The Differential Effects of Intrinsic and Identified Motivation on Well-Being and Performance: Prospective, Experimental, and Implicit Approaches to Self-Determination Theory

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Self-determination theory research has demonstrated that intrinsic and identified self-regulations are associated with successful adaptation. However, few distinctions are typically made between these regulations and their outcomes. In the present studies, the associations between intrinsic and identified motivations and outcomes of psychological well-being and academic performance are compared in educational settings. In Study 1, intrinsic self-regulation predicted psychological well-being, independent of academic performance. In contrast, identified regulation predicted academic performance. Additionally, the more that students demonstrated an identified academic regulation, the more that their psychological well-being was contingent on performance. In Study 2a, priming intrinsic self-regulation led to greater psychological well-being 10 days later. In Study 2b, an implicit measure of identified regulation predicted academic performance 6 weeks later. Results indicate the need to address important distinctions between intrinsic and identified regulations.

Keywords: motivation, self-determination, well-being, performance

Most things that matter in life are not easy to achieve. How do we manage to attain our goals while being happy in the process? Does a certain type of motivation lead us to work toward doing well, and another type lead us to feel good as we work? Researchers have identified styles of self-regulation that may help to answer these questions.

Self-determination theory built on the classic distinction between extrinsic and intrinsic motivation by developing a continuum model of motivation (Deci & Ryan, 2000), with points along the continuum representing distinct self-regulatory styles for behavior. Past research demonstrated that the autonomous end of the continuum, comprising intrinsic and identified self-regulations,[1] is associated with positive outcomes, such as psychological well-being (e.g., Reis, Sheldon, Gable, Roscoe, & Ryan, 2000) and academic performance (e.g., Grolnick & Ryan, 1987). Intrinsic regulation is the most autonomous of the regulatory styles and exists when people freely choose to perform an activity out of a sense of interest. In contrast, the identified regulatory style involves an individual's recognition and acceptance of the value and importance of a behavior and the integration of this into the self.

Although intrinsic and identified regulations are correlated, these constructs are theoretically distinct. Despite this, little research has examined intrinsic and identified regulatory styles separately, and there is not much empirical differentiation between the outcomes associated with each type of motivation.

We propose that, in addition to the benefits associated with autonomous motivation generally, theory and research may be advanced by examining the relative contributions of intrinsic and identified regulatory styles to the prediction of positive outcomes. Briefly, in the academic domain, among both elementary school and university students, we will show that intrinsic self-regulation is an important predictor of psychological well-being outcomes, controlling for identified self-regulation, and that identified regulation is an important predictor of performance outcomes, controlling for intrinsic self-regulation.

Self-Regulatory Style and Outcomes

Autonomous reasons for engaging in a particular behavior are associated with beneficial psychological outcomes, such as feeling good about an activity, goal progress, and psychological well-being, as well as with positive behavioral outcomes, such as school performance. Autonomous regulation is positively correlated with children's enjoyment of elementary school (Ryan & Connell, 1989), with university students' enjoyment of an organic chemistry class (Black & Deci, 2000), as well as with positive mood (Reis et al., 2000), vitality (e.g., Nix, Ryan, Manly, & Deci, 1999; Reis et

[1] Subsequent theory and research described an integrated self-regulation that is highly correlated with identified regulation but that is thought to be relatively more autonomous.

al., 2000; Ryan & Frederick, 1997), and positive coping strategies (Ryan & Connell, 1989). In addition, autonomous regulation is associated with greater conceptual learning of material (Grolnick & Ryan, 1987), with academic performance (Grolnick, Ryan, & Deci, 1991), and with grades (Miserandino, 1996) in elementary school children. Likewise, junior college students who persisted in a course were significantly more autonomous at the beginning of the semester than were students who later dropped out (Vallerand & Bissonnette, 1992). Overall, research has indicated that having an autonomous self-regulatory style is associated with psychological well-being and positive behavioral outcomes.

The majority of the above research treats self-regulation in terms of the self-determination continuum. For example, a number of researchers report using autonomy summary scores that are often computed from the Self-Regulation Scale (Ryan & Connell, 1989) by subtracting the sum of the nonautonomous regulations (i.e., introjected and extrinsic) from the sum of intrinsic and identified regulations, thereby creating a Relative Autonomy Index (e.g., Black & Deci, 2000; Grolnick et al., 1991; Miserandino, 1996). Others compute the same index by attaching weights to the self-regulation subscales (i.e., extrinsic $= -2$, introjection $= -1$, identified $= +1$, intrinsic $= +2$) and use this composite to predict outcome variables (e.g., Grolnick & Ryan, 1987; Reis et al., 2000; Vallerand & Bissonnette, 1992). As a result of these indexing methods, distinctions between regulations that are close together on the self-determination continuum, such as the distinctions between intrinsic and identified regulations, may be overlooked (Koestner & Losier, 2002).

Implicit in the combining of intrinsic and identified self-regulation scores is that the promotion of high levels of both regulations is an appropriate objective toward which socializing agents should strive. Indeed, self-determination theory suggests that intrinsic motivation and internalization work in a complementary fashion to encourage vitality, growth, and adaptation (Deci & Ryan, 2000). Intrinsic self-regulation promotes a focus on the task itself and yields energizing emotions such as interest and excitement, whereas identification keeps one oriented toward the long-term significance of one's current pursuits and may foster persistence at uninteresting, but important, activities. Possessing high levels of both intrinsic motivation and identification would seem to allow one the flexibility to adapt to a wide array of situations.

Researchers who do not use self-determination theory as their starting point also established the adaptive value of possessing both intrinsic and more instrumental goals. For example, in a longitudinal study of talented teenagers, Wong and Csikszentmihalyi (1991) distinguished between two forms of academic motivation: intrinsic motivation and work orientation. They argued that intrinsic motivation is based on the rewards of ongoing experience, whereas work orientation reflects an investment in long-term goals such as fulfilling one's career expectations and meeting one's psychological needs. Their results indicated that work orientation, which we would liken to identified regulation, was significantly associated with the amount of time that students spent studying but was unrelated to their experience while studying. By contrast, intrinsic motivation was related to enjoyable studying experiences but not to the amount of time spent studying. To achieve good grades and simultaneously enjoy the process would seem to require combining self-regulation strategies that focus both on im-

mediate experience (i.e., intrinsic motivation) and on long-term goals (i.e., identification).

Educational settings provide a fertile environment in which to study distinct regulatory styles because students often report having high levels of both intrinsic and identified motivation for their academic involvement (Vallerand, Fortier, & Guay, 1997) and because academic involvement is central to the identities of many young people (Blais, Vallerand, Brière, Gagnon, & Pelletier, 1990). In the present studies, we examine the correlates of intrinsic and identified regulation among elementary school and university undergraduate students. Because the intrinsic self-regulatory style reflects the positive experience that individuals have regarding an activity, such as feelings of enjoyment and interest, we hypothesized that intrinsic regulation would predict positive affect and satisfaction with life, two of the primary indices of psychological well-being (Diener & Seligman, 2004). Moreover, we expected that the link between intrinsic motivation and psychological well-being would not be contingent on performance. That is, the positive psychological benefits of pursuing intrinsically regulated goals should be based on the activity itself and not dependent on associated outcomes.

However, because success at school involves performing deliberate, effortful, and challenging exercises, such as studying and doing homework, we hypothesized that an identified regulation would be predictive of performance, as assessed by students' grades. Internalizing a goal into the self, as is done when an individual has an identified self-regulation, is necessary for establishing the importance of the goal and also for developing and maintaining commitment to, and persistence at working toward, the goal (Austin & Vancouver, 1996). Research has indicated that the extent to which individuals identify with their goals is predictive of their goal commitment and progress, even in the face of adversity (e.g., Lydon, Burton, & Menzies-Toman, 2005; Lydon & Zanna, 1990). Therefore, we believed that students' academic performance would be best predicted by their levels of identified self-regulation.

Including Experimental and Implicit Cognitive Methodologies

Whereas our primary objective was to examine the distinct contributions of intrinsic and identified motives in accounting for psychological well-being and performance outcomes, we also sought to expand on the methodologies typically used in self-determination theory research by incorporating social–cognitive theory and its methods. To date, few studies have directly used cognitive experimental methods in the examination of motivational processes. Levesque and Pelletier (2003) demonstrated that priming intrinsic motivation, or temporarily increasing its cognitive accessibility, led participants to report greater enjoyment of a laboratory activity and to show better performance than those primed with extrinsic motivation. This interesting work appears to be one of the first published reports of the incorporation of cognitive principles into the study of self-determination theory. However, similar to others, Levesque and Pelletier (2003) compared only intrinsic and extrinsic motivation and so did not examine performance differences between intrinsic and identified regulations.

In addition to the benefits of experimental control that priming affords, we viewed social–cognitive theory as an approach that would expand our understanding of how autonomous motives may guide behavior. Although a relatively large amount of research exists that examines explicit self-reported autonomous motives and their correlates, to our knowledge there is little research that uses implicit methods of assessing individual differences in autonomous motivation in the self-determination framework (cf. McClelland, Koestner, & Weinberger, 1989). Social–cognitive theory suggests that, over time, an explicit, conscious motive can come to operate in an implicit, efficient, and effortless fashion (Bargh & Chartrand, 1999; 2000). In fact, recent research indicated that some types of motivation can be activated merely by associated cues (Ratelle, Baldwin, & Vallerand, 2005). In the context of our educational paradigm, this might mean that a student who consciously identifies with an academic goal may learn to associate environmental cues, such as a textbook, with his or her motivation. Consequently, the student's identified motivation may become activated simply by the sight of a textbook, and this may occur even when he or she is tired, distracted, or facing other demands on conscious attention, for little effort is required for such activation. Thus, a measure of motivation that operates at an implicit level would add explanatory power to research based in self-determination theory.

Present Studies

Our goal in this set of studies was to examine intrinsic and identified self-regulations in the academic domain, with respect to performance and psychological well-being outcomes.[2] Study 1 explored three primary hypotheses with a sample of elementary school children. First, we predicted that pursuing an intrinsically motivating goal would be associated with higher psychological well-being, as measured by positive affect. Second, we hypothesized that the association between intrinsic regulation and psychological well-being would not be contingent on students' performance, as measured by their report card grades. Specifically, we believed that intrinsic motivation, assessed 7 days prior to the receipt of report card grades, would be a significant predictor of positive affect 1 day after the receipt of grades, when controlling for baseline affect and report card grades. Third, we hypothesized that identified regulation would be predictive of academic performance. We statistically controlled for students' grade expectations because students who did well in the past and expected to do well in the future may have developed identified motives. We sought to demonstrate that identified motives assessed 7 days prior to the receipt of report cards would be predictive of report card grades, over and above students' grade expectations.

In addition to our three primary hypotheses, we examined one exploratory hypothesis. Given that progress toward autonomous goals is associated with greater well-being (Sheldon & Elliot, 1999; Sheldon & Kasser, 1998) and our prediction that, specifically, identified regulations would be positively associated with grades, we speculated that identified motives would interact with grades to predict positive affect. Our rationale was that when students recognize the importance of the goal and incorporate it into the self, that is, when they have an identified self-regulation, performing well will be rewarding and result in an increase in psychological well-being. Conversely, when such students perform poorly, they may feel a strong sense of disappointment and therefore experience a decrease in well-being. For all analyses in Study 1, we deemed it important to include both the intrinsic and identified self-regulation styles to examine the possible distinct contributions that one style may make to a particular outcome, relative to the other style.

In Study 2a, we created an experimental test of the first two hypotheses from Study 1, with a sample of university students who were initially assessed 10 days prior to, and then only mere hours after, writing a difficult midterm examination. We hypothesized that experimentally priming intrinsic motivation would increase students' levels of psychological well-being, measured immediately after the exam. We also predicted that this effect would not be contingent on how well students believed that they had performed on the exam. Whereas most students might be expected to experience a change in well-being dependent on their perceived exam performance, we hypothesized that those in the intrinsic priming condition would experience an increase in their psychological well-being regardless of their perceived performance. In addition, we sought to examine the relation between active involvement in goal pursuit, as measured by the amount of time spent studying, and changes in well-being. We hypothesized that among those in the intrinsic regulation condition, the amount of time that students spent studying for the exam would represent the frequency of environmental cues associated with an intrinsically motivated goal and thereby would predict increases in psychological well-being.

Finally, in Study 2b, we tested our third hypothesis from Study 1, with the addition of an implicit measure of motivation. We predicted that identified self-regulation, assessed both implicitly and explicitly, would predict performance on the course's final examination, when controlling for intrinsic regulation and previous course grades. Lastly, an exploratory goal was to examine the possibility of interactive effects between explicit and implicit self-regulations. We believed that if it is identified regulation that is most critical for performance, then having high levels of explicit or implicit identification should contribute to better final examination grades. In contrast, we expected that those with low levels on both measures would perform more poorly than others.

Study 1

With a sample of elementary school children, our goal in this study was to demonstrate the importance of distinguishing between intrinsic and identified self-regulatory styles. Briefly, we hypothesized that intrinsic self-regulation would best predict psychological well-being outcomes, such as positive affect, when controlling for baseline levels, and that this association would not be contingent on students' performance as assessed by their report card grades. In addition, we believed that such performance outcomes would be best predicted by identified self-regulation. Finally, we sought to examine the interaction between identified

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[2] Ryan and Deci (2003) noted that "identifications can be thought of as more versus less compartmentalized, and only those that are well integrated within the psyche represent the full endorsement of the self" (p. 258). The measures that we use to assess identification do not currently capture this important distinction.

regulation scores and academic performance on students' psychological well-being.

Method

Participants

Participants were 241 elementary school children ranging in age from 8 years to 13 years (127 girls, M for age = 11 years, 4 months), attending schools in Toronto, Ontario, Canada. Parents and children consented to the children's participation as well as to the school's disclosure of report card grades to the researchers. Participants completed scales 7 days before their report cards were distributed (Time 1) and 1 day after the distribution (Time 2).

Procedure

Researchers visited the classrooms of participants at two different time points, during which children completed paper and pencil questionnaires. To aid comprehension, the researchers read each item of the questionnaires aloud to the class, and children then recorded their own responses on individual questionnaire packets. Although the measures were completed in group settings, participants responded individually, and privately, at their own desks.

At Time 1, children completed 24 items from Ryan and Connell's (1989) Self-Regulation Scale, representing three of the four domains from the original scale (reasons for class work, homework, and trying to do well in school). On a 4-point scale, participants endorsed various statements reflecting the different styles of self-regulation and the extent that they explained the reasons for their own behavior with regard to school. Five items assessed intrinsic regulation (α = .90), and five items assessed identified regulation (α = .75). An example of an identified self-regulation reason is "because I want to learn new things," whereas an example of an intrinsic regulation reason is "because it's fun."

Children also completed the Positive and Negative Affect Scale for Children (PANAS-C; Laurent et al., 1999), which is a child-oriented adaptation of the PANAS (Watson, Clark, & Tellegen, 1988). On a 5-point scale, they rated words describing their feelings and emotions (e.g., happy, calm, sad, gloomy) in the past few weeks. The 12 items from the positive affect subscale were used to measure subjective well-being (α = .88).[3] Finally, participants indicated their grade expectations for their upcoming report cards. Because this was the first reporting period of the school year, there was no baseline measure of students' academic performance available for that year. As an alternative, we used students' grade expectations as the baseline measure.

One week later, after report cards had been distributed, the researchers returned to the classrooms of participating children. At this Time 2 session, participants again completed the PANAS-C (Laurent et al., 1999) as the measure of their psychological well-being, reflecting their current feelings and emotions. As at Time 1, researchers read each item aloud, and participants indicated their responses in their own questionnaires. Following this session, the researchers received copies of children's report cards from school administration and then converted students' expected grades and report card grades to a 13-point scale ranging from 13 ($A+$) to 1 (F).

Results

Correlations Among Predictor Variables

We first performed simple correlations between intrinsic regulation, identified regulation, positive affect at Time 1, positive affect at Time 2, expected grades, and actual report card grades. Intrinsic and identified self-regulation scores were significantly correlated with each other, $r(239)$ = .56, p < .001, with Time 1

positive affect, rs(239) = .15–.17, ps < .02, and with Time 2 positive affect, rs(239) = .23–.26, ps < .001. However, when examining grades, only identified regulation was significantly correlated with actual report card grades, $r(239)$ = .26, p < .001, and expected grades, $r(239)$ = .24, p < .001. Finally, expected grades correlated with actual grades, $r(239)$ = .42, p < .01.

Mean Differences

We made a comparison to examine whether mean positive affect scores changed from Time 1 to Time 2; however, no change was observed, $t(240)$ = 1, ns. We then made a similar comparison between children's expected grades (M = 9.11) and their actual report card grades (M = 8.05). Although these two grade indices were significantly correlated, $r(239)$ = .42, p < .001, children significantly overestimated what their grades would be, $t(240)$ = 6.87, SD = 2.40, p < .001.

Predicting Positive Affect

To test our first two hypotheses that intrinsic self-regulation would be independently predictive of psychological well-being and that this association would not be contingent on performance, we conducted a hierarchical multiple regression analysis in which we sought to use intrinsic self-regulation scores to predict positive affect at Time 2. In the first step of the regression, we entered positive affect at Time 1 and students' actual report card grades as control variables. Then, in Step 2, we entered scores on both the intrinsic and identified subscales of the Self-Regulation Scale (Ryan & Connell, 1989), and finally in Step 3, we entered the two-way interactions between report card grades and each self-regulation. As one might expect, Time 1 positive affect was a significant predictor of Time 2 positive affect, β = .54, $t(234)$ = 10.00, p < .001, as were actual report card grades, β = .12, $t(234)$ = 2.33, p < .03. Central to our hypothesis, intrinsic self-regulation scores significantly predicted greater positive affect at Time 2, β = .14, $t(234)$ = 2.22, p < .03, but identified regulation scores did not, β = .04, $t(234)$ < 1, ns. This result indicated that students with a highly intrinsic orientation toward school reported greater well-being after the receipt of their report card grades.

Then, in the final step, we examined interactions between the predictors to address our second and exploratory hypotheses that the relationship between intrinsic self-regulation and positive affect would not be contingent on performance, as assessed by report cards, but that the relationship between identified self-regulation and positive affect would be contingent on performance. To address the first, we examined the interaction between intrinsic self-regulation and report card grades. This did not prove significant, β = −.10, $t(234)$ = −1.45, p = .15, and therefore indicated that the relationship between higher intrinsic self-regulation and greater positive affect is not contingent on performance.

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[3] Consistent with the notion that positive and negative affect are distinct and not two ends of the same continuum, positive and negative affect were correlated but not highly so, $r(239)$ = −.30 at Time 1 and $r(239)$ = −.40 at Time 2. Neither intrinsic nor identified self-regulation, nor any interactions, were significant in predicting changes in negative affect, although as one might expect, lower report card grades were associated with increases in negative affect, β = −.24, $t(240)$ = −4.56, p < .01.

To address our exploratory hypothesis, we examined the interaction between identified self-regulation scores and report card grades, which proved significant, $\beta = .15$, $t(234) = 2.04$, $p = .04$. The interaction is depicted in Figure 1. Among children who had lower levels of identification, there was little difference in Time 2 positive affect between those with higher report card grades and those with lower grades. However, when only children who had higher levels of identification were examined, a marked difference was observed between those with low and those with high report card grades. Students who were more identified with school but who received low grades on their report cards showed lower levels of Time 2 positive affect than did the others. By contrast, those children who were more identified with school and who received higher grades on their report cards showed greater Time 2 positive affect than did the other groups of children.

Overall, intrinsic regulation positively predicted students' well-being after receiving their report cards, independent of identified regulation and of grades received. However, among those who were more identified with school, the extent to which they experienced greater or lesser positive affect was contingent on the grades that they received.

Predicting Report Card Grades

To address our third primary hypothesis that identified self-regulation would be predictive of performance, we conducted a second hierarchical multiple regression analysis. We entered children's grade expectations, assessed 1 week before report cards were distributed (Time 1), along with each self-regulation score, followed by the interactions between grade expectations and self-regulation scores. As might be anticipated, expected grades were a strong predictor of actual grades. However, identification also proved to be a significant positive predictor, $\beta = .24$, $t(235) = 3.32$, $p = .001$. The more that students identified with school, the higher were their report card grades. When controlling for identified self-regulation, there was a nonsignificant trend for intrinsic self-regulation to be negatively associated with grades, $\beta = -.12$, $t(235) = -1.67$, $p = .10$, although the zero-order correlation with grades was not significant, $r(239) = .06$, ns.
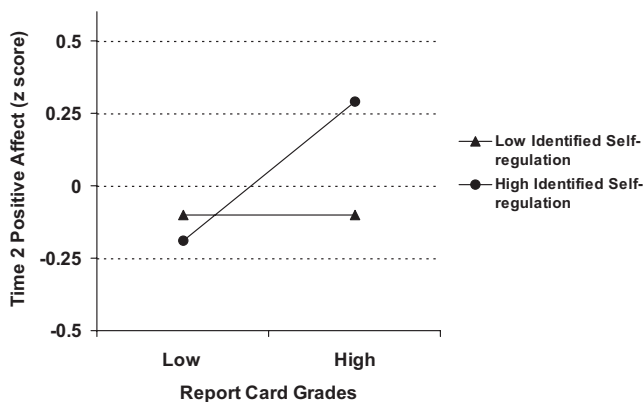

Figure 1. Study 1: Time 2 positive affect (z score) as predicted by students' report card grades and identified self-regulation, controlling for Time 1 positive affect.

Summary of Study 1 Findings

Results suggested that intrinsic self-regulation predicts increases in indices of students' psychological well-being, such as positive affect, and that changes in well-being are not contingent on performance, as measured by the grades that students receive. The more that students had an intrinsic academic self-regulation, the greater were the increases in their well-being, regardless of their performance. As hypothesized, identified self-regulation was a significant positive predictor of students' academic performance such that the more identified students were with their education, the higher their grades. Identification also interacted with students' grades to predict changes in positive affect. Although intrinsic regulation was associated with psychological well-being in a non-contingent fashion, the relationship between identified self-regulation and students' well-being was contingent on their performance: The more that students had an identified regulation, the more their well-being was positively associated with their report card grades.

Study 2a

To extend the findings of Study 1 on the differing roles of identified and intrinsic self-regulations, we conducted a second study concerning psychological well-being and performance in the context of a specific academic goal, this time with university students. On the basis of the finding that intrinsic self-regulation was positively associated with psychological well-being in Study 1, our objective in Study 2a was to experimentally obtain a similar effect. We sought to induce intrinsic and identified self-regulation orientations and to test whether the inductions of these different regulatory styles would influence students' well-being and academic performance when writing a difficult examination. Specifically, we predicted that a manipulation involving intrinsic regulation would result in greater psychological well-being immediately following the examination, 10 days after the experimental session. Furthermore, on the basis of results of Study 1, we hypothesized that this effect would not be contingent on how well students thought that they had performed on the exam that day. In addition, we predicted that a manipulation of an identified regulation focus would result in better performance on the midterm examination.

We believed that if priming an association between intrinsic motivation and the particular academic goal can influence psychological well-being, then activities related to the course, such as studying, should reactivate the link to intrinsic motivation and thereby affect individuals' psychological well-being. Therefore, an exploratory hypothesis for Study 2a was that for those primed with intrinsic motivation, the amount of time spent studying would be related to changes in subjective well-being, whereas for those not primed with intrinsic motivation, the amount of time spent studying would be unrelated to changes in well-being.

Method

Participants

Participants were 60 (59 female; M for age $= 21$ years) undergraduate students enrolled in an upper level undergraduate psychology course at McGill University in Montreal, Québec, Canada. At Time 1, 65 individuals

participated, with 60 returning for the Time 2 session. There were no differences in Time 1 psychological well-being between those who returned and those who did not, $F(1, 63) = 0.20$, $MSE = 1.01$, ns. Of the 5 individuals who did not return, 1 was in the control condition, 2 were in the intrinsic condition, and 2 were in the identified condition.

Procedure

Recruitment. Approximately 2 weeks prior to a midterm examination, participants were recruited from a psychology class for a study examining academic goals. This class was chosen because it was not a required course, and much of the material is typically reported to be interesting to students, something that would suggest the possibility of students having at least some intrinsic motivation. The experimenters explained that those who participated in this multipart study would be remunerated $10 (U.S.$8.89) for their time.

Participants completed a questionnaire 10 days prior to the exam. At the beginning of the session, the experimenters explained that, for ease of investigation, they were interested in an academic goal that was possibly common to many of the students taking part in the study: mastering the course material. All participants endorsed having this goal to some degree.[4]

Part 1 measures. Because participants were aware of a variety of social psychological phenomena and techniques, the questionnaire included numerous measures to maintain the appearance of it being simply a survey. In addition to a variety of individual differences measures, students were asked questions about their study habits, about their impressions of course difficulty, and about their commitment. Of importance, participants also completed a baseline measure of their current psychological well-being, the Satisfaction with Life Scale (Diener, Emmons, Larsen, & Griffin, 1985). In addition, participants completed a measure of perceived locus of causality (Sheldon & Kasser, 1995, 1998) to assess intrinsic and identified motives for the goal of mastering the course material.

Self-regulatory manipulation. The last two components of the questionnaire composed the manipulation of regulatory style. Participants were randomly assigned to one of three conditions: control, intrinsic regulation, or identified regulation. For those in the control condition, the questionnaire ended following the completion of the last scale, whereas for those in either of the two experimental conditions, the questionnaire continued for one extra page. The first part of the manipulation consisted of a list of statements with which participants were asked to indicate their agreement by writing the word "Yes" (to denote "Yes, I agree at least somewhat.") or the word "No" (to denote "No, I disagree completely.") next to each statement. These response options were constructed to increase the likelihood that participants would endorse the statements on the list (Salancik, 1974).

With items included in the identified and intrinsic subscales of Ryan and Connell's (1989) Self-Regulation Scale, two lists of seven statements were created, one for each condition. For example, in the intrinsic condition, participants were presented with items such as "I find the course material interesting" and "I enjoy the course material," whereas those in the identified condition endorsed items such as "Mastering the course material is important to me" and "I value being able to learn from the course material." All participants endorsed the vast majority of the statements, and there were no differences in endorsement between the priming conditions, $F(1, 41) = 1.74$, $MSE = 0.04$, ns. Following the completion of the statement component, participants were asked to write about their goal of mastering the course material in terms of it being *fun, enjoyable,* and *interesting* in the intrinsic condition or in terms of *values, identity,* and *meaning* in the identified condition. These words were again chosen on the basis of Ryan and Connell's (1989) work. Participants in both conditions were able to write about their goals and wrote passages that were approximately equal in length.

E-mail manipulation booster. At the end of the experimental session, participants were informed that the second component of the study would take place approximately 10 days later, but that the exact date, time, and location had not yet been set. Under the guise of providing the Time 2 information, participants were asked to record their e-mail addresses for the experimenters if they wished to be contacted. All participants complied.

Approximately 4 days prior to the midterm exam, when students were presumably in the process of studying, the experimenters sent an e-mail message to each participant. These messages varied according to condition. In the control condition, the message simply contained the necessary information for attending the next session of the study. However, in the experimental conditions, the message served to reinforce the Time 1 manipulation. In the intrinsic condition, part of the e-mail message read "Thank you for your continued participation in our study on the ways in which students find their academic goal of mastering course material to be interesting and enjoyable," whereas in the identified condition, this same sentence finished with "the ways in which students identify with their academic goal of mastering course material and find this goal to be important."

Participants returned to the lab for the second session shortly after they finished writing their midterm examination, for which the mean grade was 66%. In this second component, they completed a questionnaire containing measures similar to those assessed in the first session, including their current satisfaction with life, and indicated the grades that they anticipated receiving on the midterm, based on their experience of having just written the test as well as the amount of time they spent studying for the test.

Results

Effect of the Manipulation on Psychological Well-Being

To address our hypothesis that the induction of an intrinsic self-regulation focus would positively affect psychological well-being, we conducted an analysis of covariance, controlling for initial well-being scores. Results indicated a significant main effect of condition on satisfaction with life scores after the midterm test, $F(2, 56) = 5.60$, $MSE = 0.37$, $p < .001$, whereby the well-being of those in the intrinsic condition ($M = 5.50$) was significantly higher than that of those in the control condition ($M = 4.90$), $t(56) = 3.17$, $p < .01$, and than that of those in the identified condition ($M = 5.01$), $t(56) = 2.55$, $p < .01$. In addition, a repeated measures analysis of variance revealed a significant Time × Condition effect, $F(2, 57) = 4.14$, $MSE = 0.27$, $p = .02$, such that there was a significant increase in satisfaction with life from Time 1 to Time 2 for those in the intrinsic condition, $t(57) = 3.12$, $p < .01$, but not in the control condition, $t(57) = 0.93$, ns, or in the identified condition, $t(57) = 0.87$, ns. The means from this analysis are presented in Table 1. These results indicated that the intrinsic manipulation led to significant improvements in individuals' psychological well-being after writing the midterm examination.

Effect of the Manipulation on Midterm Examination Grades

Contrary to our hypothesis, an analysis of covariance in which we controlled for previously obtained course grades revealed no significant effects of the manipulations on students' midterm examination grades, $F(2, 50) = 0.08$, $MSE = 1.04$, ns.

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[4] Of the participants, 63% endorsed the goal by indicating "Yes, I have this goal." The remaining 37% of participants indicated that "Yes, I sort of have this goal."

Table 1

Study 2a: Mean Satisfaction With Life Scores as a Function of Experimental Condition

Condition	Point of assessment	
	Time 1	Time 2
Control	5.17	5.01
Identified	4.73	4.87
Intrinsic[a]	5.00	5.53

[a] Significant increase from Time 1 to Time 2, $p < .01$.

Effect of Perceived Midterm Grades on Psychological Well-Being

We conducted further analyses to examine the role of students' midterm exam grade perceptions in the prediction of subjective well-being after the midterm examination had taken place. On the basis of the results of Study 1 that indicated that the psychological well-being of those who have highly intrinsic regulation is not contingent on their performance, we believed that the well-being of students in the intrinsic induction condition would not be related to their perceived performance on the test. In contrast, we believed that among students not in the intrinsic condition, those who felt that they had performed well on the exam would experience greater subjective well-being than those who felt that they had performed poorly.

In a hierarchical multiple regression, Time 1 satisfaction with life scores were entered to control for baseline levels of well-being. Then, students' perceptions of their midterm exam grades and dummy coded variables reflecting the manipulation were entered. Finally, the interactions between students' grade perceptions and the manipulation variables were entered. To test for three levels of the experimental manipulation, it was necessary to create two dummy codes, one contrasting the intrinsic condition with the other groups and the second contrasting the identified condition with the other two groups. Results revealed that the intrinsic condition was a highly significant predictor of well-being, $\beta = .28$, $t(53) = 3.08$, $p = .003$, and that grade perceptions approached significance in prediction of well-being, $\beta = .25$, $t(53) = 1.72$, $p = .09$, following the midterm. In addition, the Perception of Midterm Grades $\times$ Condition interaction approached significance, $\beta = -.24$, $t(53) = -1.96$, $p = .055$. This interaction is depicted in Figure 2, whereby the psychological well-being of those students in the intrinsic manipulation condition was not affected by how well they felt that they did on the midterm exam ($pr = -.15$), but the well-being of all other participants was contingent on their perception of having performed well versus having performed poorly ($pr = .30$). Among those not in the intrinsic condition, students experienced greater well-being if they felt that they had performed well on the exam but experienced lower levels of well-being if they felt they had performed poorly. The intrinsic manipulation appeared to serve as a protective factor against these contingencies, with those in the intrinsic condition experiencing greater psychological well-being regardless of their perceptions of achievement.

There was no significant main effect or interaction with the dummy code for the identified condition, $ts(53) < 1$, *ns*. Similarly,

when examining the psychological well-being of only those participants in the identified regulation condition, the partial correlation between changes in psychological well-being and midterm exam grade perceptions, controlling for previously obtained course grades, did not reach statistical significance, $pr(14) = .27$, $p = .26$.

Exploratory Analyses: Days Spent Studying and the Intrinsic Manipulation

To investigate a possible mechanism for how the intrinsic manipulation led to greater psychological well-being, we conducted exploratory analyses. In theory, the intrinsic manipulation should have led to a cognitive association between the engagement in course activities, such as studying, and feelings of enjoyment. As a result, the more that students in this condition spent time studying for the midterm examination, the more that they should have experienced greater well-being. Therefore, we investigated differences in the relationship between the amount of time spent studying and changes in psychological well-being from Time 1 to Time 2. In both the control condition, $r(17) = .11$, *ns*, and the identified condition, $r(20) = .05$, *ns*, correlations were not significant. However, in the intrinsic condition there was a significant relationship between changes in satisfaction with life and the amount of time spent studying, $r(15) = .56$, $p = .02$. The more that participants in the intrinsic condition studied, the greater was the increase in their psychological well-being from Time 1 to Time 2. A comparison of effect sizes revealed that this correlation was significantly greater than those in the identified and control conditions, $z = 1.75$, $p < .05$, one-tailed. It should be noted that the manipulation did not lead participants in the intrinsic condition ($M = 4.62$) to spend more time studying than those in the identified condition ($M = 4.55$) or in the control condition ($M = 4.97$), $F(2, 55) < 1$, *ns*. In addition, the manipulation did not interact with any measure of individual differences to predict the number of days that students spent studying, $Fs(2, 55) < 1$, *ns*.

Summary of Study 2a Findings

Results indicate that the manipulation of intrinsic self-regulation in students' approach to an academic goal significantly improved
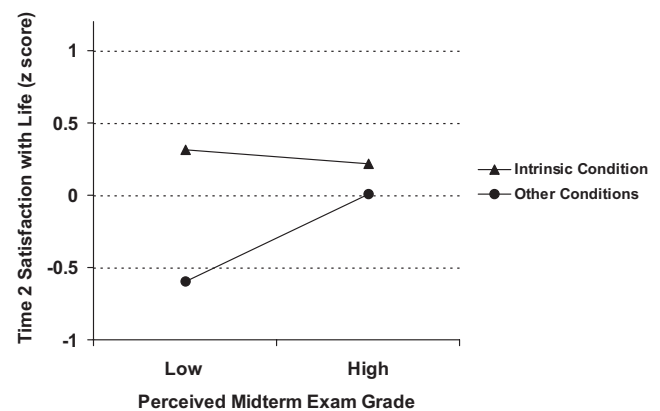

Figure 2. Study 2a: Time 2 satisfaction with life (z score) as predicted by condition and students' perceived midterm examination grades, controlling for Time 1 satisfaction with life.

their subsequent psychological well-being. This intrinsic regulation manipulation appeared to serve as a protective factor against the grade-contingent changes in well-being that were experienced by the other participants in the study. Finally, exploratory analyses suggested a possible mechanism for how students in the intrinsic manipulation condition experienced greater well-being following the midterm exam. In that condition, the more time that students spent studying, the greater was the increase in psychological well-being from Time 1 to Time 2. Presumably, working toward their academic goal with an intrinsic focus allowed them to experience the positive outcomes associated with intrinsic self-regulation.

Study 2b

Study 1 revealed that identified self-regulation was associated with better academic performance, as indicated by students' report card grades. In Study 2b, we sought to expand on this finding in four ways. First, we extended the time frame between the assessment of self-regulation and academic performance to 6 weeks. Second, we assessed students' academic self-regulatory styles two thirds of the way through the course to ensure that regulation scores were based on a substantial amount of actual experience in the goal pursuit (Fazio & Zanna, 1981). Third, we were able to use previously obtained course grades as a baseline for academic performance. Last, we created a cognitive measure of self-regulation that enabled us to examine the independent, and possibly interactive, effects of an explicit self-report measure and an implicit cognitive measure in predicting academic performance.

Method

Participants

Of the 60 participants in Study 2a, 53 remained in the sample for Study 2b. Of the participants, 4 did not consent to having their course grades used in the research, and 3 did not have a full set of grades for the semester, leaving a total of 53 participants for analyses involving academic performance.

Procedure

Approximately 6 weeks prior to the final examination in the course, participants completed a lexical decision task to ascertain the cognitive accessibility of intrinsic and identified self-regulation words. This task was included to provide an implicit measure of intrinsic and identified regulations. In addition, participants' scores on the intrinsic and identified items of Sheldon and Kasser's (1998) measure of perceived locus of causality, collected at the beginning of Study 2a, were used as direct indices of intrinsic and identified regulation. On a 9-point scale, participants rated their agreement with reasons for pursuing the academic goal of mastering course material. On average, students reported high levels of intrinsic ($M = 6.19$, $Mdn = 7$) and identified ($M = 7.03$, $Mdn = 7$) self-regulation.

Lexical decision task. Using E-Prime software (Psychology Software Tools, n.d.), we presented participants with letter strings on a computer monitor and asked them to indicate whether each string constituted a word or a nonword by pressing particular keys on the computer keyboard. In the initial instructions, participants were reminded of the course name and number. To establish the appropriate context, prior to the presentation of each letter string, the course number 333 was subliminally flashed for 20 ms, followed by a mask of XXX, similar to the methodology used by Mikulincer, Birnbaum, Woddis, and Nachmias (2000). Half of the letter strings were nonwords, which resembled actual words but had letters missing or out of order, and the other half were words. Some words were determined to be of neutral valence (Anderson, 1968) and would later be used to control for individual differences in baseline responding. Words representing the two different types of self-regulation were selected by again borrowing from Ryan and Connell's (1989) Self-Regulation Scale. Intrinsic items included the words *interesting, enjoyable, fun, exciting,* and *fascinating,* whereas identification items included *important, meaning, value, identity,* and *worthwhile*. All strings were randomly presented and response latencies to each were measured in milliseconds.

Permission to obtain grades. At the conclusion of the session, the experimenters explained to participants that they were also interested in students' academic performance and how it may be related to variables assessed during the course of the study. Participants were then provided with the option of giving the experimenters consent to obtain their final examination grades. All but 4 individuals consented.

Results

Preliminary Analyses

To verify that the experimental manipulations in Study 2a did not influence the implicit measures of self-regulation in Study 2b or students' final examination grades, we conducted analyses of variance. Results indicated that implicit measures (i.e., response latencies) did not differ between the experimental conditions outlined in Study 2a, $Fs(2, 50) = 0.16–0.71$, $MSEs = 1.05–1.10$, *ns*. Similarly, final examination grades were not affected by the earlier Study 2a manipulations, $F(2, 50) = 0.78$, $MSE = 1.01$, *ns*. In addition, explicit measures of self-regulation, assessed prior to the manipulation in Study 2a, were not affected by experimental condition, $Fs(2, 62) = 0.32–0.74$, $MSEs = 1.01–1.02$, *ns*. Thus, the manipulations in Study 2a did not influence implicit or explicit self-regulation scores nor did they influence final examination scores.

Predicting Final Exam Grades: Identified Versus Intrinsic Regulations

To create indices of implicit intrinsic and identified regulation, we first performed a logarithmic transformation, as suggested by Fazio (1990), to normalize the positively skewed distribution of reaction time data (Bargh & Chartrand, 2000). Then, to create indices for both of the self-regulation styles in question, we aggregated response latencies to the intrinsic and identified words, respectively. Following this, we removed the variance associated with response latencies to the words of neutral valence from each index to control for individual differences in general speed of responding. Analyses involving the implicit measures of self-regulation reflected these computed values. Lower scores on these indices denote faster response latencies and therefore higher levels of intrinsic and identified motivation.

The explicit (self-report) and implicit (response latencies) measures of identification were significantly correlated with each other, $r(51) = -.27$, $p = .05$, and with this same pattern, the correlation between explicit and implicit measures of intrinsic regulation approached significance, $r(51) = -.25$, $p = .07$. In addition, explicit measures of identified and intrinsic self-regulations were correlated with each other, $r(51) = .31$, $p = .02$, as were the implicit measures of identified and intrinsic self-regulations, $r(51) = .29$, $p = .03$.

In addressing our hypothesis that measures of identified self-regulation, both explicit and implicit, would significantly predict academic performance, we conducted two hierarchical multiple regression analyses in which we sought to predict final examination grades. In the first regression, we entered students' previous course grades in Step 1 to control for general differences in students' academic achievement. Then, in Step 2, we entered all variables representing intrinsic self-regulation: explicit (self-report) intrinsic regulation scores, implicit (response latencies) intrinsic regulation scores, and the Explicit × Implicit Intrinsic Regulation interaction. Finally, in Step 3 we entered all variables representing identified self-regulation scores (explicit identified, implicit identified, and the Explicit × Implicit Identified Regulation interaction). By examining the R^2_{change} from Step 2 to Step 3, we sought to determine if the addition of identified self-regulation significantly contributed to the prediction of students' final examination grades above and beyond what was accounted for by intrinsic regulation scores. Results indicated that intrinsic regulation, entered in Step 2, did not significantly predict final exam grades, $R^2_{change} = .06$, $F_{change}(3, 48) = 1.88$, $p = .15$, but that identified regulation, entered in Step 3, did add significantly to the prediction of exam grades, $R^2_{change} = .13$, $F_{change}(3, 45) = 5.04$, $p = .004$.

We then conducted a similar second hierarchical multiple regression, this time reversing the order of entry of intrinsic and identified self-regulation scores. As in the first regression, we entered previous course grades in Step 1. Then, in Step 2, we entered the identified regulation variables (explicit, implicit, and Explicit × Implicit), and in Step 3, we entered the intrinsic regulation variables (explicit, implicit, and Explicit × Implicit). Results revealed that identified regulation significantly predicted final exam grades, $R^2_{change} = .15$, $F_{change}(3, 48) = 5.36$, $p = .003$, but that the addition of intrinsic regulation did not significantly contribute to the prediction of grades, $R^2_{change} = .05$, $F_{change}(3, 45) = 1.77$, $p = .17$. Together, the results of these two regression analyses indicated that identified self-regulation significantly, and independently of intrinsic self-regulation, predicted students' academic performance, as measured by their final examination grades, but that intrinsic self-regulation itself was not a significant predictor of performance. The more that students had an identified self-regulation, the higher were their grades on the final examination.

Individual Predictors of Final Examination Grades

In addition to examining the role of self-regulation style as a whole in the prediction of final exam grades, we examined the individual contributions of the different self-regulation measures by conducting partial correlations in which we controlled for previously achieved course grades and by conducting a hierarchical multiple regression. The partial correlation between the explicit measure of identified regulation and final exam grades approached significance, $pr(50) = .25$, $p = .07$, as did that between the explicit measure of intrinsic regulation and final exam grades, $pr(50) = .26$, $p = .06$. The implicit measure of identification proved to be the most highly related to final exam grades, $pr(50) = -.36$, $p = .01$, whereby the more cognitively accessible that identified words were, as indicated by shorter response latencies, the higher were students' grades on the final examination. Though similar, the

partial correlation between response latencies to intrinsic words and final exam grades did not reach significance, $pr(50) = -.23$, $p = .11$.

Then, in a hierarchical multiple regression analysis, we entered previous course grades to again control for individual differences in academic achievement in Step 1. As might be expected, previous course grades were a highly significant predictor of final exam grades, $\beta = .65$, $t(51) = 6.04$, $p < .001$. In Step 2, we entered the terms for each of the explicit measures and each of the implicit measures. The improvement to the model approached significance, $R^2_{change} = .08$, $F_{change}(2, 48) = 2.41$, $p = .10$. The sole main effect accounting for unique variance, controlling for the contributions of the other measures, was the implicit measure of identified regulation that also approached significance, $\beta = -.26$, $t(48) = -2.02$, $p < .07$. The explicit measures of identification and intrinsic self-regulation and the implicit measure of intrinsic self-regulation did not explain any unique variance in final exam grades, $ts(48) < 1.1$, ns. Finally, in Step 3, we entered the interaction terms between explicit and implicit measures of identified self-regulation and between explicit and implicit measures of intrinsic self-regulation. This provided a significant contribution to the model, $R^2_{change} = .14$, $F_{change}(1, 46) = 4.89$, $p < .02$, with the interaction between explicit and implicit measures of identification proving to be a significant predictor of final examination grades, $\beta = .34$, $t(46) = 3.15$, $p < .01$. The interaction term for intrinsic self-regulation, however, was not significant, $t(46) < 1$.

Decomposing the Explicit × Implicit Identified Regulation Interaction

We then conducted an analysis of covariance (controlling for previous course grades) to further decompose the Explicit × Implicit Identified Regulation interaction and make specific cell comparisons. To this end, we used median splits of the explicit and implicit measures of identified self-regulation. As can be seen in Table 2, this analysis revealed a significant interaction, $F(1, 48) = 3.98$, $MSE = 72.41$, $p = .05$, such that those with low scores on both the explicit and implicit measures of identification had significantly lower final exam grades than did those in the other three groups, $ts(48) > 2.25$, $ps < .05$. For example, having low self-reported identification did not result in lower examination grades unless one also had low implicit identified regulation scores. Those students who had high levels of either explicit or implicit identification achieved higher grades on the final exam than did those with low scores on both measures of identified regulation, with the

Table 2

Study 2b: Mean Final Examination Grades as a Function of Identified Self-Regulation, Controlling for Previous Course Grades

Explicit identification (self-reported)	Implicit identification (chronic accessibility)	
	Low	High
Low	66.14$_a$ ($n = 17$)	73.86$_b$ ($n = 15$)
High	75.26$_b$ ($n = 9$)	73.34$_b$ ($n = 12$)

Note. Means that do not share subscripts differ at $p < .01$.

final exam grades of those with high scores on one or both measures of identified self-regulation not differing from one another, $ts < 1$, *ns*.

Summary of Study 2b Findings

Results highlighted the importance of identified self-regulation in the prediction of academic achievement. Further, the inclusion of an implicit measure of identification, in addition to the explicit (self-report) measures typically used by self-determination theory researchers, provided a significant contribution in the prediction of students' grades on the course final examination, written more than 1 month following the laboratory session.

Discussion

Across studies, we found evidence that intrinsic and identified self-regulations differ in their relative influence on psychological well-being and goal performance. By using a variety of methodologies and statistical controls, we obtained consistent results with children and young adults in academic settings. In Study 1, examining elementary school students longitudinally, we first showed that intrinsic self-regulation positively predicted changes in students' psychological well-being and that this was independent of their academic performance. Second, we demonstrated that identified regulation positively predicted students' performance, independent of intrinsic self-regulation, such that those with greater levels of identification had higher report card grades. Finally, we saw evidence that identified self-regulation interacted with academic performance to predict levels of psychological well-being. Unlike the relationship between intrinsic regulation and well-being, the association between identified self-regulation and well-being was contingent on students' academic performance. Among those who had high levels of identified self-regulation, well-being was dependent on report card grades, whereas among those who had low levels of identified regulation, there were no such contingencies.

Then, in Study 2a, we found additional evidence for the influence of intrinsic self-regulation on psychological well-being by showing that those university students who underwent an experimental intrinsic regulation induction had significantly higher levels of well-being 10 days after writing a midterm examination. Although we failed to demonstrate a contingency between the well-being of students in the identified manipulation condition and their perceived exam grades, we did show that students in the intrinsic condition did not have contingencies between their perceived performance and their psychological well-being and that their active involvement in the pursuit of the goal was related to their well-being. That is, the amount of time that these students spent studying was positively associated with changes in their life satisfaction. Finally, in Study 2b, we obtained further evidence for the importance of identified regulations in the prediction of performance. With the addition of an implicit measure of identified regulation, we saw that final examination grades, obtained over 1 month later, were best predicted by students' levels of identified self-regulation, and that this was independent of intrinsic regulation. Unfortunately, we did not have a measure of well-being from the time of the final examination, making it impossible to test for

an interaction between identified regulation and academic performance on psychological well-being, as we did in Study 1.

Strengths of the Research

In each study we sought to use statistical or experimental controls to strengthen our empirical tests. For example, in testing the link between intrinsic self-regulation and psychological well-being, we controlled for the grades that students received on their report cards, in Study 1, and for the grades that students thought they would receive on the exam they had just written, in Study 2a. In both cases, intrinsic self-regulation predicted psychological well-being, independent of actual or perceived academic performance. This supports the notion that well-being derived from intrinsic pursuits is not contingent on outcome but rather may develop from the positive feelings and satisfaction that are associated with the intrinsically interesting nature of the activity.

By using an experimental manipulation, the results of Study 2a demonstrate a causal influence of intrinsic self-regulation that can be sustained over time. We theorized that the manipulation strengthened the association between intrinsic self-regulation and the pursuit of the goal, which, in this case, was mastering the course material. As a result, actions associated with the goal served as cues that reactivated the cognitive link between intrinsic self-regulation and the goal, thereby bolstering psychological well-being. We obtained preliminary evidence for this in the finding that the amount of time that students spent studying was strongly associated with changes in levels of psychological well-being for those in the intrinsic condition but not for those in the other conditions. The more time that students in the intrinsic condition spent being actively involved in the pursuit of their goal (i.e., studying), the more that they experienced psychological well-being.

The effectiveness of our intrinsic self-regulation manipulation highlights the value of self-determination theory by offering researchers, educators, and mental health practitioners tools that may help individuals to improve their psychological well-being. Such findings provide the possibility of aiding people to constructively deal with situations in which they may find themselves working toward goals that are not consistently pleasant. Reconsidering the goal in terms of intrinsic reasons may help people to reap the psychological benefits associated with pursuing intrinsically motivated goals. In other words, framing the pursuit of a goal in terms of it being interesting, enjoyable, and fun may help to improve people's general well-being, as it did in our study (see also Sheldon, Kasser, Smith, & Share, 2002; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004). Because the manipulation was relatively easy and straightforward to administer, it seems reasonable to expect that, with some initial guidance, people may be able to restructure their own thoughts regarding the reasons for goal pursuit, and therefore positively affect their psychological well-being. As cognitive and self-determination theorists might point out, however, such a procedure cannot make a goal become intrinsically motivating. Testament to this was Ratelle et al.'s (2005) unsuccessful attempt to create and condition intrinsic motivation in contrast to their success with the same methodology at conditioning extrinsic motivation. We believe that our procedure can lead individuals to discover and recognize the existing intrin-

sically motivating aspects of their goal pursuits but would not successfully create intrinsic motivation ex nihilo.

In testing the association between identified self-regulation and performance, we wished to guard against the possibility that previous academic success might lead to higher levels of identified self-regulation and thereby inflate any of the correlations that we would observe. Therefore, in Study 1 we controlled for students' expectations of their grades, which are likely highly correlated with their previous grades that were unavailable to us, and in Study 2b, we controlled for the grades that students obtained earlier in the term. In both cases, identified self-regulation predicted subsequent academic performance and did so even when controlling for intrinsic self-regulation.

It is clear from both Study 1 and Study 2a that the link between intrinsic regulation and psychological well-being is not contingent on performance. The results for identified regulation were more equivocal, with Study 1 showing that psychological well-being was contingent on performance for highly identified individuals. This was not replicated in Study 2a, but this may be due to the ineffectiveness of the identified regulation manipulation in that experiment. Perhaps with an effective manipulation of identification, we would observe the same contingency as that found in Study 1 as well as a greater amount of time spent pursuing the goal. Given that previous research indicated that progress toward autonomous goals (intrinsic and identified combined) leads to greater well-being (Sheldon & Elliot, 1999; Sheldon & Kasser, 1998), researchers may want to further examine the role of contingencies in well-being, with a specific focus on identified self-regulation, and to develop other ways of manipulating the salience of identification.

An exciting feature of the results concerning identified self-regulation and performance is our successful assessment of identification at an implicit level. Because self-determination researchers traditionally measure motivation on an explicit level, one might assume that autonomous self-regulations guide behavior only in a highly self-conscious manner. Our results suggest that identified regulations also operate at an implicit level and therefore may have a more powerful and extensive influence on behavior. Theory and research suggest that we are often too tired or mentally taxed to exert conscious, effortful self-regulation (Baumeister, Bratslavsky, Muraven, & Tice, 1998) but that motives operating at an implicit level can guide behavior even under such circumstances (Bargh & Chartrand, 1999). Perhaps internalizing the importance of a goal, as is done when one has an identified self-regulation, leads individuals to construct mental scripts for how to pursue their goals that, subsequently, they are able to follow in a relatively automatic fashion. The incorporation of implicit measures of self-regulation may therefore begin to provide useful insight into how identified regulation operates to affect behavior.

Future Research

Although our research demonstrates that performance is best predicted by identified self-regulation scores, we acknowledge that there may be ways in which intrinsic self-regulation enhances academic performance (Cordova & Lepper, 1996). When we consider that, in Study 2a, students in the intrinsic experimental condition maintained their subjective well-being even when they

thought that they had performed poorly that day, it seems possible that intrinsic regulation can positively affect performance. By maintaining their psychological well-being, these students may be more likely to attend the next class and may be quicker to reopen their textbooks. Unlike students who became deflated by their weak performance, these students may be better able to continue with their goal pursuit and improve their subsequent performance.

Another direction for future research would be to examine intrinsic and identified self-regulations in other contexts. We chose to recruit participants from classroom settings, an elementary school and a university course, to focus on a single real-life goal common to all participants. Moreover, the goal, an academic one, is a goal that is often used to study motivation (e.g., Grolnick & Ryan, 1987; Vallerand & Bissonnette, 1992). These two samples allowed for the examination of motivational processes at two very different age points and added to the external validity of our findings. However, we acknowledge that confining our research to educational settings presents some limitations. Gagné and Deci (2005) posited that when pursuing a goal requires effort and persistence at important but relatively uninteresting tasks, as is often the case with education, identified regulation may be especially predictive of performance. In contrast, when the pursuit of a goal requires less effortful persistence at interesting tasks, as might be more common with self-selected goals, intrinsic regulation may be predictive of performance. Using another context in which to study the differences between intrinsic and identified self-regulations would therefore be valuable. A limited amount of research already has suggested that such distinctions are visible in the nonacademic domains of politics (Koestner, Losier, Vallerand, & Carducci, 1996), close relationships (Lydon et al., 2005), and sports. For example, there is evidence that athletes' intrinsic self-regulation is associated with their happiness during the season but that their levels of identified self-regulation are associated with how many points they actually score (Paquin, 2005).

An additional direction for future research would be to test a mediational model of identification and performance. Theoretically, we would expect identification to be associated with increased effort, persistence, and deliberate practice. This should, in turn, enhance performance over time, especially in contexts that are challenging and difficult.

Given that our research makes an empirical distinction between the effects of intrinsic and identified self-regulation, future research might examine other regulations on the self-determination continuum. We believe that a particularly interesting comparison would be between identified and introjected regulations. Although introjection is theorized to be adjacent to identification on the continuum, correlational research suggests that identification is more strongly associated with intrinsic regulation than it is with introjection (Koestner & Losier, 2002). This may result in strong distinctions between these two types of self-regulation and the outcomes with which they are associated. Although highly interesting, experimentally inducing an introjection focus for a real world goal may pose too great a risk because of possible negative effects on well-being and performance. Therefore, researchers may wish to examine introjection experimentally within the context of an artificial goal, limited to the laboratory.

Self-Regulation and the Pursuit of Goals Over Time

Whereas our research points out the importance and value of distinguishing between intrinsic and identified motivations, future research might expand on this and examine the development of these motivations over time in the pursuit of specific, meaningful goals. Intrinsic motivation may often act as an initial engine that fuels goal pursuit. However, long-term and significant goals require learning tasks, developing and improving skill sets, and sustaining effort. As Ryan (1995) noted, most meaningful life goals are not always fun and enjoyable, and as Dweck (1999) observed, all significant accomplishments require overcoming obstacles and failures. Therefore, a key challenge in goal pursuit may be the development of identification with the goal. When goal adversity is high, identification should be critical to goal pursuit, whereas when adversity is low, intrinsic motivation may be predictive of goal pursuit.

Just as intrinsic and identified motivations are differentially related to various positive outcomes, progress toward these outcomes may be differentially related to motivation via feedback loops. Intrinsic motivation may be influenced by an affect feedback loop in the pursuit of goals, whereas identified motivation may be influenced by goal attainability or progress. We believe that what should be most important for sustaining intrinsic motivation is that the activity continues to meet the individual's needs for psychological well-being, whereas what should be critical for maintaining identified motivation is that the activity moves one closer to success at achieving goals that are self-defining and express one's identity. Again, this underscores the potential theoretical value in distinguishing between intrinsic and identified regulations. They both are associated with positive outcomes, but attention to the distinct contributions of each may help researchers to specify how these outcomes are achieved and how the motivations are sustained.

Summary and Conclusion

Although there are theoretical distinctions between intrinsic and identified self-regulations, little empirical support exists for these differences. This set of studies provides evidence for such distinctions by differentiating between the outcomes associated with intrinsic and identified self-regulations, by using longitudinal, experimental, and implicit cognitive methodologies. In Study 1, we examined self-regulation and outcomes longitudinally. Then, in Study 2a, we were able to experimentally manipulate intrinsic regulation, and later, in Study 2b, we measured the chronic accessibility of regulations in context. The incorporation of these methods represents a new approach that advances and strengthens existing work on autonomous motivation and points to new possibilities concerning how motivation influences individuals' psychological states and behavior.

Achieving personally significant goals, and being happy doing so, are key to optimizing human potential. Identified motivation represents the extent to which a goal is genuinely meaningful and important to individuals. It functions to sustain energy and effort in goal pursuit when one is faced with challenges, stressors, and even boredom. Intrinsic motivation appears to play a regulating role in these goals, for when there is no inherent interest or enjoyment associated with a particular goal, psychological well-being may suffer. But, because the relationship between intrinsic motivation and well-being is not contingent on performance, possessing intrinsic motivation maintains our well-being even when we are faced with setbacks. Fortunately, the likelihood of encountering setbacks is reduced by identified motivation because of its ability to mobilize energy and induce deliberate practice, ultimately increasing chances of success. In tandem, intrinsic and identified regulations should help people to achieve their goals and, happily, to feel good in the process.

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