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Autonomous, Controlled, and Amotivated Types of Academic Motivation: A Person-Oriented Analysis

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The authors investigated students' profiles regarding autonomous, controlled, and amotivated regulation and tested whether profile groups differed on some academic adjustment outcomes. Studies 1 and 2 performed on high school students revealed 3 profiles: (a) students with high levels of both controlled motivation and amotivation but low levels of autonomous motivation, (b) students with high levels of both controlled and autonomous motivation but low levels of amotivation, and (c) students with moderate levels of both autonomous and controlled motivations but low levels of amotivation. These first 2 studies revealed that students in the high autonomous/high controlled group reported the highest degree of academic adjustment. Study 3 performed on college students revealed 3 profiles: (a) students with high levels of autonomous motivations but low levels of both controlled motivation and amotivation, (b) students with high levels of both autonomous and controlled motivation but low levels of amotivation, and (c) students with low to moderate levels of the various motivational components. Study 3 indicated that students in the autonomous group were more persistent than students in the other groups. Results are discussed in light of self-determination theory (E. L. Deci & R. M. Ryan, 1985).

Keywords: academic motivation, self-determination, college students, high school students

Over the past 30 years, self-determination theory (SDT; Deci & Ryan, 1991, 2000) has been quite useful for understanding students' optimal functioning in school by studying motivation in a multidimensional fashion. SDT has thus proposed three categories of motivation that lie on a continuum of self-determination, namely autonomous regulation (i.e., acting out of choice and pleasure), controlled regulation (i.e., acting for reward, behaving to avoid punishment, or trying to avoid feelings of guilt), and amotivation (AM; i.e., lack of autonomous and controlled regulation). In short, SDT posits that autonomous motivation reflects the highest quality of regulation, whereas controlled motivation and AM reflect the intermediate and lower ends of the quality continuum. Support for this perspective on quality of motivation has been obtained in numerous studies showing that autonomous types of motivation lead to adaptive outcomes such as achievement (e.g., Guay & Vallerand, 1997), whereas controlled types of motivation and AM lead to negative outcomes such as dropping out of school (e.g., Vallerand, Fortier, & Guay, 1997).

Though previous SDT academic studies are valuable, they have not usually examined motivational components via a person-oriented approach but rather via a variable-oriented approach (except in the physical education domain, in which some studies have used a person-oriented approach; Wang & Biddle, 2001). In other words, one may find a positive relation between autonomous motivation and achievement (i.e., variable-oriented approach) without knowing whether the person who has reported autonomous motivation has also reported controlled motivation (i.e., person-oriented approach). Because many studies have shown that autonomous and controlled categories are sometimes positively and moderately related (Deci & Ryan, 2002), it now seems crucial to understand whether endorsing both motives is beneficial for school adjustment. Such analysis may be more fruitful in terms of disentangling the qualitative and quantitative aspects of motivation. Specifically, if one were to find that students endorsing both autonomous and controlled motivation were doing better in terms of achievement and satisfaction at school than those endorsing solely autonomous motivation, then this would challenge the SDT perspective on quality of motivation.

The goals of this research were thus twofold. The first goal was to discover various motivational profiles that are naturally occurring among samples of college and high school students. The terminology *naturally occurring* is important here because it ech-

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oes a person-oriented approach in which the central goal is to identify the existing profiles by allowing them to emerge instead of forcing them through a priori categories (e.g., median split). Second, we aimed to verify how students grouped in these profiles differ in terms of academic adjustment variables.

SDT Motivational Components

Motivation is defined by SDT as the reasons underlying behavior. SDT posits that there are different types of motivation that vary according to their level of self-determination (i.e., the extent to which a behavior is freely endorsed by individuals), which reflects the aspect of quality of motivation. First, *intrinsic motivation* (IM) entails performing a behavior for reasons inherent to it, such as pleasure and satisfaction. Second, *extrinsic motivation* (EM) refers to doing something for reasons that are external to the activity itself. EM actually refers to a family of motivations that vary in their level of autonomy. There are behaviors whose underlying motivations have not been internalized by the person but rather are heteronomous. This type of EM is labeled *external regulation* and is evidenced when individuals' behavior is motivated by the desire to obtain a reward or to avoid punishment. A second type of EM, *introjected regulation*, refers to behaviors that are performed on account of internal pressures such as obligation and guilt. The reasons for doing something are somewhat endorsed by the person but in a controlled fashion. A third type of EM is *identified regulation*, whereby individuals identify with the reasons for performing a behavior. This is an autonomous form of EM, as individuals engage in a behavior because they personally find it important. A fourth type of EM is *integrated regulation*, and this occurs when identified regulations are congruent with other values and needs. However, this form of regulation is more relevant for individuals with formed identities and not for older adolescents and emerging adults who are the focus of the present research project. For this reason, integrated regulation was not evaluated in these studies. Finally, *amotivation* (AM) refers to the lack or absence of motivation and is observed when individuals do not perceive the contingencies between their actions and their consequences.

According to Shahar, Henrich, Blatt, Ryan, and Little (2003), when evaluating the quality of motivational orientations, the distinction between autonomous and controlled motivation is more important than that between IM and EM. *Autonomous motivation* is observed when behavior is initiated and governed by the self (i.e., when intrinsically motivated or regulated by identification), whereas *controlled motivation* is observed when behavior is not initiated or governed by the self (i.e., when regulated by introjection or external factors). Research in the educational realm (and other domains; see Vallerand, 1997) suggests that positive indices of student functioning are associated with high levels of autonomous motivations, whereas negative indices are associated with high levels of controlled motivations and AM (Ryan & Deci, 2000).

The Relation Between Autonomous and Controlled Motivations

There have been several theoretical positions regarding the relation between autonomous and controlled motivations or conceptually akin motivational constructs. Certain researchers have conceptualized these motivations as being poles of a single dimension. For instance, Harter (1981) developed a scale in which students can be categorized as motivated in either an intrinsic or extrinsic fashion such that the endorsement of intrinsic and extrinsic motives is impossible to detect. However, more recently, Harter and Jackson (1992) modified Harter's scale and showed that, when studied through a person-oriented approach, both intrinsic and extrinsic forms are endorsed by 50% of students. Similarly, Lepper, Corpus, and Iyengar (2005) proposed that having developed both intrinsic and extrinsic motives can be adaptive for students, such that they not only will seek pleasurable activities but will also be attuned to the inevitable extrinsic outcomes associated with these activities (see also Amabile, 1993). SDT also argues that autonomous and controlled motivations are not necessarily opposite dimensions but, rather, relate to each other in a quasi-simplex fashion (Ryan & Connell, 1989). Adjacent motivations (e.g., IM and identified regulation) are more strongly correlated with each other than are distal motivations (e.g., IM and external regulation). Thus, according to SDT, individuals can potentially report both autonomous and controlled motivations for a given domain (see Ryan, Plant, & O'Malley, 1995). However, SDT posits that those who report a higher degree of autonomous motivation compared to controlled motivation will be the best adapted.

In sum, all of these perspectives acknowledge that students can endorse both autonomous (i.e., intrinsic) and controlled (i.e., extrinsic) motives and that this profile can be potentially adaptive, but studies have rarely used a person-oriented approach to analyze responses regarding motivational components. Nevertheless, we presume that most of these perspectives would posit, while using a person-oriented approach, that endorsing more autonomous than controlled motives would lead to the most positive outcomes (i.e., Deci & Ryan, 2002).

A Person-Oriented Approach

Pintrich (2003) argued that an outcome such as achievement might be the result of a combination of several motives and consequently suggested using a person-oriented approach. Rather than simply attempting to support or invalidate the importance of a single motivational construct in the prediction of school outcomes, a person-oriented approach investigates how different types of motivation combine to produce distinct motivational profiles.

This person-oriented approach has been used in the educational literature to study academic goals (Braten & Olaussen, 2005; Meece & Holt, 1993), IM (Pintrich, Anderman, & Klobucar, 1994), self-efficacy or self-confidence (Braten & Olaussen, 2005; Csizer & Dornyei, 2005; Pintrich et al., 1994), interest (Alexander & Murphy, 1998; Csizer & Dornyei, 2005; Nurmi & Aunola, 2005), and task value (Braten & Olaussen, 2005). Across these studies, focusing on individuals instead of variables allowed for the identification of homogeneous groups of students who share similar motivational characteristics. Although the findings obtained in these studies were not always consistent, most of them suggested that motivational profiles characterized by variables such as high task value, high self-efficacy, high mastery goals, and so on, are the best predictors of students' positive educational processes and outcomes (e.g., performance, persistence, cognitive

processing). However, motivational profiles characterized by both adaptive (i.e., high mastery goals) and nonadaptive (i.e., high performance goals) motivations can sometimes be associated with positive school outcomes (e.g., Barron & Harackiewicz, 2001; Braten & Olaussen, 2005; Linnenbrink, 2005).

Most academic studies on SDT have focused on the relation between types of motivation and various academic adjustment variables without looking at motivational profile. However, it is important to note that the relative autonomy index (RAI) developed by some SDT researchers is itself a score that combines endorsement of autonomous and controlled motives via a variable-oriented approach. Based on the simplex pattern, the formula used to compute the RAI aims to contrast the relative amount of autonomous motivation with the amount of controlled regulation reported by individuals (see Ryan & Connell, 1989). Although the RAI is quite useful for reducing the number of motivational components used in some analyses, it does not portray how groups of individuals endorse different types of motivation. For example, two students may both have a score of 0 on the RAI, but one may endorse high levels of autonomous and controlled regulation whereas the other may endorse these motives at low levels. In addition, given that in the RAI types of motivation are grouped into two super categories (autonomous and controlled), it is impossible to determine whether some types of motivation are more important than others. For example, research may find that the most adaptive profile in high school is one that includes moderate levels of IM, low levels of introjected and external motivation as well as of AM, but very high levels of identified regulation. Using the RAI, it would be impossible to isolate such a profile of students. Thus, the RAI reduces the simultaneous endorsement of multiple motivational orientations to one dimension that basically contrasts, and makes mutually exclusive, the endorsement of autonomous and controlled regulations.

Some studies in the sports literature have begun to examine motivational profiles based on SDT types of motivation (e.g., Wang & Biddle, 2001; Wang, Chatzisarantis, Spray, & Biddle, 2002). For example, a study by Wang and Biddle conducted among 2,500 adolescents used SDT motivational components along with goals orientation (ego vs. task), implicit beliefs (incremental vs. entity), and perceived competence in order to identify groups of students sharing similar answers. Results of this study revealed five clusters, including a self-determined one and a highly motivated one. The self-determined cluster was characterized by high levels of autonomy, high task goals, high incremental implicit beliefs, and high perceived competence, but conversely low levels of ego goals and entity self-beliefs; the highly motivated cluster was portrayed by high scores on all of these motivation components. Results further indicated that the self-determined cluster showed higher recreational involvement, and the highly motivated cluster reported playing more competitive sports. These results are quite interesting, but, as pointed out earlier, such analyses have yet to be applied to the academic area.

The Present Research

In line with past theorizing, and in an attempt to overcome some of the limitations of past research, our objective was to study students' motivational profiles from the theoretical perspective of SDT using a person-oriented approach. Although this research is rather exploratory, we expected certain profiles to emerge. We expected that some students would display an *autonomous profile*, evidenced by high levels of IM and identified regulation and low levels of introjected and external regulations and AM. Such a profile is consistent with previous goal research (e.g., Barron & Harackiewicz, 2001; Linnenbrink, 2005) and with the self-determination continuum (Ryan & Connell, 1989). We also expected some students to display a *controlled profile*, evidenced by low levels of IM and identified regulation, and by moderate to high levels of introjected and external regulations and AM. This profile is also consistent with the self-determination continuum (Ryan & Connell, 1989). Finally, we predicted that some students would report a *combined profile* evidenced by high levels of both autonomous (IM and identified regulation) and controlled (introjected and external regulations, AM) motivations. This profile is also in line with previous research (Amabile, 1993; Lepper et al., 2005).

Another objective of this project was to test how each profile relates to academic outcomes. Several studies have reported that motivational profiles characterized by adaptive motivations (e.g., high mastery goals, high IM, or high self-efficacy) predict the most positive outcomes in comparison with motivational profiles characterized by less adaptive motivations (e.g., performance goals and low interest; Meece & Holt, 1993; Nurmi & Aunola, 2005; Wang & Biddle, 2001). We might thus have been tempted to predict that an autonomous motivational profile would predict the most positive academic outcomes, whereas a controlled profile would predict the most negative academic outcomes. However, recent research findings (e.g., Barron & Harackiewicz, 2001; Braten & Olaussen, 2005; Linnenbrink, 2005) and theorizing (e.g., Amabile, 1993; Lepper et al., 2005) suggest that a combination of adaptive (e.g., mastery goals) and less adaptive (e.g., performance goals) motivations can promote positive academic outcomes. For this reason, it was difficult to make a formal hypothesis about whether a purely autonomous profile would be the most adaptive one.

In examining students' motivational profiles, we also tested whether some profiles are more characteristic of male or female students. Because research has shown that women are usually more autonomous than men in the educational context (e.g., Vallerand et al., 1997; Walls & Little, 2005), we expected female students to be more highly represented in autonomous and combined profiles. Inversely, male students should be more likely to have developed a controlled profile. Our hypotheses were tested in three studies.

Study 1

Method

Participants and Procedure

Participants were 4,498 high school students (2,262 boys, 2,224 girls, 12 unspecified) from the Montreal, Canada, area. This sample was collected in 1988–1989. Their mean age was 14.97 years, and more than 96% of them were francophone. They were recruited in classrooms and asked to complete a questionnaire (part of these data were reported in Vallerand et al., 1997). A year after they had completed the questionnaire, a measure of school persistence was obtained via the Quebec Ministry of Education.

Measures

Academic motivations. The Academic Motivation Scale (AMS; Vallerand, Blais, Brière, & Pelletier, 1989) was used to assess students' reasons for pursuing their studies. This multidimensional scale measures five types of academic motivation (four items each). Participants indicated, on a 7-point scale (1 = *not at all*, 7 = *exactly*), the extent to which they pursued their studies out of IM, identified regulation, introjected regulation, external regulation, and AM (see Appendix). The AMS has been found to be reliable and valid (Vallerand et al., 1989, 1993), and, in the present study, Cronbach's alphas were .93, .78, .85, .64, and .85 for IM, identified regulation, introjected regulation, external regulation, and AM, respectively.

Affective and cognitive functioning. A composite scale was used to assess dimensions of affective and cognitive functioning at school. School satisfaction was assessed using a French version (Blais, Vallerand, Pelletier, & Brière, 1989) of the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985), which was adapted to measure students' satisfaction at school. This 5-item scale assesses, on a 7-point scale (1 = *totally disagree*, 7 = *totally agree*), the extent to which individuals are generally satisfied at school. A sample item is "I am satisfied with my school life" ($\alpha = .82$). School anxiety and distraction were assessed using a scale developed by Vallerand et al. (1989). Each subscale contains three items, measured on a 7-point scale (1 = *totally disagree*, 7 = *totally agree*). Sample items are "In class, I am generally tense" (anxiety; $\alpha = .71$) and "I am distracted in class" (distraction; $\alpha = .60$). These scales have been used frequently in the past and have displayed satisfying psychometric qualities (see Ratelle, Vallerand, Senécal, & Provencher, 2005; Vallerand et al., 1989).

School dropout. A measure of students' academic persistence was obtained via the Quebec Ministry of Education. Students were classified as either enrolled or dropped out.

Statistical Analyses

To accurately assess motivational profiles, we decided to use a statistical method that allows for the detection of heterogeneity in motivational profiles (Nagin, 1999, 2005). This group-based approach is typically used in longitudinal analysis (e.g., Ratelle, Guay, Larose, & Senécal, 2004) and is much more flexible than the general linear model (e.g., using regression analyses) in allowing for a mixture of various continuous variables and their dynamic interplay. Indeed, using regression analyses with all possible interaction effects among types of motivation would have been complex and confusing. More important, regression analyses do not offer the possibility of identifying the number of individuals characterized by different motivational profiles. A group-based approach also includes features that are more advantageous than conventional cluster analysis, which is how motivational profiles have been estimated in past research. The group-based approach is designed to identify subgroups of participants displaying distinct levels of a set of variables (i.e., academic motivations) and describe the observed pattern or profile. Because this method allows for the identification of a mixture of groups, it becomes possible to locate groups of participants reporting various, and even contrasting, motivational profiles (e.g., some might report an autonomous profile, whereas others report a controlled profile). Furthermore, this analytical approach yields indices of model fit used for choosing the model with the optimal solution. This feature also presents a clear advantage over conventional cluster analysis.

Academic motivational profiles were modeled using scores of each motivation subscale of the AMS (IM, identified regulation, introjected regulation, external regulation, and AM) and estimated using the SAS TRAJ procedure (Jones, Nagin, & Roeder, 2001). This statistical module allows for the identification of the number of groups of students displaying distinct motivational profiles, describes the composition of these profiles for each subgroup (i.e., the strength of each motivation), and estimates the proportion of students in each profile group. The group-based approach is an application of finite mixture modeling, which is an elaboration of the conventional maximum likelihood model. First, during the model selection phase, the identification of the optimal number of distinct profiles was obtained by estimating models with two, three, and four groups. The decision regarding which model best fit the data was made based on the Bayesian information criterion (BIC), calculated as $BIC = -2\log(L) + \log(n) \times k$, where L is the model's maximized likelihood, n is the sample size, and k is the number of parameters in the model (Nagin, 1999). Although there are no clear guidelines for interpreting the magnitude of the BIC, the optimal model was deemed to be the one with the highest BIC value. Because BIC is always negative, the highest BIC value is the lowest negative score. Second, the model's coefficient estimates were used to calculate, for every participant, the probability of belonging to each profile group. These probabilities were based on each individual's pattern of responses on all variables, using maximum likelihood estimation (Nagin, 1999). From these probabilities, the procedure assigned participants to the group for which membership probability was highest (referred to as the *maximum posterior probability assignment rule*). Together, these two estimates (BIC value and group membership probability) provided information on the fit of the model. Hence, students belonging to a particular profile group had a high mean probability (maximum of 1) of assignment to the group to which they belonged and a low mean probability (minimum 0) of assignment to other groups. A good fit was indicated by probabilities of .70/.80 or higher (see Nagin, 1999).

Results and Discussion

Preliminary Analyses

We tested for gender differences across the variables of the study and found that girls and boys differed on several variables, Wilks's $\lambda(8, 3884) = .94$, $p < .05$. In comparison to boys, girls reported higher levels of IM and identified and introjected regulations, and lower levels of external regulation and AM. They also reported higher satisfaction and less distraction at school. Gender effects accounted for less than 3% of the variance. Also, contingency analyses revealed that a higher proportion of boys than girls dropped out of high school, $\chi^2(1, N = 4{,}486) = 5.44$, $p < .05$.

We also examined the correlations among motivational subscales to test whether they reflected a simplex pattern in line with the self-determination continuum. Types of motivation generally related to one another in a continuum-like fashion, whereby motivations correlated more strongly with adjacent motivations (e.g.,

IM and identified regulation) than with distal motivations (e.g., IM and external regulation; see Table 1). However, it is important to note that there were some problematic correlations in light of the self-determination continuum: (a) There was a substantial correlation of .74 between IM and introjected regulation, (b) the correlations between identified regulation and introjected and extrinsic regulations were practically identical, and (c) the correlation between identified and extrinsic regulations (.49) was higher than the correlation between introjected and extrinsic regulations (.31). More is said on this issue in the General Discussion.

Motivational Profiles

The BIC-based model selection procedure revealed that the three-group model best fit the data, suggesting that there were three distinct motivational profiles (BIC = –17,908.43; see the top panel of Figure 1). Participants in each profile group reported similar levels and patterns of variation across type of motivation. Mean assignment probabilities for each group varied from .82 to .88 (average probability = .85). The first group (labeled *C* group) constituted 5.9% of the sample (265 participants) and included students whose motivational profile was characterized by low levels of autonomous motivations and moderate to high levels of both controlled motivations and AM. For these participants, AM was the strongest type of motivation. The second group (labeled *Moderate AU-C*) included 45.9% of the sample (2,064 participants) and included students whose motivational profile was characterized by moderate levels of both autonomous and controlled motivations and by low levels of AM. Finally, the third group (labeled *High AU-C*) included 48.2% of the sample (2,168 participants), and these participants reported high levels of both autonomous and controlled motivations and low levels of AM. We performed a multivariate analysis of variance (MANOVA) on motivation subscales as a function of profile group to test whether motivation scores differed across motivational profiles. Following a significant multivariate effect, Wilks's $\lambda(10, 8310) = .21$, $p < .01$, univariate analyses were performed and revealed that, for each motivation, profile groups all differed significantly from one another (see Table 2), thereby providing very good support for the distinctiveness of the motivational profiles.

One might argue that the finding that three groups showed the best fit across 4,000 students does not rule out the possibility that a small number of students had high levels of autonomous and low levels of controlled motivations in that sample. As mentioned, we identified the optimal number of distinct motivational profiles by estimating models with two, three, and four groups. We stopped at four groups because the solutions that were yielded did not provide a better fit to the data, nor did they allow for the identification of distinct groups. For example, we observed that a four-group solution (BIC = –21,436.53) resulted in cutting one of the three profiles into two nearly identical profiles. According to Nagin (2005), the solution with fewest groups should be chosen, especially when adding another group proves to be futile. In addition, it is important to note that the BIC values were lower in the four-group solution than in the three-group solution, thus providing further support for the three-group solution.

We then examined how the three motivational profiles related to different academic variables. We started by analyzing the relation between motivational profiles and indices of school functioning. A significant multivariate effect, Wilks's $\lambda(6, 8470) = .73$, $p < .05$, suggested that motivational profiles were associated with distinct patterns of school satisfaction, anxiety, and distraction (see Table 3). Specifically, individuals in the High AU-C group reported the most positive indices of school functioning (lowest anxiety and distraction, highest satisfaction), followed by individuals in the Moderate AU-C group, and in the C group. Second, we used profile group to predict school dropout. Results of a logistic regression revealed that being in the C group was the most effective predictor of school dropout (Wald [1] = 67.60, $p < .05$, odds = 5.33), followed by being in the Moderate AU-C group (Wald [1] = 23.91, $p < .05$, odds = 1.98). In contrast, being in the High AU-C group was a negative predictor of school dropout (Wald [1] = 1.33, $p < .05$, odds = 0.74). Finally, contingency analyses revealed that more girls reported a High AU-C profile and more boys reported Moderate AU-C and C profiles, $\chi^2(1, N = 4{,}486) = 106.71$, $p < .05$. Thus, the motivational profile that appeared to be most adaptive for high school students was more typical of girls than boys.

Table 1
Correlations and Descriptive Statistics for All Variables (Study 1)

Variable	1	2	3	4	5	6	7	8	9
1. Intrinsic motivation[a]	—	.53**	.74**	.19**	−.46**	−.11**	−.49**	.53**	−.12**
2. Identified regulation[a]		—	.51**	.49**	−.41**	−.08**	−.26**	.37**	−.15**
3. Introjected regulation[a]			—	.31**	−.32**	−.02	−.35**	.37*	−.10**
4. External regulation[a]				—	−.07**	.02	−.00	.09**	−.06**
5. Amotivation[a]					—	.15**	.39**	−.43	.13**
6. Anxiety in school[a]						—	.18**	−.26**	.04*
7. Distraction in class[a]							—	−.44**	.12**
8. Satisfaction at school[a]								—	−.17**
9. School dropout[b]									—
M	4.22	5.73	4.70	5.48	2.15	3.11	4.31	4.54	
SD	1.27	1.11	1.50	1.21	1.38	1.43	1.21	1.26	

[a] 7-point scale. [b] 1 = *dropout,* 0 = *persist.*
* $p < .05$. ** $p < .01$.

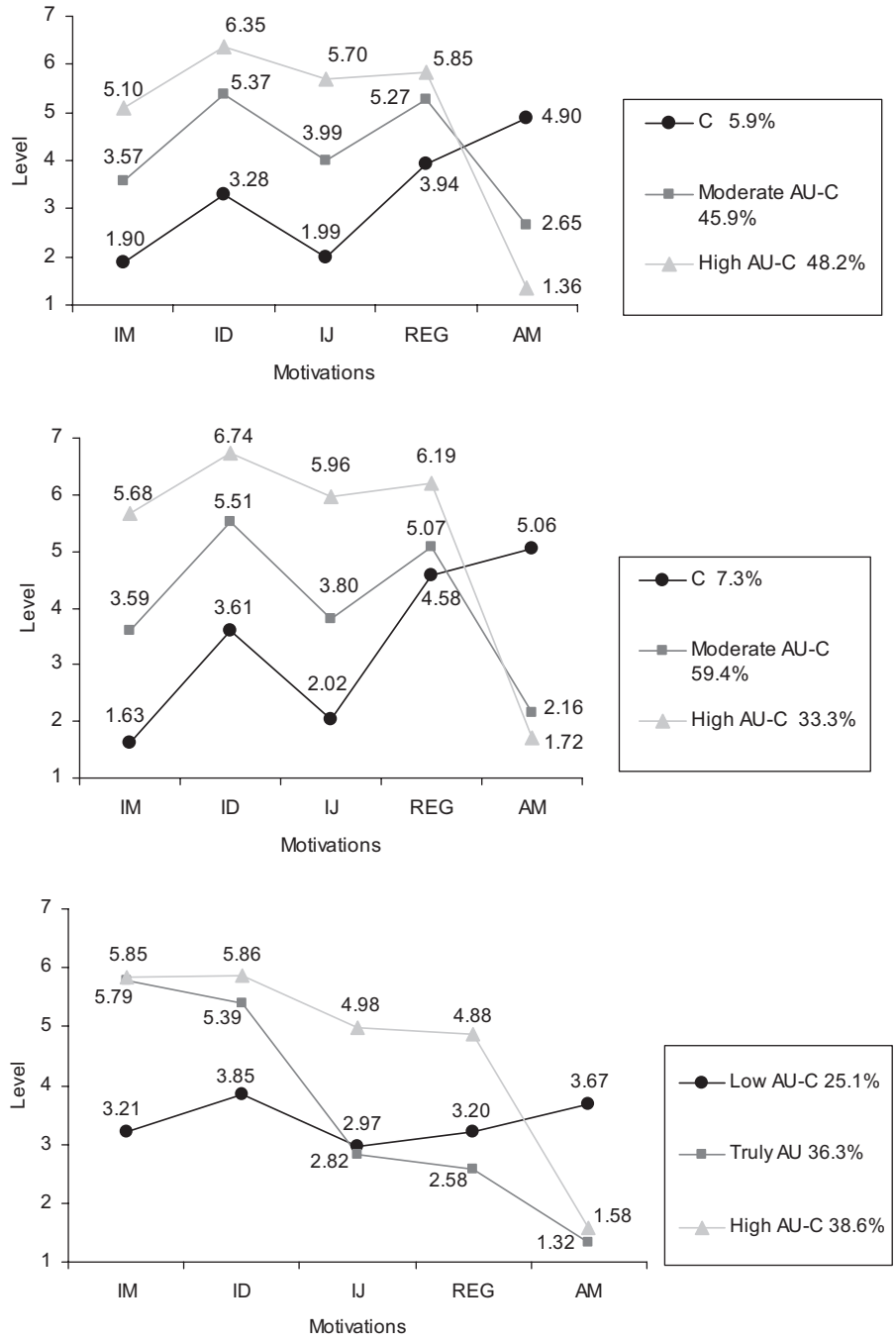

Figure 1. Academic motivational profiles—Studies 1 (top), 2 (middle), and 3 (bottom). Sample 1: $N = 4{,}498$. Sample 2: $N = 942$. Sample 3: $N = 410$. C = controlled; AU = autonomous; IM = intrinsic motivation; ID = identified regulation; IJ = introjected regulation; REG = external regulation; AM = amotivation.

Discussion

Through our examination of high school students' motivational profiles, we observed that more than 9 out of 10 students in this sample had a motivational profile that combined equivalent levels of autonomous and controlled motivations (of either moderate or high magnitude). Furthermore, having a profile that combines high levels of autonomous and controlled motivations appears to be adaptive because these students, despite having high levels of controlled motivation, experienced the most positive academic outcomes (e.g., better school satisfaction, a higher probability of staying in school, and lower distraction and anxiety). Consistent with previous research (e.g., Vallerand et al., 1997), the most adaptive motivational profile mostly

Table 2
Comparison of Profile Groups Based on Motivational Types (Studies 1–3)

Motivational type	C	Low AU-C	AU	Moderate AU-C	High AU-C	F^a	η^2
			Study 1				
Intrinsic motivation	1.90_a			3.56_b	5.11_c	2383.66^{**}	.54
Identified regulation	3.28_a			5.67_b	6.35_c	1770.61^{**}	.46
Introjected regulation	1.99_a			3.99_b	5.70_c	2043.91^{**}	.50
External regulation	3.95_a			5.27_b	5.84_c	344.56^{**}	.14
Amotivation	4.88_a			2.62_b	1.35_c	1561.42^{**}	.43
			Study 2				
Intrinsic motivation	1.63_a			3.59_b	5.68_c	483.22^{**}	.51
Identified regulation	3.61_a			5.51_b	6.75_c	457.19^{**}	.49
Introjected regulation	2.02_a			3.80_b	5.96_c	539.34^{**}	.54
External regulation	4.58_a			5.07_b	6.19_c	104.27^{**}	.18
Amotivation	5.06_a			2.16_b	1.72_c	213.76^{**}	.31
			Study 3				
Intrinsic motivation		3.21_a	5.79_b		5.85_b	263.23^{**}	.56
Identified regulation		3.85_a	5.39_b		5.86_c	144.55^{**}	.42
Introjected regulation		2.97_a	2.82_a		4.98_b	174.88^{**}	.46
External regulation		3.20_a	5.58_b		4.88_c	159.07^{**}	.44
Amotivation		3.67_a	1.33_b		1.57_c	271.87^{**}	.57

Note. All measures used a 7-point scale. For each dependent variable, means with different subscripts indicate a significant difference at $p < .01$ using Tukey's honestly significant difference test. C = controlled; AU = autonomous.
[a] Study 1: $F(2, 4159)$; Study 2: $F(2, 935)$; Study 3: $F(2, 407)$.
** $p < .01$.

characterized girls. We also obtained a controlled profile, which best predicted school dropout. This profile mostly characterized boys. Surprisingly, we did not find an autonomous profile in this sample, which might suggest that the high school climate is unsuccessful in fostering such a motivational profile.

Study 2

The second study aimed to replicate the findings obtained in Study 1 using a similar sample. We hoped to show that the motivational profiles found in Study 1 could be generalized to other samples of students.

Table 3
Comparison of Profile Groups Based on School Functioning and Outcomes (Studies 1–3)

Profile group	C	Low AU-C	AU	Moderate AU-C	High AU-C	F^a	η^2
			Study 1				
School anxiety[b]	3.37_a			3.25_a	2.94_b	26.43^{**}	.01
Distraction in class[b]	5.61_a			4.62_b	3.85_c	405.36^{**}	.16
School satisfaction[b]	2.98_a			4.15_b	5.09_c	57.40^{**}	.22
			Study 2				
Achievement[c]	65.37_a			72.10_b	72.25_b	16.88^{**}	.04
Absenteeism	29.57_a			21.38_b	19.89_b	4.64^{**}	.01
			Study 3				
Achievement-fall[c]		71.99_a	80.21_b		79.16_b	25.80^{**}	.12
Achievement-winter[c]		71.63_a	78.97_b		78.10_b	14.73^{**}	.08

Note. For each dependent variable, means with different subscripts indicate a significant difference at $p < .01$ using Tukey's honestly significant difference test. C = controlled; AU = autonomous.
[a] Study 1: $F(2, 4240)$, Study 2: $F(2, 903)$, Study 3: $F(2, 397)$. [b] Used a 7-point scale. [c] Used a scale of 1–100.
*** $p < .01$.

Method

Participants and Procedure

Participants were 942 high school students from the Quebec City, Canada, area (524 girls, 417 boys, 1 unspecified). Their mean age was 13.75 years, and more than 92% of them were francophone. The average family income ranged from $40,000 CAD to $49,999 CAD, and 80% of parents had at least a high school diploma. Participants were recruited in classrooms and asked to complete a questionnaire. Data were collected in 2003–2004. At the end of the school year, measures of achievement and absenteeism were obtained.

Measures

Academic motivations. As in Study 1, academic motivations were assessed using the French version of the AMS (Vallerand et al., 1989). Alphas were .90, .80, .84, .73, and .85 for IM, identified regulation, introjected regulation, external regulation, and AM, respectively.

Academic achievement and absenteeism. Students' grades and number of school periods missed were obtained via their official report cards.

Results and Discussion

Gender differences were replicated, Wilks's $\lambda(8, 890) = .93$, $p < .05$, with boys being less autonomous at school and having lower achievement than girls ($ps < .05$; explaining less than 3% of the variance). Correlations among motivational components mostly supported the self-determination continuum (see Table 4) except that, like in Study 1, there was a strong positive relation between introjected regulation and IM ($r = .60$). In addition, as in Study 1, the correlation between identified and extrinsic regulations (.47) was nearly equivalent to the correlation between introjected and extrinsic regulations (.44). Finally, the negative correlation between identified regulation and AM was higher than the correlation between IM and AM. These problematic correlations are discussed in the General Discussion.

Motivational Profiles

In estimating students' motivational profiles, we obtained a three-group solution identical to that obtained in Study 1 (BIC = −8,541.52; see the middle panel of Figure 1). Mean assignment probabilities for each group varied from .82 to .87 (average probability = .85). The first group (C group), which constituted 7.3% of the sample (69 participants), included students whose motivational profile was characterized by low levels of autonomous motivations and high levels of both controlled motivations and AM. For these students, AM was stronger than all other types of motivation. The second group (Moderate AU-C) included 59.4% of the sample (560 participants), whose profile was characterized by moderate levels of both autonomous and controlled motivations and low levels of AM. The third group (High AU-C) comprised 33.3% of the sample (314 participants) and entailed high levels of both autonomous and controlled motivations and low levels of AM. We again performed a MANOVA on motivation subscales as a function of profile group, and, following a significant multivariate effect, Wilks's $\lambda(10, 1862) = .21$, $p < .01$, univariate analyses were performed. Results suggested that, for each motivation, profile groups all differed significantly from one another (see Table 1), thereby providing additional support for the distinctiveness of the motivational profiles.

We next examined the relation between motivational profiles and academic achievement and absenteeism. Results of a MANOVA suggested that each motivational profile was associated with our school outcomes, Wilks's $\lambda(6, 1796) = .80$, $p < .05$. Specifically, individuals in Moderate AU-C and High AU-C groups had higher grades and lower absenteeism than students in the C group, although Moderate AU-C and High AU-C groups did not differ from each other on these measures (see Table 3). Contingency analyses yielded a nonsignificant $\chi^2(2, N = 941) = 3.32$, $p > .05$, suggesting that there was an equivalent proportion of boys and girls in each profile.

Discussion

We replicated the motivational profiles obtained in Study 1 using a sample of students from another generation (15 years after Study 1 was conducted), thereby supporting the validity of these profiles. We again found that for more than 9 out of 10 students in this sample, motivational profiles combined relatively equivalent levels of autonomous and controlled motivations (at either moderate or high levels). Also, a third of the students were characterized by a high autonomous/high controlled motivational profile (found in Study 1 to be the most adaptive), and fewer than 1 out

Table 4
Correlations and Descriptive Statistics for All Variables (Study 2)

Variable	1	2	3	4	5	6	7
1. Intrinsic motivation[a]	—	.55**	.60**	.16**	−.36**	.17**	−.14**
2. Identified regulation[a]		—	.55**	.47**	−.41**	.15**	−.06†
3. Introjected regulation[a]			—	.44**	−.19**	−.02	−.08*
4. External regulation[a]				—	.03	−.19**	−.08*
5. Amotivation[a]					—	−.36**	.12**
6. Academic achievement[b]						—	−.30**
7. Absenteeism							—
M	4.13	5.78	4.38	5.40	2.21	71.67	21.42
SD	1.64	1.16	1.61	1.31	1.42	8.92	22.54

[a] 7-point scale. [b] Percentage (0–100).
† $p < .10$. * $p < .05$. ** $p < .01$.

of 10 students reported a maladaptive, controlled motivational profile. In contrast to Study 1, the two combined profiles (High AU-C and Moderate AU-C) did not differ from each other on the basis of achievement and absenteeism. Gender differences in terms of motivational profiles were not replicated. Nevertheless, the motivational profiles that were obtained in Studies 1 and 2 appear to be quite robust across samples.

The findings of Study 2, and, by extension, of Study 1, do not allow us to determine whether having a purely autonomous profile is more adaptive than having a combined profile because we did not find an autonomous profile in either sample. A tentative conclusion might be that highly autonomous motivations are enough to ensure positive academic outcomes by protecting against the negative role of controlled motivators. Taken together, these findings suggest that autonomous motivations might play a buffering role against controlling factors, such as competition and tangible rewards, that are often found in the high school environment. However, it would be crucial to test this hypothesis by comparing the High AU-C profile with a purely autonomous profile.

Study 3

The goal of the third study was to replicate the motivational profiles obtained in Studies 1 and 2 in an educational setting characterized by fewer constraints. Indeed, college students have more opportunities to make choices than high school students: (a) They are not obligated to pursue their studies, (b) they can choose their academic program, and (c) they can choose their courses and their schedule. Because high school and college environments differ in terms of variables that can undermine or enhance motivation, we expected some differences between motivational profiles of college and high school students. Motivational research has repeatedly shown that extrinsic control undermines autonomous motivation, whereas having more opportunities to make meaningful choices enhances autonomous motivation (Ryan & Deci, 2002; Vallerand, 1997). Therefore, we expected that we might observe an autonomous motivational profile in college students because their educational environment, through its less controlling nature, would be more likely to promote autonomous forms of motivation.

Method

Participants and Procedure

The sample was composed of 410 first-year college students (226 women, 184 men). Their mean age was 18.58 years, and 98% of them were francophone. Average income of the fathers ranged from $30,000 CAD to $39,999 CAD and of the mothers from $20,000 CAD to $29,999 CAD. In terms of level of education, 78% of fathers and 85% of mothers had at least a high school diploma. Data for these students were used and reported in Ratelle et al. (2004; Ratelle, Larose, Guay, & Senécal, 2005). Participants received a questionnaire by mail and were asked to complete and return it in a prestamped envelope. The return rate was 56%.

Measures

Academic motivations. As in Studies 1 and 2, academic motivations were assessed using the French version of the AMS (Vallerand et al., 1989). Cronbach's alphas were .95, .75, .85, .90, and .87 for IM, identified regulation, introjected regulation, external regulation, and AM, respectively.

Academic achievement. Students' grades for fall and winter semesters were obtained from their official report cards.

Academic persistence. Colleges provided data on students' continued enrollment after their first year in college (i.e., a year later). Students were classified as either enrolled in program or dropped out of program.

Results and Discussion

As in Studies 1 and 2, gender differences were found, Wilks's $\lambda(7, 355) = .87$, $p < .05$, whereby women were found to be more autonomous and to have higher grades than men (ps $< .05$; explaining less than 6% of the variance). Correlational analyses revealed a simplex pattern (see Table 5) that was even more in line with SDT than the one observed in Studies 1 and 2.

Motivational Profiles

Students' motivational profiles were estimated using the same BIC-based model selection procedure and yielded a three-group

Table 5
Correlations and Descriptive Statistics for All Variables (Study 3)

Variable	1	2	3	4	5	6	7	8
1. Intrinsic motivation[a]	—	.62**	.29**	.10*	−.69**	.25**	.20**	.25**
2. Identified regulation[a]		—	.38**	.28**	−.61**	.23**	−.22**	.29**
3. Introjected regulation[a]			—	.51**	−.12**	.09†	.08	.12*
4. External regulation[a]				—	−.02	−.05	−.09†	.09†
5. Amotivation[a]					—	−.39**	−.33**	−.37**
6. Academic achievement (fall)[b]						—	.73**	.44**
7. Absenteeism (winter)[b]							—	.28**
8. Academic persistence[c]								
M	5.18	5.19	3.68	3.61	2.00	75.64	75.25	
SD	1.50	1.24	1.50	1.55	1.27	11.86	11.98	

[a] 7-point scale. [b] Percentage (0–100); 1 = *dropout,* 2 = *persist.*
† $p < .10$. * $p < .05$. ** $p < .01$.

solution (BIC = –3,517.83; see bottom panel of Figure 1). Mean assignment probabilities for each group varied from .83 to .91 (average probability = .86). It is interesting that although we replicated one of the motivational profiles found in Studies 1 and 2 (i.e., High AU-C, which represented 38.6% of the sample), we found two different motivational profiles: (a) one that combines low to moderate levels of autonomous and controlled motivations (labeled *Low AU-C*), sharing some similarities with the C group obtained in Studies 1 and 2; and (b) an autonomous motivational profile (labeled *AU*). Respectively, these two groups represented 25.1% and 36.3% of the sample. A MANOVA was performed on motivation subscales as a function of profile group and yielded a significant multivariate effect, Wilks's $\lambda(10, 806) = .14$, $p < .01$. Results revealed that profile groups differed significantly from one another on nearly all motivation subscales (see Table 2), thereby providing stronger support for the distinctiveness of the profiles.

We then contrasted motivational profiles on the basis of academic achievement and persistence. Following a significant multivariate test, Wilks's $\lambda(4, 718) = .91$, $p < .05$, univariate tests revealed that students with an AU profile and those with a High AU-C profile had similar achievement levels (see Table 3). However, students in these two groups had higher grades than those in the Low AU-C group. Also, results of a logistic regression revealed that being in the Low AU-C group was the most effective predictor of dropout (Wald [1] = 30.86, $p < .05$, odds = 0.18), whereas being in the AU or High AU-C groups predicted more persistence in an academic program (AU group: Wald [1] = 26.94, $p < .05$, odds = 4.73; High AU-C group: Wald [1] = 11.18, $p < .05$, odds = 2.50). However, when we compared odds for these two motivational profiles (see Garson, 2005, for more details), our findings suggested that having an autonomous profile was better for promoting academic persistence than having a profile that combined high levels of both autonomous and controlled motivations. Specifically, persistence in a program was almost twice (1.89) as likely for students in the AU group than for those in the High AU-C group, which attested to the benefits of promoting an autonomous motivational profile in students. A contingency analysis revealed that more women reported an AU profile and more men reported a Low AU-C profile, $\chi^2(2, N = 409) = 14.04$, $p < .05$.

Discussion

Overall, the findings of Study 3 suggest that, for college students, it is possible to identify an autonomous motivational profile in which levels of autonomous motivations are high and levels of controlled motivations are low. Hence, the development of motivational profiles appears to be context sensitive. It is, however, possible that some developmental processes contribute to the development of an autonomous profile; future studies are needed on this issue. We also replicated the combined profile found in Studies 1 and 2 (High AU-C). This profile was observed for nearly 40% of the students in this sample. It is interesting that we found that achievement was equivalent for students reporting an autonomous profile and those reporting a combined profile. However, an autonomous profile did predict a higher probability of persevering in an academic program than did a combined profile. Hence, depending on the specific outcome under study, an autonomous profile can be more advantageous than a combined profile.

General Discussion

Our goal was to examine students' motivational profiles with respect to both their composition and their associated academic outcomes. In samples of high school students (Studies 1 and 2), we found consistent and robust support for three distinct motivational profiles: (a) a controlled profile, (b) a profile characterized by moderate levels of both autonomous and controlled motivations, and (c) a profile characterized by high levels of both autonomous and controlled motivations. We did not, however, find an autonomous motivational profile in this student population. Our findings suggest that, for these samples of high school students, the most adaptive profile is one characterized by high levels of both autonomous and controlled motivations. This profile was associated with positive school outcomes such as high persistence and achievement, low absenteeism, and high cognitive and affective functioning. In Study 3, three motivational profiles were obtained: (a) a high autonomous/high controlled profile identical to that found in the high school samples; (b) a low autonomous/low controlled profile, which shared some similarities with the controlled profile among the high school students; and (c) an autonomous motivational profile. Our findings suggest that achievement levels are similar for those students who have autonomous and combined profiles. However, academic persistence was more strongly associated with an autonomous profile. Hence, for some outcomes, having an autonomous profile appears more adaptive for students. This last finding thus provides good support for the SDT perspective on quality of motivation. In other words, it appears that students who endorse more autonomous motivations compared to controlled ones are the most persistent in their education.

The fact that an autonomous profile could only be found in college, an educational setting characterized by lesser constraints, suggests that students' motivational profiles might be context sensitive. Because high school entails more extrinsic controls and rigid constraints, this could explain why most students develop, to some extent, controlled forms of motivation. In fact, these motivations, although not always adaptive (see Ryan & Deci, 2000; Vallerand, 1997), can inevitably be developed in order for students to meet environmental demands. However, controlled forms of motivations may be most detrimental when students also fail to develop autonomous forms of motivation. Our findings thus seem to suggest that the high school environment could be improved to make it more sensitive to students' needs. High school educators may be well advised to use some of the strategies employed at the college level to promote students' development of autonomous motivations.

Because not all high school students go on to college, one may argue that a selection bias operated in Study 3, whereby it was the most autonomously motivated high school students who decided to pursue college studies. If such a selection bias operated, this would mean that it was not the college environment per se that fostered a self-determined profile but rather the inherent characteristics of our sample. However, it is important to keep in mind that in Studies 1 and 2, we were unable to identify a profile of students with high levels of autonomous motivations and low levels of both controlled motivations and AM. The fact that we could not isolate such a profile in high school, but that we could in college, with 36% of the students being characterized by such a profile, works against a selection bias hypothesis. In other words, if a selection bias had been in effect, we should have at least found a small number of high school students with an autonomous profile in high

school (approximately 5%). Clearly, our interpretations about the characteristics of the college environment are not the only ones possible; consequently, future research is needed to determine why an autonomous profile was discovered in Study 3. For example, it could be that it is not the college context that fosters the development of an autonomous profile per se, but rather that this new profile is the result of natural development that occurs with age, whereby certain students from the high autonomy-controlled group experience decreased levels of controlled motivations.

Because high levels of autonomous motivations were associated with positive academic outcomes when levels of controlled motivations were either low or high, it might be that autonomous motivations play a protective role against controlled motivations. Similar theorizing was proposed by Deci and Ryan (1985), who focused on the dispositional level of motivation, at which an autonomous orientation would protect autonomous motivation in the face of activities taking place in controlling settings. Although the protective function of autonomous motivations might also operate at the contextual level, we advise some caution in drawing conclusions about the protective role of autonomous motivation given the support we obtained for the autonomous profile in Study 3 while using persistence as an outcome variable.

Overall, the findings obtained in these studies highlight the importance of studying how types of motivation proposed by SDT can be endorsed by students using a person-oriented approach. These three studies enabled us to more thoroughly delineate student populations found in our schools with regard to the different reasons underlying their academic behaviors. Additionally, our findings provide further support for the importance of distinguishing between the different types of motivation identified by SDT. According to some motivational researchers, consideration of autonomous forms of motivation is sufficient for predicting important school outcomes. Research focusing only on IM or on interest exemplifies such an assumption (e.g., Gottfried, 1990; Krapp, 2002). However, our findings suggest that although considering only autonomous forms of motivations might be enough to predict levels of functioning and success among high school students, such is not the case for college students. Indeed, considering only autonomous motivations lumps together students with combined and autonomous profiles. The distinction among profiles that are characterized by the presence of autonomous motivations is important given that profiles with high levels of autonomous motivations but low levels of both controlled motivations and AM, and not all profiles that showed autonomous motivations, were found to be optimal in promoting academic persistence in Study 3.

An important question in this article concerns the phenomenological significance of simultaneously pursuing autonomous and controlled regulations. Indeed, one may argue that such "combined" pursuit is easier to conceptualize when the motivational constructs are "goals" or even "purposes" (i.e., Barron & Harackiewicz, 2001), but when the constructs in question can be arranged on one dimension of self-determination this seems less plausible. Are students switching between the two types of regulations at different times? Is there a way to conceptualize a phenomenological combination of a sense of autonomy and a sense of control? Lepper et al. (2005) have already answered these interesting questions:

> In fact, it may be quite adaptive for students to seek out activities that they find inherently pleasurable while simultaneously paying attention to the extrinsic consequences of those activities in any specific context. Seeking only immediate enjoyment with no attention to external contingencies and constraints may substantially reduce a student's future outcomes and opportunities. Conversely, attending only to extrinsic constraints and incentives can substantially undermine intrinsic interest and the enjoyment that can come from learning itself. (p. 191)

In interpreting the findings of these studies, some limitations must be considered. Although a major strength of our research is its use of objective measures such as dropout and achievement, some constructs (e.g., motivations, satisfaction, and anxiety) were assessed using self-report scales. It is therefore possible that personal characteristics and biases (e.g., desirability concerns, neuroticism) could have influenced participants' responses. Also, past performance might explain some variance in behavioral indicators such as school persistence and attendance. Future research on motivational profiles should therefore consider the impact of this factor. Another limitation of this research is the absence of longitudinal assessments of motivations. Further research should examine the temporal stability of motivational profiles within a single sample. Another suggestion for future research would be to identify contextual and social variables responsible for the development of students' motivational profiles. An additional limitation is that the design used in this research is correlational in nature and thus prevents us from drawing causal interpretations from our findings. Furthermore, the simplex pattern proposed by SDT is only corroborated in Study 3. Some correlations in Studies 1 and 2 are not in line with SDT contentions. For example, the correlation of intrinsic and introjected regulations is higher than the correlation between intrinsic and identified regulations. In addition, the correlation between identified and extrinsic regulations is higher than the one between introjected and extrinsic regulations. Why did we find these correlations that are so untypical of research in SDT? As we argued earlier, the prevalence of constraints and rewards in high school may explain these unexpected results (see the quotation from Lepper et al., 2005, in the preceding paragraph). Further research is necessary to understand why the continuum is supported in some contexts (high school) and not in others (college).

In conclusion, the present research underscores the importance of studying students' motivation using a person-oriented approach. Examining how types of motivation combine allowed us to identify different motivational profiles that can be developed by high school and college students as well as their academic correlates. In addition, our study provides some support for the SDT perspective on quality of motivation. Indeed, it appears that without autonomous forms of motivations, students may not adequately contend with the educational challenges that they have to face.

References

Alexander, P. A., & Murphy, P. K. (1998). Profiling the differences in students' knowledge, interest, and strategic processing. *Journal of Educational Psychology, 90,* 435–447.

Amabile, T. M. (1993). Motivational synergy: Toward new conceptualizations of intrinsic and extrinsic motivation in the workplace. *Human Resource Management Review, 3,* 185–201.

Barron, K. E., & Harackiewicz, J. M. (2001). Achievement goals and optimal motivation: Testing multiple goal models. *Journal of Personality and Social Psychology, 80,* 706–722.

Blais, M. R., Vallerand, R. J., Pelletier, L. G., & Brière, N. M. (1989).

L'Échelle de satisfaction de vie: Validation canadienne-française du "Satisfaction with Life Scale" [Validation of the Satisfaction with Life Scale]. *Canadian Journal of Behavioural Science, 21,* 210–223.

Braten, I., & Olaussen, B. S. (2005). Profiling individual differences in student motivation: A longitudinal cluster-analytic study in different academic contexts. *Contemporary Educational Psychology, 30,* 359–396.

Csizer, K., & Dornyei, Z. (2005). Language learners' motivational profiles and their motivated learning behavior. *Language Learning, 55,* 613–659.

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

Deci, E. L., & Ryan, R. M. (1991). A motivational approach to the self: Integration in personality. In R. Dienstbier (Ed.), *Nebraska Symposium on Motivation: Vol. 38. Perspectives on motivation* (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.

Deci, E. L., & Ryan, R. M. (Eds.). (2002). *Handbook of self-determination research.* Rochester, NY: University of Rochester Press.

Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment, 49,* 71–76.

Garson, G. D. (2005). *PA 765 Statnotes: An online textbook.* Retrieved September 26, 2005, from http://www2.chass.ncsu.edu/garson/pa765/statnote.htm

Gottfried, A. E. (1990). Academic intrinsic motivation in young elementary school children. *Journal of Educational Psychology, 82,* 525–538.

Guay, F. & Vallerand, R. J. (1997). Social context, students' motivation, and academic achievement: Toward a process model. *Social Psychology of Education, 1,* 211–233.

Harter, S. (1981). A new self-report scale of intrinsic versus extrinsic orientation in the classroom: Motivated and informational components. *Developmental Psychology, 17,* 300–312.

Harter, S., & Jackson, B. K. (1992). Trait vs. nontrait conceptualizations of intrinsic/extrinsic motivational orientation. *Motivation and Emotion, 16,* 209–230.

Jones, B. L., Nagin, D. S., & Roeder, K. (2001). A SAS procedure based on mixture models for estimating developmental trajectories. *Sociological Methods & Research, 29,* 374–393.

Krapp, A. (2002). An educational-psychological theory of interest and its relation to SDT. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 405–427). Rochester, NY: University of Rochester Press.

Lepper, M. R., Corpus, J. H., & Iyengar, S. S. (2005). Intrinsic and extrinsic motivational orientations in the classroom: Age differences and academic correlates. *Journal of Educational Psychology, 97,* 184–196.

Linnenbrink, E. A. (2005). The dilemma of performance-approach goals: The use of multiple goal contexts to promote students' motivation and learning. *Journal of Educational Psychology, 97,* 197–213.

Meece, J. L., & Holt, K. (1993). A pattern analysis of students' achievement goals. *Journal of Educational Psychology, 85,* 582–590.

Nagin, D. S. (1999). Analyzing developmental trajectories: A semi-parametric, group-based approach. *Psychological Methods, 4,* 139–177.

Nagin, D. S. (2005). *Group-based modeling of development.* Cambridge, MA: Harvard University Press.

Nurmi, J.-E., & Aunola, K. (2005). Task-motivation during the first school years: A person-oriented approach to longitudinal data. *Learning and Instruction, 15,* 103–122.

Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology, 95,* 667–686.

Pintrich, P. R., Anderman, E. M., & Klobucar, C. (1994). Intraindividual differences in motivation and cognition in students with and without learning disabilities. *Journal of Learning Disabilities, 27,* 360–370.

Ratelle, C. F., Guay, F., Larose, S., & Senécal, C. (2004). Family correlates of trajectories of academic motivation during a school transition: A semi-parametric group-based approach. *Journal of Educational Psychology, 96,* 743–754.

Ratelle, C. F., Larose, S., Guay, F., & Senécal, C. (2005). Perceptions of parental involvement and support as predictors of college students' persistence in a scientific curriculum. *Journal of Family Psychology, 19,* 286–293.

Ratelle, C. F., Vallerand, R. J., Senécal, C., & Provencher, P. (2005). The relationship between school-leisure conflict and poor educational and mental health indices: A motivational analysis. *Journal of Applied Social Psychology, 35,* 1800–1823.

Ryan, R. M., & Connell, J. P. (1989). Perceived locus of causality and internalization: Examining reasons for acting in two domains. *Journal of Personality and Social Psychology, 57,* 749–761.

Ryan, R. M., & Deci, E. L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25,* 54–67.

Ryan, R. M., & Deci, E. L. (2002). Overview of self-determination theory: An organismic dialectical perspective. In E. L. Deci & R. M. Ryan (Eds.), *Handbook of self-determination research* (pp. 431–441). Rochester, NY: University of Rochester Press.

Ryan, R. M., Plant, R. W., & O'Malley, S. (1995). Initial motivations for alcohol treatment: Relations with patient characteristics, treatment involvement and dropout. *Addictive Behaviors, 20,* 279–297.

Shahar, G., Henrich, C. C., Blatt, S. J., Ryan, R. M., & Little, T. D. (2003). Interpersonal relatedness, self-definition, and motivational orientation during adolescence: A theoretical and empirical investigation. *Developmental Psychology, 39,* 470–483.

Vallerand, R. J. (1997). Toward a hierarchical model of intrinsic and extrinsic motivation. In M. P. Zanna (Ed.), *Advances in experimental social psychology* (Vol. 27, pp. 271–360). New York: Academic Press.

Vallerand, R. J., Blais, M. R., Brière, N. M., & Pelletier, L. G. (1989). Construction et validation de l'échelle de Motivation en Éducation (EME) [On the construction and validation of the French form of the Academic Motivation Scale]. *Canadian Journal of Behavioural Science, 21,* 323–349.

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.

Vallerand, R. J., Pelletier, L. G., Blais, M. R., Brière, N. M., Senécal, C., & Vallières, E. F. (1993). On the assessment of intrinsic, extrinsic, and amotivation in education: Evidence on the concurrent and construct validity of the Academic Motivation Scale. *Educational and Psychological Measurement, 53,* 159–172.

Walls, T. A., & Little, T. D. (2005). Relations among personal agency, motivation, and school adjustment in early adolescence. *Journal of Educational Psychology, 97,* 23–31.

Wang, C. K. J., & Biddle, S. J. H. (2001). Young people's motivational profiles in physical activity: A cluster analysis. *Journal of Sport and Exercise Psychology, 23,* 1–22.

Wang, C. K. J., Chatzisarantis, N. L. D., Spray, C. M., & Biddle, S. J. H. (2002). Achievement goal profiles in school physical education: Differences in self-determination, sport ability beliefs and physical activity. *British Journal of Educational Psychology, 72,* 433–445.

(*Appendix follows*)

Appendix

The Academic Motivation Scale

Why do you go to school?

1. Because I need at least a high school diploma in order to find a high-paying job later on.
2. Because I experience pleasure and satisfaction while learning new things.
3. Because I think that a high school education will help me better prepare for the career I have chosen.
4. Honestly, I don't know; I really feel that I am wasting my time in school.
5. To prove to myself that I am capable of completing my high school diploma.
6. In order to obtain a more prestigious job later on.
7. For the pleasure I experience when I discover new things never seen before.
8. Because eventually it will enable me to enter the job market in a field that I like.
9. I once had good reasons for going to school; however, now I wonder whether I should continue.
10. Because of the fact that when I succeed in school I feel important.
11. Because I want to have "the good life" later on.
12. For the pleasure that I experience in broadening my knowledge about subjects which appeal to me.
13. Because this will help me make a better choice regarding my career orientation.
14. I can't see why I go to school and frankly, I couldn't care less.
15. To show myself that I am an intelligent person.
16. In order to have a better salary later on.
17. Because my studies allow me to continue to learn about many things that interest me.
18. Because I believe that my high school education will improve my competence as a worker.
19. I don't know; I can't understand what I am doing in school.
20. Because I want to show myself that I can succeed in my studies.

Coding

Intrinsic motivation – Items 2, 7, 12, 17

Identified regulation – Items 3, 8, 13, 18

Introjected regulation – Items 5, 10, 15, 20

External regulation – Items 1, 6, 11, 16

Amotivation – Items 4, 9, 14, 19

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