Motivational Predictors of Coping With Academic Examination

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ABSTRACT. The present study focused on the motivational predictors of coping with academic examination through the test of the contribution of self-determination for academic studies and achievement goals. Coping strategies, academic motivation and achievement goals were assessed among 199 undergraduate students. Regression analysis revealed that problem-focused coping is positively predicted by identified regulation and negatively by amotivation, whereas emotion-focused coping is positively predicted by introjected regulation and amotivation. Mastery approach goals contributed positively to problem-focused coping. Identified regulation and mastery approach goals made a unique positive contribution to problem-focused coping, and amotivation was negatively related. Students' coping actions may vary according to both the reasons why they engage in academic studies and the goals they pursue in this setting.

Keywords academic examination, achievement goals, coping, self-determination

EVALUATIVE SITUATIONS, SUCH AS ACADEMIC EXAMINATIONS, are stressors that elicit coping responses given the significance and stakes associated with graduation (Lazarus & Folkman, 1984). Coping is defined as the person's behavioral and cognitive actions to manage the internal and external demands experienced during a stressful situation (Lazarus & Folkman, 1984). Past studies

have shown that students may use different kinds of strategies to face the exam-related stress. More particularly, those categories can be categorized as problem-focused, which involves activities centered on changing the stressful situation—for example planning and studying for the exam situation—or emotion-focused, which involves activities centered on modifying one's reaction resulting on the stressful situation—such as seeking social support for emotional reasons and engaging in activities not related to the exam situation (Carver & Scheier, 1994; Folkman & Lazarus, 1985; Rovira, Fernandez-Castro, & Edo, 2005).

Students' coping strategies are central in the academic setting, given that they influence approaches to studying during academic exam preparation (Moneta, Spada, & Rost, 2007). When preparing for exams, students using problem-focused strategies are more likely to adopt deep and strategic approaches to studying, resulting in less negative and more positive affects, whereas students using avoidance coping strategies tend to adopt a surface approach to studying, resulting in more negative and less positive affects (Appelhans & Schmeck, 2002; Moneta, et al., 2007). Thus, in an academic context, in preparing for an examination, it is adaptive to engage in problem-focused coping, the active ones such as planning and studying prior to the exam (Folkman & Lazarus, 1985; Folkman & Moskowitz, 2004). Thus, given their outcomes, the identification of the determinants of students' coping strategies used to face the academic examination is a major stake for research in educational psychology.

Existing studies have emphasized that the coping strategies used to face the exams vary according to the students' anxiety style (Raffety, Smith, & Ptacek, 1997), extraversion and neuroticism (Gallagher, 1996), their level of self-esteem, optimism and psychological control (Aspinwall & Taylor, 1992), and the degree and nature of affect related to the academic stressors (Rovira et al., 2005). However, the mechanisms that lead students to use particular strategies require a more detailed enquiry. More precisely, little is known about the influence of motivational variables—more specifically, the reasons why students engage in academics and the kind of goal they pursue in this setting—on the coping strategies used to face the exam. According to Lazarus (1991), research on coping must consider the motivational antecedents leading to the selection of particular modes of coping. As he characteristically argued, "how the person copes depends not only on the coping possibilities and how they are appraised but also on what a person wants to accomplish in the encounter" (Lazarus, 1991, p. 115). In academic contexts, motivational factors may act as resources that students bring with them in stressful encounters and can be used to underlie mechanisms by which coping can be promoted or hindered (Amiot, Blanchard, & Gaudreau, 2008; Lazarus, 1991; Skinner & Edge, 2002). While students may engage in academics for various reasons and pursue different goals, it remains to be determined how these reasons and goals affect the way they cope with the demands encountered in exam situations. With this in mind, the present study draws upon both the self-determination theory (Deci & Ryan, 1985, 2000) and

the 2×2 achievement goals framework (Elliot & McGregor, 2001) to explore the motivational foundations of coping with an academic examination.

First, this study considers that the reasons underlying students' involvement in the academic studies are likely to be antecedents of the kind of strategies they use to face the academic stressors. The self-determination framework has been considered relevant in the academic setting to explain academic involvement and outcomes (Deci & Ryan, 1985, 2000; see Vallerand, 1997, for a review). The degree to which student motivation is self-determined versus controlled predicted different educational benefits and academic performance (Reeve, 2002). The self-determination framework distinguishes three types of behavioral regulation with varying degrees of self-determined motivation: intrinsic motivation, extrinsic motivation, and amotivation (Deci & Ryan, 1985; 1991). *Intrinsic motivation* is autonomous and corresponds to the highest level of self-determination (Deci & Ryan, 1985), and it is generally defined as engaging in an activity for the pleasure and satisfaction derived from the actual participation. The self-determination theory proposes three forms of intrinsic motivation: for knowledge (i.e., engaging in academics for the pleasure and satisfaction experienced while learning, exploring or trying to understand something new), for accomplishment (i.e., carrying out academics for the pleasure and satisfaction of out-doing oneself, and trying to reach new personal objectives), and for experiencing stimulation (i.e., engaging in academics to experience the stimulating sensations derived from this engagement).

Extrinsic motivation is instrumental in nature and is experienced when engaging in an activity as a means to an end. Three major types of extrinsic motivation have been proposed (Deci & Ryan, 1985; 1991) that vary in terms of their inherent self-determination. From lowest to highest levels of self-determination, they are external regulation (i.e., when the source of control is outside the student), introjected regulation (i.e., the student has only partially internalized previous external pressure or inducement to engage in academics), and identified regulation (i.e., the student performs the behavior out of choice and values it as being important). Relative to external and introjected regulations, identified regulation tends to be relatively self-determined (Ryan & Deci, 2000). Identified regulation involves an individual's recognition and acceptance of the value and importance of a behavior and the integration of this into the self (Burton, Lydon, D'Alessandro, & Koestner, 2006). For example, a student may not like college but may decide to go because he or she feels that a college diploma is important to enter the job market in a field that he or she likes. As a result, identification represents an important aspect of the process of transforming external regulation into true self-regulation in an academic context (Ryan & Deci, 2002). Finally, Deci and Ryan (1985) have suggested that a third motivational concept, termed *amotivation,* refers to the relative absence of motivation.

In academic domains, there is evidence that intrinsic and identified regulation tend toward positive outcomes (Reeve, 2002). Past research demonstrated that

intrinsic motivation and identified self-regulation are positively associated with psychological well-being (Reis, Sheldon, Gable, Roscoe, & Ryan, 2000), positive academic outcomes such as academic performance (Grolnick, Ryan, & Deci, 1991), grades (Miserandino, 1996), persistence in course (Vallerand & Bissonette, 1992), and effort and positive emotions experienced in class (Vallerand, Fortier, & Guay, 1997). Overall, self-determined reasons for engaging in a particular behavior are associated with successful adaptation and beneficial psychological and educational outcomes. In contrast, less self-determined forms of motivation, represented by external regulation, introjected regulation and amotivation, have been associated with less positive emotions in school, general anxiety, and dropout from school (Sénécal, Koestner, & Vallerand, 1995). Thus, self-determined forms of motivation have been proposed to promote a more active engagement of the self when dealing with stressful situations, leading to the use of adaptive coping strategies (Skinner & Edge, 2002). Conversely, less self-determined forms of motivations should not lead to such a constructive engagement, thus eliciting less adaptive forms of coping during stress (Skinner & Edge, 2002).

Growing empirical evidence has supported the association between self-determination and coping. In their one-semester prospective study, Knee and Zuckerman (1998) reported significant associations between motivation and general students' coping styles. Self-determined motivation was negatively associated with the less-adaptive, disengagement-focused forms of coping (i.e., denial, behavioral and mental disengagement) and positively associated with the more-adaptive, problem-focused strategies (i.e., planning, search for instrumental social support), but less self-determined forms of motivation were associated with a greater use of disengagement-oriented coping. More recently, Amiot et al. (2008), have confirmed the role played by self-determination in predicting a greater students' use of problem-focused coping strategies and a lesser use of disengagement-oriented coping when experiencing the transition to university. In the context of a stressful argument with one's romantic partner, Knee, Patrick, Vietor, Nanayakkara, and Neighbors (2002) replicated these results when examining the associations between self-determination and coping strategies. Similar results were obtained in a study conducted in the context of a stressful sport competition (Amiot, Gaudreau, & Blanchard, 2004). Given these theoretical and empirical considerations, we expected that the reasons why students engage in academics should predict specific coping patterns when dealing with the stress of examination.

Secondly, as Lazarus (1991) suggested, the goals that individuals seek in a particular context will influence their coping option. The 2×2 achievement goal framework (Elliot & McGregor, 2001) has been considered in the academic setting to explain the achievement-relevant process. Students' achievement goals, defined as concrete cognitive representations that direct individuals toward specific end states, could be potential explanatory variables of students' coping with a stress-related exam. Achievement goals create a framework for how students

interpret and experience achievement and are the ways that people define success and competence in achievement setting (Dweck, 1986). It is presumed that they guide students' behavior, cognition, and affect, as they become involved in academic work (Ames, 1992). In this line, achievement goals are viewed as important predictors of a variety of achievement-relevant processes prior to the undergraduate examination experience (McGregor & Elliot, 2002).

According to this framework, four goals could guide students' activities in academic tasks: performance approach, performance avoidance, mastery approach, and mastery avoidance. In the academic setting, mastery approach goals are linked to numerous positive processes, such as challenge appraisals, deep processing, effort, and persistence. These are unrelated to anticipatory test anxiety (Elliot, McGregor, & Gable, 1999). Performance approach goals are linked to challenge appraisals and grade aspirations, and are unrelated to anticipatory test anxiety (McGregor & Elliot, 2002). Performance avoidance goals are linked to numerous negative processes, such as threat appraisal and anticipatory test anxiety (McGregor & Elliot, 2002), and surface processing and disorganization (Elliot, et al., 1999). Mastery avoidance goals are related to anticipatory exam anxiety and disorganization in exam preparation (McGregor & Elliot, 2002). Overall, the achievement goal framework posits that one consequence of goal orientation adoption is the differential usage of various strategies for learning (Pintrich, 2000).

Given the influence of goal orientations on study strategies, achievement goals could be related to the kind of coping strategies students use to deal with academic stressors. Prior research has suggested a relation between the achievement goals children adopt and their responses to academic difficulty or failure. Friedel, Schnabel, Turner, and Midgley (2007) have demonstrated that children's endorsement of mastery goals was positively related to the use of positive coping strategies, and negatively related to the use of denial and maladaptive coping strategies. Conversely, children's endorsement of performance-approach goals was negatively related to their use of positive coping strategies, and positively related to their use of less adaptive coping strategies. Moreover, in the sport domain, mastery goals have been associated with problem-focused coping, and performance orientations have been related to emotion-focused coping (Ntoumanis, Biddle, & Haddock, 1999). Given the centrality of students' achievement goals in the academic setting and existing research on their link with coping strategies in different settings, it was expected that the kind of goal students pursue in academics should predict specific patterns to face the exam.

The contribution of individual reasons for involvement and achievement goals on coping strategies have been considered separately in existing studies. However, according to Deci and Ryan (2000), knowing what goals an individual pursues is not enough to predict the quality of performance and experience, and it seems necessary to also consider the reasons why he/she pursues it. Sheldon, Ryan, Deci, and Kasser (2004) further emphasized that both what

goals individuals pursue and why they pursue them make significant independent contributions to psychological well-being. A simultaneous test to the relative contribution of these variables could provide a more complete picture of the motivational foundations of students coping with an exam.

In line with Lazarus's (1991) assumptions, the general purpose of the present study was to further explore the question of the motivational foundation of coping strategies in the academic context drawing upon the Self-determination theory (Deci & Ryan, 1985) and the 2×2 achievement goal framework (Elliot & McGregor, 2001). This study aimed to focus on the contribution of both the reasons why students engage in academics and the kind of achievement goals they pursue in this context, with regard to coping strategies.

First, it was hypothesized that self-determined forms of motivation such as intrinsic motivation and identified regulation should positively predict the use of problem-focused coping strategies (H1a) while non-self-determined forms of motivation, such as introjected regulation, external regulation, and amotivation should positively predict students' emotion-focused coping (H1b).

Secondly, it was hypothesized that mastery and performance approach goals in undergraduate studies should positively predict problem-focused strategies (H2a), whereas emotion-focused coping should be positively predicted by mastery and performance avoidance types of achievement goals (H2b).

Finally, in line with previous studies (Deci & Ryan, 2000; Sheldon et al., 2004), a third hypothesis stated that, taken in combination, both the reasons why students engage in academic studies and the goals they pursue in this setting would make a unique contribution to problem-focused (H3a) and emotion-focused coping strategies (H3b).

Method

Participants

A sample of 199 university students—128 males and 71 females, ranging from 17 to 25 years ($M = 20.27$, $SD = 1.41$), and enrolled in a sport and exercise science course—freely took part to this study.

Measures

Coping strategies. Coping was assessed with the French version (Muller & Spitz, 2003) of the brief COPE (Carver, 1997). This measure is composed of 14 scales, with 2 items per scale: active coping, planning, seeking social support for instrumental reasons, acceptance considered as relevant to problem focused coping, seeking social support for emotional reasons, positive reinterpretation, denial, behavioral disengagement, venting of emotions, distraction, blame, humor, religion, and substance use considered as relevant to emotion-focused coping.

The religion and substance use subscales were removed from the questionnaire because they are considered to be irrelevant in an academic setting (Rovira et al., 2005). Participants were asked to rate on a 4-point scale (from 1 "*Not at all*" to 4 "*Usually*") to what extent they generally use each of the strategies described in order to manage the exam situation. Average scores were computed for each dimension of coping—i.e., problem-focused and emotion-focused coping, according to their respective properties and definition. In this sample, Cronbach's alphas were of .60 for problem-focused coping and .75 for emotion-focused coping.

Achievement goals. The French version (Darnon & Butera, 2005) of the achievement goals questionnaire (Elliot & McGregor, 2001) was used to assess participants' achievement goals for the academic setting. This questionnaire was composed of 3 items per scale: mastery approach, performance approach, mastery avoidance, and performance avoidance. Participants were instructed to consider their attitudes toward learning and performance in courses and to indicate the extent to which they believe each item to be true of them on a 7-point scale (i.e., from 1 "*Not at all true of me*" to 7 "*Very true of me*"). Their responses for each goal were averaged. The internal consistency coefficients of mastery approach, performance approach, mastery avoidance, and performance avoidance goals were .76, .85, .65, and .60 respectively.

Academic motivation. The Academic Motivation Scale (Vallerand, et al., 1993) was used to assess students' academic motivation. This scale is composed of seven subscales with four items. Three subscales assess types of intrinsic motivation: motivation to know, to accomplish things, and to experience stimulation. The three intrinsic subscales were combined to form one intrinsic motivation subscale (Vallerand & Ratelle, 2002). The other three subscales assess three types of extrinsic motivation: external regulation, introjected regulation, and identified regulation, the latter assessing amotivation. Students were asked, "Why are you pursuing academic activities?" The 28 items were scored on a 7-point scale (i.e., from 1 "*Do not agree at all*" to 7 "*Very strongly agree*"). Alpha coefficients obtained for those seven subscales ranged from .62 to .87.

Procedure

A set of questionnaires was distributed to voluntary students during regular classes of the school year second term, one month before the exam session. The students were told that the purpose of the study was to investigate how students face examinations. They were further informed that their responses would be treated anonymously. The instructions to fill in the questionnaire were given in written form, and students were carefully instructed to answer by themselves. The questionnaires were directly collected at the end of the class.

Data Analysis

The first hypothesis on the relationship between self-determination framework and coping strategies was tested using two sets of multiple regression analysis, with problem and emotion-focused coping, respectively, as criterion variables. In each analysis, the five types of academic motivation were the predictor variables and were mean-centered before computing the analysis. In the two sets, age and gender were entered at the same time to control their potential effect on coping.

The second set of hypothesis on the relation between achievement goals and coping strategies was also tested using two sets of regression analysis, with respectively problem-focused and emotion-focused coping as criterion variable. In each analysis, the four types of achievement goals were the predictor variables and were mean-centered before computing the analysis. In the two sets, age and gender were entered at the same time to control their potential effect on coping.

The third hypothesis was tested using two sets of multiple regression analysis, with respectively problem-focused and emotion-focused strategies as criterion variables. For each analysis, both the five types of academic motivation and the four kinds of achievement goals were the predictor variables and were centered before computing the analysis. In the two sets, age and gender were entered at the same time to control their potential effect on coping.

Results

Means, standard deviations, and correlation matrix for the variables studied are presented in Table 1.

Relationships Between Self-Determination Variables and Coping Strategies

Correlations between the different forms of self-determination motivation and coping are shown in Table 1. Inspection of the pattern of correlations revealed that intrinsic motivation ($r = .24$, $p < .01$), and identified regulation ($r = .30$, $p < .01$) are significantly and positively related to problem-focused coping, whereas amotivation is negatively related to this dimension ($r = -.31$, $p < .01$). Intrinsic motivation ($r = .19$, $p < .01$), introjected regulation ($r = .25$, $p < .01$), and amotivation ($r = .25$, $p < .01$), are significantly and positively linked to emotion-focused coping.

In order to study how self-determination variables are related to coping strategies, several multiple regression analyses were applied. The first hypothesis stated that intrinsic motivation and identified regulation are likely to be associated with problem-focused coping, whereas non self-determined forms of motivation (i.e. introjected regulation, external regulation, and amotivation) are likely to be associated with emotion-focused coping strategies. The regression analysis revealed that identified regulation was a positive predictor ($\beta = .20$, $p < .05$) and

TABLE 1. Means, Standard Deviations, and Correlations for Variables Used in the Study ($N = 199$)

Variables	M	SD	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1. Intrinsic Motivation	3.82	0.93	—	.44**	.46**	.19**	−.10	.42**	.19**	.21**	.01	.24**	.19**
2. EM identified regulation	5.35	0.95		—	.24**	.41**	−.31**	.27**	.17*	.09	.01	.30**	.00
3. EM introjected regulation	3.59	1.47			—	.45**	.14*	.17*	.37**	.19**	.25**	.12	.25**
4. EM external regulation	4.48	1.38				—	.09	.02	.25**	.05	.22**	.03	.01
5. Amotivation	1.90	1.13					—	−.16*	.00	.01	−.02	−.31**	.25**
6. Mastery approach	4.78	1.16						—	.25**	.55**	.14*	.35**	−.02
7. Performance approach	3.59	1.47							—	.24**	.08	.10	.03
8. Mastery avoidance	4.34	1.23								—	.20**	.22**	.02
9. Performance avoidance	4.64	1.20									—	−.01	.01
10. Problem-focused coping	2.79	0.43										—	.07
11. Emotion-focused coping	2.15	0.39											—

Note. *$p < .05$; **$p < .01$; EM: Extrinsic motivation.

that amotivation was a negative predictor ($\beta = -.22$, $p < .01$) of problem-focused coping, while controlling for the contribution of age ($\beta = -.09$, $p = .15$) and gender ($\beta = -.16$, $p < .05$). The equation was significant $F(7, 191) = 7.09$, $p < .01$, $R^2 = .17$[1].

Regressing emotion-focused coping on the motivational variables revealed that introjected regulation ($\beta = .21$, $p < .05$) and amotivation ($\beta = .24$, $p < .01$) were positive predictors of this dimension, while controlling for age ($\beta = .05$, $p = .39$) and gender ($\beta = .08$, $p = .20$). The equation was significant, $F(7, 191) = 5.06$, $p < .01$, $R^2 = .12$.

To summarize, self-determination variables evidenced meaningful relations with coping strategies to face examination. As expected, identified regulation positively predicted endorsement of problem-focused coping strategies, whereas amotivation negatively predicted this dimension. In addition, introjected regulation and amotivation positively predicted endorsement of emotion-focused coping strategies.

Relationship Between Achievement Goals and Coping

Correlations between achievement goals and coping revealed that both the mastery approach goal ($r = .35$, $p < .01$), and mastery avoidance goal ($r = .22$, $p < .01$) are significantly and positively linked with problem-focused coping (see Table 1).

Two multiple regression analyses were applied to test the second hypothesis. It was expected that mastery and performance approach goals would positively predict problem-focused strategies, whereas emotion-focused coping would be positively predicted by mastery and performance avoidance types of achievement goals. The regression of problem-focused coping on the four achievement goals revealed that mastery approach goals were positive predictors of this dimension ($\beta = .33$, $p < .01$), while controlling for age ($\beta = -.07$, $p = .24$) and gender ($\beta = -.14$, $p < .05$). The equation was significant, $F(6, 192) = 6.01$, $p < .01$, $R^2 = .13$. No significant links were found between the four achievement goals and emotion-focused coping.

In summary, the results partially confirmed the second hypothesis. As expected, mastery approach goals positively predicted endorsement of problem-focused coping strategies. However, the results did not support the supposed relationships between mastery avoidance and performance avoidance goals and emotion-focused coping strategies.

Relationship Between Self-Determination Variables, Achievement Goals, and Coping Strategies

A multiple regression analysis was conducted to test for the unique contribution of both self-determination variables and achievement goals on both problem-focused and emotion-focused coping.

The results of the regression analysis with problem-focused coping as a criterion variable, revealed that mastery approach goals ($\beta = .21$, $p < .01$) and identified regulation ($\beta = .17$, $p < .05$) were significant positive predictors, whereas amotivation ($\beta = -.22$, $p < .05$) was a significant negative predictor of this dimension, controlling for the contribution of gender ($\beta = -.13$, $p < .05$) and age ($\beta = -.08$, $p = .19$). The equation was significant, $F(11, 187) = 5.84$, $p < .0001$, $R^2 = .21$ (see Table 2).

The analysis revealed that introjected regulation ($\beta = .22$, $p < .05$) and amotivation ($\beta = .23$, $p < .01$) were positive predictors of emotion-focused coping, while controlling for age ($\beta = .05$, $p = .40$) and gender ($\beta = .08$, $p = .23$). The equation was significant, $F(11, 187) = 3.31$, $p < .01$, $R^2 = .11$ (see Table 3).

Therefore, taken in combination, both the reasons why students engage in academic studies and the goals they pursue in this setting made a unique contribution to problem-focused and emotion-focused coping strategies to face exam-related stress. Mastery approach goals and identified regulation predicted endorsement of problem-focused coping strategies, whereas introjected regulation and amotivation predicted endorsement of emotion-focused coping strategies.

Discussion

In line with Lazarus's (1991) assumptions, the general purpose of the present study was to identify the motivational predictors of coping strategies in the academic context drawing upon the self-determination theory (Deci & Ryan, 1985) and the 2×2 achievement goal framework (Elliot & McGregor, 2001). It was expected that the reasons why students engage in academics and the kind of

TABLE 2. Hierarchical Regression Analysis of Problem-Focused on Motivational Variables (N = 199)

Variables	β	$SE\beta$	p
Age	−.08	.06	.19
Gender	−.13	.06	.04
Mastery approach	.21	.08	.01
Performance approach	−.02	.07	.73
Mastery avoidance	.05	.07	.46
Performance avoidance	−.07	.06	.24
Intrinsic Motivation	.00	.08	.97
EM identified regulation	.17	.08	.03
EM introjected regulation	.11	.08	.19
EM external regulation	−.03	.08	.70
Amotivation	−.21	.07	.00

Note. Data in table are standardized coefficients; EM: Extrinsic motivation.

TABLE 3. Hierarchical Regression Analysis of Emotion-Focused Coping on Motivational Variables (N = 199)

Variables	β	$SE\beta$	p
Age	.05	.06	.40
Gender	.08	.07	.23
Mastery approach	−.08	.08	.32
Performance approach	−.03	.07	.63
Mastery avoidance	.02	.08	.75
Performance avoidance	−.00	.07	.99
Intrinsic Motivation	.17	.08	.06
EM identified regulation	.01	.08	.83
EM introjected regulation	.22	.09	.01
EM external regulation	−.15	.08	.07
Amotivation	.23	.07	.00

Note. Data in table are standardized coefficients; EM: Extrinsic motivation.

achievement goals they pursue in this context would relate to the coping strategies they use to deal with academic examinations.

The results have shown that problem-focused strategies are positively predicted by identified regulation and are negatively predicted by amotivation. These findings partially confirm our first hypothesis and are in line with previous studies conducted in other fields, which revealed that self-determined forms of motivation are positively associated with more active forms of coping (Amiot et al., 2004, 2008; Knee & Zuckerman, 1998; Knee, et al., 2002). In this study, identified regulation is the best positive predictor of problem-focused coping among the five motivation types. Identified regulation keeps one oriented toward the long-term significance of one's current pursuit and may foster persistence in uninteresting but important activities. The results obtained in the present study complete existing studies demonstrating that identified regulation is generally associated with more positive academic outcomes, such as persistence, effort, psychological adjustment at school, and concentration (Koestner, Losier, Vallerand, & Carducci, 1996; Reeve, 2002; Vallerand et al., 1997). Moreover, Koestner et al. (1996) have shown that identified reasons promote active involvement that can be observed with regard to individuals' emotions, cognitions, and behaviors. Thus, the fact that students might go to school because they feel that this is the way they have to follow in order to pursue the career they want, is significantly related to the use of planning, active coping, and efforts to master the demands associated with the academic stressors. An active way of coping could explain why students with an identified regulation tend to increase their effort to face the impending examination. Furthermore, problem-focused coping strategies, such as active coping

and planning, have been proposed to alleviate the negative impact of stress and to yield more positive outcomes (Compas, Connor-Smith, Saltzman, Thomsen, & Wasworth, 2001). In this respect, possessing high-level identified regulation could trigger one's flexibility to adapt to a wide array of situations (Burton, et al., 2006). This pattern is completed by the negative relation observed between amotivation and problem-focused coping. Amotivation is viewed as reflecting the relative absence of self-determination, and research has documented its association with passivity, distress, and poor adaptation (Vallerand et al., 1993).

The regression results have further revealed that emotion-focused coping strategies are positively predicted by introjected regulation and amotivation, and have partially confirmed our hypothesis. This result confirms that less self-determined forms of motivation are associated with less adaptive forms of coping (Amiot et al, 2004, 2008; Knee & Zuckerman, 1998; Knee, et al., 2002). Deci and Ryan (2000) have described introjection as a type of internal regulation that is still quite controlling, because people perform such actions with the feeling of pressure in order to avoid guilt or anxiety or to attain ego-enhancements or pride. Ryan and Connell (1989) have shown that introjected regulation was related to added anxiety and to poorer coping responses. This pattern of results may infer that introjected regulation and amotivation do not lead to a constructive engagement of the self, but rather to negative emotional experience eliciting less adaptive forms of coping during academic stress.

The results of the second set of hypotheses have shown that mastery approach goals are the only positive predictors of problem-focused coping strategies used by students when dealing with an examination. Our findings demonstrating that mastery approach goals evoke adaptive coping processes in the examination context are conceptually consistent with the extant literature in the academic setting (Elliot et al., 1999; McGregor & Elliot, 2002). Mastery goals are usually found to be strongly related to measures of active engagement in learning activities such as deep processing strategies, effort and performance (Pintrich, 2000). Thus, consistent with theory and previous research, our own findings indicate that students placing a strong emphasis on developing their competence allegedly use more active strategies and put more effort in learning activities when dealing with an impending examination. Mastery approach goals are related to challenge appraisals, more self-regulated learning strategies, deep processing, and low anticipatory anxiety (Elliot & McGregor, 2001). Our results complete these findings, given that this type of goal also relates to the use of constructive strategies designed to solve the problems and demands associated with the examination. It further confirms the relationship between task orientation and problem-focused coping observed in the school domain (Friedel et al., 2007) and in other settings (Ntoumanis et al., 1999). No relationship has been found between students' achievement goals and emotion-focused coping. It is likely that when facing the exam, students characterized by avoidance achievement goals use different strategies, such as self-handicapping (Elliot, Cury, Fryer, & Huguet, 2006).

Further research must be conducted for a better understanding of the relationships between achievement goals and emotion-focused coping.

A third hypothesis aims to verify the assumption that the reasons why students engage in academics and the kind of goals they pursue in this setting make a unique contribution to the coping strategies they use to face the examination. The results support this hypothesis, with the combined contribution of mastery approach goals and identified regulation on the adoption of problem-focused coping strategies. It confirms that focusing on the goals or motives alone is not enough (Deci & Ryan, 2000). Students may be more efficient when facing negative, demanding, or challenging academic situations if they engage in studying with an internalization of why involvement in academic studies could be important for future outcomes, and if they pursue self-referenced goals developing competence or skills. This pattern of results is strengthened by the fact that amotivation is a negative predictor of problem-focused coping.

On the whole, this study has been innovative by providing support for Lazarus's (1991) assumption on the motivational antecedents of coping that allows us to tap into the links between motivational variables and coping in an academic setting. In addition, motivational factors contribute to highlighting mechanisms by which coping can be promoted or hindered in academically stressful situations (Skinner & Edge, 2002). We also point out that in a given academically stressful situation, the motivational resources could play a role in adaptive coping strategies. It may be interesting to further detail how motivational variables could act as resources that students bring with them in a stressful situation (Amiot et al., 2008; Skinner & Edge, 2002). Specifically, and based on the test of two distinct theoretical frameworks on students' motivation, this study highlights the need to take into account the type and the nature of motivational variables leading to the selection of adaptive or maladaptive coping strategies in a specific context. Because many educational activities prescribed in schools are not designed to be intrinsically interesting, extrinsic motivation is also important in an academic setting (Reeve, 2002; Ryan & Deci, 2000). Thus, differences in coping were also associated with the different types of extrinsic motivation. The more students were extrinsically regulated, the less they showed active and adaptive forms of coping to face the academic examination. Relative to external and introjected regulations, identified regulation tends to be relatively self-determined (Ryan & Deci, 2002). Our results have emphasized the relevance of both the self-determination theory (Deci & Ryan, 1985, 2000) and the 2×2 achievement goals framework (Elliot & McGregor, 2001) to explore the motivational foundations of coping with examination and the educational outcomes in academic setting. From an educational perspective, the findings have confirmed that adaptive motivational orientations such as self-determined forms of motivation and mastery approach goals may help students improve their approaches to dealing with evaluative situations. As a result, it seems important to promote successful internalisation. A practical implication from the present study is that teachers

could work to building adaptive motivational climates such as a mastery climate (Ntoumanis et al., 1999) and supporting or promoting autonomy in class, as they will facilitate internalisation and the adoption of mastery-approach goals (Reeve, 2002).

However, this study has several limitations. First, it adopted a cross-sectional design, and its correlational nature did not allow causal testing between self-determination, achievement goals, and coping strategies. In addition, given the low reliabilities of some scales, the findings should be interpreted with caution. Partly because this is a function of scales having a very small number of items and that alpha coefficients are notoriously sensitive to the number of items. Moreover, in the present study, self-determination variables and achievement goals were considered unique predictors of students coping. A prospective study would give greater insight into the potential causal ordering of these dimensions, to test how students' achievement goals orientation and self-determination could influence coping with a specific academic exam. It should also be noted that this study did not examine the consequences of motivational and coping orientations on exam-performance or affect following the academic examination. Indeed, the results obtained suggested that female students use significantly more problem-focused coping than their male counterparts. This result paves the way for future studies designed to consider potential gender differences in adaptation to stressful academic examination and the possibility of gender moderating relations between motivation and coping. The results obtained in the present study are specific to the academic setting and to a sample of French students, and might not be generalizable to other achievement settings or other countries with different educational climates.

Evaluative situations, such as examination, have become a test bench for general theoretical models on stress and adjustment. The results obtained in the present study suggested that researchers interested in the identification of the determinants of coping strategies could gain insight from the test of the individuals' motivational orientations. Both the reasons why individuals engage in activities and the goals they pursue could contribute to the understanding of the adaptation of individuals during stressful events. Being more specific to the academic setting, a focus on the determinants and correlates of coping with academic examination could help understand why and how coping could affect students' performance and involvement in academic studies. Future research should investigate motivational variables in order to understand how they might act as a stable resource that students bring with them in the academic situation to facilitate or interfere with their adaptation to stressful situations.

NOTE

1. All R^2 values are adjusted R^2.

AUTHOR NOTES

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