# Autonomous Motivation, Controlled Motivation, and Goal Progress

## Richard Koestner,[1] Nancy Otis,[2] Theodore A. Powers,[3] Luc Pelletier,[4] and Hugo Gagnon[1]

[1]McGill University

[2]University of Ottawa

[3]University of Massachusetts, Dartmouth

[4]University of Ottawa

**ABSTRACT**   Although the self-concordance of goals has been repeatedly shown to predict better goal progress, recent research suggests potential problems with aggregating autonomous and controlled motivations to form a summary index of self-concordance (Judge, Bono, Erez, & Locke, 2005). The purpose of the present investigation was to further examine the relations among autonomous motivation, controlled motivation, and goal progress to determine the relative importance of autonomous motivation and controlled motivation in the pursuit of personal goals. The results of three studies and a meta-analysis indicated that autonomous motivation was substantially related to goal progress whereas controlled motivation was not. Additionally, the relation of autonomous motivation to goal progress was shown to involve implementation planning. Together, the three studies highlight the importance for goal setters of having autonomous motivation and developing implementation plans, especially ones formulated in terms of approach strategies rather than avoidance strategies. The present research suggests that individuals pursuing goals should focus relatively greater attention

on enhancing their autonomous motivation rather than reducing their controlled motivation.

An individual may have many different reasons for setting a goal (Ryan, 1995). A goal may be selected because it reflects an individual's interests and personal values, or it can be adopted because of social pressure or because of expectations of what an individual "should do" (Sheldon & Kasser, 1998). Research suggests that the source of a goal will influence how goal pursuit is regulated and whether it will meet with success (Ryan, Sheldon, Kasser, & Deci, 1996). Goals that are not endorsed by the self are likely to generate intrapersonal conflict, whereas autonomous goals allow individuals to draw on volitional resources such as the capacity to exert sustained effort (Sheldon & Elliot, 1999; Sheldon & Houser-Marko, 2001).

Sheldon and Elliot (1998) completed a series of short-term, prospective studies that examined the extent to which the source of goals influenced their attainment. Participants were asked to list several goals that they planned to strive for during the semester and to rate the goals in terms of the source of their motivation. "Autonomous" goals were defined as those that reflected personal interests and values, whereas "controlled" goals reflected something one feels compelled to do by external or internal pressures. Specifically, participants were asked to rate four different reasons that ranged from highly autonomous to highly controlled. The four reasons for pursuing goals were intrinsic (i.e., "because of the fun and enjoyment which the goal will provide"), identified (i.e., "because you really believe that it is an important goal to have"), introjected (i.e., "because you would feel ashamed, guilty, or anxious if you didn't"), and external (i.e., "because somebody else wants you to"). Separate indexes of autonomous (intrinsic + identified) and controlled (external + introjection) motivation were calculated.

Sheldon and Elliot (1998) originally examined the separate effects of autonomous and controlled goals on progress, but later studies shifted focus to a summary index of goal self-concordance (Koestner et al., 2006; Koestner, Lekes, Powers, & Chicoine, 2002; Sheldon & Elliot, 1999; Sheldon & Houser-Marko, 2001; Sheldon & Kasser, 1998). This index was created by subtracting the mean of controlled reasons (external regulation and introjection) from the mean of autonomous reasons (intrinsic and identified). The rationale for this

method was previous theorizing and evidence that an underlying continuum of self-determination is reflected in the correlations among scales assessing intrinsic, identified, introjected, and external regulation (Ryan & Connell, 1989). Several studies have shown that goal self-concordance is significantly positively related to goal progress (Koestner et al., 2006).

A recent article, however, noted two potential problems in aggregating autonomous and controlled motivation to form a summary self-concordance index ( Judge et al., 2005). First, autonomous motivation and controlled motivation were not significantly negatively related to each other, as one might expect if a difference score were to be calculated with them. Instead, the scales were nonsignificantly positively related. Second, the relations of autonomous and controlled motivation to various goal outcomes were not mirror-image opposites. Indeed, in two studies of working adults, autonomous motivation was associated with positive outcomes, whereas controlled motivation was unrelated to outcomes (rather than being negatively related to positive outcomes). In Sheldon and Elliot's (1998) original three studies autonomous and controlled motivation were negatively related to each other but at a nonsignificant level (average $r = -.09$). Furthermore, Sheldon and Elliot (1998) found that controlled motivation was unassociated with goal progress (average $r = .01$) rather than being significantly negatively related.

The present investigation examined the relations of autonomous motivation and controlled motivation to goal progress to determine their relative importance in the pursuit of personal goals. Only Judge et al. (2005) explicitly noted that controlled motivation does not appear to be negatively related to autonomous motivation and goal progress as would be expected by the self-concordance model of goal progress. It would thus seem important to conduct further research to determine if controlled motivation plays a role in the success of goal pursuits. Previous studies that have assessed autonomous and controlled motivation more generally in various domains (e.g., toward school, religion, sports) have typically demonstrated that autonomous motivation is significantly positively associated with adjustment outcomes, whereas controlled motivation is significantly negatively associated with the same outcomes (see Vallerand, 1997; and Deci & Ryan, 2002 for reviews). There may be something unique about pursuing personal goals, however, that mitigates the typical negative effects of controlling forms of self-regulation. For example,

controlled motivation might facilitate goal progress, at least in the short term, in environments that provide frequent cues about the importance of striving for a particular goal. In environments that do not provide goal-related cues, controlled motivation may be unrelated or negatively related to progress. The net result would be that the impact of controlled motivation on goal progress will be highly variable across situations and over time, resulting in an overall null relationship between this form of motivation and goal progress.

Besides exploring the relations of autonomous motivation and controlled motivation to goal progress, the present investigation also examined the role of implementation plans in goal progress and whether it may be affected by goal motivation. Implementation plans are mental exercises in which goal setters specify when and where they will initiate their goal pursuit and how they will ensure their persistence in the face of distractions and obstacles (Gollwitzer, 1999). Implementation intentions are thought to enhance successful goal striving because they link the desired behaviors with certain situations and allow for automatic responding without having continually to make decisions about when and how to act upon one's goals (Gollwitzer & Schaal, 1998). A recent meta-analysis of more than 100 studies confirmed that individuals who supplemented their goals with implementation intentions had markedly higher rates of success across diverse goal domains (Gollwitzer & Sheeran, 2006). Implementation intentions were recently shown to be especially helpful when individuals have strong goal intentions (Sheeran, Webb, & Gollwitzer, 2005).

## Present Studies

Study 1 assessed the academic and leisure goals of high school students. It also explored whether goal motivation was associated with greater spontaneous use of implementation plans. Study 2 assessed academic goals of college students and included a manipulation of implementation planning. Study 3 assessed the weight-loss goals of college women and included an objective measure of goal progress. Study 3 also included a manipulation of two distinct forms of implementation plans: approach oriented versus avoidance oriented. All three studies distinguished autonomous and controlled motivation and assessed goal progress over 1 month.

We hypothesized that autonomous motivation would be significantly associated with greater goal progress, whereas controlled motivation would be unrelated to progress. We also hypothesized that autonomous motivation would be associated with the use of implementation plans and that the implementation plans would be especially helpful for individuals with autonomous goals because such motivation reflects strong self-endorsement of the goal intention. Two studies by Koestner et al. (2002) showed that implementation plans interact with goal self-concordance to affect goal progress such that progress was highest for individuals who were high in autonomous motivation and who were instructed in using implementation plans. Those studies, however, did not separate out the two components of self-concordance: autonomous motivation and controlled motivation. In summary, we expected that the ''autonomy'' of goal pursuits rather than the ''controlling element'' would be the active ingredient in the goal self-concordance phenomenon.

## STUDY 1

Study 1 was intended to extend Sheldon's (2002) personal goal paradigm to teenagers. Specifically, high school students were asked to list their most important academic and leisure goals early in September. They were also asked to rate the extent to which they had autonomous versus controlled reasons for their goals. At a 1-month follow-up goal progress was assessed along with reports of using implementation plans. We expected to find that autonomous motivation was significantly positively related to goal progress, whereas controlled motivation was unrelated. We were curious to see whether the positive goal progress associated with autonomous motivation would be mediated by spontaneous implementation planning. Previous research has suggested that autonomous goal motivation leads to greater goal progress by allowing individuals to exert more effort, experience less conflict, and feel a greater sense of readiness to change their behavior (Koestner, 2007).

### Method

*Participants*

Four hundred and nine high school students participated in the study. The sample was composed of 207 females and 202 males whose

ages ranged from 13 to 17 with a mean of 15.48. The study was described as an investigation into high school students' goal pursuits. All students participated voluntarily after receiving school and parental approval. Only 330 participants were available for the 1-month follow-up of goal progress.

## Procedure

Participants completed goal surveys early in the school year during homeroom. Prior to distribution of the questionnaires, students were informed that they would be asked to complete a questionnaire that asked them to list their most important academic and leisure goals for the school year and that their responses would remain confidential. They were also told that a follow-up questionnaire would be administered 1 month later.

The initial questionnaire required participants to complete scales in the following order: demographic information, description of most important academic and leisure goals, and ratings of goal motivation. The follow-up was also completed in school during homeroom.

## Measures

*Academic and leisure goals.*   The instructions for listing the most important academic and leisure goals were as follows: ''Personal goals are projects and concerns that people think about, plan for, carry out, and sometimes (though not always) complete or succeed at. They may be more or less difficult to implement; require only a few or a complex series of steps; represent different areas of a person's life; and be more or less time consuming, attractive and urgent. Please list the most important school-related goal that you have for this year. Now do the same for your most important leisure goal.''

*Goal motivation.*   Sheldon and Kasser's (1995, 1998) method of measuring goal motivation in terms of people's reasons for pursuing their goals was employed. For each goal, participants rated four reasons that correspond to a continuum of self-determination ranging from highly controlled to highly autonomous. Ratings ranged from 1 to 9, with 1 representing *not at all for this reason* and 9 representing *completely because of this reason*. The four types of reasons for pursuing goals were external (i.e., ''because somebody else wants you to, or because you'll get something from somebody if you do''), introjected (i.e., ''because you would feel ashamed, guilty, or anxious if you didn't—you feel that you ought to strive for this''), identified (i.e., ''because you really believe that it

is an important goal to have — you endorse it freely and value it whole-heartedly"), and intrinsic (i.e., "because of the fun and enjoyment which the goal will provide you—the primary reason is simply your interest in the experience itself").

As in previous research, autonomous motivation was calculated as the mean of intrinsic and identified ratings, whereas controlled motivation was calculated as the mean of external and introjected regulation (Sheldon & Elliot, 1998).

*Goal progress.*   Participants were asked to rate how much progress they had made toward their academic goal and toward their leisure goal using a 9-point Likert scale, which ranged from *none* to *a great deal*.

*Implementation planning.*   Participants were also asked to report on the extent to which they had made specific plans about when, where, and how to pursue each goal and whether they had anticipated possible distractions and obstacles. The internal reliability of the two-item measure was alpha = .68 for academic goals and alpha = .83 for leisure goals.

## Results and Discussion

### Preliminary Analyses

Table 1 presents the means and standard deviations for all of the variables. Students reported significantly greater progress for their leisure goal than for their academic goal, $t(330) = 2.50$, $p = .01$; they also reported significantly greater autonomous motivation for their leisure goal than for their academic goal ($M = 5.84$), $t(408) = 7.05$, $p < .0001$. There were no differences approaching significance for implementation planning or controlled motivation between the leisure goal and the academic goal ($ps > .10$).

It can be seen on Table 1 that ratings of autonomous motivation were considerably higher than the ratings of controlled motivation and that participants reported extensive use of implementation plans and relatively high levels of goal progress. These patterns were evident for both the academic and leisure goals.

Table 1 also presents the correlations among the variables. There were significant positive correlations between the same measures as-sessed for the academic and leisure goals ($rs$ ranged from .31 to .45 for goal motivation, implementations, and progress). Implementa-

**Table 1**
Correlations of Autonomous Motivation, Controlled Motivation, and Goal Progress: Study 1

| | Mean | SD | 1. | 2. | 3. | 4. | 5. | 6. | 7. |
|---|---|---|---|---|---|---|---|---|---|
| 1. Autonomous Motivation Academic Goal | 5.86 | 2.05 | 1.0 | | | | | | |
| 2. Controlled Motivation Academic Goal | 4.35 | 2.12 | −.04 | 1.0 | | | | | |
| 3. Implementation Planning Academic Goal | 5.50 | 1.97 | .15 | .01 | 1.0 | | | | |
| 4. Progress Academic Goal | 5.88 | 1.96 | .17 | .05 | .78 | 1.0 | | | |
| 5. Autonomous Motivation. Leisure Goal | 6.65 | 2.37 | .38 | −.10 | .20 | .12 | 1.0 | | |
| 6. Controlled Motivation Leisure Goal | 4.29 | 2.36 | −.03 | .34 | .03 | −.05 | −.15 | 1.0 | |
| 7. Implementation Planning Leisure Goal | 5.73 | 2.23 | .19 | −.04 | .45 | .33 | .31 | .05 | 1.0 |
| 8. Progress Leisure Goal | 6.23 | 2.17 | .14 | −.07 | .39 | .31 | .29 | .03 | .78 |

*Notes.* All variables had 1–9 scales. The n was 330 for the academic goal and 294 for the social goal.
*r*s > .10 yields *p* < .05.
*r*s > .18 yield *p* < .01.

tion planning was highly significantly related to goal progress for both types of goals. Autonomous and controlled motivations were unrelated to each other for the academic goal but significantly negatively related for the leisure goal.

The correlations also showed that autonomous motivation was significantly positively related to greater implementation planning for both the academic and the social goal. Controlled motivation was unrelated to implementation planning.

*Central Analyses*

Hierarchical regression analyses were used to examine the relations of autonomous and controlled motivation to academic and leisure goal progress. Age and gender were entered as a first set of predictors; autonomous motivation and controlled motivation were entered as a second set of predictors; the two-way interactions between gender, autonomous motivation, and controlled motivation were entered as a final set of predictors. Because no interaction effects approached significance ($ps > .10$), we report the results from after the second set of predictors were entered.

The regression for academic goal progress yielded a significant multiple $R$ of .27, $F(4,323) = 6.50$, $p < .0001$. Age was significantly negatively related to academic goal progress (beta $= -.21$, $t(325) = -3.67$, $p < .001$), indicating that younger students made greater goal progress than older students. Gender was marginally related to academic goal progress (beta $= -.10$, $t(325) = -1.68$, $p < .10$), indicating that girls tended to report higher goal progress than boys. Autonomous motivation was significantly positively related to academic goal progress (beta $= .18$, $t(323) = 3.24$, $p < .001$) indicating that students with more autonomous motivation reported greater goal progress. Controlled motivation was unrelated to academic goal progress (beta $= .05$).

The regression for leisure goal progress yielded a significant multiple $R$ of .31, $F(4,290) = 7.82$, $p < .0001$. Age and gender were unrelated to leisure goal progress (betas $= -.07$ and $-.06$, respectively). Autonomous motivation was significantly positively related to leisure goal progress (beta $= .30$, $t(290) = 5.35$, $p < .001$) indicating that students with more autonomous motivation reported great

leisure goal progress. Controlled motivation was unrelated to leisure goal progress (beta = .08).[1]

To examine whether implementation planning mediated the effects of autonomous motivation on goal progress, we followed Baron and Kenny's (1986) guidelines for testing mediation. Correlational analyses presented in Table 1 confirmed that for both the academic and the leisure goals there was (1) a significant positive relation between the predictor variable (autonomous motivation) and the mediator (implementation planning), (2) a significant positive relation between the predictor variable and the outcome (goal progress), and (3) a significant positive relation between the mediator (implementation planning) and the outcome (goal progress). The final criterion for mediation is to show that the relation between the predictor and the outcome is reduced to nonsignificance when the effect of the mediator is controlled. A partial correlation analysis provided evidence for the mediating role of implementation planning because the relation of autonomous motivation to goal progress was reduced to nonsignificance when the effects of implementation plans was controlled for: $pr = 08$ for the academic goal and $pr = .11$ for the leisure goal.

The results of Study 1 confirmed that only autonomous motivation, not controlled motivation, was related to goal progress. The results also indicated that the beneficial effects of autonomous goals may be mediated by greater implementation planning.

## STUDY 2

There is evidence that the motivation behind a particular goal may combine with implementation intentions to influence goal success. Koestner et al. (2002) designed two short-term, prospective longitudinal studies to examine whether implementation intentions would bolster the effects of self-concordance on goal attainment. Implementation intentions were experimentally manipulated via a brief planning exercise that was modeled after those employed by Gollwitzer (Gollwitzer, 1999). The results of both studies showed

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1. The regressions for academic and leisure goal progress were repeated using self-reports of initial perceived goal difficulty as a variable entered with gender and age. Including perceived difficulty did not change any of the results reported above.

that self-concordant goals were especially strongly related to goal progress when participants had been asked to make implementation plans. The Koestner et al. (2002) studies, however, did not provide results separately for autonomous and controlled goals. The results obtained by Judge et al. (2005) and from our Study 1 suggest that it is possible that the impact of autonomous motivation and controlled motivation on goal progress may not be equally strong. Instead, it is possible that it is especially the beneficial effects of autonomous motivation on goal progress (rather than the harmful effects of controlled motivation) that would combine with implementation plans to produce greater goal progress.

Study 2 was designed to examine again the relations among autonomous motivation, controlled motivation, and goal progress. However, the study also included the experimental manipulation of implementation planning, allowing us to determine whether the positive relation of autonomous motivation to goal progress would be particularly evident when individuals had also constructed implementation plans. Participants were university students who were asked to identify their most important academic goal early in the semester. Their goal progress was assessed 1 month later.

## Methods

### Participants

One hundred and three undergraduates attending McGill University participated in the study. The sample was composed of 86 women and 17 men whose ages ranged from 17 to 31 with a mean of 20.1. The study was described as an investigation into academic goal pursuit. All participants received $10 for their participation. Two participants did not complete the follow-up measure of goal progress and are not included in the main results.

### Procedure

Participants completed goal surveys and were assigned to the implementation versus control condition early in the semester. Testing groups included 5 to 7 participants. Prior to distribution of the questionnaires, students were informed that they would be asked to complete a questionnaire that asked them to list their most important academic goal for the semester and that their responses would remain confidential. As

the follow-up questionnaire was to be sent to the participants via e-mail, participants provided their e-mail address.

The initial questionnaire required all participants to complete scales in the following order: demographic information, description of most important academic goal, and ratings of goal motivation. After these rating were completed, participants were randomly assigned to the two conditions. In the implementation condition, the questionnaires prompted the participants to form implementation intentions for their most important academic goal. Forming implementation intentions involved indicating when and where each goal was to be carried out, three possible distractions that could occur during pursuit of the goal, and three strategies for managing those distractions.

Participants assigned to the control group were not prompted to form implementation intentions about their goals. All participants were contacted 1 month later by email to indicate how much goal progress they had made.

### Measures

*Academic goal.*    The instructions for listing the most important academic goal were identical to Study 1.

*Goal motivation.*    The assessment was identical to Study 1.

*Implementation intention instructions.*    The instructions were identical to previous studies (Koestner, Lekes, et al., 2002; Koestner, Horberg, et al. 2006). Participants were instructed to specify a time and place for pursuing their academic goal. Furthermore, if-then contingencies were presented in which participants would identify three distractions that could occur and a counter behavior for each distraction. The paper and pencil exercise required about 3 minutes to complete.

*Goal progress.*    Participants rated how much progress they had made on the academic goal, using a 9-point scale with the endpoints *none* and *a great deal*.

### Results and Discussion

Preliminary analyses revealed no main effects or interaction effects related to gender. There was also no main effect for implementation plans, $t(102) = 0.40$, *ns*. Participants in the implementation condition reported a mean goal progress of 5.85 compared to a mean level of

## Table 2
### Correlations of Autonomous Motivation, Controlled Motivation, and Goal Progress: Study 2

|              | Mean | SD   | 1.   | 2.   | 3.  |
|--------------|------|------|------|------|-----|
| 1. Autonomous | 6.02 | 2.15 | 1.0  |      |     |
| 2. Controlled | 4.85 | 2.07 | −.18 | 1.0  |     |
| 3. Progress   | 5.75 | 2.20 | .19* | −.01 | 1.0 |

All variables had 1–9 scales.
$n = 105$.
*$p < .05$.

progress of 5.68 in the control condition. A recent article explored why implementation manipulations appear to be less successful with self-set goals (Koestner et al., 2006).

Table 2 shows that students rated their academic goals as considerably higher in autonomous motivation rather than controlled motivation, and they reported moderate goal progress. The table also offers support for our main hypotheses: Autonomous motivation was significantly positively related to goal progress, whereas controlled motivation was unrelated. It also shows that autonomous motivation and controlled motivation were only modestly negatively correlated.

Subgroup correlation analyses were conducted to test the hypothesis that autonomous motivation would be especially strongly related to goal progress when combined with implementation plans. As hypothesized, the relation of autonomous motivation to progress was significant in the implementation condition ($r = .37$, $p < .01$) but not in the control condition ($r = .06$, ns). The relation of controlled motivation to goal progress was not significant in either condition ($r = .13$ in implementation condition; $r = −.13$ in control condition).

A moderator multiple regression revealed a marginally significant interaction between autonomous motivation and implementation plans, beta $= .18$, $p < .10$. In the regression, we entered autonomous motivation, controlled motivation, and the unweighted effects code representing experimental conditions (implementation intentions condition $= 1$, control condition $= –1$) into the regression equation (Step 1), followed by the product of autonomous motivation ×

effects code and the interaction of controlled motivation × effects code (Step 2). All predictors were centered.

Study 2 confirmed the hypothesis that the impact of goal motivation on goal progress would be predominantly determined by autonomous rather than controlled motivation. Thus, autonomous motivation was significantly related to greater goal progress, whereas controlled motivation was unrelated to goal progress. Moreover, there was evidence that the positive relation of autonomous motivation with goal progress is accentuated when participants are asked to make implementation plans.

The interactive effect of having autonomous goals that are combined with implementation intentions can be explained by Gollwitzer and Sheeran's (2006) recent refinement of their goal implementation model. These authors provided experimental evidence that the main effects of implementation plans were qualified by significant interaction effects related to the strength of the goal they were intended to facilitate. They concluded that implementation intentions are sensitive to the respective goal intention and that implementation intentions may only benefit goal progress when the plans were underpinned by strong goal intentions. We suggest that the level of autonomous motivation of a goal is a particularly sensitive indicator of the extent to which a goal intention is strongly held. Autonomous motivation is defined in terms of the extent to which a goal is based in intrinsic motivation and meaningful identifications, and these forms of self-regulation are thought to be reflective of an individual's core self (Deci & Ryan, 2000; Sheldon 2002).

## STUDY 3

Study 3 examined the relations among autonomous motivation, controlled motivation, implementation plans, and goal progress but included an important methodological refinement: An objective assessment of goal progress was included. One area in which it is possible to objectively assess goal progress is in relation to personal goals about weight. A large percentage of people, particularly women, set personal goals about either losing or maintaining their weight (Norcross, Ratzin, & Payne, 1989), and previous studies have used the weighing of participants as way to confirm whether participants actually do make progress on their goals, like they self-report

(Marlett & Kaplan, 1972). We sought to examine the success that female university students had in reaching their personal goals related to their weight. Success was validated by objectively weighing participants at the beginning and end of the study. Participants completed measures of autonomous and controlled motivation for their eating behavior, and their goal progress was assessed at 1 month.

Study 3 also sought to examine the interplay of autonomous motivation and implementation plans on goal progress. However, the examination of implementation plans in the area of weight loss is more complicated than in other goal domains because individuals trying to lose weight tend to use a variety of avoidance-oriented implementation plans (e.g., ''don't snack,'' ''don't eat any desserts'') as well as adopting approach-oriented plans (e.g., ''eat healthy foods,'' ''eat moderate portions,'' ''exercise 3 times per week''). The distinction between approach and avoidance implementation plans is important to consider for two reasons. First, research suggests that effective self-regulation is facilitated in relation to approach-oriented goals and plans rather than avoidance-oriented ones (Carver & Scheier, 1996; Elliot & Church, 1997; Elliot, Sheldon, & Church, 1997). Approach planning is thought to be linked to positive outcomes because it guides the goal pursuit in a precise direction compared to avoidance planning which only specifies ways to avoid engaging in unwanted actions that would move someone further from their goal. Second, recent research has established that autonomous motivation about eating is particularly well suited to approach-oriented goals and plans but that it does not fit well with avoidance-oriented plans (Otis & Pelletier, 2007). That is, survey data showed that weight-related approach planning was significantly positively related to autonomous regulation, whereas controlled regulation was significantly positively related to avoidance food planning (Otis & Pelletier, 2007).

Because of the prevalence of avoidance plans in the area of weight, and because of the mismatch between autonomous motivation and avoidance plans, we decided to guide participants to set either approach-oriented or avoidance-oriented plans. Thus, after reporting their personal weight goals and their motivation, participants were randomly assigned to either an approach implementation condition, an avoidance implementation condition, or a control condition. We expected to extend the results of the previous

studies to show that autonomous but not controlled motivation would relate to objective weight goal progress. Moreover, we expected that autonomous motivation would especially relate to goal progress when combined with implementation plans. But in this case we only expected such a moderator effect for the approach-oriented implementation plan condition.

## Method

*Participants and Procedures*

Participants were 47 University of Ottawa female students who took part in the study in exchange for course credit. First, participants completed the Regulation of Eating Behaviours Scale in a larger questionnaire that was distributed in the introduction to social psychology undergraduate courses at the beginning of the semester. Participants then received a sheet of paper describing a study about women's eating behaviors. Information in this paper specified that participants in the study would be limited to females who were currently trying to regulate their eating behaviors in order to maintain or lose weight. Participants were informed that participation in this study involved attending two laboratory sessions of 20 minutes duration where they would be weighed and measured.

Participants were randomly assigned to the approach implementation, the avoidance implementation, or to a control condition. At the first laboratory session, participants in all conditions received Canada's Food Guide for Healthy Eating for nutritional information purposes. All of the participants were individually seated in a small room with a desk and were instructed to create a personal code to ensure their anonymity. They were also asked to specify their body weight goal and to complete a questionnaire assessing their perception of the regulation of eating behaviors and their food choices. Participants in the two implementation conditions completed an additional section asking them to form context-specific plans and to write them down. After completing the questionnaire, participants were asked to remove their shoes and step on a TBF-531 body fat monitor/scale to assess their weight and their percentage of body fat. Participants were asked to stand straight with their heels and buttocks against the stadiometer for height measurement. Finally, it was recommended to participants that they sign up for the second session at the same time of day in order to obtain a more precise assessment of their weight change.

One month later, all participants returned to the laboratory to be weighed. The final weigh-in was used to calculate the goal attainment index described below.

*Instruments*

*Regulation of Eating Behaviors Scale (REBS; Pelletier, Dion, Slovinec-D'Angelo, & Reid. 2004).* This scale, based on self-determination theory (Deci & Ryan, 2000), was designed to measure participant's motivation for trying to regulate their weight. The scale asks participants "Why are you trying to regulate your eating behaviors" and then provides a variety of possible motivations. Specifically, the scale measures intrinsic motivation, four types of extrinsic motivation (i.e., integrated regulation, identified regulation, introjected regulation, and external regulation) and amotivation. The 6 subscales are composed of 4 items each, for a total of 24 items. Each item represents a possible reason why people might try to regulate their eating behaviors. Participants indicated the degree to which the proposed reasons corresponded to their own reasons on a 7-point Likert scale ranging from 1 (*Does not correspond at all*) to 7 (*Corresponds exactly*). We computed a composite score to represent autonomous motivation (the sum of the intrinsic motivation, integrated regulation and identified regulation subscales) and controlled motivation (the sum of the introjected regulation and external regulation subscales). Sample items include "eating healthy is an integral part of my life" (integrated) and "I would be ashamed of myself if I was not eating healthy" (introjected).

*Specification of a body weight goal.* Participants were asked to put a specific number or 0 on the dash in this following sentence: "I intend to lose ____ lbs in the next month."

*Body weight goal-attainment index.* This index was calculated by subtracting each participant's body weight goal they had set for themselves at T1 from the actual weight change between T1 and T2. For example, if a woman had a goal to lose 5 pounds and she actually lost 4 pounds, then a body weight goal-attainment index is –1 [4–5 = −1]. The body weight goal attainment index can also be positive if the woman lost more than she wanted [6–5 = 1]. A body weight goal-attainment index of 0 represents perfect goal attainment. The mean weight change over the month was − 0.33 pounds with a standard error of 0.35.

*Body Mass Index (BMI).* The BMI takes into account both a person's height and weight and is calculated using this mathematical formula: ([weight (lb)/height (in.)$^2$] × 703). A BMI below 18.5 is considered underweight, and a BMI of 18.5 to 25 is representative of normal weight. BMIs of 25 to 30 are generally considered overweight while a BMI over 30 is generally considered as obese.

*Implementation intention manipulation.* The general instruction regarding the formation of implementation intentions is based on the classic study performed by Gollwitzer and Brandstätter (1997). In both implementation-intentions conditions, participants were first informed about the beneficial impact of planning. Participants read the following:

> Successful regulation of eating behaviours requires that one initiates and maintains various goal-directed actions (e.g., eat more fruits, eat less fat). Food planning has been found to facilitate the enactment of these actions. Food planning is essential to meet daily requirements and protect you from out-of-control eating. (Herrin, 2003)

Then, participants were instructed to make five simple plans that each linked a situation with a response (i.e., "When situation *x* occurs, I will respond with *y*"). In the approach implementation-intentions condition, participants were told the following:

> It would be useful for you to list five good opportunities to act toward goal attainment. Then list a specific wanted action to initiate in the presence of each opportunity.

In the avoidance implementation-intentions condition, participants were told the following:

> It would be useful for you to list five critical situations that may elicit unwanted behaviors (behaviors that will not make you progress toward your goal). Then, specify how you will react (intending to not display the unwanted behavior, by either ignoring the critical situation or by specifying a counter-behavior).

Finally, participants were asked to visualize the situation and the specified response. Participants were given a copy of their written implementation intentions and were advised to post this sheet of paper where they would see it often.

## Results and Discussion

The mean BMI for our sample at Time 1 was 22.82 kg/m ($SD = 4.14$; range 15.64–44.04). Based on the recommended BMI thresholds, 4.2% of our participants classified as underweight, 76.9% as normal weight, 16.8% as overweight, and 2.1% as obese. The results presented in Table 4 indicate that participants reported more autonomous than controlled motivation for their eating

behavior. It can also be seen that participants generally experienced very poor success with their weight-loss goal, coming up about 6 pounds short of their desired objective. In fact, of the 47 participants, only 5 reached or exceeded their stated weight-loss goal over the month.

Table 3 shows that the means, standard deviations, and zero-order correlations for the variables. Subgroup correlation analyses were conducted to test the hypothesis that autonomous motivation would be especially strongly related to goal progress when combined with implementation plans. As hypothesized, the relation of autonomous motivation to progress was significant in the approach implementation condition ($r = .50$, $p < .05$) but not in the control condition ($r = .04$, $ns$) or in the avoidance implementation condition ($r = -.18$, $ns$). The relation of controlled motivation to goal progress was not significant in any condition ($r = .02$ in the approach implementation condition; $r = .11$ in control condition, and $r = -.28$ in the avoidance implementation condition).

A moderator multiple regression was conducted to examine the relation of goal motivation and implementation plans to goal progress. The three experimental conditions were contrast coded. When the researcher has specific a priori hypotheses, contrast coding is preferred over the other coding systems since it facilitates the interpretation of the result and reduces the possibility of rejecting false null hypotheses (Cohen, Cohen, West, & Aiken, 2003). Our first contrast code tested the impact of one intervention versus the other intervention (Approach = 1, Avoidance = − 1). Our second contrast code tested the impact of the two interventions

## Table 3
### Correlations of Autonomous Motivation, Controlled Motivation, and Goal Progress: Study 3

|              | Mean  | SD   | 1.  | 2.   | 3.  |
|--------------|-------|------|-----|------|-----|
| 1. Autonomous | 4.84  | 1.06 | 1.0 |      |     |
| 2. Controlled | 2.21  | .79  | .02 | 1.0  |     |
| 3. Progress   | − 5.95 | 4.64 | .20 | − .04 | 1.0 |

*Note*: All variables had 1–7 scales.
$n = 47$.

versus no intervention (Approach and Avoidance = 1, Control condition = − 1). The basic model was composed of the experimental conditions (contrast code 1, contrast code 2), autonomous regulation, controlled regulation, the autonomous motivation × conditions interactions (autonomous motivation × Contrast Code 1; autonomous motivation × Contrast Code 2), and the controlled motivation × condition interactions (controlled motivation × Contrast Code 1; controlled motivation × Contrast Code 2). All predictors used in the regressions were centered. Significant interaction effects were investigated with simple slope analyses (Cohen et al., 2003).

The analysis revealed a main effect for the BMI ($\beta = − .57$), $t(1, 46) = − 4.86$, $p < .001$, indicating that participants with higher BMI before the study were less successful in achieving the goal they had specified for themselves. This analysis also revealed a main effect for autonomous motivation ($\beta = .26$), $t(1, 46) = 2.12$, $p < .05$, such that autonomous motivation was significantly associated with goal attainment. In other words, participants with high autonomous motivation were more likely to achieve their weight-loss goal. Controlled motivation was unrelated to goal progress. Of importance, the autonomous motivation × Contrast Code 1 interaction was significant, $\beta = .29$, $t(1, 46) = 2.52$, $p < .05$.

The interaction is depicted in Figure 1, which plots the regression of goal attainment on the experimental conditions at one standard deviation above and below the mean of autonomous regulation. Simple slope analyses showed that autonomous motivation was a moderator for the Approach condition, $t(47) = 2.21$, $p < .05$, but was not a significant moderator for the Avoidance condition, $t(47) = − 1.20$, $ns$. This result suggests that the positive relation between autonomous motivation and goal attainment was especially high in the Approach implementation condition. No other results approached conventional levels of signification ($ps > .10$).

The results obtained in Study 3 again supported the prediction that autonomous motivation, but not controlled motivation, would be associated with greater goal progress. The importance of obtaining this finding in Study 3 is that an objective measure of goal progress was employed. The results of Study 3 also indicated that autonomous motivation was especially predictive of goal success when it was combined with implementation plans. However, in the present study it was shown that only approach-oriented
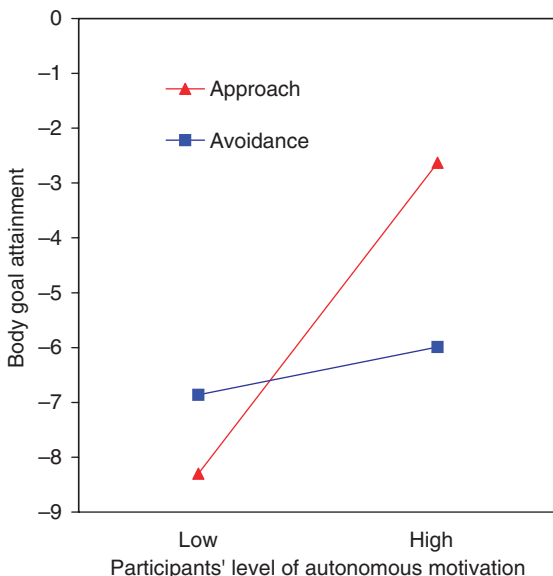
**Figure 1**
Relation between participants' body goal attainment and their level of autonomous regulation as a function of being exposed to either the approach implementations conditions or the avoidance implementations condition.

implementation plans led to heightened effects for autonomous motivation on goal progress.[2]

## GENERAL DISCUSSION

The results of all three studies indicated that autonomous motivation was reliably positively associated with goal progress, whereas controlled motivation was unrelated to goal progress. Specifically, the mean correlation between autonomous motivation and goal progress across the studies was $r = .21$ and the range of correlations were between .19 and .25. The mean correlation between controlled motivation and goal progress across the studies was $r = -.01$, and the range of correlations was between $-.04$ and .01. The consis-

2. The sample size for Study 3 was rather small. Future research should compare the effects of approach versus avoidance implementation plans with larger samples and with more diverse types of goals.

tency of these relations across three studies that assessed different types of goals and sampled both high school and college students is impressive.

The consistency of these findings is even more impressive when one examines them next to previous research that has assessed autonomous motivation, controlled motivation, and goal progress. Table 4 provides a meta-analysis of 11 studies (including the three studies from this investigation) that have *separately* examined the relations of autonomous motivation and controlled motivation with goal progress. The studies were identified by searching the electronic Psychinfo database for articles that included the key words "goal progress," "goal attainment," or "goal achievement" in combination with the words "self-concordance" or "autonomy." Correlations and regression coefficients were converted to Cohen's $d$. Composite effect size estimates $(d+)$ were calculated as the average of individual effects $(d)$ weighted by the reciprocal of their variance, thus giving greater weight to more reliable effect size estimates (Hedges & Olkin, 1985). All effect-size computations and summary analyses were done using DSTAT ( Johnson, 1993), a meta-analytic software program. Each calculation of $d+$ provided both a test of whether the value differed from 0.00 and a 95% confidence interval (CI). The homogeneity of the set of effect sizes was tested by the within-class goodness-of-fit statistic (Qw), which has an approximate chi-square distribution with $k–1$ degrees of freedom, where $k$ equals the number of effect sizes ( Johnson, 1993).

A highly significant overall effect emerged for autonomous motivation, $d+ = 0.41$ (CI 0.34, 0.49), $p < .0001$. The set of effects was homogeneous $(Q(11) = 3.04, ns)$. Participants were significantly more likely to make successful progress when goals were autonomous. However, the overall effect for controlled motivation did not reach significance, $d+ = -0.02$ (CI $-0.09/0.06$), $Q(11) = 9.99$, *ns*, suggesting that it is only the autonomous motivation of goals that reliably predicts to goal progress. Finally, Table 4 also shows that the level of autonomous motivation of goals was unrelated to their level of controlled motivation, $d+ = .00$, (CI $-0.08/0.06$, $Q(11) = 57.45$, $p < .001$). These meta-analytic results suggest that only autonomous motivation (not controlled) is reliably associated with goal progress and that levels of autonomous and controlled motivation for goals tend to be unrelated to each other.

## Table 4
### Meta-Analysis of Progress by Autonomous Motivation, Controlled Motivation, and Goal Progress

| Study | Time Frame | $n$ | Autonomy Progress | Controlled & Progress | Autonomy & Controlled |
|---|---|---|---|---|---|
| Sheldon & Elliot (1998) | | | | | |
| Study 1 | 1 month | 128 | .20 | − .05 | − .14 |
| Study 2 | 3 months | 141 | .16 | .00 | − .07 |
| Study 3 | 1 month | 82 | .21 | .08 | − .08 |
| Judge et al. (2005) | | | | | |
| Study 1 | 2 months | 240 | .17 | − .06 | .04 |
| Study 2 | 2 months | 250 | .20 | .04 | .19 |
| Downie et al. | | | | | |
| (2006) | 1 week | 81 | .17 | .02 | − .02 |
| Powers et al. (2007) | | | | | |
| Study 1 | 1 month | 83 | .21 | − .18 | − .08 |
| Study 2 | 1 week | 117 | .23 | .04 | .26 |
| Koestner et al. (this article) | | | | | |
| Study 1 | 1 month | 290 | .25 | .01 | − .11 |
| Study 2 | 1 month | 101 | .19 | − .01 | − .18 |
| Study 3 | 1 month | 47 | .20 | − .04 | .02 |

The fact that controlled motivation does not relate to goal progress will be surprising to self-concordance and self-determination researchers who would expect a negative relation between these variables. However, the lack of a relationship between controlled motivation and goal progress may also surprise behaviorally oriented researchers who advocate reinforcement programs to boost goal strivings. The lack of a relationship between controlled motivation and goal progress does not necessarily mean that controlled motivation has no impact on goal strivings. It is possible that controlled motivation affected participants' cognitions and affect in the present studies, but we measured only goal progress as an outcome. There is considerable evidence from research in other domains that controlled motivation has a negative impact on indicators of well-being (Ryan & Deci, 2000).

Future research should explore the role of dispositional variables in predisposing individuals to adopting autonomous versus

controlled goals (Judge et al., 2005). It should also examine whether specific aspects of the goal, such as its level of complexity or its relation to an individuals implicit motives, will affect the relationship of autonomous and controlled motivation to goal progress. Although we used prospective designs, the core analyses of the present studies were correlational; therefore, it is important to note that causal inferences cannot be supported. More complex longitudinal and experimental designs would be required to establish causal links. Finally the studies were all carried out over a 1-month time frame. It would certainly be of theoretical interest to consider longer time frames and follow-up assessments to establish whether reported progress is maintained and to examine the possible differential effects of autonomous motivation and controlled motivation over time.

The results from our studies also point toward a role for implementation plans in mediating or moderating the relation between autonomous motivation and goal progress. Study 1 showed that high school students with autonomous goal motivation were more likely to report using implementation plans, which, in turn, were associated with greater goal progress. Studies 2 and 3 suggested that autonomous motivation may interact with implementation plans to affect goal progress. That is, autonomous motivation appeared to have a particularly helpful impact on goal progress when combined with implementation plans. There were no consistent relations for controlled motivation to goal progress in the implementation conditions.[3] The interactive effect of having autonomous goals that are combined with implementation intentions can be explained by

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3. It is noteworthy that autonomous motivation was not significantly related to goal progress in the control conditions of Studies 2 and 3. This is surprising given that previous studies that have no specifically manipulated implementation plans have obtained significant relations between autonomous motivation and goal progress. One might have expected that in our control conditions autonomy would still be significantly related to goal progress but at a lower level than in the implementation conditions. The failure to obtain significant relations between autonomous motivation and goal progress in our control condition may relate to the fact that we assessed only a single goal in each study, whereas previous studies have combined autonomous motivation and goal progress measures across several goals, perhaps yielding a more powerful test of the relation between autonomous motivation and goal progress.

Gollwitzer and Sheeran's (2006) recent refinement of their goal implementation model. These authors concluded that implementation intentions are sensitive to the respective goal intention and that they may only benefit goal progress when the plans were underpinned by *strong* goal intentions. The level of autonomous motivation of a goal would seem to be a particularly sensitive indicator of the extent to which a goal intention is strongly held.

The results of Study 3 suggested that autonomous motivation might combine especially well with implementation plans that are framed in terms of approaching desired behaviors rather than avoiding undesirable behaviors. Thus, women who were high in autonomous motivation and who made approach-oriented implementation plans were relatively more successful at weight loss. The avoidance implementation plans were found to have no impact on measures of successful progress toward a goal, whether on their own or in interaction with either autonomous motivation or controlled motivation. The results of Study 3 also suggest that both kinds of implementation intentions interventions (approach and avoidance) were not effective in increasing goal attainment on their own. Participants who were exposed to either intervention did not experience more success at their body weight goal than control condition participants.

A possible reason why the combination of autonomous motivation and approach implementation intentions increased goal progress is that approach implementation intentions and autonomous motives are more consistent. Indeed, deciding how to eat healthy appears to be more in line with personally wanting to regulate one's eating behaviors because it reflects one's deep values, needs, and interests. Conversely, deciding how to prepare for critical situations is more in line with a controlled regulation based on external reinforcements instead of on a desire representing the authentic self. Past studies have found support for these propositions. For example, women with autonomous motivation for eating behaviors are more concerned about the quality of food, while women with a controlled motivation are more concerned by the quantity of food (Pelletier, et al., 2004). Also, women with autonomous motivation for eating behaviors were found to have healthy eating habits partly because they plan for the inclusion of healthy foods (Otis & Pelletier, 2007). Thus, it is not unexpected that women with autonomous motivation who are taught ways to formulate more specific plans about good

opportunities to eat healthy experience even more success at the regulation of their eating behaviors.

Why the results in goal-related situations indicate such consistent findings for autonomous motivation and only null results for controlled motivation remains unclear, but there are a number of possible explanations. Self-Determination Theory maintains that autonomous motivation is more fully internalized and integrated into the self (Deci & Ryan, 2000). As part of the self, autonomous motivation shows greater stability over time and across situations (Koestner, Bernieri, & Zuckerman, 1992). Being more stable, autonomous motivation will then be a better, more robust predictor of goal progress. Controlled motivation, by contrast, is more responsive to the vicissitudes of the external situation (Zuckerman, Gioioso, & Tellini, 1988), and, as such, it will exert a less stable influence on behavior over time and across situations. An example can illustrate the point: If one studies for autonomous reasons, then one will study regardless of the external influences. If one studies for controlled reasons, then one will engage in studying behavior when the situation cues the behavior, such as when there is an exam or when peers are studying, However, when the situation does not elicit controlled motivation, one will not engage in studying behavior. Most studies assess the impact of controlled motivation on goal progress by essentially averaging across situations and therefore cannot capture this variability.

The present research is limited in a number of ways. In particular, one can question the way in which goal motivation and goal progress were measured. Both autonomous and controlled motivations were assessed with only two items, and goal progress was assessed with a single item. With the exception of Study 3, all the goal-related measures were self-reported. It clearly would be important for future studies to examine the relation of autonomous, controlled motivation and goal progress by other methods (e.g., Bono & Judge, 2003, used manager reports to assess work performance). It should also be noted that we only assessed goal motivation with the scale developed by Sheldon and Elliot (1998). It is possible that the lack of a negative relation between autonomous and controlled motivation may be unique to this particular scale because many other domain-specific scales have reported significant negative correlations between autonomous and controlled motivation (Vallerand, 1997).

## Conclusion

The results of the three current studies strongly suggest that it is predominantly (and perhaps exclusively) autonomous motivation that influences goal progress, particularly in conjunction with implementation plans. This finding implies that interventions to help people change their behavior might usefully choose to focus on strengthening autonomous motivation rather than on reducing controlled motivation.

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