

The Mediating Role of Coping in the Relationship Between Satisfaction of Psychological
Needs and Academic Goal Progress: A Self-Determination Perspective

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Summary

The first objective was to test the prospective relationship between need satisfaction and coping. A total of 113 undergraduate students completed a measure of need satisfaction at Time 1 (T1; i.e. a few weeks before the midterm exams) as well as a measure of coping at Time 2 (T2; i.e. a few weeks after the midterm exams). Results indicated that need satisfaction T1 explained unique variance in both dimensions of coping T2, namely task-oriented and disengagement-oriented coping, even after having statistically controlled for gender, Conscientiousness, Neuroticism, and social desirability at T1. The second objective was to examine a model in which need satisfaction and coping predict the amount of progress towards academic goals and, in turn, how coping and goal progress are associated to increases in need satisfaction over the course of a semester. A total of 166 undergraduate students completed a measure of need satisfaction at Time 1 (T1; i.e. a few weeks before the midterm exams) as well as measures of coping, goal progress, and need satisfaction at Time 2 (T2; i.e. a few weeks after the midterm exams). Results from structural equation modeling indicated that coping T2 fully mediated the relationship between need satisfaction T1 and goal progress T2. Results also indicated that goal progress T2 partially mediated the relation between task-oriented coping T2 and need satisfaction T2 as well as between disengagement-oriented coping T2 and need satisfaction T2.

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Chapter 1: Introduction

University students face numerous demands and challenges in their strivings to progress on their educational goals. According to self-determination theory (Deci & Ryan, 2000), one key predictor of academic achievement might be the extent to which students are satisfied in their need to feel autonomous, competent, and related in their interactions with members of their school environment. Although some researchers have examined the relationship between need satisfaction and achievement, limited attention has been devoted to the self-regulation processes likely to mediate this relationship. Recent theoretical developments conceived need satisfaction as a personal resource likely to influence and to be influenced by coping strategies (Skinner & Zimmer-Gembeck, 2007). Consistent with this proposition, researchers have recently highlighted the need to explore the potential role of coping in explaining the process by which the satisfaction of needs relates to optimal achievement outcomes (Ntoumanis, Edmunds, & Duda, 2009). Moreover, coping strategies, through their influence on educational achievement, could potentially contribute to the development of feelings of autonomy, competence, and relatedness. Therefore, the aim of this thesis was to examine the relationship between need satisfaction, coping, and academic goal progress of university students. The first objective was to test the prospective relationship between need satisfaction and coping. The second objective was to examine a model in which need satisfaction and coping predict the amount of progress towards meeting academic goals and how, in turn, coping and academic goal progress could be associated to increases in need satisfaction over the course of a semester (see Figure 1).

Psychological Needs

According to Reeve (2009), a need is *a condition within the person that is essential and necessary for life, growth, and well-being*. When the needs are satisfied, fostered, and nurtured, well-being will consequently be maintained and enhanced. In contrast, when needs are thwarted or frustrated, well-being will be disrupted and significantly reduced. Reeve (2009) argues that there are three major categories of needs, namely physiological, social, and psychological needs. First, *physiological needs* correspond to elements that are essential to life survival and physical health and are characterized by needs such as hunger or thirst. Second, *social needs* correspond to our unique personal experiences and their amount or degree will significantly differ from one individual to the other. The needs for achievement or power are two examples of social needs. They are, according to Reeve's definition, dependent on the type of environment in which we live and were raised in, as well as our personal preferences. Third, *psychological needs* are inherent in everyone and exist within human nature. They are posited to exist in everyone to the same degree and their satisfaction is a needed condition to promote psychological adjustment. Three basic psychological needs have been described and examined as essential to psychological growth and well-being, namely the need for autonomy, competence, and relatedness.

Although psychological needs should be interpreted as being part of human nature, Reeve (2009) argues that psychological needs are proactive. In other words, the psychological needs should enhance our willingness to seek out and be responsive to environmental cues that offer opportunities and resources needed to nurture our need satisfaction. Deci and Ryan (1991) added the term *organismic* to the psychological need definition by affirming that the *organism* is an *entity that is alive and in active exchange with*

its environment. Accordingly, the environment is likely to offer several resources such as social support, cognitive stimulation, and growth opportunities.

Basic Psychological Need Satisfaction Theory

The *basic psychological need theory* (Deci & Ryan, 2000), a mini-theory within self-determination theory, posits that the fulfillment of three basic psychological needs (i.e. autonomy, competence, and relatedness) is required to ensure well-being, optimal functioning, and psychological growth. The fulfillment of these three needs is also considered as the key antecedent of the acquisition and maintenance of an autonomous motivational orientation. This theory asserts that people are inherently and universally desirous of feeling connected to others (relatedness), efficient in their interactions with the environment (competence), and self-determined and volitional while doing so (autonomy). First, autonomy is defined as being the need to experience self-direction and personal endorsement in the initiation and regulation of one's behavior (Deci & Ryan, 1985b). The need for autonomy can refer to three subjective experiences, namely perceived locus of causality (i.e. the individual's understanding of the causal source of one's action and behavior), volition (i.e. an unpressured willingness to engage in an activity), and perceived choice (i.e. the personal decision flexibility provided by the environment). Second, competence is defined as the psychological need to feel effective in the interactions with the environment. It reflects the desire to exercise one's capacities and skills and to seek out and master optimal challenges and opportunities (Deci & Ryan, 1985b). Finally, relatedness is defined as being the psychological need to establish close emotional bonds and attachment with other people and it reflects the desire to be emotionally connected to and interpersonally involved in warm relationships (Baumeister & Leary, 1995; Ryan & Powelson, 1991).

Relatedness, although more socially-oriented, is a key motivational construct because people function better, experience more resilience to stress, and show less psychological difficulties when their interpersonal relationships support their need for relatedness (Osterman, 2000; Ryan, Stiller, & Lynch, 1994).

General Consequences of Need Satisfaction

The fulfilment of basic needs has been identified as a key antecedent of positive cognitive, emotional, and behavioural outcomes in numerous life domains. For example, teens who feel strongly related to their parents and more autonomous in their self-regulation experienced higher levels of well-being than their counterparts whose needs for relatedness and autonomy were not well satisfied by their parents (Ryan et al., 1994), thus indicating that adolescents who experience autonomy and relatedness during socialization seem to be free to pursue their activities and to be better psychologically adjusted. Moreover, Reis, Sheldon, Gable, Roscoe, and Ryan (2000) examined satisfaction of the three basic psychological needs in people's ongoing lives. Using both individual-differences (i.e. between-person differences) and daily-diary designs (i.e. within-person differences), they showed a significant association between need satisfaction and well-being at the within as well as at the between-person levels of analysis, with the independent/additive contributions of each basic need.

Amongst athletes, need satisfaction has been found to be an important antecedent of psychological and emotional well-being (Deci et al., 2001; Gagné, Ryan, & Bargmann, 2003; Sheldon & Elliot, 1999). More specifically, the study of Gagné et al. (2003) found that gymnasts' daily experiences of satisfaction of the basic needs predicted changes in well-being over a four-week period. In addition, the fulfilment of needs seems to prevent athletes

from the development of burnout symptoms (Hodge & Lonsdale, 2008; Perreault, Gaudreau, Lapointe, & Lacroix, 2007). A few studies have also expanded their investigation into team sports. In fact, it seems that need satisfaction amongst athletes who are part of a sport team is related to subjective vitality and thus, promotes athletes' well-being within their team (Reinboth & Duda, 2006). Similar results are also obtained in the field of physical activity. In fact, need satisfaction has been identified as a key antecedent of positive affect, well-being, and less psychological distress among exercisers (Wilson, Mack, Blanchard, & Gray, 2009; Wilson & Rogers, 2008).

According to Deci et al. (2001), need satisfaction at work has also been identified as an antecedent of both autonomous motivation regulations and psychological adjustment, even across different cultures. Numerous studies have also shown that autonomy support from an employer led to greater satisfaction of the need for competence, relatedness, and autonomy which in turn, led to job satisfaction, greater persistence, better acceptance of organizational changes, and higher levels of psychological adjustment (Deci et al., 2001; Gagné, Koestner, & Zuckerman, 2000; Ilardi, Leone, Kasser, & Ryan, 1993; Kasser, Davey, & Ryan, 1992).

Additionally, in the context of romantic relationships, a recent study showed that the individual fulfillment of the needs for autonomy, relatedness, and competence was highly associated with individual well-being, but even more strongly when the entire couple reported high levels of need satisfaction (Patrick, Knee, Canevello, & Lonsbary, 2007). In other words, well-being was enhanced especially when both partners reported feeling autonomous, competent, and related to their partner. Moreover, research has shown that greater relative autonomy was associated with more open communication, greater facility in conflict resolutions, as well as higher levels of couple happiness (Blais, Sabourin, Boucher,

& Vallerand, 1990; Knee, Lonsbary, Canevello, & Patrick, 2005). More specifically, Knee et al. (2005) tested whether people's motivations to maintain their relationships mediated the association between trait autonomy and relationship functioning. They demonstrated that trait autonomy (i.e., general autonomy orientation) allows one to have more open and less defensive responses to conflict in part because trait autonomy promotes autonomous reasons for maintaining the relationship. In addition, in a meta-analytical review of five studies, Patrick and colleagues (2007) also found that need satisfaction facilitates the use of coping strategies aimed at understanding the situation in which partners explore the source of interpersonal conflicts while approaching solutions in a constructive manner. In contrast, need satisfaction was negatively associated with defensive strategies in which the partners disengaged and detached themselves from the interpersonal conflicts. Thus, it seems that the satisfaction of basic psychological needs plays a significant role in promoting positive relationship functioning, and that coping strategies play an important role in mediating these associations.

In the academic domain, several studies have provided evidence for the role of need satisfaction in promoting psychological and emotional well-being amongst students (e.g. Deci et al., 2001; Reis et al., 2000; Sheldon & Elliot, 1999; Sheldon & Krieger, 2007). Moreover, need satisfaction has also been associated with less dropout intentions as well as less actual dropout (Vallerand, Fortier, & Guay, 1997). In addition, autonomy support from teachers has also been identified as a significant predictor of adjustment at school (Soenens & Vansteekiste, 2005). Instructors' autonomy support among university students also predicted increases in autonomous self-regulation, perceived competence, interest, and decreases in anxiety over the course of a semester (Black & Deci, 2000). In fact, an

autonomy supportive context implies that the environment values personal growth and well-being by providing explanatory rationales for a needed course of actions, by relying on flexible language, by considering the other's perspective, by providing positive feedback, and by encouraging individuals to foster positive relationships (Reeve, 2009). Therefore, it seems that an autonomy supportive context, as well as the satisfaction of the need for autonomy, competence, and relatedness, can enhance positive outcomes at school while preventing students from experiencing negative consequences.

Need Satisfaction and Achievement Outcomes

Despite the empirical evidences reviewed above, limited attention has been allocated to the role of need satisfaction in promoting performance-related outcomes. Achievement, which refers to the level of performance obtained by an individual on a task as determined by subjective and/or objective criteria (VandenBos, 2007), is a central indicator of academic adjustment (Janosz, Archambault, Morizot, & Pagani, 2008), and thus an important personal goal striving of most university students.

In the sport domain, Smith, Ntoumanis, and Duda (2007) showed that athletes tended to demonstrate not only greater well-being, but also higher levels of achievement when their needs for autonomy, competence, and relatedness were satisfied. The satisfaction of needs has also been prospectively associated with higher levels of achievement among athletes (Blanchard, Mask, Vallerand, de la Sablonnière, & Provencher, 2007). In organizational settings, cross-sectional research conducted with employees (Baard, Deci, & Ryan, 2004; Greguras & Diefendorff, 2009) demonstrated that need satisfaction correlated with higher

levels of achievement, even when the achievement was measured using informant ratings (Hochwarter, Witt, Treadway, & Ferris, 2006).

In the academic context, the combined satisfaction of the needs for autonomy, competence, and relatedness is likely to facilitate achievement, as it should provide the individual with internal resources needed to engage the self in active, effortful, and volitional pursuit of educational goals (Skinner & Zimmer-Gembeck, 2007). Cross-sectional research conducted with university students (Kelly, Zuroff, Leybman, Martin, & Koestner, 2008) demonstrated that the satisfaction of the needs for autonomy, competence, and relatedness was significantly related to greater achievement. Guay and Vallerand (1997) also showed similar results within a high school student population. Moreover, comparable results were obtained when achievement was evaluated objectively by teachers (Filak & Sheldon, 2003; Sheldon & Filak, 2008). Consistent with the tenets of self-determination theory, need satisfaction seems to be an important nutriment for optimal functioning and successful achievement of personal goals across all life domains. However, the relationship between need satisfaction and school-related goal achievement has yet to be investigated using a prospective design in the academic domain.

Hypothesis 1: It is expected that need satisfaction will be prospectively and positively related to academic achievement.

Defining Coping

The academic domain is a critical area for the acquisition of adaptive self-regulation skills likely to bolster growth and well-being early in human development. The attainment of academic goals is a central component of students' academic experiences that is likely to

enhance the likelihood of graduation while reinforcing psychological functioning and adjustment during the transition from adolescence to adulthood. Therefore, it is essential to identify the main elements that are likely to promote and enhance academic achievement. The way students cope with stressful challenges derived from school hassles might act as a potential key variable predicting goal achievement of students.

More specifically, coping has been defined as the behavioral and cognitive processes by which individuals attempt to deal with the demands of a stressful situation (Lazarus & Folkman, 1984), and can be organized in at least two higher-order coping dimensions: task-oriented and disengagement-oriented coping (Skinner, Edge, Altman, & Sherwood, 2003). *Task-oriented coping* represents the strategies aimed at dealing directly with the stressful situation and subsequent thoughts and emotions. Task-oriented coping includes strategies such as active coping, planning, increased effort, positive reappraisal, and relaxation. *Disengagement-oriented coping* is characterized by the actions by which a person withdraws from the process of actively striving towards the realization of desirable outcomes. This dimension encompasses strategies such as behavioral disengagement, self-blame, and denial.

Coping and General Consequences

First of all, it seems that people who use, in general, daily optimal coping strategies tend to experience greater well-being on a daily basis (Shiota, 2006). Numerous studies have also looked at the role of coping with illness and have demonstrated that the use of optimal coping strategies was associated to greater adjustment (for a review see the meta-analysis of Roesch & Weiner, 2001). In the sport domain, several studies have also demonstrated that the use of task-oriented coping strategies can lead to higher levels of well-being and life

satisfaction amongst athletes (Amiot, Blanchard, & Gaudreau, 2004). In fact, the use of task-oriented coping strategies has been specifically associated with positive affect whereas disengagement-oriented coping seems to have been related to negative affect (Amiot et al., 2004; Gaudreau & Blondin, 2002; Gaudreau, Blondin, & Lapierre, 2002). Moreover, athletes using coping strategies oriented toward the task to accomplish tend to experience less burnout symptoms compared to those using less efficient strategies such as disengagement coping (Raedeke, 2001; Raedeke & Smith, 2004). Similar results have also been obtained in organizational settings where indicators of task-oriented coping strategies have played a significant role in preventing the development of burnout symptoms (Chan & Hui, 1995; Greenglass & Burke, 1990; Mitchell & Hastings, 2001), distress and turnover intentions (Begley, 1998), as well as promoting satisfaction amongst employees (Healy & McKay, 2008). In the academic area, the choice of task-oriented coping strategies has also been significantly and longitudinally related to positive affect within an elementary school student population (Kaplan & Midgley, 1999). Moreover, Hess and Copeland (2001) have showed that high school students using task-oriented coping strategies throughout their school year have reported less school dropout at the end of the study, namely three years later.

Need Satisfaction and Coping

Despite the mounting literature lending credence for the importance of satisfying the needs for autonomy, competence, and relatedness, the specific process by which the satisfaction of the needs promotes positive achievement outcomes has yet to draw empirical scrutiny. From a theoretical standpoint, Skinner and Zimmer-Gembeck (2007) argued that the way people deal with stressful situations is influenced by one's perception of the extent to which his needs are satisfied. Students who do not feel autonomous might evaluate the

situation as unchangeable and uncontrollable, thus increasing their tendencies to simply disengage from stressful situations whereas those who feel autonomous might be more willing to take direct and task-oriented actions to deal with stressful conditions. Students who do not feel competent are more likely to have self-doubts about their abilities to find proper solutions to resolve the stressful situation, which could result in greater tendencies to avoid the problem. However, feeling competent might help students believe that they have the capacities to face difficult situations. Finally, students who do not feel related and connected to others are more likely to isolate themselves and ultimately dropout when faced with a stressful encounter whereas students whose need for relatedness is fulfilled might seek help or social support.

Empirical support has been found for this set of hypothesis, albeit not specifically on the relationship between need satisfaction and coping per se. In fact, it seems that students reporting high levels of need for autonomy, competence, and relatedness tend to demonstrate more engagement behaviors such as persistence of effort (Skinner, Furrer, Marchand, & Kindermann, 2008; Skinner, Kindermann, Furrer, 2009; Smith et al., 2007). Additionally, Patrick et al. (2007) demonstrated that amongst intimate partners, the satisfaction of the needs was related to the use of more efficient coping strategies when facing difficulties or conflicts. These studies clearly indicate that need satisfaction can provide the inner strengths needed to feel secure in confronting stressful situations and their resulting emotions in an active, effortful, and deliberate manner. However, more specific research is needed to examine the specific relationships between need satisfaction and coping in educational settings.

Hypothesis 2: It is expected that need satisfaction will be positively associated with task-oriented coping strategies.

Hypothesis 3: It is also expected that need satisfaction will be negatively related to disengagement-oriented coping strategies.

Coping and Achievement-Related Outcomes

In the sport domain, task-oriented coping has been positively associated with goal attainment whereas disengagement coping has been negatively related to goal attainment (Amiot, et al., 2004; Gaudreau & Blondin, 2004). Similarly, indicators of task-oriented coping have been associated with greater performance at work whereas disengagement strategies seem to have been related to lower levels of work performance (Brown, Westbrook, & Challagalla, 2005).

The way students self-regulate their behaviors and cope with academic challenges can also have a significant impact on their goal achievement. In fact, it has been shown that students using task-oriented coping strategies performed better in their academic activities (Endler, Kantor, & Parker, 1994; Struthers, Perry & Menec, 2000). Sheldon and Kasser (1998), as well as Sheldon and Elliott (1999), also provided evidence that students who had stronger self-regulatory skills (e.g. planning and concentration) were more likely to progress in the pursuit of their personal academic projects. A recent meta-analysis also demonstrated that self-regulation processes, such as effort and planning, were significant predictors of goal attainment amongst different populations, including university students (Gaudreau, Carraro, & Miranda, 2010). Similar results were obtained by Soucy-Chartier, Gaudreau, and Fecteau (2010) in which task-oriented coping was positively related to the attainment of mastery and

performance goals whereas disengagement-oriented coping was associated with lower levels of attainment.

Hypothesis 4: It is expected that task-oriented coping strategies will be positively associated with academic goal achievement.

Hypothesis 5: It is also expected that disengagement-oriented coping strategies will be negatively related to academic goal achievement.

Need satisfaction, Coping, and Achievement: A Mediation Model

Psychological needs are oriented on the transactions between the individual and his environment because the organism will initiate interactions with the environment and thus, will adapt, change, and grow according to those transactions. Empirical evidences have suggested the potential role of coping in mediating the relationship between the satisfaction of psychological needs and outcomes (Amiot et al., 2004; Gaudreau et al., 2010). In addition, an integrative model has recently been proposed by Ntoumanis et al. (2009), suggesting that coping might be likely to mediate the relationship between need satisfaction and outcomes. Therefore, it seems that the strategies used by students when facing stressful events could explain the link by which need satisfaction of autonomy, competence, and relatedness can enhance academic achievement. In fact, both need satisfaction and coping have been related to school achievement. Yet, limited attention has been allocated to the process underlying the relation between the satisfaction of needs and performance such as the attainment of academic goals.

Hypothesis 6: It is expected that task-oriented coping will significantly mediate the positive relationship between need satisfaction and academic achievement.

Hypothesis 7: It is expected that disengagement-oriented coping will significantly mediate the positive relationship between need satisfaction and academic achievement.

Reciprocal Association Between Need Satisfaction and Coping

Thus far, the rationale of this thesis has been centered on the role of need satisfaction as an antecedent of coping and goal achievement-related outcomes. According to self-determination theory, feelings of need satisfaction are also highly influenced by the social environment in which significant others are nurturing the psychological needs with autonomy supportive practices. Although autonomy support has been found to be a significant social predictor of need satisfaction in both sport and educational domains (Amorose & Anderson-Butcher, 2007; Filak & Sheldon, 2008), this explanation leaves little room for the role of the self in adopting a course of action likely to enhance or debilitate the satisfaction of basic psychological needs. Humans are active agents likely to influence the course of their own psychological development. Hence, it can be proposed that a person who actively confronts the contingencies of the external environment should experience increased feelings of autonomy, competence, and relatedness. These contentions are consistent with the multi-level systemic model of coping in which Skinner and Zimmer-Gembeck (2007) proposed that coping could influence outcomes such as goal progress, which in turn, could result in an accumulation of personal resources, such as feelings of autonomy, competence, and relatedness. Similarly, Ntoumanis et al. (2009) highlighted that coping and goal progress

could be conceived as both antecedents and consequences of need satisfaction, thus alluding to their potentially reciprocal relationships.

It seems that the usage of task-oriented coping strategies and the positive effects obtained from goal attainment are potential mechanisms that could increase feelings of autonomy and need satisfaction over time. Empirical evidences have, in fact, demonstrated a reciprocal relationship of both coping and achievement with autonomous motivation (Amiot, Blanchard, & Gaudreau, 2008; Smith, Ntoumanis, Duda, & Vansteenkiste, 2011; Thompson & Gaudreau, 2008). However, to our knowledge, studies have yet to examine whether coping and achievement can predict changes in need satisfaction over the course of a semester.

Hypothesis 8: It is expected that academic achievement will be positively related to increases in need satisfaction.

Hypothesis 9 & 10: It is expected that task-oriented coping will be positively related to increases in need satisfaction (H9) whereas disengagement-oriented coping will be negatively associated to increases in need satisfaction (H10).

The Present Study

Empirical evidence has supported the role of both need satisfaction and coping in predicting achievement-related outcomes in the academic domain. However, little is known about the mediating process by which need satisfaction exerts its influence on academic achievement (H1, H4, & H5). Furthermore, research has yet to examine the hypothesis that need satisfaction could influence how individuals are coping with the demands of stressful situations (H2 & H3). Therefore, two studies were conducted to examine the relationships between need satisfaction, coping, and academic goal progress of university students.

Although the satisfaction of needs might explain different aspects of task-oriented coping, self-determination theory posits that the fulfillment of the three needs is necessary to reach optimal growth and well-being (Ryan & Deci, 2000). Therefore, even if one specific need might to some extent influence the use of a more particular coping strategy, it is the overall accumulation of need satisfaction that should serve as a cognitive resource likely to influence the use of a broader task-oriented coping style while preventing the use of disengagement-oriented coping.

Study 1 used a prospective design to examine the innovative hypothesis that need satisfaction influences how university students are coping with the demands of midterm exams. Incremental validity of need satisfaction was tested by statistically controlling for gender, social desirability (Strahan & Gerbasi, 1972), and two personality dispositions significantly associated with coping utilization: Neuroticism and Conscientiousness (Gosling, Rentfrow, & Swann, 2003). In fact, in a recent meta-analysis, Connor-Smith and Flachsbart (2007) have demonstrated that Conscientiousness tended to be associated with more task-oriented coping strategies whereas Neuroticism seemed to be related with disengagement strategies. However, the prospective role of need satisfaction on coping, after controlling for those two dimensions of personality, has yet to be demonstrated.

After documenting the unique effect of need satisfaction on coping, the aim of Study 2 was twofold. A first aim was to examine the hypothesis that coping could mediate the relationship between need satisfaction and academic goal progress (Ntoumanis et al., 2009; Skinner & Zimmer-Gembeck, 2007) (H6 & H7). A second, and more exploratory aim of this study, was to examine a reciprocal sequence in which need satisfaction is both an antecedent

of coping and goal progress, and an outcome of the coping process (Skinner & Zimmer-Gembeck, 2007) (H8, H9, & H10).

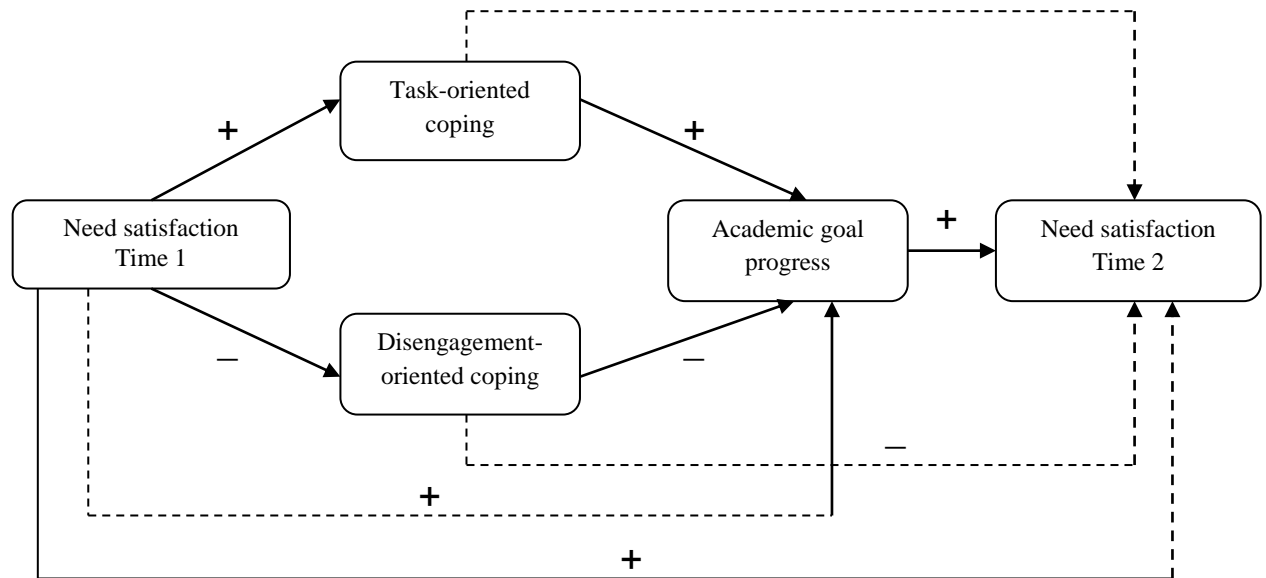


Figure 1. Hypothesized model of the relationships between need satisfaction at Time 1, coping, goal progress, and need satisfaction at Time 2. + positive relationship; - negative relationship.

Chapter 2: Method and Results

Study 1

Study 1 aimed at examining the prospective relationship between need satisfaction – assessed in the fourth week of the semester – and the use of coping strategies during midterm exams. It was expected that need satisfaction would positively and negatively correlate with task-oriented and disengagement-oriented coping, respectively. Furthermore, we sought to provide a stringent test for the role of need satisfaction by estimating its incremental value over and above the effect of four confounding covariates: gender, Neuroticism, Conscientiousness, and social desirability. It was expected that the relationship between need satisfaction and coping would remain significant, even after statistically controlling for these covariates.

Participants

Of the initial sample of 181 undergraduate students, 68 did not complete the questionnaire at Time 2, yielding a retention rate of 62%. The final sample comprised 113 participants (67.3% female) ranging in age from 16 to 24 years ($M = 19.15$, $SD = 1.20$) enrolled in psychology (21%), health sciences (32%), or other various programs (47%). The participants were in their freshman (33.6%), sophomore (23%), junior (34.5%), or senior (8.8%) year of study. The sample was predominantly Caucasian (67%) and Hispanic (19%), with other ethnical groups (African-American, Asian, Aboriginal) representing less than 14% of the sample.

Procedure and Measures

Participants completed a first online questionnaire during the fourth week of the semester. The questionnaire at Time 1 (i.e. four weeks after the start of the semester) contained socio-demographic information and measures to evaluate need satisfaction and the four covariates. Participants completed a second online questionnaire about four weeks after Time 1 (i.e. after their midterm exams) in which they were asked to report how they coped while preparing and writing their midterm exams. All descriptive statistics are displayed in Table 1. Participants received \$5 as compensation or two extra points in their introductory psychology class. Study 1 and Study 2 were approved by the Research Ethical Board of University of Ottawa and all participants provided informed consent.

Need satisfaction (Time 1). Need satisfaction was assessed using a 12-item version of the Basic Need Satisfaction Scale from Deci and Ryan (2000) measuring the need for autonomy, competence, and relatedness, but adapted to fit the academic setting (i.e. “I am free to express my ideas and opinions at school”; “I feel like I am a competent student”; “I get along with people at school”). Students were asked to indicate the extent to which the items were related to their life at school. The items were rated on a 7-point Likert scale from 1 (*not at all true*) to 7 (*very true*). The 12 items were regrouped in four separate indicators of need satisfaction using a domain representative approach (Kishton & Widaman, 1994). Accordingly, the first items of autonomy, competence, and relatedness were combined to create the first need satisfaction indicator. The second, third, and fourth items of each need satisfaction subscale were then combined to create the other indicators of need satisfaction. Several researchers have combined autonomy, competence, and relatedness to create a global

need satisfaction score (Sheldon & Filak, 2008). The internal consistency for need satisfaction was excellent (Time 1 $\alpha = .91$).

Covariates (Time 1). Neuroticism and Conscientiousness were assessed using four items from the Ten-Item Personality-Inventory (TIPI) of Gosling et al. (2003). Each item contains two descriptors (e.g., anxious-easily upset) separated by a comma, representing how students see themselves in general in their life. The items were rated on a 5-point Likert scale ranging from 1 (*does not corresponds at all*) to 5 (*corresponds strongly*). Social desirability was assessed using the short, homogeneous versions of the Marlow-Crowne Social Desirability Scale (Strahan & Gerbasi, 1972), which contained 10 items rated using a true or false format. Therefore, the alpha for this scale, along with the alphas for Conscientiousness and Neuroticism, were not computed because each scale only contained two items. Gosling et al. (2003) specifies that this measure was, in fact, designed to measure very broad domains with only two items per dimension. Thus, alphas are misleading when they are calculated on scales with small numbers of items (Kline, 2000).

Coping (Time 2). Coping was measured using six subscales from the short version of the COPE (Carver, 1997), supplemented with two subscales: increased effort (e.g., “I gave my best effort”) and relaxation (e.g., “I tried to relax my mind”) adapted from an achievement-related coping questionnaire (Gaudreau & Blondin, 2002). At Time 2, participants were asked to indicate what they were doing while preparing for their midterm exams. These 16 items were rated using a scale ranging from 1 (*does not correspond at all*) to 5 (*corresponds totally*). The 16 items corresponded to eight coping strategies, which, on the basis of a hierarchical organization of coping (Skinner et al., 2003), were regrouped into two second-order dimensions: task-oriented coping (i.e., “I’ve been taking action to try to

make the situation better”) and disengagement-oriented coping (i.e., “I’ve been giving up trying to deal with it”). The task coping dimensions included active coping, planning, increased effort, positive reappraisal, and relaxation, whereas the disengagement coping dimension included behavioral disengagement, self-blame, and denial. Two indicators of task-oriented coping were created as well two indicators of disengagement-oriented coping using a domain representative approach (Kishton & Widaman, 1994). For instance, the first and second items of the six task-oriented coping strategies were averaged, respectively, to create the first and the second indicator of task-oriented coping (i.e., “I’ve been taking action to try to make the situation better”). The internal consistency of coping dimensions was good (task-oriented coping $\alpha = .88$; disengagement-oriented coping $\alpha = .84$).

Preliminary Analyses

Attrition analyses indicated that the participants from the final sample did not differ significantly from those who dropped out after Time 1 on ratings of need satisfaction $F(1, 169) = 3.00, p > .05$, age $F(1, 180) = 2.85, p > .05$, academic year $F(1, 180) = .00, p > .05$, Neuroticism $F(1, 180) = .11, p > .05$, Conscientiousness $F(1, 180) = 1.03, p > .05$, social desirability $F(1, 180) = .37, p > .05$, and gender ($\chi^2 = 0.09, df = 1, p > .05$).

Main Results and Brief Discussion

Two hierarchical multiple regression analyses were performed on Time 2 task-oriented coping and disengagement-oriented coping, respectively (see Table 2). The four covariates were included as predictors of coping at Step 1 whereas need satisfaction was included at Step 2. Consistent with prior research, Conscientiousness and Neuroticism were respectively associated with task-oriented and disengagement-oriented coping. Of greater

importance here, need satisfaction explained unique variance in both dimensions of coping, even after having statistically controlled for gender, Conscientiousness, Neuroticism, and social desirability.

Overall, this study is the first to empirically demonstrate that the satisfaction of basic psychological needs is prospectively associated with coping. These results are lending credence to the hypothesis that the combined feelings of autonomy, competence, and relatedness provide university students with unique resources needed to effectively cope with the challenges and stresses of the academic domain, over and above gender differences, social desirability, and the significant influence of important underlying personality traits.

Study 2

Knowing that need satisfaction has unique prospective effect on coping – even after controlling for the potentially important covariates – Study 2 was aimed at examining the full overarching model displayed in Figure 1. Specifically, three sets of mediation hypotheses were tested using a prospective design with measurement points before (Time 1; need satisfaction) and after midterm exams (Time 2; coping, academic goal progress, and need satisfaction). First, need satisfaction should prospectively and indirectly relate to higher academic goal progress from a mediated positive relationship through task-oriented coping and by a mediated negative relationship through disengagement-oriented coping. In turn, task-oriented coping and disengagement-oriented should be positively and negatively associated to goal progress, respectively. Overall, the relationship between need satisfaction before the midterms (Time 1) and academic goal progress measured after the midterms (Time 2) should be significantly mediated by the way students coped during the midterm

exams (as retrospectively reported at Time 2). Second and third, it was hypothesized that both task-oriented coping and academic goal progress should also relate to positive changes in need satisfaction whereas disengagement-oriented coping should also relate to a decrement of need satisfaction over time. Academic goal progress was thus hypothesized to significantly mediate the relationship between coping and changes in need satisfaction.

Participants

The original sample consisted of 296 undergraduate students. Of these participants, 168 completed the questionnaire at Time 2, for a retention rate of 57%. Also, two participants had completed only half of the measures of the questionnaire at Time 2 and were therefore excluded from the analyses. The Mahalanobis distance critical value for five variables, $\chi^2(5) = 20.52, p < .05$, indicated that there was no participant that could be identified as multivariate outliers (Myers, Gamst, & Guarino, 2006). The final sample consisted of 166 undergraduate students (83.1% female) ranging in age from 16 to 25 years ($M = 19.31, SD = 2.47$) enrolled in psychology (18%), health sciences (40%), or other various programs (42%). The majority of participants were in their freshman year (57%), with a smaller proportion being in their sophomore (13%), junior (22%), or senior (8%) year of study. The sample was predominantly Caucasian (64%) and Asian (17%), with other ethnical groups (African-American, Hispanic, Aboriginal) representing 15% of the sample.

Procedure and Measures

A short-term prospective design with two measurement points was used in this study. Participants were recruited from undergraduate classes and were offered either a five dollars' compensation or were given an extra point in their psychology introduction class. They were

then invited to complete a second questionnaire a few weeks after the midterm exams. At Time 1, participants provided socio-demographic and academic information, and they completed measures of need satisfaction. At Time 2, they completed measures of need satisfaction, coping, and goal progress. All descriptive statistics are displayed in Table 3.

Personal goal. Participants were first asked to report a specific, meaningful, and measurable academic goal that they wished to pursue over the course of the semester. Personal goals are 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).

Need satisfaction (Time 1 & 2). As per Study 1. The internal consistency for need satisfaction was excellent (Time 1 $\alpha = .90$; Time 2 $\alpha = .90$).

Coping (Time 2). As per Study 1. The internal consistency of coping dimensions was good (task-oriented coping $\alpha = .84$; disengagement-oriented coping $\alpha = .78$).

Goal progress (Time 2). Goal progress was assessed with three items measuring the extent to which students had progressed in their academic goals since the start of the semester. Responses were rated on 9-point Likert scale ranging from 1 (*not at all agree*) to 9 (*totally*). The internal consistency was excellent ($\alpha = .96$).

Statistical Analyses

Structural equation modeling (SEM) was performed using maximum likelihood robust estimation in the MPLUS software. A confirmatory factor analysis was initially performed to test the suitability of the measurement model. A structural model was then

estimated to test the suitability of the proposed structural model (see Figure 1). The latent variables of need satisfaction at Time 1 and Time 2 were modeled using four separate indicators of need satisfaction. The latent variables of coping were modeled with two task-oriented coping and two disengagement-oriented coping strategies. Finally, the latent variable of goal progress was created using the three items of the goal progress subscale to ensure the local identification of the latent variable. These indicators are described more extensively in the method section of Study 1.

In a first step of the structural analyses, a *full mediation model* was tested. In a second step, two predetermined *partial mediation models* were tested and compared against the full mediation model. The first partial mediation model added a direct path between Time 1 need satisfaction and Time 2 goal progress. The second partial mediation model added two direct paths from task-oriented coping and disengagement-oriented coping to Time 2 need satisfaction. If the partial mediation model does not provide a better fit to the data, the full mediation model is supported. In other words, if the newly added direct paths are not significant, the full mediation model is supported. Finally, each newly added path was decomposed into direct and indirect effects (Mackinnon, Lockwood, Hoffman, West, & Sheets, 2002). The direct effect represents the association of an independent variable with a dependent variable. The indirect effect represents the effect of one or more mediating variables in the relationship between an independent and a dependent variable. A full mediation relationship necessitates the indirect effect to be significant and the direct effect to be non-significant. A partial mediation model requires both the direct and indirect effects to be significant. Significance of the indirect effects was estimated using bootstrapping

procedure bias-corrected accelerated bootstrapped 95% confidence interval generated using 500 random samples in MPLUS (Preacher & Hayes, 2008).

The fit of the measurement and structural models were tested using χ^2 . Other fit indices were used to test relative (NNFI and CFI) as well as absolute (RMSEA) fit. Values between .90 and .94 for the NNFI and CFI indicated an acceptable fit whereas values of .95 and higher indicated a relatively good fit (Hu & Bentler, 1999). Values smaller than .08 for the RMSEA and SRMR indicated an acceptable fit whereas values smaller than .06 indicated a relatively good fit. Finally, when the upper bound of the RMSEA 90% CI was below .08, the model was assumed to provide a good fit. Given that bootstrapping procedures are not available in estimation methods that are adjusting for multivariate non-normality, all fit indices and standard errors were not corrected for non-normality. Nested models were compared using the regular formula of the difference in χ^2 .

Preliminary Analyses

Treatment of missing data. Attrition analyses indicated that participants who completed both Time 1 and 2 did not differ significantly from those who dropped out after Time 1 on ratings of autonomy $F(1, 266) = 0.05, p > .05$, competence $F(1, 266) = 0.14, p > .05$, relatedness $F(1, 266) = 0.00, p > .05$, age, $F(1, 283) = 1.13, p > .05$, and academic year $F(1, 288) = 2.18, p > .05$. However, there was a significant mean difference between the final sample of participants ($n = 166$) and participants that were excluded from the study after Time 1 ($n = 130$) for gender ($\chi^2 = 6.66, df = 1, p < .05$). Nonetheless, the majority of the sample consisted of females. Thus, we assume that the gender difference between participants who were excluded of the study and those who were not might be due to the

initial disproportion of the sample. In addition, attrition analyses also indicated that participants who completed three measurement points and those who only completed one did not differ significantly on ratings of autonomy $F(1, 266) = 0.05, p > .05$, competence $F(1, 266) = 0.14, p > .05$, relatedness $F(1, 266) = 0.00, p > .05$, age, $F(1, 283) = 1.13, p > .05$, academic year $F(1, 288) = 2.18, p > .05$, and gender ($\chi^2 = 6.66, df = 1, p < .05$).

Measurement Models

Given that the same indicators of need satisfaction as a latent variable were assessed at two points in time, their auto-correlated uniqueness was estimated freely. The proposed measurement model provided an acceptable fit: $\chi^2(84) = 131.54, p < .01$, CFI = .976, NNFI = .970, SRMR = .061, RMSEA = .054, and upper bound of the RMSEA 90% CI = .080. This model was retained as a good fitting and theoretically driven measurement model. The standardized factor loadings ranged from .73 to .90 for need satisfaction at Time 1 and Time 2, from .87 to .88 for task-oriented coping, from .78 to .98 for disengagement-oriented coping, and from .92 to .95 for goal progress. The error-free correlations between the latent variables are presented in Table 3. As expected, need satisfaction at Time 1 was significantly associated with goal progress ($r = .23, p < .01$). Need satisfaction was also significantly associated with both task-oriented ($r = .38, p < .01$) and disengagement-oriented coping ($r = -.29, p < .05$). Moreover, task-oriented coping ($r = .50, p < .01$) and disengagement-oriented coping ($r = -.29, p < .01$) were positively and negatively related to goal progress, respectively. Finally, task-oriented coping ($r = .63, p < .01$), disengagement-oriented coping ($r = -.46, p < .01$), and goal progress ($r = .50, p < .05$) were significantly associated with need satisfaction at Time 2.

Structural Models

Fully mediated model. A first structural model was tested to examine the hypothesis of full mediation. This model provided an acceptable fit: $\chi^2(83) = 160.16$, CFI = .960, NNFI = .950, SRMR = .086, RMSEA = .076, and upper bound of RMSEA 90% CI = .09. The test-retest path between need satisfaction at Time 1 and 2 was significant ($r = .48$, $p < .01$). All other relationships were significant and in the expected direction. This model was considered as the most parsimonious model for basis of comparisons with the two predetermined partial mediation models.

Direct path from Time 1 need satisfaction to Time 2 goal progress. As predetermined by our mediating hypotheses, a first partial mediation model was tested in which a direct relationship was added between Time 1 need satisfaction and Time 2 goal progress (see Figure 2). This model provided an acceptable fit to the data: $\chi^2(82) = 160.16$, $p < .01$, CFI = .960, NNFI = .950, SRMR = .086, RMSEA = .076, and upper bound of RMSEA 90% CI = .094. However, this model did not provide a significant improvement of fit, as the newly added path was not significant (direct effect, $\beta = .01$, $p > .05$). The direct path from Time 1 need satisfaction to Time 2 goal progress was not included in the subsequent model. As expected, the total indirect effect was significant $B = .44$, 95% CI = .17 to .73, $p < .05$, thus showing that the relationship between Time 1 need satisfaction and Time 2 goal progress was fully mediated by coping. Both task-oriented, $B = .33$, 95% CI = .12 to .56, $p < .05$, and disengagement-oriented coping, $B = .11$, 95% CI = .01 to .29, $p < .05$, had significant specific indirect effects in the relationship between Time 1 need satisfaction and Time 2 goal progress.

Direct paths from Time 2 coping to Time 2 need satisfaction. As predetermined by our mediation hypotheses, a second partial mediation model was tested in which direct paths were added between the two coping variables and Time 2 need satisfaction (see Figure 3). This model provided an acceptable fit to the data: $\chi^2(81) = 127.77, p < .01, CFI = .976, NNFI = .969, SRMR = .060, RMSEA = .060,$ and upper bound of RMSEA 90% CI = .079. The addition of the two direct paths resulted in a significant improvement in model fit compared to full mediation model ($\Delta\chi^2 = 32.29, \Delta df = 2, p < .01$). As such, the direct paths from task-oriented ($\beta = .34, p < .01$) and disengagement-oriented coping ($\beta = -.27, p < .01$) to need satisfaction at Time 2 were both significant. As expected, the indirect effect of task-oriented coping was significant, $B = .31, 95\% CI = .10 \text{ to } .54, p < .05$, thus providing evidence that goal progress was a partial mediator of the relationship between task-oriented coping and need satisfaction at Time 2. Furthermore, the indirect effect of disengagement-oriented coping was marginally significant $B = .12, 95\% CI = .00 \text{ to } .29, p = .05$, thus demonstrating that goal progress was marginally mediating the relationship between disengagement-oriented coping and need satisfaction at Time 2. Parameter estimates of this final structural model are displayed in Figure 3.

Study 1: Descriptive Statistics and Correlations Between Variables and Covariates

	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.	6.
1. Social desirability (Time 1)	5.42	2.11	-					
2. Conscientiousness (Time 1)	4.89	.88	.41**	-				
3. Neuroticism (Time 1)	3.48	.98	-.24**	-.15	-			
4. Need satisfaction (Time 1)	4.89	.98	.17	.33**	-.33**	.91		
5. Task-oriented coping (Time 2)	3.26	.67	.18	.40**	-.17	.44**	.88	
6. Disengagement-oriented coping (Time 2)	1.90	.76	-.10	-.12	-.30	-.36**	-.09	.84

Note. Alpha of Cronbach are reported on the diagonal. ** $p < .01$, * $p < .05$.

Study 1: Results of Hierarchical Multiple Regressions

Effects	<i>t</i>	β	<i>r</i>
Time 2 Task-Oriented Coping			
Step 1 $\Delta R^2 = .165$, $\Delta F(4, 111) = 5.48$, $p < .01$			
Gender	-0.91	-.08	-.08
Social desirability	0.08	.01	.18
Conscientiousness	4.02	.39**	.40**
Neuroticism	-.82	-.08	-.17*
Step 2 $\Delta R^2 = .076$, $\Delta F(1, 110) = 10.94$, $p < .01$			
Need satisfaction	3.85	.35**	.44**
Time 2 Disengagement-Oriented Coping			
Step 1 $\Delta R^2 = .121$, $\Delta F(4, 111) = 3.81$, $p < .01$			
Gender	-0.16	-.02	.07
Social desirability	-0.04	-.00	-.10
Conscientiousness	-0.69	-.07	-.12
Neuroticism	2.86	.29**	.29**
Step 2 $\Delta R^2 = .050$, $\Delta F(1, 110) = 6.70$, $p < .05$			
Need satisfaction	-3.00	-.30**	-.36**

Note. $n = 113$. All predictors in the model were measured at Time 1. ** $p < .01$. * $p < .05$.

Study 2: Descriptive Statistics and Correlations Between the Latent Variables

	<i>M</i>	<i>SD</i>	1.	2.	3.	4.	5.
1. Need satisfaction (Time 1)	5.10	.92	.90				
2. Task-oriented coping (Time 2)	3.40	.64	.38**	.84			
3. Disengagement-oriented coping (Time 2)	1.94	.70	-.29*	-.19**	.78		
4. Goal progress (Time 2)	5.63	1.85	.23**	.50**	-.29**	.90	
5. Need satisfaction (Time 2)	4.91	.92	.57**	.63**	-.46**	.50*	.90

Note. Alpha of Cronbach are reported on the diagonal. ** $p < .01$, * $p < .05$.

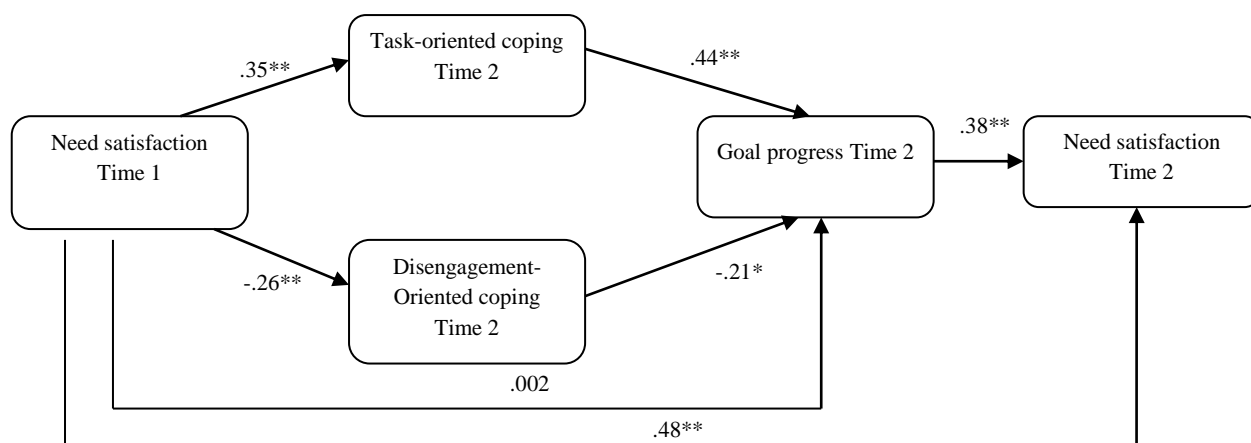


Figure 2. Coping as a mediator in the relationship between need satisfaction at Time 1 and goal progress. $** p < .01$, $* p < .05$.

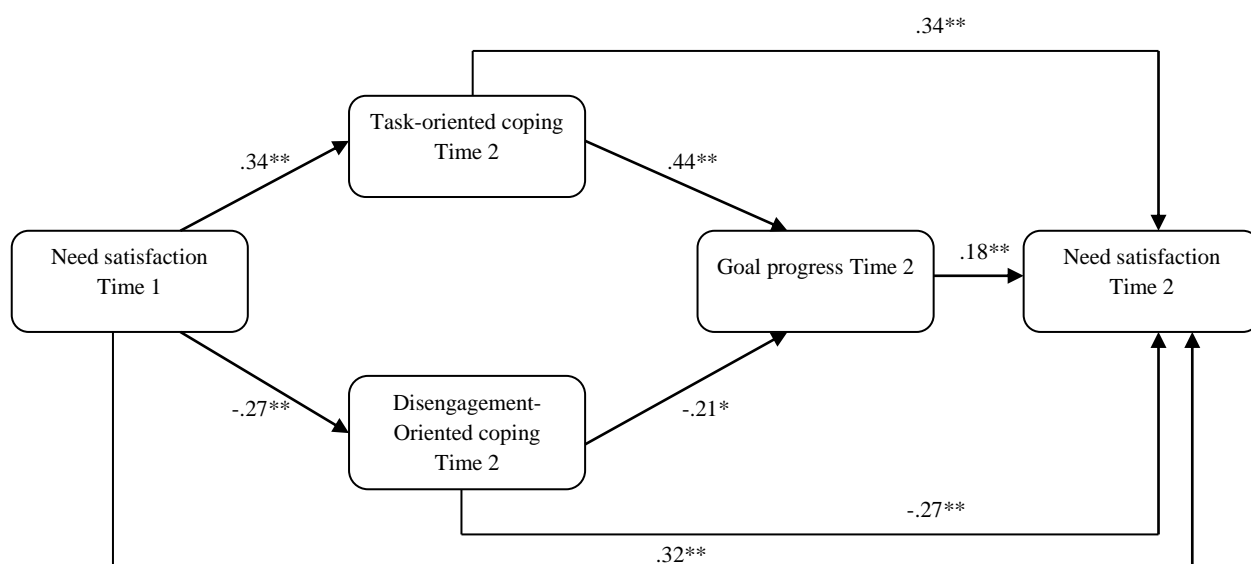


Figure 3. Goal progress as a mediator in the relationship between coping and need satisfaction at Time 2. $** p < .01$, $* p < .05$.

Chapter 3: Discussion

Summary of the Results

This study tested an integrative model in which need satisfaction was both an antecedent of coping and academic goal progress and an outcome of the coping process. First, Study 1 provided initial evidence for the significant associations between basic psychological needs fulfillment and coping during midterms. It seems that the extent to which needs are satisfied at the beginning of the semester is associated with the use of distinct coping strategies later on in the semester, namely when students are facing stressful events such as midterms. Thus, feeling autonomous, competent, and connected with others seems to encourage students to make better choices when dealing with the stress associated with writing exams. Second, it is worth reporting the prospective and incremental nature of these associations obtained using a prospective design, after partialing out the contribution of two underlying personality traits – conscientiousness and neuroticism – known to play an important role in the coping process. In fact, a meta-analysis from Connor-Smith and Flachsbart (2007) demonstrated that conscientiousness was significantly related to the use of problem-solving (i.e. task-oriented) coping whereas neuroticism was associated with more disengagement-oriented coping strategies such as withdrawal. Hence, it seems that the choice of specific coping strategies made by people to deal with stressful situations might be strongly influenced by their personality. In the present thesis, we were nonetheless able to show that need satisfaction could significantly influence the choice of coping strategies over and above student's personality trait. Overall, the results from both studies were consistent with recent theoretical advances (Ntoumanis et al., 2009; Skinner & Zimmer-Gembeck, 2007) proposing that the satisfaction of basic psychological needs facilitates self-regulation by promoting the choice of more task-oriented coping strategies while preventing withdrawal

from the challenges and stresses associated with demanding life situations such as academic exams.

Study 2 provided novel indications whereby coping dimensions are playing a significant role in the processes by which the fulfillment of psychological needs facilitates progress towards the attainment of academic goals. More specifically, these results demonstrated that task-oriented as well as disengagement-oriented coping significantly mediated the relationship between need satisfaction at Time 1 (i.e. at beginning of the semester) and goal progress at Time 2 (i.e. a few weeks after midterms). In turn, goal progress significantly mediated the relationship between task- and disengagement coping and need satisfaction at Time 2. In fact, task-oriented coping was positively associated with increases in need satisfaction because the use of task coping strategies was significantly related to progress toward academic goals. In addition, disengagement coping was negatively related to need satisfaction at Time 2 because disengagement-oriented coping was negatively associated to student's goal progress. Hence, the mere effort of planning, relaxing, reappraising, and managing one's effort is associated with greater likelihood of progressing towards the attainment of academic goals. In contrast, withdrawal from the process of actively striving to pursue important outcomes seems to play a more neutral role in the prediction of academic goal achievement. Furthermore, the integrative models of Skinner and Zimmer-Gembeck (2007) and Ntoumanis et al. (2009) both highlighted the potential role of coping in the development of basic need satisfaction fulfillment. Furthermore, Ntoumanis et al. (2009) proposed that coping and goal progress could both contribute to the accumulation of feelings of autonomy, competence, and relatedness.

Results of Study 2 were consistent with the tenets of both models, thus offering novel support for the proposed reciprocal nature of the relationship between need satisfaction and coping. On the one hand, academic goal progress was associated with significant increases in need satisfaction. On the other hand, academic goal progress mediated the relationship between coping and changes in need satisfaction. These results not only reaffirm that need satisfaction helps students to choose task-oriented strategies when dealing with stressful issues, but they also indicate that actively confronting academic challenges and stressors is a sufficient ingredient, in itself, to facilitate the development of feelings of autonomy, competence, and relatedness over the course of a semester. These results are consistent with theories of sustainable happiness (Lyubormisky, Sheldon, & Schkade, 2006) asserting that both happiness-relevant circumstances (i.e., progress on goals) and the intentional processes leading to these circumstances (i.e., effortful strivings) are important factors for the development of well-being. These findings also complement recent studies showing that coping mechanisms are playing a significant role in predicting motivational changes over time. In fact, it seems that the use of task-oriented coping strategies might predict self-determined motivation changes throughout a semester (Amiot, et al., 2008; Thompson & Gaudreau, 2008).

Practical Implications

This study contributes to an emerging stream of research placing coping and engagement "as part of a larger motivational dynamic" (Skinner et al., 2008, p. 765) closely related to the experience of personal goal striving. Our results, although correlational in nature, bear practical importance for counselling and educational psychologists by highlighting the potential of coping interventions to improve academic achievement and the

sustainable development of self-determination in the academic domain. Educational psychologists could devise and validate stress management programs to teach students how to cope with the requirements of a specific stressful situation and to adapt their coping efforts according to the changing demands of their multiple life strivings. Demonstrating the causal role of coping within a natural context – in the realm of randomized control trials of coping interventions – is needed to eventually contribute to well-being of students and individuals in general. In turn, these interventions, evaluated using randomized control trials, hold promises to evaluate and refine our understanding of the affective, motivational, and achievement outcomes of coping (Compas et al., 2010). Throughout their school years, students are likely to accumulate patterns of thoughts and behaviors that might influence the way they are pursuing their studies and the way they confront difficult situations. Hence, by helping them develop efficient coping strategies, theoretically-driven interventions could facilitate the accumulation of effective behaviors that are likely to be pursued through their future careers.

Social agents (i.e., parents, coach, teachers, and peers) are important vectors of development as they can actively support the person in his or her striving to become self-initiated, competent, and socially connected. Specifically, an autonomy supportive context implies that the environment values personal growth and well-being. Instructional behaviors from social agents should provide explanatory rationales for decisions that are taken, should rely on flexible language, should consider the other's perspective, should provide positive feedback, and should encourage individuals to foster positive relationships. On the other hand, a controlling environment pressures the other person toward prescribed outcomes and ways of behaving. Instructional behaviors from controlling social agents are characterized by pressuring language, rely on outer sources of motivation, and neglect explanatory rationale.

By definition, autonomy support implies the *interpersonal sentiment and behavior to identify, nurture, and develop another's inner motivational resources* whereas control signifies the *interpersonal sentiment and behavior to pressure another toward compliance with a prescribed way of thinking, feeling, or behaving* (Reeve, 2009). Self-determination theory proposes that the dialectic meaning attached to social environment – rather than the social environment itself – is the pivotal factor to understand the influence of social environment on the acquisition of autonomous self-regulation.

At a first glance, some of the results from this thesis might be interpreted as challenging the fundamental role of social environment as the key determinant of self-determination. However, affirming the role of coping as an important developmental pathway does not overshadow the critical role of autonomy supportive practices. Quite the contrary, it illustrates that active and effortful regulation of stressful events is essential to protect and preserve the assets gained through cumulative provisions of autonomy support. It might be the case that autonomy support serves as a blue print for the acquisition of effective coping skills needed to securely explore one's environment, particularly in periods of stress and life transition. In fact, Nicolas, Gaudreau, and Franche (in press) have shown that autonomy supportive behaviors from coaches can allow athletes to choose more efficient coping strategies, namely task-oriented strategies, when facing stressful competitive events. According to self-determination theory, autonomy support is the key antecedent of need satisfaction. Therefore, by positively influencing the fulfilment of the need for autonomy, competence, and relatedness, autonomy support as well as people's perception about the extent to which their needs are satisfied, can provide students with both internal as well as

external cues on their capacity to orient their behaviors toward the choice of better and more effective coping strategies.

Furthermore, developmental psychologists have for long recognized the role of individual processes in shaping social milieu in a way consistent with one's personality. Once acquired and used in a socially competent manner, coping strategies are likely to make individuals feel more effective, autonomous, and socially connected in their interactions with the social milieu. In turn, socially competent coping might be used as a signal by parents and teachers to increase their provision of autonomy support in a way that will consolidate the sustainable development of basic psychological needs while increasing the likelihood of being exposed to a broader set of happiness-relevant life circumstances. This bottom-up channel is consistent with recent theoretical developments suggesting that small, but repetitive successful interactions with the environment, might be needed to generate substantial changes in self-determination over time (Vallerand, Pelletier, & Koestner, 2008). Overall, these results and perspectives illustrate the complex nature of the relationship between autonomy support, self-determination, and coping rather than contradicting the overarching heuristic qualities of self-determination theory. It places the importance on the role played by the individual in his own academic development but suggests that they are active agents likely to use different strategies to help them succeed through their goal pursuit.

Limitations

Despite the theoretical and practical implications of this study, some limitations still need to be taken into consideration. First of all, this study relied exclusively on self-reported data. Although students might be the most reliable source of information to evaluate the

satisfaction of their needs and their coping strategies, further work might be needed to obtain informant reports (e.g. from teachers). For example, teachers could write down the coping strategies that students seem to be using in exam periods. To do so, they could use an observational method to note what type of behaviors students are adopting in class before, during, and after writing their exams. Informant reports of coping have also been collected from parents of students in past coping literature (Compas et al., 2010; Connor-Smith & Flachsbart, 2007). On a similar note, goal progress represents the extent to which students are advancing towards the realization of an academic goal. Therefore, it might be worth including self- and informant-reports of goal attainment at the end of the semester combined with an objective measure of grade point average for the term, thus providing both subjective and objective measures of academic performance.

Second, the prospective design used in this study included only two measurement points. Although this design was an improvement compared to cross-sectional assessment, adding a third time point would be beneficial in obtaining a better approximation of the impact that need satisfaction and coping can have on goal attainment over the course of the goal striving process throughout a university semester. From a statistical standpoint, the limitation of this design lies in the fact that the mediation variable (i.e. coping) was retrospectively assessed at the same time point as the dependent variable (i.e. goal progress). This can have the effect of increasing the probability of observing stronger relationships between the mediator and the dependent variable. Conducting a similar study with need satisfaction assessed at Times 1, 2, and 3, coping strategies at Time 2 as they are being employed, and goal attainment at Time 3 would provide a better demonstration of the proposed mediation sequence. Moreover, need satisfaction being tested at a third

measurement point would truly measure the impact of coping strategies and goal progress on the changes of need satisfaction throughout the course of the semester. Doing so would avoid confounds between goal attainment and self-reported coping strategies, as well as prevent discrepancies between retrospective reports of coping strategies and those actually employed.

Third, the research on need satisfaction has traditionally relied on correlational methods, thus precluding inference about the causal nature of the reported effect (for an exception, see Sheldon & Filak, 2008). Future work would benefit from adopting an experimental approach to examine whether thwarting the needs for relatedness, autonomy, and competence would render students more susceptible to suffer from performance decrement and to adopt disengagement-oriented coping to a larger extent than task-oriented coping. For example, we could design an experimental study with three different groups, namely a group of students for whom needs would be experimentally thwarted, a second group for whom need satisfaction would be nurtured, as well as a control group. We could test need satisfaction before the experiment as well as at the end of the study in order to control for baseline need satisfaction. After putting students in different settings (namely thwarting or nurturing need contexts), we could have them face a stressful lab experiment such as writing a test or doing a computer task. We could then question them on the type of strategies they used to face this difficult task. We could also note their behaviors as they are performing the task. At the end of the experiment, we could finally question them about their performance on the task as well as recording their objective performance. By using such a design, we would be able to provide a better causal explanation of the processes by which need satisfaction can enhance goal attainment.

Future Research Questions

First, although this study provides interesting and promising results, it would be worth using the same study design with different populations. In fact, we could test the same hypotheses within elementary or high school populations instead of students in university settings. Although it is necessary to investigate the key elements promoting university achievement, it is essential to help students succeed even at lower levels of education. In fact, promoting success and achievement amongst high school students could increase the likelihood of pursuing their studies to higher levels and securing higher socio-economic status in their adult lives. Academic settings can significantly allow individuals to develop and accumulate the necessary resources to face challenges and difficulties while reaching higher levels of attainment. Using education as a promotion and prevention factor is not only important for university students who will be exploring and entering the working market, but it is also pivotal for high school students who will soon have to choose their study orientation or even their future career. Therefore, testing the hypotheses of this thesis amongst high school students could ultimately lead to the development of interventions specifically design for this population.

Second, self-determination theory asserts that each of three needs must be equally and highly satisfied to maximize well-being and optimal functioning. Most studies also revealed moderate to strong correlations between the satisfaction of the three needs, thus preventing reliable and fair comparison of which need(s) is(are) the strongest predictor(s) of consequential life outcomes. Recently, Sheldon and Niemiec (2006) have proposed and examined an alternate modeling approach using the concept of need satisfaction balance. Specifically, the balance of needs implies that each need are equally satisfied such that they

all three have the same level. In other words, three balance orientations can be derived from measuring need balance; low levels of autonomy, competence, and relatedness; moderate levels on the three needs; and high levels of the three needs. Their findings, recently replicated with a sample of university students (Sheldon & Filak, 2008) are lending credence to incremental validity of need satisfaction balance for the development of sustainable well-being. Thus, future research is needed to investigate whether balance of need satisfaction could influence coping, over and above the unique effect of the satisfaction of the needs for relatedness, autonomy, and competence.

Finally, the balance of need satisfaction has also been used to examine whether generalized fulfillment of needs across life domains is preferable to more local or specialized need satisfaction (Milyavskaya et al., 2009). The current study examined students in the school domain without taking into consideration outside sources of influence such as friends, romantic partners, family, and part-time work. Future work would benefit from adopting a more holistic perspective to examine the potential impact of balance of need satisfaction across life domains on coping. As such, self-determination research could examine the cross-contextual consistency of need satisfaction using recent methodological advances put forward in personality psychology (Fleeson, 2001). Unfortunately, sacrificing the satisfaction of needs in interpersonal areas (i.e., friends, family, romantic relationships) might be seen as a good way by some university students to attain higher probabilities of graduating with honours, particularly in highly competitive academic disciplines. Such imbalance or within-person variability in cross-contextual need satisfaction might promote academic success in the short-term while hindering one's well-being in the long-term. Such a pattern of need satisfaction could explain the paradoxical effect of some personality traits, like self-oriented

perfectionism, whereby the individuals obtain high levels of success while reporting low to moderate levels of well-being (Flett & Hewitt, 2005).

General Thoughts on Self-Determination Theory

Finally, although we believe this article is an interesting contribution to the motivation and coping literature in academic contexts, there are still some interesting questions that need to be explored and scrutinized. Self-determination theory has extensively demonstrated the benefits of being intrinsically motivated and the benefits of feeling competent, autonomous, and related to others on different emotional, behavioural, or cognitive outcomes. However, up to now, the literature has treated motivation and need satisfaction as individual differences without entirely acknowledging the importance of the within-person variations of motivational regulations through days, weeks, or months. This thesis relied exclusively on between-subject variation allowing the conclusion that students with higher need satisfaction at the beginning of the semester are using more efficient coping strategies during their midterms than their counterparts with lower levels of need satisfaction. Albeit important, these conclusions will need to be replicated using a within-person design to observe the dynamic relationships of need satisfaction, coping, and achievement in the academic field (Gagné et al., 2003). In fact, throughout the semester, students might have significant within-person fluctuations regarding their feelings of autonomy, competence, and relatedness, which are likely to influence their momentary choice of coping strategies. Therefore, university students might disengage from stressful situations on days during which their basic needs are thwarted whereas they might focus more on the task on days during which they feel more autonomous, competent, and connected with people in their school environment. For example, a design following students every week for an entire

semester would be appropriate to investigate these complex person-situation interactions. Similar designs should also be tested in different life domains, namely in sport or work settings for example.

We suggest that the study of motivation in general should be moving toward a more person-oriented approach rather than solely on between-person research designs. It is worth noticing that self-determination theory is design to focus on the *self* and to study the dynamics between the self and its environment. However, we rarely, as researchers, orient our research questions on the self specifically. It is imperative to know what people tend to do in general, as well as which situations are enhancing positive consequences. However, at the end of the line, psychologists have to deal with patients as unique individuals with unique ways of thinking and behaving. In other words, the ultimate goal of psychologists is to help people deal with life struggles by enhancing the accumulation of positive life experiences. This thesis claims that individuals are pro-active in the pursuit of their activities and is therefore coherent with Reeve (2009) who argued that need satisfaction enhances a willingness to seek out environmental cues that will nurture our need satisfaction. In a society in which people strive for growth and happiness, it is essential to help them develop their full potential and it is even more crucial to promote a healthy balance of achievement and accomplishment in every life domains. In that sense, *self-determination theory* is probably the most appropriate theory to explain and promote growth and well-being by placing the self as the leading actor of his or her own personal development.

References

- Amiot, C. E., Blanchard, C. M., & Gaudreau, P. (2008). The self in change: A longitudinal investigation of coping and self-determination processes. *Self and Identity, 7*, 204-224. doi: 10.1080/15298860701580793.
- Amiot, C. E., Gaudreau, P., & Blanchard, C. M. (2004). Self-determination, coping, and goal attainment in sport. *Journal of Sport and Exercise Psychology, 26*(3), 396-411.
- Amorose, A. J., & Anderson-Butcher, D. (2007). Autonomy-supportive coaching and self-determined motivation in high school and college athletes: A test of self-determination theory. *Psychology of Sport and Exercise, 8*, 654-670. doi:10.1016/j.psychsport.2006.11.003.
- Baard, P. P., Deci, E. L., & Ryan, R. M. (2004). Intrinsic need satisfaction: A motivational basis of performance and well-being in two work settings. *Journal of Applied Social Psychology, 34*, 2045-2068. doi: 10.1111/j.1559-1816.2004.tb02690.x.
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin, 117*, 497-529. doi : 10.1037/0033-2909.117.3.497.
- Begley, T. M. (1998). Coping strategies as predictors of employee distress and turnover after an organizational consolidation: A longitudinal analysis. *Journal of Occupational and Organizational Psychology, 71*(4), 305-329.

Black, A. E., & Deci, E. L. (2000). The effects of instructors' autonomy support and students' autonomous motivation on learning organic chemistry: A self-determination theory perspective. *Science Education* 84, 740-756. doi: 10.1002/1098-237X%28200011%2984:6%3C740::AID-SCE4%3E3.0.CO;2-3.

Blais, M., Sabourin, S., Boucher, C., & Vallerand, R. J. (1990). Toward a model of couple happiness. *Journal of Personality and Social Psychology*, 59, 1021-1031. doi: 10.1037/0022-3514.59.5.1021.

Blanchard, C. M., Mask, L., Vallerand, R. J., de la Sablonnière, R., & Provencher, P. (2007). Reciprocal relationships between contextual and situational motivation in a sport setting. *Psychology of Sport and Exercise*, 8, 854-873. doi: 10.1016/j.psychsport.2007.03.004.

Brown, S. P., Westbrook, R. A., & Challagalla, G. (2005). Good cope, bad cope: Adaptive and Maladaptive coping strategies following a critical negative work event. *Journal of Applied Psychology*, 90, 792-798. doi: 10.1037/0021-9010.90.4.792.

Carver, C. S. (1997). You want to measure coping but your protocol's too long: Consider the Brief COPE. *International Journal of Behavioral Medicine*, 4, 92-100. doi: 10.1207/s15327558ijbm0401_6.

Chan, D. W., & Hui, E. K. (1995). Burnout and coping among Chinese secondary school teachers in Hong Kong. *British Journal of Educational Psychology*, 65(1), 15-25.

Compas, B. E., Champion, J. E., Forehand, R., Cole, D. A., Reeslund, K. L., Fear, J., et al. (2010). Coping and parenting: Mediators of 12-month outcomes of a family group cognitive-behavioral preventive intervention with families of depressed parents. *Journal of Consulting and Clinical Psychology, 78*, 623-634. doi: 10.1037/a0020459.

Connor-Smith, J.K., & Flachsbart, C. (2007). Relations between personality and coping: A meta-analysis. *Journal of Personality and Social Psychology, 93*, 1080-1107. doi: 10.1037/0022-3514.93.6.1080.

Deci, E. L., & Ryan, R. M. (1985b). *Intrinsic motivation and self-determination in human behavior*. New York: Plenum.

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to self: Integration in personality. In R. Dienstbier (Ed.), *Nebraska symposium on motivation: Perspectives on motivation* (Vol. 38, pp. 237–288). Lincoln: University of Nebraska Press.

Deci, E. L., & Ryan, R. M. (2000). The "What" and "Why" of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11*, 227-268. doi: 10.1207/S15327965PLI1104_01.

Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., & Kornazheva, B. P. (2001). Need satisfaction, motivation, and well-being in the work organizations of a former eastern bloc country: A cross-cultural study of self-determination. *Personality and Social Psychology Bulletin, 27*, 930-942. doi: 10.1177/0146167201278002.

Endler, N. S., Kantor, L., & Parker, J. D. (1994). State-trait coping, state-trait anxiety and academic performance. *Personality and Individual Differences, 16*, 663-670. doi: 10.1016/0191-8869%2894%2990208-9.

Filak, V. F., & Sheldon, K. M. (2008). Teacher support, student motivation, student need satisfaction, and college teacher course evaluations: Testing a sequential path model. *Educational Psychology, 28*, 711-724. doi: 10.1348/014466607X238797.

Fleeson, W. (2001). Toward a structure- and process-integrated view of personality: Traits as density distributions of states. *Journal of Personality and Social Psychology, 80*, 1011-1027. doi : 10.1037//0022-3514.80.6.1011.

Flett, G. L., & Hewitt, P. L. (2005). The perils of perfectionism in sports and exercise. *Current Directions in Psychological Science, 14*, 14 -18. doi: 10.1111/j.0963-7214.2005.00326.x.

Filak, V. F., & Sheldon, K. M. (2003). Student psychological need satisfaction and collegeteacher-course evaluations. *Educational Psychology 23*, 235-247. doi: 10.1080/0144341032000060084.

Gagné, M., Koestner, R., & Zuckerman, M. (2000). Facilitating acceptance of organizational change: The importance of self-determination. *Journal of Applied Social Psychology, 30*, 1843-1852. doi: 10.1111/j.1559-1816.2000.tb02471.x.

Gagné, M., Ryan, R. M., & Bargmann, K. (2003). Autonomy support and need satisfaction in the motivation and well-being of gymnasts. *Journal of Applied Sport Psychology, 15*, 372-390. doi: 10.1080/714044203.

Gaudreau, P., & Blondin, J.-P. (2004) Different athletes cope differently during a competition: A cluster analysis of coping. *Personality and Individual differences, 36*, 1865-1877. doi: 10.1016/j.paid.2003.08.017.

Gaudreau, P., Blondin, J. -P., & Lapierre, A. -M. (2002). Athlete's coping during a competition: Relationship of coping strategies with positive affect, negative affect, and performance-goal discrepancy. *Psychology of Sport and Exercise, 3*, 125-150. doi: 10.1016/S1469-0292(01)00015-2.

Gaudreau, P., Carraro, N., & Miranda, D. (2010). *From goal motivation to goal progress: The mediating role of coping in the Self-Concordance Model*. Manuscript submitted for publication.

Gaudreau, P., & Blondin, J.-P. (2002). Development of a questionnaire for the assessment of coping strategies employed by athletes in competitive sport settings. *Psychology of Sport and Exercise, 3*, 1-34. doi: 10.1016/S1469-0292(01)00017-6.

Gosling, S. D., Rentfrow, P. J., & Swann, W. B. J. (2003). A very brief measure of the big five personality domains. *Journal of Research in Personality, 37*, 507-528. doi: 10.1016/S0092-6566(03)00046-1.

Greenglass, E.R., & Burke, R.J. (1990). A gender-role perspective of coping and burnout. *Applied Psychology, 29*, 5-27. doi: 10.1111/j.1464-0597.1990.tb01035.x.

Greguras, G. J., & Diefendorff, J. M. (2009). Different fits satisfy different needs: Linking person- environment fit to employee commitment and performance using self-determination theory. *Journal of Applied Psychology, 94*, 465-477. doi: 10.1037/a0014068.

Guay, F., & Vallerand, R. J. (1997). Social context, student's motivation, and academic achievement: Toward a process model. *Social Psychology of Education, 1*, 211-233. 10.1007/BF02339891.

Healy, C.M., & McKay, M.F. (2008). Nursing stress: the effects of coping strategies and job satisfaction in a sample of Australian nurses. *Journal of Advanced Nursing*, *31*, 681-688. doi: 10.1046/j.1365-2648.2000.01323.x.

Hess, R. S., & Copeland, E. P. (2001). Students' stress, coping strategies, and school completion: A longitudinal perspective. *School Psychology Quarterly*, *16*(4), 389-405. doi: <http://dx.doi.org/10.1521/scpq.16.4.389.19899>.

Hochwarter, W. A., Witt, L. A., Treadway, D. C., & Ferris, G. R. (2006). The interaction of social skill and organizational support on job performance. *Journal of Applied Psychology*, *91*, 482-489. doi: 10.1037/0021-9010.91.2.482.

Hodge, K., Lonsdale, C. & NG, J. Y. Y. (2008). Burnout in elite rugby: Relationships with basic psychological needs fulfilment. *Journal of Sports Sciences*, *26*, 835-844. doi: 10.1080/02640410701784525.

Hu, L.-T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, *6*, 1-55. doi: 10.1080/10705519909540118.

Ilardi, B. C., Leone, D., Kasser, T., & Ryan, R. M. (1993). Employee and supervisor ratings of motivation: Main effects and discrepancies associated with job satisfaction and adjustment in a factory setting. *Journal of Applied Social Psychology*, *23*, 1789-1805. doi: 10.1111/j.1559-1816.1993.tb01066.x.

Janosz, M., Archambault, I., Morizot, J., & Pagani, L. S. (2008). School engagement trajectories and their differential predictive relations to drop out. *Journal of Social Issues*, *64*, 21-40. doi: 10.1111/j.1540-4560.2008.00546.x.

Kaplan, A., & Midgley, C. (1999). The relationship between perceptions of the classroom goal structure and early adolescents' affect in school: The mediating role of coping strategies. *Learning and Individual Differences, 11*, 187-212. doi: <http://dx.doi.org/10.1016/S1041-6080%2800%2980005-9>.

Kasser, T., Davey, J., & Ryan, R. M. (1992). Motivation and employee-supervisor discrepancies in a psychiatric vocational rehabilitation setting. *Rehabilitation Psychology, 37*, 175-188. doi: <http://dx.doi.org/10.1037/h0079104>.

Kelly, A. C., Zuroff, D. C., Leybman, M. J., Martin, E. A., & Koestner, R. (2008). Satisfied groups and satisfied members: Untangling the between- and within-groups effects of need satisfaction. *Journal of Applied Social Psychology, 38*, 1805-1826. doi:10.1111/j.1559-1816.2008.00370.x.

Kishton, J. M., & Widaman, K. F. (1994). Unidimensional versus domain representative parceling of questionnaire items: An empirical example. *Educational and Psychological Measurement, 54*, 757-765. doi: <http://dx.doi.org/10.1177/0013164494054003022>.

Kline, P. (2000). *Handbook of Psychological Testing*. London, Routledge.

Knee, C. R., Lonsbary, C., Canevello, A., & Patrick, H. (2005). Self-determination and conflict in romantic relationships. *Journal of Personality and Social Psychology, 39*, 997-1009. doi: 10.1037/0022-3514.89.6.997.

Koestner, R., Lekes, N., Powers, T. A., & Chicoine, E. (2002). Attaining personal goals: Self- concordance plus implementation intentions equals success. *Journal of Personality and Social Psychology, 83*, 231-244. doi: 10.1037//0022-3514.83.1.231.

Lazarus, R. S., & Folkman, S. (1984). *Stress, appraisal, and coping*. New York: Springer.

Lyubormisky, S., Sheldon, K. M., & Schkade, D. (2006). Pursuing happiness: The architecture of sustainable change. *Review of General Psychology, 9*, 111-131. doi: 10.1037/1089-2680.9.2.111.

MacKinnon, D. P., Lockwood, C. M., Hoffman, J. M., West, S. G., & Sheets, V. (2002). A comparison of methods to test mediation and other intervening effects. *Psychological Methods, 7*, 83-104. doi: 10.1037//1082-989X.7.1.83.

Meyers, L. S., Gamst, G., & Guarino, A. J. (2006). *Applied multivariate research: Design and interpretation*. Thousand Oaks, CA: Sage Publications.

Milyavskaya, M., Gingras, I., Mageau, G., Koestner, R., Gagnon, H., Fang, J., & Boiché, J.(2009). Balance across contexts: Importance of balanced need satisfaction across various life domains. *Personality and Social Psychology Bulletin, 35*, 1031-1045. doi: 10.1177/0146167209337036.

Mitchell, G., & Hastings, R. P. (2001). Coping, burnout, and emotion in staff working in community services for people with challenging behaviors. *American Journal on Mental Retardation, 106*, 448-459. doi: <http://dx.doi.org/10.1352/0895-8017%282001%29106%3C0448:CBAEIS%3E2.0.CO;2>.

Nicolas, M., Gaudreau, P, & Franche, V. (in press). Perception of coaching behaviors, coping, and achievement in a sport competition. *Journal of Exercise and Sport Psychology*.

Ntoumanis, N., Edmunds, J., & Duda, J. L. (2009). Understanding the coping process from a self-determination theory perspective. *British Journal of Health Psychology, 14*, 249-260. doi: 10.1348/135910708X349352.

Osterman, K. F. (2000). Students' need for belonging in the school community. *Review of Educational Research, 70*, 323-367. doi: <http://dx.doi.org/10.2307/1170786>.

Patrick, H., Knee, C. R., Canevello, A., & Lonsbary, C. (2007). The role of need fulfillment in relationship functioning and well-being: A self-determination theory perspective. *Journal of Personality and Social Psychology, 92*, 434-457. doi: 10.1037/0022-3514.92.3.434.

Perreault, S., Gaudreau, P., Lapointe, M.-C., & Lacroix, C. (2007). Does it take three to tango? Psychological need satisfaction and athlete burnout. *International Journal of Sport Psychology, 38*(4), 437-450.

Preacher, K. J., & Hayes, A. F. (2008). Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behavior Research Methods, 40*, 879-891. doi: 10.3758/BRM.40.3.879.

Raedeke, T. D., & Smith, A. L. (2001). Development and preliminary validation of an Athlete Burnout Measure. *Journal of sport and Exercise psychology, 23*(4), 281-306.

Raedeke, T. D., & Smith, A. L. (2004). Coping resources and athlete burnout: An examination of stress mediated and moderation hypotheses. *Journal of Sport & Exercise Psychology, 26* (4), 525-541.

Reeve, J. (2009). *Understanding motivation and emotion* (5th ed.). Hoboken: John Wiley & Sons, inc.

Reinboth, M., & Duda, J. L. (2006). Perceived motivational climate, need satisfaction and indices of well-being in team sports: A longitudinal perspective. *Psychology of Sport and Exercise*, 7, 269-286. doi: 10.1016/j.psychsport.2005.06.002.

Reis, H. T., Sheldon, K. M., Gable, S. L., Roscoe, J., & Ryan, R. M. (2000). Daily well-being: The role of autonomy, competence, and relatedness. *Personality and Social Psychology Bulletin*, 26, 419-435. doi: 10.1177/0146167200266002.

Roesch, S. C., & Weiner, B. (2001). A meta-analytic review of coping with illness: Do causal attributions matters? *Journal of Psychosomatic Research*, 50(4), 205-219.

Ryan, R. M., & Deci, E. L. (2000). The darker and brighter sides of human existence: Basic psychological needs as a unifying concept. *Psychological Inquiry*, 11, 319-338. doi: 10.1207/S15327965PLI1104_03.

Ryan, R. M., & Powelson, C. L. (1991). Autonomy and relatedness as fundamental to motivation and education. *Journal of Experimental Education* 60(1), 49-66.

Ryan, R. M., Stiller, J. D., & Lynch, J. H. (1994). Representations of relationships to teachers, parents, and friends as predictors of academic motivation and self-esteem. *The Journal of Early Adolescence* 14, 226-249. doi: 10.1177/027243169401400207.

Sheldon, K. M., & Elliot, A. J. (1999). Goal striving, need satisfaction, and longitudinal well-being: The self-concordance model. *Journal of Personality and Social Psychology*, 76, 482-497. doi: 10.1037/0022-3514.76.3.482.

Sheldon, K. M., & Filak, V. (2008). Manipulating autonomy, competence, and relatedness support in a game-learning context: New evidence that all three needs matter. *British Journal of Social Psychology*, 47, 267-283. doi: 10.1348/014466607X238797.

Sheldon, K. M., & Kasser, T. (1998). Pursuing personal goals: Skills enable progress, but not all progress is beneficial. *Personality and Social Psychology Bulletin*, *24*, 1319-1331. doi: 10.1177/01461672982412006.

Sheldon, K. M., & Krieger, L. S. (2007). Understanding the negative effects of legal education on law students: A longitudinal test of self-determination theory. *Personality and Social Psychology Bulletin*, *33*, 883-897. doi: 10.1177/0146167207301014.

Sheldon, K. M., & Niemiec, C. P. (2006). It's not just the amount that counts: Balanced need satisfaction also affects well-being. *Journal of Personality and Social Psychology*, *91*, 331-341. 10.1037/0022-3514.91.2.331.

Shiota, M. N. (2006). Silver linings and candles in the dark: Differences among positive coping strategies in predicting subjective well-being. *Emotion*, *6*, 335-339. doi: 10.1037/1528-3542.6.2.335.

Skinner, E. A., Edge, K., Altman, J., & Sherwood, H. (2003). Searching for the structure of coping: A review and critique of category systems for classifying ways of coping. *Psychological Bulletin*, *129*, 216-269. doi: 10.1037/0033-2909.129.2.216.

Skinner, E., Furrer, C., Marchand, G., & Kindermann, T. (2008). Engagement and disaffection in the classroom: Part of a larger motivational dynamic? *Journal of Educational Psychology*, *100*, 765. doi: 10.1037/a0012840.

Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement*, *69*, 493-525. doi: 10.1177/0013164408323233.

Skinner, E. A., & Zimmer-Gembeck, M. J. (2007). The development of coping. *Annual Review of Psychology, 58*, 119-144. doi: 10.1146/annurev.psych.58.110405.085705.

Smith, A., Ntoumanis, N., & Duda, J. L. (2007). Goal striving, goal attainment, and well-being: Adapting and testing the self-concordance in sport. *Journal of Sport and Exercise Psychology, 29*(6), 763-782.

Smith, A. L., Ntoumanis, N., Duda, J. L., & Vansteenkiste, M. (2011). Goal striving, coping, and well-being: A prospective investigation of the self-concordance model in sport. *Journal of Sport & Exercise Psychology, 33*(1), 124-145.

Soenens, B., & Vansteenkiste, M. (2005). Antecedents and outcomes of self-determination in 3 life domains: The role of parents' and teachers' autonomy support. *Journal of Youth and Adolescence 34*, 589-604. doi: 10.1007/s10964-005-8948-y.

Soucy Chartier, I., Gaudreau, P., & Fecteau, M.-C. (2011). From dispositional affect to academic goal attainment: The mediating role of coping. *Anxiety, Stress & Coping, 24*, 43-58. doi: 10.1080/10615801003725360.

Strahan, R., & Gerbasi, K. C. (1972). Short, homogeneous versions of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology, 28*, 191-193. doi: 10.1002/1097-4679%28197204%2928:2%3C191::AID-JCLP2270280220%3E3.0.CO;2-G.

Struthers, C. W., Perry, R. P., & Menec, V. H. (2000). An examination of the relationship among academic stress, coping, motivation, and performance in college. *Research in Higher Education, 41*, 581-592. doi: 0361-0365/00/1000-0581&18.00/0.

Thompson, A., & Gaudreau, P. (2008). From optimism and pessimism to coping: The mediating role of academic motivation. *International Journal of Stress Management, 15*, 269-288. doi: 10.1037/a0012941.

Vallerand, R. J., Fortier, M. S., & Guay, F. (1997). Self-determination and persistence in a real-life setting: Toward a motivational model of high school dropout. *Journal of Personality and Social Psychology, 72*, 1161-1176. doi: 10.1037/0022-3514.72.5.1161.

Vallerand, R. J., Pelletier, L. G., & Koestner, R. (2008). Reflections on self-determination theory. *Canadian Psychology, 49*, 257-262. doi: 10.1037/a0012804.

VandenBos, G. R. (2007). *APA dictionary of psychology*. Washington, DC: American Psychological Association.

Wilson, P. M., Mack, D. E., Blanchard, C. M., & Gray, C. E. (2009). The role of perceived psychological need satisfaction in exercise-related affect. *Hellenic Journal of Psychology, 6*, 183-206.

Wilson, P. M., & Rogers, W. (2008). Examining relationships between perceived psychological need satisfaction and behavioral regulations in exercise. *Journal of Applied Biobehavioral Research, 13*, 119-142. doi: <http://dx.doi.org/10.1111/j.1751-9861.2008.00031.x>.