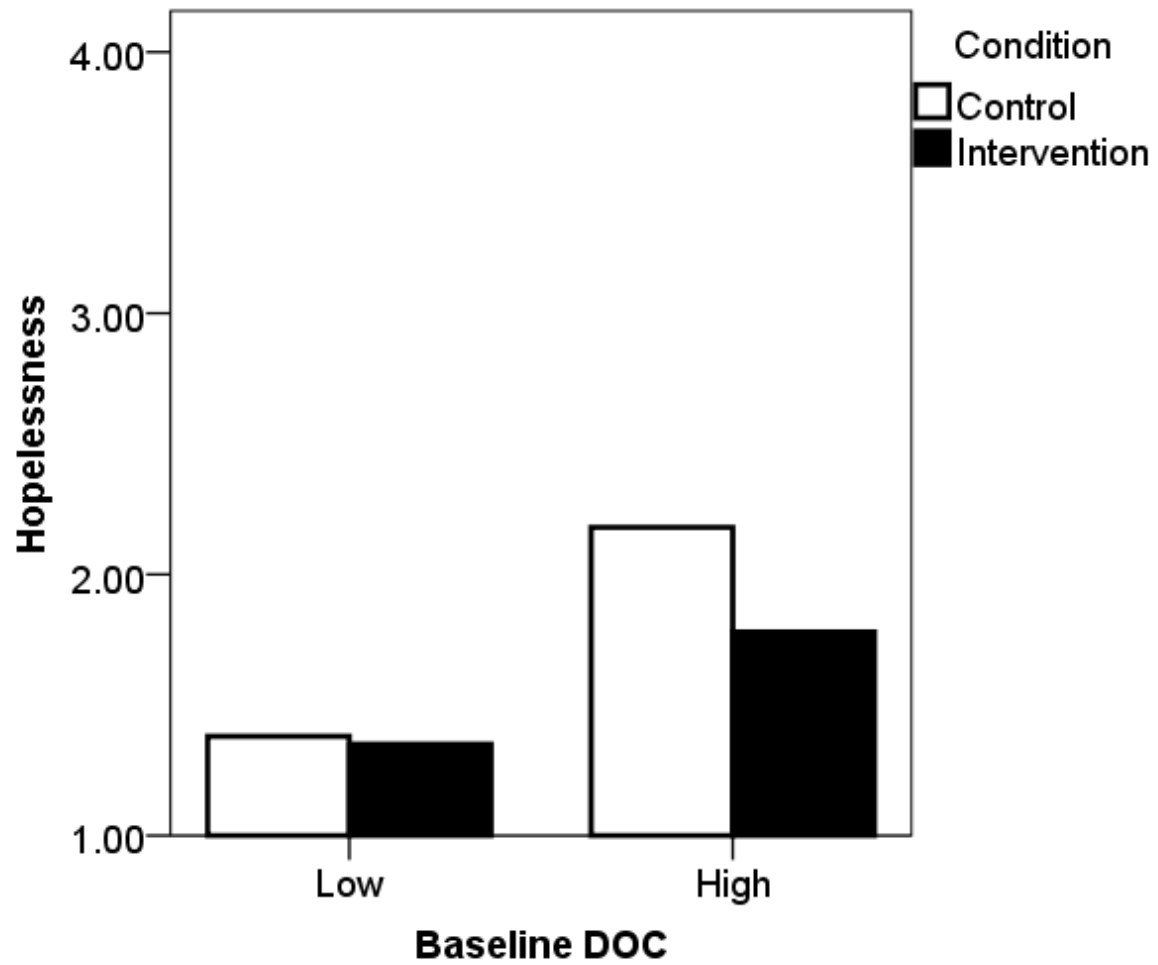


Figure 7. Effect of the coping intervention on daily hopelessness for students with low versus high disengagement-oriented coping (DOC) at baseline.

Table 11

Descriptive Statistics of the Dependent Variables

	Range	<i>N</i>	<i>M</i>	<i>SD</i>	Alpha
Baseline measures					
TOC	1-5	140	3.48	1.79	.89
DOC	1-5	140	2.27	0.66	.72
Daily measures					
Daily progress	1-9	140, 668	4.98	2.31	.71
Daily study time	0-720	138, 661	122.31	113.53	---
Daily stress	1-5	140, 664	2.50	0.77	.89
Daily anxiety	1-5	140, 657	2.15	0.96	.82
Daily anger	1-5	140, 659	1.85	0.88	.85
Daily shame	1-5	139, 647	1.55	0.77	.82
Daily hopelessness	1-5	139, 648	1.66	0.91	.74
Daily boredom	1-5	139, 652	1.99	0.97	.87

Table 12

Results of the Multilevel Models to Predict Daily Stress

Effects	<u>Model 1</u>		<u>Model 2</u>		<u>Model 3</u>		<u>Model 4</u>		<u>Model 5</u>	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Fixed effects										
Intercept	2.497*	0.051	2.644*	0.081	2.641*	0.074	2.642*	0.074	2.640*	0.072
Intervention			-0.260*	0.102	-0.250*	0.100	-0.253*	0.100	-0.253	0.095
Baseline TOC					-0.077	0.079	-0.228	0.132	-0.156	0.140
Baseline DOC					0.200*	0.075	0.183*	0.075	0.328*	0.107
Intervention X Baseline TOC							0.246†	0.156	0.158	0.167
Intervention X Baseline DOC									-0.257‡	0.144
ICC	.501									
Random effects										
Tau	0.290		0.275		0.258		0.255		0.250	
Sigma ²	0.288		0.288		0.288		0.288		0.288	
Change in Pseudo R ²	---		0.052		0.061		0.013		0.019	

Note. * $p < .05$. † $p = .115$. ‡ $p = .078$. TOC = task-oriented coping. DOC = disengagement-oriented coping.

Table 13

Results of the Multilevel Models to Predict Daily Study Time

Effects	<u>Model 1</u>		<u>Model 2</u>		<u>Model 3</u>		<u>Model 4</u>		<u>Model 5</u>	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Fixed effects										
Intercept	119.47*	6.984	105.67*	9.67	106.00*	9.36	106.00*	9.33	106.16*	9.38
Intervention			24.55†	13.70	23.50††	12.96	23.49††	12.92	23.61††	12.87
Baseline TOC					44.06*	10.19	32.52*	16.08	29.08††	15.64
Baseline DOC					-2.28	9.15	-3.41	9.33	-10.91	11.73
Intervention X Baseline TOC							18.73	21.96	23.27	20.56
Intervention X Baseline DOC									13.48	17.89
ICC	.390									
Random effects										
Tau	4976		4884		4199		4214		4240	
Sigma ²	7771		7768		7773		7772		7773	
Change in Pseudo R ²	---		0.019		0.140		0.000		0.000	

Note. * $p < .05$. † $p = .076$. †† $p = .070$. TOC = task-oriented coping. DOC = disengagement-oriented coping.

Table 14

Results of the Multilevel Models to Predict Daily Goal Progress

Effects	<u>Model 1</u>		<u>Model 2</u>		<u>Model 3</u>		<u>Model 4</u>		<u>Model 5</u>	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Fixed effects										
Intercept	4.986*	0.133	4.884*	0.205	4.874*	0.172	4.870*	0.169	4.874*	0.169
Intervention			0.182	9.270	0.171	0.241	0.182	0.237	0.184	0.237
Baseline TOC					1.093*	0.203	1.526*	0.300	1.424*	0.319
Baseline DOC					0.058	0.190	0.103	0.198	-0.120	0.256
Intervention X Baseline TOC							-0.712†	0.397	-0.578	0.401
Intervention X Baseline DOC									0.399	0.382
ICC	.307									
Random effects										
Tau	1.648		1.659		1.238		1.208		1.212	
Sigma ²	3.714		3.713		3.716		3.715		3.713	
Change in Pseudo R ²	---		0.000		0.254		0.024		0.000	

Note. * $p < .05$. † $p = .075$. TOC = task-oriented coping. DOC = disengagement-oriented coping.

Table 15

Results of the Multilevel Models to Predict Daily Anxiety

Effects	<u>Model 1</u>		<u>Model 2</u>		<u>Model 3</u>		<u>Model 4</u>		<u>Model 5</u>	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Fixed effects										
Intercept	2.144*	0.064	2.330*	0.095	2.325*	0.089	2.326*	0.089	2.323*	0.088
Intervention			-0.332*	0.127	-0.318*	0.122	-0.320*	0.122	-0.321	0.121
Baseline TOC					0.100	0.110	-0.013	0.207	0.039	0.212
Baseline DOC					0.320*	0.094	0.308*	0.096	0.419*	0.123
Intervention X Baseline TOC							0.186	0.237	0.118	0.243
Intervention X Baseline DOC									-0.198	0.186
ICC	.518									
Random effects										
Tau	0.477		0.452		0.422		0.424		0.425	
Sigma ²	0.444		0.444		0.443		0.442		0.442	
Change in Pseudo R ²	---		0.052		0.066		0.000		0.000	

Note. * $p < .05$. TOC = task-oriented coping. DOC = disengagement-oriented coping.

Table 16

Results of the Multilevel Models to Predict Daily Anger

Effects	<u>Model 1</u>		<u>Model 2</u>		<u>Model 3</u>		<u>Model 4</u>		<u>Model 5</u>	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Fixed effects										
Intercept	1.861*	0.059	1.976*	0.096	1.971*	0.085	1.971*	0.085	1.970*	0.085
Intervention			-0.205†	0.121	-0.187†	0.109	-0.188†	0.110	-0.188†	0.110
Baseline TOC					-0.164‡	0.091	-0.206	0.165	-0.176	0.175
Baseline DOC					0.376*	0.090	0.371*	0.091	0.435*	0.151
Intervention X Baseline TOC							0.068	0.194	0.029	0.203
Intervention X Baseline DOC									-0.112	0.185
ICC	.529									
Random effects										
Tau	0.409		0.400		0.324		0.327		0.329	
Sigma ²	0.365		0.365		0.364		0.364		0.364	
Change in Pseudo R ²	---		0.020		0.190		0.000		0.000	

Note. * $p < .05$. † $p = .09$. ‡ $p = .07$. TOC = task-oriented coping. DOC = disengagement-oriented coping.

Table 17

Results of the Multilevel Models to Predict Daily Shame

Effects	<u>Model 1</u>		<u>Model 2</u>		<u>Model 3</u>		<u>Model 4</u>		<u>Model 5</u>	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Fixed effects										
Intercept	1.559*	0.055	1.668*	0.090	1.672*	0.085	1.672*	0.085	1.672*	0.085
Intervention			-0.193†	0.113	-0.188††	0.106	-0.188‡	0.106	-0.189‡	0.107
Baseline TOC					-0.050	0.092	-0.097	0.180	-0.078	0.186
Baseline DOC					0.308*	0.086	0.304*	0.087	0.346*	0.150
Intervention X Baseline TOC							0.076	0.208	0.052	0.210
Intervention X Baseline DOC									-0.072	0.181
ICC	.616									
Random effects										
Tau	0.365		0.359		0.324		0.326		0.328	
Sigma ²	0.228		0.228		0.227		0.227		0.227	
Change in Pseudo R ²	---		0.017		0.099		0.000		0.000	

Note. * $p < .05$. † $p = .088$. †† $p = .081$. ‡ $p = .080$. TOC = task-oriented coping. DOC = disengagement-oriented coping.

Table 18

Results of the Multilevel Models to Predict Daily Hopelessness

Effects	<u>Model 1</u>		<u>Model 2</u>		<u>Model 3</u>		<u>Model 4</u>		<u>Model 5</u>	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Fixed effects										
Intercept	1.667*	0.063	1.773*	0.104	1.777*	0.085	1.779*	0.092	1.779*	0.091
Intervention			-0.186	0.129	-0.178	0.118	-0.180	0.118	-0.184	0.107
Baseline TOC					-0.027	0.102	-0.145	0.201	-0.073	0.201
Baseline DOC					0.424*	0.088	0.412*	0.090	0.581*	0.125
Intervention X Baseline TOC							0.197	0.233	0.100	0.227
Intervention X Baseline DOC									-0.291†	0.170
ICC	.551									
Random effects										
Tau	0.458		0.453		0.385		0.385		0.380	
Sigma ²	0.373		0.373		0.372		0.372		0.372	
Change in Pseudo R ²	---		0.011		0.151		0.000		0.014	

Note. * $p < .05$. † $p = .089$. TOC = task-oriented coping. DOC = disengagement-oriented coping.

Table 19

Results of the Multilevel Models to Predict Daily Boredom

Effects	<u>Model 1</u>		<u>Model 2</u>		<u>Model 3</u>		<u>Model 4</u>		<u>Model 5</u>	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Fixed effects										
Intercept	2.001*	0.067	2.118*	0.105	2.113*	0.091	2.114*	0.091	2.113*	0.091
Intervention			-0.208	0.135	-0.189	0.123	-0.191	0.123	-0.192	0.122
Baseline TOC					-0.290*	0.105	-0.432*	0.168	-0.390*	0.178
Baseline DOC					0.320*	0.100	0.305*	0.098	0.394	0.146
Intervention X Baseline TOC							0.233	0.208	0.178	0.222
Intervention X Baseline DOC									-0.159†	0.192
ICC	.540									
Random effects										
Tau	0.511		0.504		0.416		0.415		0.417	
Sigma ²	0.435		0.435		0.434		0.434		0.434	
Change in Pseudo R ²	---		0.013		0.176		0.001		0.000	

Note. * $p < .05$. TOC = task-oriented coping. DOC = disengagement-oriented coping.

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CHAPTER 6

A Discussion of Key Findings, Limitations, and Implications

The overarching goal of the proposed doctoral thesis was to better understand the coping cognitions and behaviours that undergraduate university students use to manage the demands of post-secondary goal pursuit. The relationship between coping and academic achievement and academic psychological adjustment in the post-secondary academic setting was examined. Article 1 focused on the development of a new coping questionnaire designed specifically to measure academic coping during goal pursuit. The validity of the questionnaire was assessed within the confines of the transactional model of stress and coping (Folkman et al., 1986; Lazarus & Folkman, 1980; Lazarus & Launier, 1978). It was formally hypothesized that task-oriented coping efforts would positively relate to indicators of academic achievement and academic psychological adjustment. To compare, disengagement-oriented coping was hypothesized to relate to lower levels of academic achievement and higher levels of academic psychological maladjustment. Article 2 proposed a unified model comparing and contrasting the relationships between dispositional and situational cognitive appraisals, coping, and goal progress. It was hypothesized that while dispositional individual differences in coping exist, as not all students are coping the same way (i.e., between-person level), the situational coping responses of students are also likely to vary from one day to the other during a typical week of the academic year (i.e., within-person level). Therefore, new research questions pertaining to appraisal, coping, and goal progress were examined at both the between-person and within-person levels of analyses. Finally, Article 3 focused on the development and implementation of a coping skills training program designed as a brief and cost-effective program targeting negative achievement emotions students encountered during studying. The coping skills training program was implemented using experimental methods testing the causal relationships

between coping and goal progress and academic psychological adjustment. The development and test of this coping skills training program aimed to create bridges between existing coping theory and the research findings in Article 1 and 2 and preventive coping interventions.

Summary and Theoretical Implications

The Coping Inventory for Academic Striving (CIAS) was developed to address the need to improve the reliability of the hierarchical and multidimensional conceptualization of coping, and the suitability of the current coping instances measured in the context of post-secondary education. As discussed, existing academic coping questionnaires have often been developed using an empirical approach where the hierarchical organization of coping is derived using some type of exploratory factor analyses and tied back to theory *post hoc*. This method has often resulted in inconsistencies in the number and nature of coping strategies and dimensions examined across research (e.g., Aldwin & Revenson, 1987; Folkman & Lazarus, 1986, 1988; Parker & Endler, 1992; Parker et al., 1993). It has also resulted in questionnaires for which the factor structure failed to replicate across samples. The CIAS was instead developed using a theoretical approach for scale development -establishing *a priori*- the conceptualization of coping and creating items to measure specific coping strategies. In Article 1, the test of the first-order factor structure of the CIAS identified 44 robust and unique indicators of the 11 coping strategies with no-cross loading on other coping strategies. Furthermore, the results of hierarchical confirmatory factor analyses, with two independent samples of students, provided evidence for the tenability of a model regrouping these coping strategies in two broader dimensions of coping. *Task-oriented coping* was defined as strategies used to actively alter the task demands of a stressor and associated emotions and thoughts whereas *disengagement-oriented coping* was defined as strategies used to disengage or distract attention momentarily from a goal related stressor. The hierarchical framework of the CIAS is consistent with research on coping in the post-

secondary educational setting examining the distinction between task coping efforts and disengagement coping efforts (Amiot et al., 2008; Soucy-Chartier et al., 2011; Thompson & Gaudreau, 2008). These findings extend research on coping in post-secondary educational setting by providing a questionnaire with good psychometric properties designed specifically to measure coping instances and strategies that are relevant in the lives of university students.

The CIAS was developed in efforts to improve the face validity of coping in post-secondary students. To our knowledge, the CIAS is the first hierarchical and multidimensional domain-specific questionnaire developed solely to measure how post-secondary students manage the demands of academic goal pursuit. The Brief COPE (Carver, 1997) measures general coping strategies and has been shown to be efficient in the measurement of the coping strategies that university students use when managing goal demands (e.g., Amiot et al., 2008; Soucy-Chartier et al., 2011; Thompson & Gaudreau, 2008). Of particular importance, in Article 1, the results of the convergent and incremental validity provided evidence that the CIAS predicted indicators of academic psychological adjustment over and above a general measure of coping. These results suggest that the conceptualization of academic coping as measured by the CIAS may capture unique and specific academic coping cognitions and behaviours that are not captured by the Brief COPE, a general coping questionnaire. This finding also points to the methodological benefits of developing domain specific coping questionnaires thereby reducing method bias and improving the prediction of the association between coping and antecedents and outcomes of coping. The CIAS provides educational psychologists and researchers with a tool specifically designed to measure post-secondary coping actions to which university students can relate. The coping actions measured by the CIAS can also facilitate the development and evaluation of post-secondary educational interventions designed to help university students struggling to manage their academic endeavours.

Indeed, in Article 3, the conceptual framework of the CIAS provided a useful framework to help university students create coping plans that were associated with academic performance and academic psychological adjustment for at least some of the students recruited to participate in a small-scale and short-term experimental study.

The construct validity of the hierarchical organization of the CIAS was tested with known antecedents (i.e., personality, cognitions, motivation) and outcomes of coping (i.e., academic achievement and academic psychological adjustment) as outlined within the confines of the classic transactional model of stress and coping (Folkman et al., 1986; Lazarus, 1991; Lazarus & Folkman, 1980; Lazarus & Launier, 1978). Skinner and colleagues (2003) have proposed a set of guidelines which was adopted to evaluate the construct validity of the hierarchical organization of the CIAS. These guidelines suggest that every coping strategy encompassed in a particular coping dimension should serve the same goal in dealing with a stressor (i.e., functional homogeneity) while all coping dimensions should have unique goals (i.e., functional distinctiveness). The findings of Article 1 provided evidence for both the functional homogeneity and functional distinctiveness of the CIAS coping dimensions. Particularly, task-oriented coping strategies were, for the most part, similarly related to several antecedents of coping including optimism, challenge appraisal, self-efficacy, and academic autonomous goal motivation and outcomes of coping including academic satisfaction, positive affect, and goal progress. As well, disengagement-oriented coping and the corresponding coping strategies were, for the most part, related to several antecedents including neuroticism, pessimism, test anxiety and fear of failure, perceived stress, and academic controlled goal motivation in addition to outcomes of coping including negative affect and dropout intention. In support of the functional distinctiveness, the task-oriented coping strategies and dimension and disengagement-oriented coping strategies and dimension were related to different external correlates of coping, thus

providing strong evidence for the hypothesis that these coping dimensions are in fact distinct constructs. Overall, the results of the construct validity provided support for the reliability and factorial validity of the hierarchical organization of coping as measured by the CIAS. Furthermore in Article 2, the internal consistency of the task-oriented and disengagement-oriented coping dimensions at both the within-person and between-person level of analyses was acceptable, an indication that the CIAS is reliable measure of the preferred use of coping and fluctuations in coping in post-secondary students.

As discussed, the hierarchical organization of coping strategies within higher- order dimensions of coping has both empirical and theoretical advantages. The hierarchical factor structure of the CIAS gives a more parsimonious account of coping. It also reduces the need for statistical power that would otherwise be required in examining the eleven coping strategies, thereby facilitating research with more complex designs. Particularly relevant in Article 2, multilevel structural equation models were tested to examine dispositional and situational academic coping. The study of the two broad coping dimensions, in lieu of the eleven coping strategies, facilitated these complex multilevel analyses with a relatively small sample size. The organization of coping strategies within consistent coping dimensions also facilitates the comparison of coping research across contexts, stressors and ages and the comparison of the antecedents, processes, and outcomes of coping (E.A. Skinner et al., 2003). Article 1 examined the antecedents and outcomes of coping assessing the coping responses that students generally used to manage academic demands over the course of an exam period. In this approach, information concerning students' day-to-day utilization of coping and day-to-day variations in the antecedents and outcomes of coping was not captured. Article 2 provided a complementary perspective of what happens in situ, in the daily lives of students.

Article 2 aimed to extend findings from Article 1 by examining both the stability and fluctuations in the relationships between antecedents and outcomes of coping. Lazarus and Folkman (1984) originally presented coping as a multilevel construct that can be conceived both at the dispositional and situational level. From a statistical standpoint, the between-person and within-person relationships between constructs are independent because they are looking at two separate research questions. The dispositional approach (i.e., between-level of analyses) assumes that students possess a preferred mode of coping which can be used to identify which students may be more likely to make academic goal progress. In this approach, students are compared to one another. The situational approach (i.e., within-level of analyses) examines how coping changes to manage fluctuating goal demands and can be used to identify when students are more likely to make goal progress. In this approach, the students are compared to their own habitual trends. While researchers have begun to distinguish dispositional and situational coping, the majority of research has focused on either the dispositional or situational approach (Folkman & Lazarus, 1985; Folkman et al., 1986; Garner & Fletcher, 2009; Grant et al., 2002; Holt & Dunn, 2004; Larsson et al., 1988; Levy-Shiff et al., 1998; Long & Schutz, 1995; Ramirez-Maestre et al., 2008; Scherer et al., 1993; N. Skinner & Brewer, 2002). While a positive step, testing relationships between constructs without considering both the between-person effect and the within-person effect may mask the true relationship between constructs (Preacher et al., 2010). Article 2 instead proposed a unified multilevel approach in efforts to compare and contrast the relationships between the antecedents and outcomes of coping – appraisal and goal progress- when examining individual differences in coping with goal demands and how students cope with daily changes in goal demands.

The results of the unified multilevel model revealed that while some relationships between appraisal, coping, and goal pursuit were homologous (i.e., comparable across levels of analysis),

some differences in the relationships between the antecedents and outcomes of coping did exist at the dispositional between-person level and situational within-person level of analysis. The results of the relationships between *challenge appraisal*, task coping and goal progress were homologous at the within- and between-person level of analyses, consistent with traditional results found within the context of the transactional model of stress and coping (Folkman et al., 1986; Lazarus & Folkman, 1980; Lazarus & Launier, 1978). That is, both the dispositional preferred tendency to appraise goal demands as a challenge (i.e., between-person level) and the daily or episodic challenge appraisal associated with fluctuating goal demands (i.e., within-person level) predicted the use of task-oriented coping. These between-person results are consistent with findings in Article 1 and are also in line with research demonstrating that challenge appraisal related to the use of task-oriented coping when considering how post-secondary students generally pursue their goals (N. Skinner & Brewer, 2002). Furthermore, the within-person relationships are consistent with research highlighting the positive relationships between challenge appraisal and the use of task-oriented coping on days when goals demands are more salient, for example, in highly stressful post-secondary examinations (Drumheller et al., 1991).

Distinctly, the relationships between *threat appraisal*, coping, and goal progress differed at the dispositional and situational level. Consistent with findings in Article 1, the dispositional perception of threat appraisal related exclusively to the use of disengagement-oriented coping (i.e., between-person level). To compare, daily or episodic threat appraisal related to both task- and disengagement-oriented coping. That is, daily or episodic threat appraisal activated efforts to both approach and avoid goal demands. These results are in line with goal pursuit research in two similar achievement domains -sport and work- where episodic or situational task coping has been found to be initiated following a change in threat to goal pursuit (Jones et al., 2009; Portello & Long, 2001).

Furthermore, research studying the physiological response initiated by a threat inducing episode supports the pattern of coping at the within-person level found in this study. Blascovich and colleagues (2003; 2004; 1993) reported that a change in threat appraisal initiated a cardiovascular pattern consistent with physiological effortful engagement directed both toward the task at hand indicative of task-oriented coping and toward the environment or the self indicative of disengagement-oriented coping. These results may suggest that a higher than average threat appraisal may signal the need to reevaluate goal pursuit. In fact, research has shown the threat of poor academic performance significantly relates to increases in the importance and value of college academic achievement (Struthers et al., 2000). It may be the case that when an individual's perception of threat is higher than average, an individual may adopt task specific coping behaviour if he or she believes the self-efficacy of enacting the coping behaviour is likely to maintain goal progress eliminating the negative performance consequences associated with threat appraisal (Eysenck & Calvo, 1992; Milne, Orbell, & Sheeran, 2002).

Furthermore, the performance implications of the utilization of disengagement-oriented coping differed across the dispositional and situational level of analyses, which is another interesting contribution of the multilevel approach adopted in Article 2. Specifically, at the dispositional between-person level of analyses, the generalized tendency toward the use of task-oriented coping was positively related to goal progress while the tendency toward disengagement-oriented coping was unrelated to goal progress. These findings at the dispositional level are consistent with the results of Article 1 demonstrating a significant positive relationship between task-oriented coping and goal progress and a non significant relationship between disengagement-oriented coping and goal progress related to the generalized coping tendencies during exams. It is also supported by additional research examining coping and university goal pursuit (Gaudreau et al., 2012). At the

situational within-person level of analyses, fluctuating levels of task-oriented coping were positively related to goal progress while fluctuating levels of disengagement-oriented coping were negatively related to goal progress. These findings may suggest and are in line with research demonstrating that the negative situational effect of disengagement-oriented coping on performance depends on whether the individual generally uses it alone or in combination with situational task-oriented coping (e.g., Martinent & Decret, 2013). Together, the findings of this research provided evidence that both the preferred and fluctuating level of a construct can provide complementary but distinct understandings of self-regulation.

The results of Article 1 and Article 2 extend theoretical knowledge surrounding the function of coping with students in post-secondary education. Both the preferred use of coping (i.e., between-person level) and how students' change coping to manage fluctuating goal demands (i.e., within-person level) have supported the theoretical position that task coping strategies relate to positive outcomes and can be viewed as "good news" coping in the context of post-secondary education. In reference to academic and psychological adjustment, the results of Article 1 provided evidence that the general use of task-oriented coping to manage academic demands over the course of an exam period related to academic satisfaction, positive affect and lower levels of perceived stress. In reference to academic achievement, the results of Article 1 and Article 2 also revealed that the preferred use of task-oriented coping related to goal progress (i.e., between-person level) while the results of Article 2 revealed that the use of task-oriented coping to manage changing goal demands also related to making progress on post-secondary goals (i.e., within-person level). In other words, students who are using more task-oriented coping than their counterparts ended up making more progress on their goals. Furthermore, on days during which a student uses more task-oriented coping than his or her own average, he or she was more likely to make more progress on his/her goals

compared to his/her typical daily goal progress. In contrast, disengagement-oriented coping has generally been shown to relate to negative outcomes and has been viewed as “bad news” coping, mostly detrimental to university academic attainment and academic psychological adjustment (Skinner et al., 2003). However, the dispositional and situational conceptualization of disengagement-oriented coping may serve different functions. As discussed, the situational use of disengagement-oriented coping used to manage changing goal demands was shown to be detrimental to academic performance, consistent with “bad news” function of disengagement-oriented coping. However, the examination of dispositional disengagement-oriented coping in Article 2 provided evidence that the individual preferred use of disengagement-oriented coping may not play a role in performance achievement, but instead play a role in predicting other types of “bad news” consequential academic psychological adjustment outcomes in the educational domain. In fact, the results of Article 1 revealed significant positive relationships between the preferred use of disengagement-oriented coping during exams and dropout intention and negative affect along with a negative significant relationship with satisfaction with school. These findings provide insight into a useful point of intervention. Students who are more likely to rely on disengagement-oriented coping may be more likely to experience anxiety directed toward their academic activities, be less satisfied, and experience higher amount of intention to abandon their post-secondary education goals. Hence, coping interventions designed to target these students and their coping responses can help students in securing more positive outcomes in the pursuit of their academic goals.

Article 3 was designed as a real world application and test of theory and correlational findings in Article 1 and 2 demonstrating the academic performance and psychological benefits of task-oriented coping. The proposed if-then coping intervention was tested using a naturally occurring goal of daily studying behaviour, thus increasing the external validity of the intervention.

Students in the experimental condition set if-then task-oriented coping plans targeted at negative emotions they deemed detrimental to their daily studying behaviours. Research has provided evidence that negative emotions are tied to failures to make goal progress (Parker et al., 2004; Soucy-Chartier et al., 2011). Students in the control condition were provided with information concerning the availability of various academic resources on campus. This control condition was designed to recreate the natural environment on campus where students have access to a variety of services available to promote their academic success. A daily one-week longitudinal design was used to capture daily assessments of negative achievement emotions, stress, the amount of time spent studying, and students' perception of their progress in meeting their studying goal.

Overall, the findings of the intervention revealed that the implementation of if-then task-oriented coping plans improved both academic performance and academic psychological adjustment. Students in the experimental group reported lower levels of daily stress and negative achievement emotions including anxiety, anger, shame, and hopelessness along with higher levels of daily studying time. However, the effect of the intervention on some indicators of performance and adjustment was moderated by baseline coping. Specifically, the development of coping plans improved daily perceived stress, goal progress, hopelessness and boredom only for students in the experimental condition who at the outset of the intervention reported using either high levels of disengagement-oriented coping or low levels of task-oriented coping to manage academic goal demands. These findings suggest that the implementation of coping plans worked best for students with a limited coping repertoire. It is worth noting that students in the coping intervention, on average, reported studying 25 more minutes every day than the students in the control condition. Such a difference, if maintained over the course of an entire semester, could help students develop

the needed time to develop good study habits while minimizing the tendency to put off studying and being burdened with having to invest in condensed and exhausting studying periods.

Research provides evidence that struggling students have difficulties identifying opportunities to actively manage academic demands (Sandler et al., 2000; Wood & Locke, 1987). The formation of implementation coping plans in this study linked task-oriented coping efforts with negative emotions identified as being detrimental to their studying behaviours. Research supports that goal intentions are strengthened -increasing the likelihood of goal directed behaviour- when goal intentions are paired with cognitive and/or behavioural plans to act (Gollwitzer et al., 1990; Gollwitzer & Sheeran, 2006). Pairing coping efforts with external and internal cues can increase the accessibility of opportunities to engage in coping efforts (Gollwitzer, 1996; Gollwitzer, 1999; Gollwitzer & Brandstätter, 1997). The targeted external or internal cues, in this case negative emotions, may have served as a cue to enact task-oriented coping efforts. The findings of this study are supported by experimental research in other achievement domains where the use of implementation if-then coping plans have been shown to decrease the experience of negative emotions while increasing goal-directed behaviour (Achtziger et al., 2008; Arathoon & Malouff, 2004). However, this study extends findings highlighting the additional benefit for students with a pre-existing limited coping repertoire.

Methodological & Theoretical Limitations & Future Research

Article 1. Rapid advances have been made in the last three to five years regarding the treatment of missing data. In Article 1, mean substitution was chosen as the method to impute the missing scores for the CIAS coping cognitions and behaviours. Specifically, a missing score for a coping item was replaced with the mean value calculated for the remaining corresponding items of the subscale. Missing values were only replaced for participants with missing data on three or fewer

different coping subscales. The use of mean substitution may have resulted in an underestimation of the variance and an overestimation of covariance within imputed data (Brown, 2006). By potentially increasing the degree of relatedness among coping items corresponding to a single coping subscale, the use of the mean imputation method could have potentially influenced the selection of items in the development of the questionnaire. However, this possibility appears quite improbable given that missing items on the CIAS were considered missing completely at random because no systematic trends in missing items were identified, and less than 1% of the cases in the CIAS responses were imputed. Nonetheless, the use of the full information maximum likelihood imputation method may have been preferable. This method does not impute data, but instead computes parameter estimates and standard errors that would most likely have been found from the observed data with no missing data (Hox, 1999). This method gives unbiased parameter estimates and standard errors. However, and despite its strengths, the approach was unavailable in the software used to analyze the data from Article 1.

The construct validity of the newly conceptualized coping dimensions was tested within the confines of the transactional model of stress and coping examining theoretically identified “coping antecedents” including personality, motivation, and cognitive appraisals and “coping outcomes” organized into performance achievement and academic psychological adjustment outcomes. While research has provided evidence to support several of these relationships, the validity of the findings related to academic psychological adjustment in Article 1 may be limited by the use of general questionnaires measuring general feelings of positive and negative affect and perceived stress. Specifically, students were asked to report how they were feeling over the last few days or over the last week. These questionnaires could potentially tap feelings related to goal striving in other salient life domains including for example work and extra-curricular activities. As such, the use of general

measures of outcomes could have potentially underestimated the association between academic coping and the coping outcomes. Having outcomes assessed at the contextual level (i.e., specific to school experience) would have potentially yielded stronger associations between coping and coping outcomes. In addition, the list of antecedents and outcomes was not exhaustive. Particularly relevant, achievement goal motivation has been shown to closely relate to how students manage goal pursuit and academic achievement (Doron, Stephan, Maiano, & Le Scanff, 2011; Elliot & Church, 1997; Smith, Duda, Allen, & Hall, 2002). On the one hand, approach academic goals entail task involvement and mastery and have been shown to relate to challenge appraisal and efforts to approach stressful task and emotional demands during academic goal pursuit. On the other hand, avoidance goals entail the tendency to avoid academic goal failures and have been shown to relate to efforts to disengage or distract the self from stressful goal demands (Elliot, 1999; Elliot & Harackiewicz, 1996). Future research should focus on testing the potential associations between achievement goal orientations and post-secondary academic coping as conceptualized by the CIAS.

Finally, the CIAS was developed to examine coping in undergraduate university students. The psychometrics and validity of the questionnaire was tested in undergraduate students across a variety of undergraduate programs in both a Canadian and American university. However, the extent to which the CIAS will be applicable in testing the coping responses in graduate students remains to be explored. The CIAS could serve as viable platform to start exploring how graduate students are coping with the academic demands of graduate school. Perhaps, some modifications will need to be made to account for the idiosyncratic nature of graduate school. In comparison to undergraduate students, graduate students are required to take an increasingly independent role in learning with more multi-faceted and frequent evaluations of performance related to research activities, the need to publish, and work in internships and clinical placements. Research has also shown that graduate

students may be more likely to engage in substance abuse as a means to disengage from academic stressors and to seek emotional support from family and spouses (Flaherty & Richman, 1993; Toews et al., 1997). Nonetheless, this question is an empirical one and examining the hierarchical and multidimensional factor structure and correlates of the CIAS with graduate students appears to be a promising line of future research.

Article 2. In this daily diary study, academic coping was assessed using the Brief CIAS which was designed specifically to reduce the burden placed on students associated with multiple assessments of the same constructs across seven days. While the Brief CIAS was developed with the goal to maximize content validity, the breadth of the coping construct is inevitably narrower with the use of brief questionnaires. Advances in planned missing data analyses may offer alternatives to assessing psychological constructs using original long forms of questionnaires maximizing content validity while minimizing participant burden. This includes adopting planned missingness designs and multiple imputation techniques to measure daily constructs (e.g., Graham, Taylor, Olchowski, & Cumsille, 2006). In doing so, multiple forms of the daily questionnaires can be created that each contain a subset of the total items used to measure the proposed constructs of interest. Participants are then randomly assigned to one of the created forms each day. Missing items on each form can then be imputed using the full information maximum likelihood imputation method, previously defined. These designs reduce the fatigue and burden on participants, which in turn may increase the quality and validity of the data (Little & Rhemtulla, 2013).

Moreover, multilevel structural equation structural analyses were performed using manifest rather than latent variables – a justifiable decision in such a complex multilevel models with a relatively small sample size. This approach did not provide a test of the measurement of constructs at the dispositional and state level. Debate in the literature exists regarding the equivalency of the

nature of state and trait psychological constructs and the utility of questionnaires to measure both state and trait constructs (Merz & Roesch, 2011). Future research would benefit from a test of the hierarchical invariance of the factor structure of the CIAS across levels of analyses. These analyses could be used to determine whether the hierarchical organization of CIAS within task-oriented and disengagement-oriented coping is an accurate evaluation of both situational and dispositional post-secondary academic coping. Finally, the test of the multilevel relationships in Article 2 revealed that the perception of threat at the daily level was associated with a generalized utilization of both task- and disengagement-oriented coping. While these relationships were significant, the findings gave no indication of the magnitude of the relationships. Examining the effect size of these relationships would provide additional information about the practical importance of the within- and between-person use of coping during goal pursuit.

Article 3. Methodologically, separate multilevel models were conducted to test the effect of the if-then coping manipulation for each outcome. Using separate multilevel models, fails to control for the multicollinearity between the dependent variables potentially increasing the likelihood of Type I error. Instead, multilevel structural equation modelling is a valuable alternative allowing for the test of the effect of the coping skills manipulation for each outcome simultaneously. Theoretically, the coping manipulation in Article 3 aimed to reduce students' daily experience of stress and negative emotions. Stress and emotions were assessed daily at the end of each day. It has been suggested that individuals may not be able to accurately assess inner states which may in some cases occur unconsciously (Blascovich, 2008; Blascovich et al., 2004; Nisbett & Wilson, 1977). Cardiovascular indicators such as heart rate and cortisol secretions can provide a valuable alternative source of information to evaluate emotions and stress (Blascovich, 2008; Dennis, Buss, & Hastings, 2012). Subsequent research may benefit from incorporating cardiovascular daily indicators of stress and

emotions in combination with self-report measures in order to capture an all encompassing picture of the experience of emotions and stress in university students.

Furthermore, the implementation task-oriented coping intervention tested in Article 3 was only tested over the course of a one week period in the lives of university students. Future work would be valuable to determine whether the implementation of if-then task-oriented coping plans could reduce stress over a longer period, across the semester or even the academic year. A design with weekly instead of daily assessment of emotions and stress would be valuable to determine the utility of the intervention across weeks with varying levels of academic demands, for example mid-term periods. Introducing and testing the potential utility of “booster sessions” strengthening the connection between if-then coping plans and perceived stress and emotions may be worth introducing throughout the academic semester especially during crucial exam periods when the threat toward academic goals and the associated perception of stress and emotions are highest. Additionally, testing long-term performance outcomes such as semester grade-point average and maintenance of a full-time course load across the semester would provide subsequent evidence in support of the cumulative positive effect of the implementation of task-oriented coping efforts on daily studying behaviour. Finally, the findings of the intervention revealed that the effect of the coping implementation was most beneficial for students previously identified as possessing a limited repertoire of coping. Future research should focus on preselecting students based on their baseline coping repertoire in efforts to make the intervention more "cost-effective" by delivering it only to students who are likely to benefit the most from such an intervention

Practical Implications and Conclusions

The overarching goal of the proposed doctoral thesis was an examination of academic coping as a potential factor that can predict post-secondary educational success in undergraduate university students. Currently, research has identified several socio-economic risk factors that can help identify students who are at risk for underperformance and post-secondary dropout. Recently, advances have been made toward identifying psychological factors that predict academic success across all students, but in comparison, the empirical attention allocated to the role of coping in post-secondary educational success has remained limited (Richardson et al., 2012; Robbins et al., 2009). Advances may have been impeded by the lack of a structurally sound and valid questionnaire developed specifically to measure the coping responses of university students. Article 1 in this doctoral thesis focused on the development of the Coping Inventory for Academic Striving (CIAS) which was shown to be a psychometrically sound and valid measure of post-secondary coping across two independent samples of undergraduate students. Moving forward, this questionnaire will be a valuable tool for researchers, universities, and educational psychologists pursuing the development of research and intervention programs focusing on the role of coping to promote the academic success of students.

The overarching results of the research presented in this doctoral thesis supported the role of coping in predicting academic success. The positive relationship between task-oriented coping and academic performance was supported using cross-sectional, daily diary, and experimental methods. Furthermore, both the dispositional and situational use of task-oriented coping was found to positively relate to academic performance. Not only did coping play a role in academic performance, but it was also found to relate to the academic and psychological adjustment of students. Students using task-oriented coping strategies to manage their academic demands reported higher levels of

psychological adjustment in their academic lives including higher levels of satisfaction with school and positive emotions along with reporting lower levels of stress and negative achievement emotions. Together, the findings of this doctoral thesis supported the positive role of task-oriented coping strategies such as mental imagery, planning, thought control, logical analyses, effort, relaxation, and seeking support in both the performance and psychological adjustment of university students.

Turning back to the role of coping in identifying vulnerable students, the proposed research also identified the use of disengagement-oriented coping as a predictor of lower levels of academic performance and academic psychological maladjustment. In particular, disengagement-oriented coping was found to relate to lower academic performance and satisfaction with school and higher levels of stress, negative emotions, and intention to drop out of university. In addition, the research in the proposed doctoral thesis also identified personality and motivational factors of students more likely to turn to disengagement-oriented coping to manage academic stressors. These identified personality traits in particular may prove to be a valuable alternative to identifying vulnerable first year university students upon entrance to the university in comparison to the current academic probation system which only intervenes with struggling students after the first semester has finished. At this point, it may be already too late to reverse the negative impact of a poor first semester academic performance placing financial scholarships at risk and even the potential for meeting grade point cut offs for entrance into specialized undergraduate programs and graduate school. In efforts to intervene with these vulnerable students, our research tested an implementation if-then coping skills intervention which was found to be a useful tool in boosting the studying behaviour and academic psychological adjustment of students identified as having a limited coping repertoire (i.e., low task-oriented coping and high disengagement-oriented coping strategies). This online and cost-effective

coping skills intervention may serve as a platform for introducing a university wide initiative helping first year students adjust to the new demands of post-secondary education. Overall, the research undertaken in the proposed doctoral thesis has both theoretical and practical implications. Going forward, the use of the theoretically developed CIAS in the examination of coping in the post-secondary setting may also facilitate the comparison and synthesis of academic coping research across studies conducted on different campuses across the country. As such, future work is required to translate the CIAS in foreign languages in order to obtain a global perspective on how university students from different countries and cultures are coping with the demands of their post-secondary education.

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APPENDIX A

Article 1: Supplementary File

A1

Table 1

Definition of the actions and cognitions organized within each of the 11 subscales of the Coping Inventory for Academic Striving

Coping strategy	Definition
Planning	Cognitive and behavioural actions used with the purpose of devising a set of steps for completing school work.
Mental imagery	Cognitive actions used to mentally rehearse the execution of academic performance and visualize a positive end result.
Thought control	Cognitive actions used to restructure cognitive beliefs by emphasizing the positive aspects of the current academic situation and past academic performances.
Seeking support	Behavioural actions used to obtain emotional support or advice and feedback concerning questions about schoolwork.
Relaxation	Behavioural and cognitive actions used to reduce the mental tension and stress associated with the academic situation.
Logical analysis	Cognitive actions used to analyze the demands of the academic situation and improve on past performances.
Effort	Behavioural actions used to manage physical and mental resources in order to actively engage in an academic activity.
Social distancing	Behavioural actions used with the purpose to minimize or avoid participation in social interactions for a period of time.
Mental distraction	Cognitive and behavioural actions used with the purpose of diverting attention from an academic situation by focusing on unrelated activities and people.
Disengagement	Cognitive and behavioural actions used with the purpose to avoid engaging in the actions involved in completing the requirements of the academic situation.
Venting	Behavioural actions used to express the negative emotions experienced during the academic situation.

A2

Table 2

Initial fit of the one-factor models and final fit after the deletion of items

	SB χ^2	df	CFI	RMSEA
Planning				
Initial model (6)	41.95	9	.976	.111
Final model (4)	22.25	5	.983	.108
Mental imagery				
Initial model (8)	82.91	20	.971	.103
Final model (7)	56.65	14	.976	.101
Thought control				
Initial model (8)	25.31	20	.996	.03
Final model (7)	20.41	14	.994	.03
Seeking support				
Initial model (8)	106.59	20	.963	.121
Final model (7)	43.74	14	.979	.084
Relaxation				
Initial model (8)	136.76	20	.900	.140
Final model (6)	10.36	9	.998	.022
Logical analysis				
Initial model (8)	44.03	20	.973	.063
Final model (7)	21.56	14	.991	.043
Effort				
Initial model (6)	26.44	9	.979	.081
Final model (5)	12.73	5	.988	.072

	SB χ^2	<i>df</i>	CFI	RMSEA
Disengagement				
Initial model (9)	264.13	27	.763	.172
Final model (6)	9.87	9	.998	.018
Venting				
Initial model (8)	190.91	20	.892	.169
Final model (5)	4.133	5	1.000	.000
Social distancing				
Initial model (8)	111.34	20	.933	.124
Final model (6)	29.76	9	.977	.088
Mental distraction				
Initial model (6)	19.48	9	.986	.062
Final model (5)	15.32	5	.986	.083

A3

Table 3

Final version of the Coping Inventory for Academic Striving.

Each of the following items represents what students may do to deal with the stress associated with the pursuit of an academic goal during midterm exams.

Please rate the extent to which each item corresponds to what you thought about or did while pursuing your academic goal during your preparation for your midterm exams.

Does not correspond at all	Corresponds a little	Corresponds moderately	Corresponds strongly	Corresponds totally
1	2	3	4	5

1. I tried to visualize that I was in total control.
2. I expressed my irritation about school.
3. I followed a schedule.
4. I distanced myself from my peers.
5. I was determined to put a high level of effort in my academic activities.
6. I distracted myself from my school work by thinking about other activities.
7. I eliminated my doubts about my school work by thinking positively.
8. I asked for advice.
9. I attempted to calm myself down.
10. I tried to identify the potential challenges of the situation.
11. I lost all hope of completing my school work.
12. I visualized myself performing well.
13. I voiced my discontent with the academic situation.
14. I created a plan of action for my school work.
15. I avoided having to talk to other students.
16. I gave my best effort.
17. I tried to think about things other than my school work.
18. I replaced my negative thoughts about my school work with positive thoughts.
19. I asked my peers for advice concerning my school work.
20. I tried to reduce the stress I was feeling.
21. I analyzed the situation in order to improve my performance.
22. I became dejected and felt that all efforts exerted in my school work were futile.

23. I mentally rehearsed completing the tasks involved in my academic work.
24. I expressed my displeasure regarding school.
25. I refrained from social interactions with other students.
26. I put effort in my work.
27. I diverted my attention from the academic situation.
28. I tried to interpret the situation in a positive manner.
29. I asked for help to determine how to best accomplish my school work.
30. I used some techniques in an attempt to relax.
31. I analyzed the requirements of my school work.
32. I quit believing in my ability to manage my school work.
33. I visualized myself doing my best academic performance.
34. I expressed my annoyance with my school work.
35. I developed timetable for when I would perform my school work.
36. I kept everyone at a distance.
37. I gave a quality effort.
38. I occupied myself, so I did not have to think about my school work.
39. I maintained a positive focus when thinking about my school work.
40. I tried to seek out advice of knowledgeable people.
41. I tried to manage my nervousness by relaxing.
42. I sought to understand the situation in order to manage my academic work.
43. I let myself feel hopeless and discouraged.
44. I did not talk to other students.

APPENDIX B

The development of the Brief Coping Inventory for Academic Striving (Brief CIAS)

B1: Development of the Brief CIAS

Following the test of the factor structure of the CIAS, a brief version of the CIAS- the Brief Coping Inventory for Academic Striving (Brief CIAS) - was created to facilitate longitudinal research examining changes in academic coping using experience sampling. Experience sampling involves measuring a construct to capture change following different events and/or at specific intervals of time including daily, weekly, and monthly etcetera (Hektner et al., 2007). Multiple assessments of a single construct have been shown to place a burden on participants which often results in high attrition rates and non compliance (Stone et al., 2002). In an attempt to reduce the burden of experience sampling on participants, researchers have used/adapted shorter versions of existing questionnaires to measure constructs (Stone et al., 2002). The Brief CIAS was adapted from the Coping Inventory for Academic Striving (CIAS), the hierarchical and multidimensional measure of academic coping developed in Article 1. This questionnaire measured 11 coping strategies organized within task-oriented coping and disengagement-oriented coping.

The results of Article 1 revealed that the CIAS measures coping instances not captured by the Brief COPE (Carver, 1997), a general coping questionnaire. However, the full CIAS (44 items) includes a substantially higher number of items than the Brief COPE (16 items). Predictive power is contingent on the number of items of a questionnaire, and discrepancies between the number of items may account for the significant findings. Given, in the present research, the convergent and incremental validity was tested using the Brief CIAS (22 items) which includes a comparable number of items as the Brief COPE (16 items).

Methods

Scale Development

The principal investigator and a coping expert participated in the creation of the Brief CIAS. The short form development followed guidelines outlined by Smith and colleagues (2000) to facilitate the development of reliable and valid short form measures. The undergraduate students recruited in Article 1: Study 2 were used in the development, test of the psychometrics, and validity of the Brief CIAS. The Brief CIAS was created by examining the standardized factor loadings from the final first-order confirmatory factor analyses from Article 1: Study 2. Two items per coping strategy were selected considering simultaneously both the content validity of the items- tapping the breadth of the conceptualization of each strategy- and the item consistency indicated by strong factor loadings. The Brief CIAS included 22 items measuring 11 coping strategies organized within task-oriented coping and disengagement-oriented coping dimensions. The first-order factor structure of the task-oriented and disengagement-oriented coping dimensions were tested using confirmatory factor analyses. The models were interpreted using the same standards as Article 1.

Results

Psychometrics of the Brief CIAS

The first-order factor structure of the task-oriented coping items and disengagement-oriented coping items were tested separately. The fit of the model testing the seven task-oriented coping strategies organizing 14 coping instances was a good fit to the data ($\chi^2 = 109.63$, $SB\chi^2 = 98.63$, $df = 56$, $p < .001$, $CFI = .987$, $NNFI = .978$, $RMSEA = .043$). All items were good indicators of their associated subscale as evidenced by significant and strong standardized loadings with explained variance (R^2). Similarly, the fit of the model testing the four disengagement-oriented coping

strategies organizing 8 coping instances was also a good fit to the data ($\chi^2 = 25.68$, $SB\chi^2 = 20.90$, $df = 14$, $p = .11$, $CFI = .995$, $NNFI = .989$, $RMSEA = .034$). All items were good indicators of their associated subscale as evidenced by significant and strong standardized loadings with explained variance (R^2). The alpha of Cronbach for each subscale was acceptable and was as follows: planning ($\alpha = .80$); mental imagery ($\alpha = .88$); thought control ($\alpha = .84$); seeking support ($\alpha = .90$); relaxation ($\alpha = .84$); logical analysis ($\alpha = .80$); effort ($\alpha = .88$); disengagement ($\alpha = .82$); venting ($\alpha = .93$); mental distraction ($\alpha = .78$); social distancing ($\alpha = .85$).

Convergent validity. The convergent validity of the CIAS was again tested using Bivariate Pearson correlations, in a sample of 108 students, see Table 1. The task-oriented subscales and disengagement-oriented subscales of the Brief CIAS were significantly and moderately related to the task-oriented subscales and disengagement-oriented subscales of the Brief COPE (Carver, 1997).

Incremental Validity. The Brief CIAS task-oriented coping dimension ($\beta = .42$, $p < .05$) and disengagement-oriented coping dimension ($\beta = -.24$, $p > .05$) were significant predictors accounting for 12% of the variance in positive affect after controlling for the Brief COPE (Carver, 1997). The results also revealed that disengagement-oriented coping ($\beta = .38$, $p < .01$) and task-oriented coping ($\beta = -.22$, $p < .05$) were significant predictors of negative affect while accounting for 10% of the variance in negative affect after controlling for the Brief COPE. The second set of analyses tested whether the Brief COPE could account for a significant portion of variance in positive affect and negative affect after controlling for coping as measured by Brief CIAS. The results revealed that the task-oriented ($\beta = .07$, $p > .05$) and disengagement-oriented coping ($\beta = -.03$, $p > .05$) dimensions as measured by the Brief COPE (Carver, 1997) were not significant predictors of positive affect after controlling for the Brief CIAS task and disengagement-oriented dimensions. Similarly, task ($\beta = -.05$, $p > .05$) and disengagement-oriented dimensions ($\beta = .16$, $p > .05$) of the Brief COPE were not

significant predictors of negative affect after controlling for the Brief CIAS coping dimensions. The results can be found in Table 2.

Conclusions

Tests of the psychometrics revealed that the Brief CIAS was a good measure of the 11 proposed coping strategies organized within task-oriented and disengagement-oriented coping dimensions. The pattern, direction and magnitude of the relationships between the Brief CIAS coping strategies and the Brief COPE strategies was consistent with the results of the convergent validity tested with the full CIAS. Again, the Brief CIAS predicted positive and negative affect over and above the Brief COPE. These results provide additional evidence that the newly developed conceptualization of academic coping measures unique cognitive and behavioural coping instances after controlling for potential methodological bias resulting from the number of items. Together, these results suggests the Brief CIAS is a psychometrically sound and valid measure of academic coping. The Brief CIAS was used in Article 2 and 3 to measure daily assessments of coping with academic goal pursuit.

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B2

Table 1

Relationship between the Brief CIAS subscales and the Brief COPE subscales

Brief CIAS coping strategies	Brief COPE subscales							
	Active	Planning	Acceptance	Seeking support	Behavioural disengagement	Mental disengagement	Denial	Blame
Planning	.44**	.61**	.33**	.16	-.06	-.18	.01	.01
Mental imagery	.33**	.36**	.34**	.25*	-.03	.11	.14	-.05
Thought control	.42**	.45**	.37**	.10	-.19*	-.06	-.10	-.05
Seeking support	.41**	.28*	.27*	.78**	.15	.03	.25*	.15
Relaxation	.38**	.40**	.35**	.29*	-.10	.09	.01	.07
Logical analysis	.64**	.63**	.49**	.23*	-.13	-.02	-.11	.12
Effort	.71**	.66**	.44**	.16	-.18	-.27	-.04	.03
Disengagement	-.07	-.19*	.08	.26**	.64**	.36**	.57**	.49**
Venting	-.06	-.17	.09	.33**	.26*	.37**	.32**	.40**
Social distancing	.11	.10	.28*	.18	.29*	-.03	.24*	.33*
Mental distraction	-.22*	-.21*	.13	.08	.41**	0.74**	0.40**	0.41**

* $p < .05$, ** $p < .01$

B3

Table 2

Test of the incremental validity of the Brief CIAS with the Brief COPE

	Positive Affect	Negative Affect	Step 2	Positive Affect	Negative Affect
Step 1	R2 = .12	R2 = .21		R2 = .25	R2 = .27
	F(2,105) = 8.07*	F(2,105) = 15.41**		F (2,105) = 18.97**	F (2,105) = 21.04**
Brief COPE TOC	$\beta = .27^{**}$	$\beta = -.29^{*}$	Brief CIAS TOC	$\beta = .44^{**}$	$\beta = -.22^{*}$
Brief COPE DOC	$\beta = -.28^{**}$	$\beta = .46^{**}$	Brief CIAS DOC	$\beta = -.30^{**}$	$\beta = .53^{**}$
Step 2	R2 = .24	R2 = .31	Step 2	R2 = .24	R2 = .30
	F(4,103) = 9.59**	F(4,103) = 12.56**		F (4,103) = 9.59**	F (4,103) = 12.56**
Brief COPE TOC	$\beta = .07$	$\beta = -.05$	Brief CIAS TOC	$\beta = .42^{**}$	$\beta = -.22^{*}$
Brief COPE DOC	$\beta = -.03$	$\beta = .16$	Brief CIAS DOC	$\beta = -.24^{*}$	$\beta = .38^{**}$
Brief CIAS TOC	$\beta = .42^{**}$	$\beta = -.22^{*}$	Brief COPE TOC	$\beta = .07$	$\beta = -.05$
Brief CIAS DOC	$\beta = -.24^{*}$	$\beta = .38^{**}$	Brief COPE DOC	$\beta = -.03$	$\beta = .16$

Note. TOC = task coping DOC= disengagement coping

* $p < .05$, ** $p < .01$

B4

Table 3

Final version Brief CIAS

Each of the following items represents what students may do to deal with the stress associated with the pursuit of your academic goal.

Please rate the extent to which each item corresponds to what you thought about or did while pursuing your academic goal today.

Does not correspond at all	Corresponds a little	Corresponds moderately	Corresponds strongly	Corresponds totally
1	2	3	4	5

-
1. I visualized myself doing my best academic performance.
 2. I expressed my displeasure regarding school.
 3. I created a plan of action for my school work.
 4. I refrained from social interactions with other students.
 5. I put effort in my work.
 6. I diverted my attention from the academic situation.
 7. I eliminated my doubts about my school work by thinking positively.
 8. I asked for help to determine how to best accomplish my school work.
 9. I tried to manage my nervousness by relaxing.
 10. I sought to understand the situation in order to manage my academic work.
 11. I quit believing in my ability to manage my school work.
 12. I tried to picture myself successfully completing my school work.
 13. I expressed my annoyance with my school work.
 14. I tried to manage my time.
 15. I kept everyone at a distance.
 16. I gave a quality effort.
 17. I occupied myself, so I did not have to think about my school work.
 18. I tried to interpret the situation in a positive manner.
 19. I tried to seek out advice of knowledgeable people.
 20. I used some techniques in an attempt to relax.
 21. I attempted to identify the demands of my school work.
 22. I let myself feel hopeless and discouraged.
-

APPENDIX C

Questionnaires used in Article 1

C1: Questionnaires used in Article1: Study 1

Demographic information (Time 1)

- 1.1 Please indicate your sex. Male Female
- 1.2 What is your native language? English French Spanish Other
- 1.3 What is your age? _____.
- 1.4 What is the level of your academic training?
Freshmen (1st year); Sophomore (2nd year); Junior (3rd year); Senior (4th year)
- 1.5 In what academic program are you mainly enrolled? _____.
- 1.6 What is your grade point average from high school _____.
- 1.7 What level of academic performance best describes your current grade point average?

A+ (90-100%)	A (85-89%)	A- (80-84%)	B+ (75-79%)	B (70-74%)	C+ (66-69%)	C (60-65%)	D (50-54%)	F (0-49%)
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- 1.8 How do you describe yourself in terms of your ethnic group.
(PLEASE CHECK “✓” **ALL** THAT APPLY)

- ☐ Aboriginal/Native
- ☐ Caucasian (white)
- ☐ Afro-American (black)
- ☐ Asian
- ☐ Hispanic (Latino)
- ☐ Other ethnic or cultural group(s), please specify: _____

Academic goal (Time 1)

Please think of the **academic goals** that you have been pursuing since the start of the fall semester. A goal is something that people think about, plan for, carry out, and sometimes (though not always) complete or succeed at.

Please think of **one academic goal that is most important to you that you have already been pursuing since the start of the semester that you will continue to pursue over the course over the fall academic semester.** This goal should be something that you could realistically attain over the next three months. Write this goal in the following box. Your goal should be written in a specific and concise manner.

Goal Confidence

On a scale from 0 (not at all) to 100 (totally), how confident do you feel that you will successfully attain your academic goal?

Goal commitment

On a scale from 0 (not at all) to 100 (totally), to what extent do you feel invested / committed to this academic goal?

Goal investment

On a scale from 0 (not at all) to 100 (totally), to what extent do you feel that your academic goal is a priority in you life at the current time?

Note. Hereafter, the order of the presentation of the questionnaires is counterbalanced meaning that not all people will complete questionnaires in the same order.

Coping Inventory for Academic Striving (Time 1: Initial pool of items)

Each of the following items represents what students may do to deal with the stress associated with the pursuit of an academic goal during midterm exams.

Please rate the extent to which each item corresponds to what you thought about or did while **pursuing your academic goal** during your preparation for your midterm exams.

<i>Does not correspond at all</i>	<i>Corresponds a little</i>	<i>Corresponds moderately</i>	<i>Corresponds strongly</i>	<i>Corresponds totally</i>
1	2	3	4	5

1. I abandoned the belief that I would succeed in my school work.
2. I formulated a strategy to manage my school work.
3. I tried to visualize that I was in total control.
4. I used swear-words loudly or in my head to release my anger.
5. I distanced myself from my peers.
6. I committed myself to maintaining a consistent effort in my school work.
7. I tried to keep my mind occupied.
8. I eliminated my doubts about my school work by thinking positively.
9. I asked for advice.
10. I tried to relax my mind.
11. I reanalyzed the results of my last academic assignments.
12. I gave up on my school work.
13. I followed a schedule.
14. I visualized that I was completely able to manage my school work.
15. I expressed my irritation about school.
16. I spent some time apart from other students.
17. I was determined to put a high level of effort in my academic activities.
18. I distracted myself from my school work by thinking about other activities.
19. I tried to see the positive side of my past academic performances.
20. I asked my peers for advice concerning my school work.
21. I tried to manage the stress I was feeling.
22. I tried to identify the potential challenges of the situation.
23. I lost all hope of completing my school work.
24. I made a schedule to organize my school work.
25. I mentally rehearsed having attained success in my current academic endeavours.
26. I became angry at the situations that I encountered in my school work.
27. I avoided having to talk to other students.
28. I gave my best effort.
29. I tried to think about things other than my school work.
30. I replaced my negative thoughts about my school work with positive thoughts.
31. I asked a competent student for help.
32. I tried to manage my nervousness by relaxing.

33. I analyzed the demands of my school work.
34. I let myself feel hopeless and discouraged.
35. I created a plan of action for my school work.
36. I visualized myself performing well.
37. I became upset with my school work.
38. I spent time alone.
39. I provided a relentless effort.
40. I diverted my attention from the academic situation.
41. I tried to keep a positive perspective when thinking about my school work.
42. I talked to a trustworthy person.
43. I attempted to calm myself down.
44. I tried to develop a clear understanding of the requirements of the situation.
45. I wished that I could simply avoid studying.
46. I developed timetable for when I would perform my school work.
47. I visualized achieving my best academic performance.
48. I voiced my discontent with the academic situation.
49. I refrained from social interactions with other students.
50. I put effort in my work.
51. I thought about my other activities to distract my mind from my academic work.
52. I reframed my concerns about my academic work in a constructive manner.
53. I asked for help to determine how to best accomplish my school work.
54. I tried to reduce the stress I was feeling.
55. I analyzed the situation in order to improve my performance.
56. I became dejected and felt that all efforts exerted in my school work were futile.
57. I planned out the time when I would work on my school work.
58. I mentally rehearsed completing the tasks involved in my academic work.
59. I used swear-words in my head in an attempt to express my frustrations.
60. I kept everyone at a distance.
61. I gave a quality effort.
62. I occupied myself, so I did not have to think about my school work.
63. I attempted to replace my doubts about my school work with constructive thoughts.
64. I tried to seek out advice of knowledgeable people.
65. I tried to keep my stress under control with some relaxation exercises.
66. I examined the situation in detail in order to improve on my last academic performance.
67. I quit working on my school work.
68. I created mental images of myself being successful in my school work.
69. I expressed my displeasure regarding school.
70. I did not talk to other students.
71. I tried to interpret the situation in a positive manner.
72. I sought out help from another student.
73. I attempted to unwind.
74. I analyzed the requirements of my school work.
75. I wished that I could stop doing school work.
76. I visualized myself doing my best academic performance.
77. I expressed my annoyance with my school work.

- 78. I refrained from having conversations with others.
- 79. I maintained a positive focus when thinking about my school work.
- 80. I spoke with someone in an attempt to motivate myself towards my school work.
- 81. I used some techniques in an attempt to relax.
- 82. I sought to understand the situation in order to manage my academic work.
- 83. I quit believing in my ability to manage my school work.

Perceived stress (Time 1 & Time 2)

Perceived Stress scale (Cohen et al., 1983)

We would like to know your thoughts and feelings during the last week. In each case, please indicate how often you felt or thought a certain way during the last week.

<i>Never</i>	<i>Almost never</i>	<i>Sometimes</i>	<i>Fairly often</i>	<i>Very often</i>
1	2	3	4	5

During the last week, how often...

1. ... have you been upset because of something that happened unexpectedly?
2. ... have you felt that you were unable to control the important things in your life?
3. ... have you felt nervous and stressed?
4. ... have you felt confident about your ability to handle personal problems or challenges?
5. ... have you felt that things were going your way?
6. ... have you found that you could not cope with all the things that you had to do?
7. ... have you been able to control irritations in your life?
8. ... have you felt that you were on top on things?
9. ... have you been angered because of things that were outside of your control?
10. ... have you felt difficulties were piling up so high that you could not overcome them?

Positive and Negative Affect (Time 2)

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

This scale consists of a number of words that describe different feelings and emotions that you may have experienced recently. For each item indicate to what extent you felt this way **over the past few days.**

<i>Does not correspond at all</i>	<i>Corresponds very slightly</i>	<i>Corresponds slightly</i>	<i>Corresponds moderately</i>	<i>Corresponds strongly</i>
1	2	3	4	5
1. Interested				
2. Distressed				
3. Excited				
4. Upset				
5. Strong				
6. Guilty				
7. Scared				
8. Hostile				
9. Enthusiastic				
10. Proud				
11. Irritable				
12. Alert				
13. Ashamed				
14. Inspired				
15. Nervous				
16. Determined				
17. Attentive				
18. Jittery				
19. Active				
20. Afraid				

Coping (Time 2)

The Brief COPE (Carver, 1997)

Each of the following items represents things that students can do when they are dealing with the stress and challenge associated with the preparation and studying of university exams.

Please indicate the extent to which each item corresponds to what YOU DID BEFORE AND DURING THE MID-TERM EXAMS PERIOD.

<i>Does not correspond at all</i>	<i>Corresponds a little</i>	<i>Corresponds moderately</i>	<i>Corresponds strongly</i>	<i>Corresponds totally</i>
1	2	3	4	5

1. I turned to other activities to distract myself.
2. I concentrated my efforts on doing something about the exams.
3. I said to myself "this isn't real".
4. I tried to get emotional support from others.
5. I just gave up trying to reach my goal.
6. I got upset and let my emotions out.
7. I tried to get advice from someone about what to do.
8. I tried to see things in a different light to make it seem more positive.
9. I tried to come up with a strategy about what to do.
10. I focused on dealing with the exams by letting other activities slide a little.
11. I committed myself by giving my best effort.
12. I took my distance from other people.
13. I tried to accept the reality of the fact that the situation was happening.
14. I tried to relax my body and my mind.
15. I criticized myself.
16. I did something to distract myself, such as going to movies, watching television, reading, daydreaming, sleeping, shopping.
17. I took additional action to deal with the exams.
18. I refused to believe that the situation was happening.
19. I tried to get comfort and understanding from someone.
20. I gave up the attempt to get what I wanted.
21. I expressed my negative feelings.
22. I talked to someone to find out more about how to deal with the exams.
23. I looked for something good in what was happening.
24. I thought hard about what steps to take to deal with the situation.
25. I putted aside other activities in order to concentrate on the exams.
26. I gave a relentless effort.
27. I kept other people at a distance.
28. I tried to learn to live with the reality of the exam period.
29. I tried to relax as much as possible.
30. I blamed myself for things that were happening.

Coping Inventory for Academic Striving (Time 2: Final questionnaire)

Each of the following items represents what students may do to deal with the stress associated with the pursuit of an academic goal during midterm exams.

Please rate the extent to which each item corresponds to what you thought about or did while **pursuing your academic goal** during your preparation for your midterm exams.

<i>Does not correspond at all</i>	<i>Corresponds a little</i>	<i>Corresponds moderately</i>	<i>Corresponds strongly</i>	<i>Corresponds totally</i>
1	2	3	4	5

1. I tried to visualize that I was in total control.
2. I expressed my irritation about school.
3. I followed a schedule.
4. I distanced myself from my peers.
5. I was determined to put a high level of effort in my academic activities.
6. I distracted myself from my school work by thinking about other activities.
7. I eliminated my doubts about my school work by thinking positively.
8. I asked for advice.
9. I attempted to calm myself down.
10. I tried to identify the potential challenges of the situation.
11. I lost all hope of completing my school work.
12. I visualized myself performing well.
13. I voiced my discontent with the academic situation.
14. I created a plan of action for my school work.
15. I avoided having to talk to other students.
16. I gave my best effort.
17. I tried to think about things other than my school work.
18. I replaced my negative thoughts about my school work with positive thoughts.
19. I asked my peers for advice concerning my school work.
20. I tried to reduce the stress I was feeling.
21. I analyzed the situation in order to improve my performance.
22. I became dejected and felt that all efforts exerted in my school work were futile.
23. I mentally rehearsed completing the tasks involved in my academic work.
24. I expressed my displeasure regarding school.
25. I refrained from social interactions with other students.
26. I put effort in my work.
27. I diverted my attention from the academic situation.
28. I tried to interpret the situation in a positive manner.
29. I asked for help to determine how to best accomplish my school work.
30. I used some techniques in an attempt to relax.
31. I analyzed the requirements of my school work.

- 32. I quit believing in my ability to manage my school work.
- 33. I visualized myself doing my best academic performance.
- 34. I expressed my annoyance with my school work.
- 35. I developed timetable for when I would perform my school work.
- 36. I kept everyone at a distance.
- 37. I gave a quality effort.
- 38. I occupied myself, so I did not have to think about my school work.
- 39. I maintained a positive focus when thinking about my school work.
- 40. I tried to seek out advice of knowledgeable people.
- 41. I tried to manage my nervousness by relaxing.
- 42. I sought to understand the situation in order to manage my academic work.
- 43. I let myself feel hopeless and discouraged.
- 44. I did not talk to other students.

C2: Questionnaires used in Article1: Study 2

Demographic information (Time 1)

- 1.1 Please indicate your sex. Male Female
- 1.2 What is your native language? English French Spanish Other
- 1.3 What is your age? _____.
- 1.4 What is the level of your academic training?
Freshmen (1st year); Sophomore (2nd year); Junior (3rd year); Senior (4th year)
- 1.5 In what academic program are you mainly enrolled? _____.
- 1.6 What is your grade point average from high school _____.
- 1.7 What level of academic performance best describes your current grade point average?

A+ (90-100%)	A (85-89%)	A- (80-84%)	B+ (75-79%)	B (70-74%)	C+ (66-69%)	C (60-65%)	D (50-54%)	F (0-49%)
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- 1.8 How do you describe yourself in terms of your ethnic group.
(PLEASE CHECK “✓” **ALL** THAT APPLY)

- ☐ Aboriginal/Native
- ☐ Caucasian (white)
- ☐ Afro-American (black)
- ☐ Asian
- ☐ Hispanic (Latino)
- ☐ Other ethnic or cultural group(s), please specify:_____

Academic goal (Time 1)

Please think of the **academic goals** that you have been pursuing since the start of the fall semester. A goal is something that people think about, plan for, carry out, and sometimes (though not always) complete or succeed at.

Please think of **one academic goal that is most important to you that you have already been pursuing since the start of the semester that you will continue to pursue over the course over the fall academic semester.** This goal should be something that you could realistically attain over the next three months. Write this goal in the following box. Your goal should be written in a specific and concise manner.

Goal Confidence

On a scale from 0 (not at all) to 100 (totally), how confident do you feel that you will successfully attain your academic goal?

Goal commitment

On a scale from 0 (not at all) to 100 (totally), to what extent do you feel invested / committed to this academic goal?

Goal investment

On a scale from 0 (not at all) to 100 (totally), to what extent do you feel that your academic goal is a priority in your life at the current time?

Note. Hereafter, the order of the presentation of the questionnaires is counterbalanced meaning that not all people will complete questionnaires in the same order.

Perceived stress (Time 1)

Perceived Stress scale (Cohen et al., 1983)

We would like to know your thoughts and feelings during the last week. In each case, please indicate how often you felt or thought a certain way during the last week.

<i>Never</i>	<i>Almost never</i>	<i>Sometimes</i>	<i>Fairly often</i>	<i>Very often</i>
1	2	3	4	5

During the last week, how often...

1. ... have you been upset because of something that happened unexpectedly?
2. ... have you felt that you were unable to control the important things in your life?
3. ... have you felt nervous and stressed?
4. ... have you felt confident about your ability to handle personal problems or challenges?
5. ... have you felt that things were going your way?
6. ... have you found that you could not cope with all the things that you had to do?
7. ... have you been able to control irritations in your life?
8. ... have you felt that you were on top on things?
9. ... have you been angered because of things that were outside of your control?
10. ... have you felt difficulties were piling up so high that you could not overcome them?

Coping Inventory for Academic Striving (Time 1 & Time 2)

Each of the following items represents what students may do to deal with the stress associated with the pursuit of an academic goal during midterm exams.

Please rate the extent to which each item corresponds to what you thought about or did while **pursuing your academic goal** during your preparation for your midterm exams.

<i>Does not correspond at all</i>	<i>Corresponds a little</i>	<i>Corresponds moderately</i>	<i>Corresponds strongly</i>	<i>Corresponds totally</i>
1	2	3	4	5

1. I tried to visualize that I was in total control.
2. I expressed my irritation about school.
3. I followed a schedule.
4. I distanced myself from my peers.
5. I was determined to put a high level of effort in my academic activities.
6. I distracted myself from my school work by thinking about other activities.
7. I eliminated my doubts about my school work by thinking positively.
8. I asked for advice.
9. I attempted to calm myself down.
10. I tried to identify the potential challenges of the situation.
11. I lost all hope of completing my school work.
12. I visualized myself performing well.
13. I voiced my discontent with the academic situation.
14. I created a plan of action for my school work.
15. I avoided having to talk to other students.
16. I gave my best effort.
17. I tried to think about things other than my school work.
18. I replaced my negative thoughts about my school work with positive thoughts.
19. I asked my peers for advice concerning my school work.
20. I tried to reduce the stress I was feeling.
21. I analyzed the situation in order to improve my performance.
22. I became dejected and felt that all efforts exerted in my school work were futile.
23. I mentally rehearsed completing the tasks involved in my academic work.
24. I expressed my displeasure regarding school.
25. I refrained from social interactions with other students.
26. I put effort in my work.
27. I diverted my attention from the academic situation.
28. I tried to interpret the situation in a positive manner.
29. I asked for help to determine how to best accomplish my school work.
30. I used some techniques in an attempt to relax.
31. I analyzed the requirements of my school work.
32. I quit believing in my ability to manage my school work.
33. I visualized myself doing my best academic performance.
34. I expressed my annoyance with my school work.

- 35. I developed timetable for when I would perform my school work.
- 36. I kept everyone at a distance.
- 37. I gave a quality effort.
- 38. I occupied myself, so I did not have to think about my school work.
- 39. I maintained a positive focus when thinking about my school work.
- 40. I tried to seek out advice of knowledgeable people.
- 41. I tried to manage my nervousness by relaxing.
- 42. I sought to understand the situation in order to manage my academic work.
- 43. I let myself feel hopeless and discouraged.
- 44. I did not talk to other students.

The Five-Factor model of Personality (Time 1)

Personality Inventory (Gosling et al., 2003)

For each item, indicate to what extent it represents how you are in general in your life.

<i>Does not Correspond at all</i>	<i>Corresponds very slightly</i>	<i>Corresponds slightly</i>	<i>Corresponds moderately</i>	<i>Corresponds strongly</i>
1	2	3	4	5

1. Extroverted – sociable
2. Critical – quarrelsome
3. Dependable - self-disciplined
4. Anxious – easily upset
5. Open to new experience – complex
6. Reserved – quiet
7. Sympathetic – warm
8. Disorganized – careless
9. Calm – emotionally stable
10. Conventional - uncreative

Dispositional Optimism and Pessimism (Time 1)

The Life Orientation Test (Scheier & Carver, 1985)

Listed below are 8 statements concerning personal characteristics and traits. Please read each item and rate the extent to which you agree.

<i>Not at all agree</i>	<i>Very slightly agree</i>	<i>Slightly agree</i>	<i>Moderately agree</i>	<i>Strongly agree</i>	<i>Very strongly agree</i>	<i>Totally agree</i>
1	2	3	4	5	6	7

1. In uncertain times, I usually expect the best.
2. If something can go wrong for me, it will.
3. I always look on the bright side of things.
4. I hardly ever expect things to go my way.
5. I am always optimistic about my future.
6. Things never work out the way I want them to.
7. I am a believer in the idea that “every cloud has a silver lining”
8. I rarely count on good happening to me.

Challenge appraisal (Time 1)

Flow State Scale-2 (Jackson & Eklund, 2002)

In response to the academic goal that you set, please indicate the extent to which you agree with the following statements.

<i>Strongly Disagree</i>	<i>Disagree</i>	<i>Neither Agree or Disagree</i>	<i>Agree</i>	<i>Strongly Agree</i>
1	2	3	4	5

1. I feel challenged, but I believe my skills will allow me to meet the challenge.
2. My abilities match the high challenge of the situation.
3. I feel that I am competent to meet the high demands of the situation.
4. The challenge and my skills are at an equally high level.

Test Anxiety & Fear of failure (Time 1)

Test Anxiety subscale from the Motivated Strategies for Learning Questionnaire Manual (Pintrich et al., 1993)

We would like to know what thoughts about school you've had **during the past few days**. Think about how you spend each day and night and then think about how you were feeling about your life in college.

Part 1

<i>Not at all agree</i>	<i>Very slightly agree</i>	<i>Slightly agree</i>	<i>Moderately agree</i>	<i>Strongly agree</i>	<i>Very strongly agree</i>	<i>Totally agree</i>
1	2	3	4	5	6	7

1. When I take a test I think about how poorly I am doing compared with other students.
2. When I take a test I think about items on other parts of the test I can't answer.
3. When I take tests I think of the consequences of failing.
4. I have an uneasy, upset feeling when I take an exam.
5. I feel my heart beating fast when I take an exam.

Part 2

Performance Failure Appraisal Inventory (Conroy, 2001)

Instructions: Circle the appropriate number corresponding to the one phrase that best represents the extent to which you agree with the item. If any of the items concern something that is not part of your experience, answer on the basis of how you think you might feel *if you had* such an experience. Otherwise, answer all items on the basis of your own experience.

-2	-1	0	1	2
Do not believe		Believe 50%		Believe 100%
at all		of the time		of the time

1. When I am failing, I am afraid that I might not have enough talent.
2. When I am failing, it upsets my “plan” for the future.
3. When I am not succeeding, people are less interested in me.
4. When I am failing, important others are disappointed.
5. When I am failing, I worry about what others think about me.

Perceived situational and emotional control (Time1)

Perceived situational and emotional control (Kowalski et al., 2005)

Regarding the pursuit of your academic goal, please indicate the extent that you agree with each of the following statements.

<i>Not at all agree</i>	<i>Agree slightly</i>	<i>Moderately agree</i>	<i>Strongly agree</i>	<i>Totally agree</i>
1	2	3	4	5

1. If I want to, I can change the situation.
2. If I want to, I can control my emotions.
3. No matter how hard I try, I can not change the situation.
4. No matter how hard I try, I can not control my emotions.
5. I can control my emotions.
6. I can change the situation if I decide to.

Self-efficacy (Time 1)

Academic efficacy subscale from the Patterns of Adaptive Learning Scales (Midgley et al., 2000)

Each of the following items represents feelings that you could have about life at the university.

<i>Does not correspond at all</i>	<i>Corresponds very slightly</i>	<i>Corresponds slightly</i>	<i>Corresponds moderately</i>	<i>Corresponds strongly</i>	<i>Corresponds very strongly</i>	<i>Corresponds totally</i>
1	2	3	4	5	6	7

1. I am certain I can master the materials taught in my classes this semester.
2. I am certain I can figure out how to learn the most difficult material in my classes.
3. I can do almost all the work in my classes if I don't give up
4. Even if the material is hard, I can learn it
5. I can do even the hardest work in my classes if I try.

Academic Satisfaction (Time 1& Time 2)

School satisfaction subscale of the Multidimensional Students' Life Satisfaction Scale (Huebner et al., 1998)

We would like to know what thoughts about school you've had **during the past few days.** Think about how you spend each day and night and then think about how you were feeling about your life in college.

<i>Not at all agree</i>	<i>Very slightly agree</i>	<i>Slightly agree</i>	<i>Moderately agree</i>	<i>Strongly agree</i>	<i>Very strongly agree</i>	<i>Totally agree</i>
1	2	3	4	5	6	7

1. I look forward to going to school
2. I like being in school
3. School is interesting
4. I wish I didn't have to go to school
5. There are many things about school I don't like
6. I enjoy school activities
7. I learn a lot at school
8. I feel bad at school

Self-concordance (Time 1)

Please rate the extent to which you are pursuing the academic goal you specified above for the following reasons using the rating scale below.

<i>Not at all for this reason</i>			<i>Somewhat for this reason</i>			<i>Totally because of this reason</i>		
1	2	3	4	5	6	7	8	9

I AM PURSUING MY ACADEMIC GOAL BECAUSE...

1. Somebody else is putting pressure on me; I will get something from somebody if I do.
2. I would feel ashamed, guilty or anxious if I didn't; I feel obligated to have this goal.
3. Because I am valuing this goal wholeheartedly; It is important for my personal development.
4. Because of the fun and enjoyment that this goal provides me; simply for the interest in the experience itself.

Positive and Negative Affect (Time 1 & Time 2)

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

This scale consists of a number of words that describe different feelings and emotions that you may have experienced recently. For each item indicate to what extent you felt this way **over the past few days.**

<i>Does not correspond at all</i>	<i>Corresponds very slightly</i>	<i>Corresponds slightly</i>	<i>Corresponds moderately</i>	<i>Corresponds strongly</i>
1	2	3	4	5
1. Interested				
2. Distressed				
3. Excited				
4. Upset				
5. Strong				
6. Guilty				
7. Scared				
8. Hostile				
9. Enthusiastic				
10. Proud				
11. Irritable				
12. Alert				
13. Ashamed				
14. Inspired				
15. Nervous				
16. Determined				
17. Attentive				
18. Jittery				
19. Active				
20. Afraid				

Social Desirability responding (Time 1)

The Marlowe-Crowne 2(10) Social Desirability Scale (Strahan & Gerbasi, 1972)

Listed below are a number of statements concerning personal attitudes and traits. Read each item and decide whether the statement is true or false as it pertains to you personally.

1. I never hesitate to go out of my way to help someone in trouble. (T)
2. I have never intensely disliked anyone. (T)
3. There have been times when I was quite jealous of the good fortune of others. (F)
4. I would never think of letting someone else be punished for my wrong doings. (T)
5. I sometimes feel resentful when I don't get my way. (F)
6. There have been times when I felt like rebelling against people in authority even though I knew they were right. (F)
7. I am always courteous, even to people who are disagreeable. (T)
8. When I don't know something I don't at all mind admitting it. (T)
9. I can remember "playing sick" to get out of something. (F)
10. I am sometimes irritated by people who ask favors of me. (F)

Dropout Intention (Time2)

Please indicate the extent to which each items corresponds to your current feelings about your life at school.

<i>Not at all agree</i>	<i>Very slightly agree</i>	<i>Slightly agree</i>	<i>Moderately agree</i>	<i>Strongly agree</i>	<i>Very strongly agree</i>	<i>Totally agree</i>
1	2	3	4	5	6	7

1. I consider dropping out of university.
2. I intend to drop out of university.
3. I think that I would be happier by quitting the university.
4. My plan is to change program.
5. I seriously think about getting into another program.

Goal progress (Time 1 & Time 2)

Goal progress (Dugas et al., 2012)

Using the rating scale below, please indicate the extent to which you made progress on your academic goals since the start of the semester.

<i>Not at all</i>	<i>Very slightly</i>		<i>Slightly</i>	<i>Moderate ly</i>	<i>Strongly</i>	<i>Very strongly</i>		<i>Totally</i>
1	2	3	4	5	6	7	8	9

Please rate the extent to which...

- 1 ...you have progressed on your academic goal
- 2 ...you have moved forward in the pursuit of your academic goal
- 3 ...you have come closer to reaching your academic goal
- 4 ...you have made progress toward the realization of your academic goal
- 5 ...you have advanced toward your academic goal

APPENDIX D

Questionnaires used in Article 2

D1. Baseline Questionnaires

Demographic information (Baseline)

- 1.1 Please indicate your sex. Male Female
- 1.2 What is your native language? English French Spanish Other
- 1.3 What is your age? _____.
- 1.4 What is the level of your academic training?
Freshmen (1st year); Sophomore (2nd year); Junior (3rd year); Senior (4th year)
- 1.5 In what academic program are you mainly enrolled? _____.
- 1.6 What is your grade point average from high school _____.
- 1.7 What level of academic performance best describes your current grade point average?

A+ (90-100%)	A (85-89%)	A- (80-84%)	B+ (75-79%)	B (70-74%)	C+ (66-69%)	C (60-65%)	D (50-54%)	F (0-49%)
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- 1.8 How do you describe yourself in terms of your ethnic group.
(PLEASE CHECK “✓” **ALL** THAT APPLY)

- ☐ Aboriginal/Native
- ☐ Caucasian (white)
- ☐ Afro-American (black)
- ☐ Asian
- ☐ Hispanic (Latino)
- ☐ Other ethnic or cultural group(s), please specify:_____

Academic goal (Baseline).

A goal is something that people think about, plan for, carry out, and sometimes (though not always) complete or succeed at.

Please think of **one academic goal that is most important to you that you** would like to pursue EACH DAY OVER THE COURSE OF THE NEXT SIX DAYS. This goal should be something that you could realistically attain over the next three months. Write this goal in the following box. Your goal should be written in a specific and concise manner.

--

Note. Hereafter, the order of the presentation of the questionnaires is counterbalanced meaning that not all people will complete questionnaires in the same order.

D2. Daily Questionnaires

Challenge appraisal (Daily)

Flow State Scale-2 (Jackson & Eklund, 2002)

In relation to the academic goal that you set, please indicate the extent to which the following statements are consistent with how you have been feeling today.

<i>Not at all</i>	<i>A little</i>	<i>Moderately</i>	<i>Strongly</i>	<i>Totally</i>
1	2	3	4	5

1. I felt challenged, but I believed my skills would allow me to meet the challenge.
2. My abilities met the high challenge of the situation.
3. I felt that I was competent to meet the high demands of the situation.
4. The challenge and my skills were at an equally high level.

Threat appraisal (Daily)

In relation to the academic goal that you set, please indicate the extent to which the following statements are consistent with how you have been feeling today.

<i>Not at all</i>	<i>A little</i>	<i>Moderately</i>	<i>Strongly</i>	<i>Totally</i>
1	2	3	4	5

1. I felt threatened by the high demands of the situation.
2. I felt that my self-worth could be comprised.
3. I felt intimidated by the situation.
4. I felt that I would lose something by not progressing on my goal.
5. I felt pressured to meet the demands of my goal.

Academic coping (Daily)

The Brief Coping Inventory for Academic Striving

Each of the following items represents what students may do to deal with the stress associated with the pursuit of your academic goal.

Please rate the extent to which each item corresponds to what you thought about or did while pursuing your academic goal today.

Does not correspond at all	Corresponds a little	Corresponds moderately	Corresponds strongly	Corresponds totally
1	2	3	4	5

1. I visualized myself doing my best academic performance.
2. I expressed my displeasure regarding school.
3. I created a plan of action for my school work.
4. I refrained from social interactions with other students.
5. I put effort in my work.
6. I diverted my attention from the academic situation.
7. I eliminated my doubts about my school work by thinking positively.
8. I asked for help to determine how to best accomplish my school work.
9. I tried to manage my nervousness by relaxing.
10. I sought to understand the situation in order to manage my academic work.
11. I quit believing in my ability to manage my school work.
12. I tried to picture myself successfully completing my school work.
13. I expressed my annoyance with my school work.
14. I tried to manage my time.
15. I kept everyone at a distance.
16. I gave a quality effort.
17. I occupied myself, so I did not have to think about my school work.
18. I tried to interpret the situation in a positive manner.
19. I tried to seek out advice of knowledgeable people.
20. I used some techniques in an attempt to relax.
21. I attempted to identify the demands of my school work.
22. I let myself feel hopeless and discouraged.

Goal progress (Daily)

Goal progress (Dugas et al., 2012)

Using the rating scale below, please indicate the extent to which you made progress on your academic goal today.

<i>Not at all</i>	<i>Very slightly</i>		<i>Slightly</i>	<i>Moderately</i>	<i>Strongly</i>	<i>Very strongly</i>		<i>Totally</i>
1	2	3	4	5	6	7	8	9

Please rate the extent to which...

- 1 ...you progressed on your academic goal
- 2 ...you moved forward in the pursuit of your academic goal
- 3 ...you came closer to reaching your academic goal
- 4 ...you made progress toward the realization of your academic goal
- 5 ...you advanced toward your academic goal

APPENDIX E

Questionnaires used in Article 3

E1 : Lab component

Demographic information

- 1.1 Please indicate your sex. Male Female
- 1.2 What is your native language? English French Spanish Other
- 1.3 What is your age? _____.
- 1.4 What is the level of your academic training?
Freshmen (1st year); Sophomore (2nd year); Junior (3rd year); Senior (4th year)
- 1.5 In what academic program are you mainly enrolled? _____.
- 1.6 What is your grade point average from high school _____.
- 1.7 What level of academic performance best describes your current grade point average?

A+ (90-100%)	A (85-89%)	A- (80-84%)	B+ (75-79%)	B (70-74%)	C+ (66-69%)	C (60-65%)	D (50-54%)	F (0-49%)
--------------	------------	-------------	-------------	------------	-------------	------------	------------	-----------

- 1.8 How do you describe yourself in terms of your ethnic group.
(PLEASE CHECK “✓” **ALL** THAT APPLY)

- ☐ Aboriginal/Native
- ☐ Caucasian (white)
- ☐ Afro-American (black)
- ☐ Asian
- ☐ Hispanic (Latino)
- ☐ Other ethnic or cultural group(s), please specify:_____

Academic goal (Lab component)

You are now ready to start the second part of this experiment. In this part of the study, you will be asked to set a goal related to your academic studying behaviour. You will also be asked to complete a series of exercises designed to help you in pursuing your studying goal.

ON A TYPICAL DAY, HOW MANY MINUTES DO YOU...

1) spend studying each day. Studying includes any academic activities outside of attending class such as preparing for upcoming exams, working on course assignments, reading course notes, etc.

We would now like you to set a goals related to increasing your studying during this week. A goal is something that people think about, plan for, carry out, and sometimes (though not always) complete or succeed at. Above you have reported the frequency to which you typically engage in studying for upcoming exams. We would now like you to set goals towards increasing or maintaining the amount of minutes you spend engaging in each of the following studying behaviours on each day during this one-week period.

On each day, I will spend _____ minutes studying.

Goal Confidence

On a scale from 0 (not at all) to 100 (totally), how confident do you feel that you will successfully attain your studying goal each day?

Goal commitment

On a scale from 0 (not at all) to 100 (totally), to what extent do you feel invested / committed to your studying goal?

Goal investment

On a scale from 0 (not at all) to 100 (totally), to what extent do you feel that your studying goal is a daily priority in you life at the current time?

Academic coping (Lab component)

The Brief Coping Inventory for Academic Striving

Each of the following items represents what students may do to deal with the stress associated with the pursuit of your academic goal.

Please rate the extent to which each item corresponds to what you thought about or did while pursuing your academic goal today.

Does not correspond at all	Corresponds a little	Corresponds moderately	Corresponds strongly	Corresponds totally
1	2	3	4	5

1. I visualized myself doing my best academic performance.
2. I expressed my displeasure regarding school.
3. I created a plan of action for my school work.
4. I refrained from social interactions with other students.
5. I put effort in my work.
6. I diverted my attention from the academic situation.
7. I eliminated my doubts about my school work by thinking positively.
8. I asked for help to determine how to best accomplish my school work.
9. I tried to manage my nervousness by relaxing.
10. I sought to understand the situation in order to manage my academic work.
11. I quit believing in my ability to manage my school work.
12. I tried to picture myself successfully completing my school work.
13. I expressed my annoyance with my school work.
14. I tried to manage my time.
15. I kept everyone at a distance.
16. I gave a quality effort.
17. I occupied myself, so I did not have to think about my school work.
18. I tried to interpret the situation in a positive manner.
19. I tried to seek out advice of knowledgeable people.
20. I used some techniques in an attempt to relax.
21. I attempted to identify the demands of my school work.
22. I let myself feel hopeless and discouraged.

Negative Achievement emotions (Lab component)

Achievement Emotions Questionnaire (Pekrum et al., 2005)

"Studying for your courses at university can induce different feelings. The following list refers to emotions you may experience before or during studying or working on school-related tasks. Please recall some typical situations of studying which you have experienced during the course of your studies. Now could you use the rating scale below to rate the following emotions in terms of how likely each of these feelings could be detrimental to the pursuit of your studying goals during the upcoming week?

<i>Not at all</i>	<i>A little</i>	<i>Moderately</i>	<i>Strongly</i>	<i>Totally</i>
1	2	3	4	5

1. I get angry when I have to study
2. I worry whether I have properly understood the material,
3. I avoid discussing course material because I have had so much trouble with it
4. My hopelessness undermines all my energy
5. Studying for my courses bores me
6. I get annoyed about having to study
7. While studying I feel like distracting myself in order to reduce my anxiety
8. I avoid eye contact when somebody notices how little I understand
9. I feel helpless
10. The material is so boring that I find myself daydreaming
11. I don't even want to begin studying because I get so upset over the amount of material
12. As time runs out my heart begins to race
13. I feel ashamed
14. I'm discouraged about the fact that I'll never learn the material
15. I would rather put off this boring work till tomorrow
16. My irritation makes me restless when I sit at my desk for a long time
17. I get tense and nervous while studying
18. I feel ashamed about my constant procrastination
19. I feel so helpless that I can't give my studies my full efforts
20. I get tired sitting at my desk because I'm bored

E2: Experimental Manipulation

Identifying and reflecting about potentially detrimental emotions is an important step to help you prepare for the pursuit of your goals during the upcoming week. Please open ENVELOPE A beside your computer. It contains two sheets: EMOTION 1 and EMOTION 2. On the first sheet (EMOTION 1), please highlight the emotion that is the most likely to be detrimental for the pursuit of your academic goal during the week. On the second sheet (EMOTION 2), please highlight the emotion that is the second most likely to be detrimental for the pursuit of your academic goal during the week. You can now put the two sheets back in envelope A.

EMOTION 1. Negative Achievement emotions

Achievement Emotions Questionnaire (Pekrum et al., 2005)

<i>Not at all</i>	<i>A little</i>	<i>Moderately</i>	<i>Strongly</i>	<i>Totally</i>
1	2	3	4	5

1. I get angry when I have to study
2. I worry whether I have properly understood the material,
3. I avoid discussing course material because I have had so much trouble with it
4. My hopelessness undermines all my energy
5. Studying for my courses bores me
6. I get annoyed about having to study
7. While studying I feel like distracting myself in order to reduce my anxiety
8. I avoid eye contact when somebody notices how little I understand
9. I feel helpless
10. The material is so boring that I find myself daydreaming
11. I don't even want to begin studying because I get so upset over the amount of material
12. As time runs out my heart begins to race
13. I feel ashamed
14. I'm discouraged about the fact that I'll never learn the material
15. I would rather put off this boring work till tomorrow
16. My irritation makes me restless when I sit at my desk for a long time
17. I get tense and nervous while studying
18. I feel ashamed about my constant procrastination
19. I feel so helpless that I can't give my studies my full efforts
20. I get tired sitting at my desk because I'm bored

EMOTION 2. Negative Achievement emotions

Achievement Emotions Questionnaire (Pekrum et al., 2005)

<i>Not at all</i>	<i>A little</i>	<i>Moderately</i>	<i>Strongly</i>	<i>Totally</i>
1	2	3	4	5

1. I get angry when I have to study
2. I worry whether I have properly understood the material,
3. I avoid discussing course material because I have had so much trouble with it
4. My hopelessness undermines all my energy
5. Studying for my courses bores me
6. I get annoyed about having to study
7. While studying I feel like distracting myself in order to reduce my anxiety
8. I avoid eye contact when somebody notices how little I understand
9. I feel helpless
10. The material is so boring that I find myself daydreaming
11. I don't even want to begin studying because I get so upset over the amount of material
12. As time runs out my heart begins to race
13. I feel ashamed
14. I'm discouraged about the fact that I'll never learn the material
15. I would rather put off this boring work till tomorrow
16. My irritation makes me restless when I sit at my desk for a long time
17. I get tense and nervous while studying
18. I feel ashamed about my constant procrastination
19. I feel so helpless that I can't give my studies my full efforts
20. I get tired sitting at my desk because I'm bored

Identifying and reflecting about potential action to manage detrimental emotions is an important step to help you prepare for the pursuit of your goals during the upcoming week.

You are now invited to remove ACTIONS FOR EMOTION 1 from ENVELOPE B. The following list contains items representing actions that students can do to deal with the demands associated with the pursuit of their studying goals. Using the rating scale below, please rate the extent to which each of the following actions can be effective in helping you deal with EMOTION 1 during the pursuit of your studying goals.

Additionally, please highlight the two actions that are the most likely to be effective in helping you manage the detrimental emotion 1 while pursuing your academic goal during the week.

You can now put the ACTIONS FOR EMOTION 1 sheet in envelope B.

You can also put the EMOTION 1 sheet back in envelope A.

ACTIONS FOR EMOTION 1

The Task-oriented coping actions from The Brief Coping Inventory for Academic Striving

<i>Not at all</i>	<i>Slightly</i>	<i>Moderately</i>	<i>Strongly</i>	<i>Totally</i>
1	2	3	4	5

1. Visualize myself doing my best academic performance.
2. Create a plan of action for my school work.
3. Put effort in my work.
4. Eliminate my doubts about my school work by thinking positively.
5. Ask for help to determine how to best accomplish my school work.
6. Try to manage my nervousness by relaxing.
7. Seek to understand the situation in order to manage my academic work.
8. Try to picture myself successfully completing my school work.
9. Try to manage my time.
10. Give a quality effort.
11. Try to interpret the situation in a positive manner.
12. Try to seek out advice of knowledgeable people.
13. Use some techniques in an attempt to relax.
14. Attempt to identify the demands of my school work.

Identifying and reflecting about potential action to manage detrimental emotions is an important step to help you prepare for the pursuit of your goals during the upcoming week.

You are now invited to remove ACTIONS FOR EMOTION 2 from ENVELOPE B. The following list contains items representing actions that students can do to deal with the demands associated with the pursuit of their studying goals. Using the rating scale below, please rate the extent to which each of the following actions can be effective in helping you deal with EMOTION 2 during the pursuit of your studying goals.

Additionally, please highlight the two actions that are the most likely to be effective in helping you manage the detrimental emotion 1 while pursuing your academic goal during the week.

You can now put the ACTIONS FOR EMOTION 2 sheet in envelope B.

You can also put the EMOTION 2 sheet back in envelope A.

ACTIONS FOR EMOTION 2

The Task-oriented coping actions from The Brief Coping Inventory for Academic Striving

<i>Not at all</i>	<i>Slightly</i>	<i>Moderately</i>	<i>Strongly</i>	<i>Totally</i>
1	2	3	4	5

1. Visualize myself doing my best academic performance.
2. Create a plan of action for my school work.
3. Put effort in my work.
4. Eliminate my doubts about my school work by thinking positively.
5. Ask for help to determine how to best accomplish my school work.
6. Try to manage my nervousness by relaxing.
7. Seek to understand the situation in order to manage my academic work.
8. Try to picture myself successfully completing my school work.
9. Try to manage my time.
10. Give a quality effort.
11. Try to interpret the situation in a positive manner.
12. Try to seek out advice of knowledgeable people.
13. Use some techniques in an attempt to relax.
14. Attempt to identify the demands of my school work.

EMOTION 1. IF-THEN COPING PLANS

It is now time, to link each of your emotions with a specific coping action. Research indicates that creating mental linkage in the form of "IF-THEN" strategy can help you become more effective at pursuing your goal and managing your emotions.

Please remove EMOTION 1 from ENVELOPE A and the ACTIONS FOR EMOTION 1 from ENVELOPE B.

In general, using the scale below, please rate how often do you experience this emotion?
(EMOTION 1)

<i>Not at all</i>	<i>Slightly</i>	<i>Moderately</i>	<i>Often</i>	<i>Very Often</i>
1	2	3	4	5

Using the space below, please rewrite the information from the two sheets in envelopes A and B.

IF...	 (write the statement from EMOTION 1 sheet (envelope A))
-------	--

THEN I
WILL...

(write the statement from ACTION 1 FOR EMOTION 1 (envelope B))

AND

(write the statement from ACTION 2 FOR EMOTION 1 (envelope B))

Before moving to the next page, please read aloud and repeat loudly to yourself the two IF-THEN strategies for EMOTION 1.

Close your eyes for a few seconds. Without looking at the screen, please try to remember and to repeat these two strategies loudly to yourself.

Keep memorizing the IF-THEN strategies until you are capable of repeating them without looking at the screen. Memorizing the IF-THEN strategies will be extremely useful to help you pursue your goals and manage EMOTION 1 during the week.

EMOTION 2. IF-THEN COPING PLANS

Please remove EMOTION 2 from ENVELOPE A and ACTIONS FOR EMOTION 2 from ENVELOPE B.

In general, using the scale below, please rate how often you experience this emotion? (EMOTION 2)

<i>Not at all</i>	<i>Slightly</i>	<i>Moderately</i>	<i>Often</i>	<i>Very Often</i>
1	2	3	4	5

Using the space below, please rewrite the information from the two sheets taken in envelopes A and B.

IF...	 (write the statement from EMOTION 2 sheet (envelope A))
-------	--

THEN I
WILL...

(write the statement from ACTION 1 FOR EMOTION 2 (envelope B))

AND

(write the statement from ACTION 2 FOR EMOTION 2 (envelope B))

Before moving to the next page, please read aloud and repeat loudly to yourself the two IF-THEN strategies for EMOTION 2.

Close your eyes for a few seconds. Without looking at the screen, please try to remember and to repeat these two strategies loudly to yourself.

Keep memorizing the IF-THEN strategies until you are capable of repeating them without looking at the screen. Memorizing the IF-THEN strategies will be extremely useful to help you pursue your goals and manage EMOTION 2 during the week.

E3: Control Text

There are several resources on campus that can help you in the pursuit of your studying goals and with your academic goals in general. The following text provides information on the resources and services. Please read the following text and answer the accompanying questions.

Please read the following information attentively. At the end of this section, you will be asked to answer a few questions about these services to ensure that you have fully read the information presented in the following section.

SASS or Student Academic Success Service is an organization at the university dedicated to providing a series of services and programs to both support both your academic pursuits and personal development as you pursue your diploma.

Here is a list of several of the services and programs offered by SASS:

Academic Writing Help Centre

110 University Private

At the writing centre, students can make individual appointments with an instructor who will work with them to develop tools necessary to improve their writing skills. This includes but is not limited to mastering the written language of their choice, understanding the requirements of an academic writing task, developing their critical thinking skills, and expanding their critical thinking abilities.

Counselling and Coaching Service

Students encounter a wide array of experiences in their student life. In a respectful and confidential forum, the qualified counsellors at the Counselling and Coaching Service can work with students to help them identify the problems they encounter and assist students in developing new strategies to use to confront these problems.

There are three types of counselling offered:

Personal counselling: This type of counselling can help students manage the emotions and personal issues associated with the various experiences embedded within their transition to university. A counsellor can help students identify and clarify personal issues while helping the student gain an understanding of their options. They will also provide references to specialized services when required.

Career counselling: This type of counselling aims to facilitate both academic program and career decision-making. A counsellor can help students explore and identify their options concerning both their academic program and their career options that best fits the students' interests and aptitudes. A counsellor can also work with students to set goals to facilitate success at the university

Study skills counselling: This type of counselling can help students identify their current learning strategies and habits and focus on improving study skills in order obtain your best academic performance. Examples of study skills that are relevant to your success at the university include procrastination, stress management, and perfectionism.

Career Services

University Centre, Rm 312

<http://www.sass.uottawa.ca/careers/>

At career services, the counsellors and student mentors are available to help students device a career plan and provide access to a variety of workshops and online resources to prepare students for the work force. Specifically, career planning mentors and workshops are offered to help students determine what they can do with their studies. Several job preparation tools are also offered including job searching training, resume writing workshops and resources, and job interview skills training. Furthermore, resources for finding a job are also available including several online job postings, schedules for career fairs at the university, online postings for internships, and online postings for volunteering experience.

Student Mentoring

<http://www.sass.uottawa.ca/mentoring/undergraduate/mentoring-centers.php>

The student mentoring service is devised of a series of services designed to support the needs of students. The goal of the mentors is to provide guidance and advice to students and information on the experiences of these students at the university. There are 17 Mentoring centres located across campus and with each centre tailored to the needs of the students belongs to a specific faculty or in need of a university service. These include the following:

Faculty Mentoring

- Faculty of Arts
- Faculty of Engineering

- Faculty of Health Sciences
- Faculty of Law, Common Law Section
- Faculty of Science
- Faculty of Social Sciences
- Telfer School of Management

Mentoring Centres affiliated to university services

- Co-operative Education Programs
- French Immersion Studies
- Residence (Study Groups)
- SASS – Aboriginal Resource Centre
- Learning Technology (SASS – Access)
- SASS – Careers
- Sports Services
- Official Languages and Bilingualism Institute (OLBI)

Mentoring 2-3-4: There is also a student mentoring program for 2nd, 3rd, and 4th year students. This program matches students with a mentor (in the same Faculty) as the students advance in their studies. Each mentor will work with students to help them tailor their study skills to fit the demands of their courses, research graduate programs, explore career options, and answer questions related to the job application process in the students field of interest. This program is offered in the Faculty of Science and Social Sciences.

<http://www.sass.uottawa.ca/mentoring/mentoring-2-3-4>

Peer Help Centre

University Centre RM 211D

The **Student Federation of the University of Ottawa** also provides student-run programs tailored to the needs of undergraduate students as part of the Peer help Centre

<http://sfuo.ca/services/peerhelp/en/index.html>

The goal of the trained peer support workers is to provide students with beneficial academic, social, and personal support and advice as it relates to all areas surrounding their academic experience. The following seven services and programs are available:

Tutor Referrals: Students in need of academic tutoring can apply for a tutor in person and will be given a list of tutors which are required to contact and negotiate terms with on their own accord.

Presentation Critique: Students are given the opportunity to practice their oral presentation in front of trained volunteer who will provide constructive feedback. Appointments may be no longer than 90 minutes.

Peer Editing: Students may have their paper reviewed by a trained volunteer. Volunteers will edit papers up to 15 pages in length in English or French, but will not edit theses, take-home exams or exam preparations. Again, appointments may be no longer than 90 minutes.

Resource center (on and off campus): The centre is able to provide referrals and information for a range of issues including academics, student services, an physical and mental health.

Mentoring for Youth program: This program provides university students the opportunity to act as a mentor for a high school student. It provides training in active listening, conflict resolution and training in youth education.

Active listening: Peer support workers are trained in active listening, crisis intervention, limits and boundaries, and suicide awareness and are able to provide students a confidential and empathetic forum to discuss their personal issues while helping them explore their options. Active listening is designed as a complement to professional counselling.

Peer support phone line: Students are able to gain access to anonymous support outside of daytime work hours through the peer support phone line. The volunteers who staff the phones lines are trained in active listening, call management, crisis intervention, limits and boundaries, and suicide awareness and provide support and information on a array of personal issues as well as referrals to outside services.

Students are free to drop-in to the centre to speak to a peer support worker except in the case of peer editing and presentation critiques for which an appointment is needed 24 hours in advance.

Comprehension Questions

What is the maximum amount of time an appointment may run for presentation critiques and peer editing?

Where can students find resources for French immersion studies?

a-Peer help centre

b-Academic writing centre

c- Student mentoring

Which service offered by SAS or The Student Federation of the University of Ottawa would you be most likely to use?

E4: Daily measures

Number of minutes spent studying daily

TODAY, HOW MANY MINUTES DID YOU...

1) spend studying.

Goal progress

Goal progress (Dugas et al., 2012)

Using the rating scale below, please indicate the extent to which you made progress on your academic goals since the start of the semester.

<i>Not at all</i>	<i>Very slightly</i>		<i>Slightly</i>	<i>Moderate ly</i>	<i>Strongly</i>	<i>Very strongly</i>		<i>Totally</i>
1	2	3	4	5	6	7	8	9

Please rate the extent to which...

- 1 ...you have progressed on your academic goal
- 2 ...you have moved forward in the pursuit of your academic goal
- 3 ...you have come closer to reaching your academic goal
- 4 ...you have made progress toward the realization of your academic goal
- 5 ...you have advanced toward your academic goal

Academic Coping

The Brief Coping Inventory for Academic Striving

Each of the following items represents what students may do to deal with the stress associated with the pursuit of your studying goals. Please rate the extent to which each item corresponds to what you thought about or did while pursuing your studying goals today.

Does not correspond at all	Corresponds a little	Corresponds moderately	Corresponds strongly	Corresponds totally
1	2	3	4	5

1. I visualized myself doing my best academic performance.
2. I expressed my displeasure regarding school.
3. I created a plan of action for my school work.
4. I refrained from social interactions with other students.
5. I put effort in my work.
6. I diverted my attention from the academic situation.
7. I eliminated my doubts about my school work by thinking positively.
8. I asked for help to determine how to best accomplish my school work.
9. I tried to manage my nervousness by relaxing.
10. I sought to understand the situation in order to manage my academic work.
11. I quit believing in my ability to manage my school work.
12. I tried to picture myself successfully completing my school work.
13. I expressed my annoyance with my school work.
14. I tried to manage my time.
15. I kept everyone at a distance.
16. I gave a quality effort.
17. I occupied myself, so I did not have to think about my school work.
18. I tried to interpret the situation in a positive manner.
19. I tried to seek out advice of knowledgeable people.
20. I used some techniques in an attempt to relax.
21. I attempted to identify the demands of my school work.
22. I let myself feel hopeless and discouraged.

Negative achievement emotions

The Achievement Emotions Questionnaire (AEQ) (Pekrum et al., 2005)

Studying for your courses at university can induce different feelings. The following list refers to emotions you may have experienced regarding school today.

<i>Not at all</i>	<i>Slightly</i>	<i>Moderately</i>	<i>Strongly</i>	<i>Very strongly</i>
1	2	3	4	5

1. I got angry when I had to study
2. I got worried whether I had properly understood the material
3. Because I had so much trouble with the course material, I avoided discussing it.
4. My hopelessness undermined all my energy.
5. Studying for my courses bored me.
6. I got annoyed about having to study.
7. While studying I felt like distracting myself in order to reduce my anxiety.
8. When somebody noticed how little I understood, I avoided eye contact.
9. I felt helpless.
10. The material was so boring that I found myself daydreaming.
11. Because I got so upset over the amount of material, I didn't even want to begin studying.
12. As time ran out my heart began to race.
13. I felt ashamed.
14. I was discouraged about the fact that I would never learn the material.
15. I would have rather put off this boring work till tomorrow.
16. When I sat at my desk for a long time, my irritation made me restless.
17. I got tense and nervous while studying.
18. I felt ashamed about my constant procrastination.
19. I felt so helpless that I couldn't give my studies my full efforts.
20. Because I was bored I got tired sitting at my desk.

Perceived stress

The Achievement Emotions Questionnaire (AEQ) (Pekrum et al., 2005)

We would like to know your thoughts and feelings today. In each case, please indicate how often you felt or thought a certain way today.

<i>Never</i>	<i>Almost never</i>	<i>Sometimes</i>	<i>Fairly often</i>	<i>Very often</i>
1	2	3	4	5

Today, how often...

1. ... have you been upset because of something that happened unexpectedly?
2. ... have you felt that you were unable to control the important things in your life?
3. ... have you felt nervous and stressed?
4. ... have you felt confident about your ability to handle personal problems or challenges?
5. ... have you felt that things were going your way?
6. ... have you found that you could not cope with all the things that you had to do?
7. ... have you been able to control irritations in your life?
8. ... have you felt that you were on top on things?
9. ... have you been angered because of things that were outside of your control?
10. ... have you felt difficulties were piling up so high that you could not overcome them?