The Why and How of Goal Pursuits: Effects of Global Autonomous Motivation and Perceived Control on Emotional Well-being

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ABSTRACT

The Why and How of Goal Pursuits: Effects of Global Autonomous Motivation and Perceived Control on Emotional Well-being

E. Gaëlle Hortop

This study examined the effects of global autonomous motivation and global perceived control on young adults' adaptive goal striving and emotional wellbeing. We reasoned that autonomously motivated participants who also perceive high levels of control would make accelerated progress with the pursuit of their most important goal and experience associated increases in emotional wellbeing. By contrast, we predicted that these benefits of autonomous motivation would be reduced among participants who perceive low levels of control. A 6-month longitudinal study of 125 college students was conducted, and self-reported global autonomous motivation, global perceived control, progress towards the most important goal, and emotional well-being were assessed. Regression analyses showed that the combination of high baseline levels of global autonomous motivation and global perceived control was associated with accelerated goal progress after 6 months, which mediated 6-month increases in emotional well-being. These benefits were not apparent among autonomously motivated participants who perceived low levels of control. The study's findings suggest that global autonomous motivation and perceived control may need to work together to foster adaptive goal striving and emotional well-being.

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Contribution of Authors

E. Gaëlle Hortop developed the hypotheses, conducted the statistical analysis, and wrote the first draft of the manuscript with the support of her supervisor Carsten Wrosch. Carsten Wrosch designed the study, wrote the study protocol, and extensively edited and revised the final version of the manuscript. Maryléne Gagné edited and revised the final version to ensure that it was in line with Self-Determination Theory.

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The Why and How of Goal Pursuits: Effects of Global Autonomous Motivation and Perceived Control on Emotional Well-being

Introduction

Distinct traditions in motivational psychology have shown that why individuals pursue their activities in general, and how much control they generally perceive over desired outcomes are central determinants of subjective wellbeing. A diverse set of psychological benefits has been linked to high levels of global autonomous motivation (Koestner and Losier 1996 ; Vallerand 1997) and global perceived control (Eccles and Simpson 2011 ; Lachman and Weaver 1998). These benefits may occur because general tendencies of motivation can influence circumstance specific motivational states (Mata et al. 2009 ; Vallerand 1997), which are likely to affect adaptive behaviors and associated well-being (Sheldon and Elliot 1998 ; Lang and Heckhausen 2001). Surprisingly, however, there is a lack of research examining how global autonomous motivation and global perceived control work together in influencing subjective well-being. To address this gap in the literature, we examined in a longitudinal study of young adults whether global autonomous motivation and global perceived control are independent constructs that can interact in predicting emotional wellbeing. We expected that high levels of perceived control are particularly adaptive among autonomously motivated individuals because this combination increases the likelihood that individuals make accelerated progress towards self-relevant goals. By contrast, autonomously motivated individuals who perceive low levels of control may experience less goal progress and fewer benefits to their emotional well-being.

Benefits of autonomous motivation. One model of motivational predictors of quality of life has been advanced by self-determination theory (SDT; Deci and Ryan 1985 ; Ryan and Deci 2000 ; Vallerand 2012). According to SDT, motivation can be classified with respect to the amount of self-determination experienced (Amiot et al. 2008 ; Deci and Ryan 1985 ; Guay et al. 2003 ; Vallerand 2012). Autonomous motivation is motivation that is high in self-determination. It incorporates intrinsic regulations such as the experience of spontaneous enjoyment and meaning, and integrated regulations in which the individual fully integrates activities, and brings them in harmony with all other elements of his or her values and identity (Guay et al. 2003 ; Vallerand 2012). This experience of self-determination fulfills the fundamental human need for autonomy and has been described as the ‘‘experience of integration and freedom’’ (Deci and Ryan 2000).

Individuals vary in the extent to which they generally act for autonomous reasons (Vallerand 1997), which can forecast positive outcomes, such as effective coping, self-improvement, positive social experiences, and subjective well-being (Amiot et al. 2008 ; Deci and Ryan 1985 ;Hodgins et al. 1996 ; Koestner and Zuckerman 1994 ;Mata et al. 2009 ; Vallerand1997). These effects may occur because global autonomous motivation can exert a top-down influence on circumstance-specific motivational states (Mata et al. 2009 ; Vallerand 1997). In turn, autonomously motivated individuals may invest much effort into achieving specific goals and are more likely to experience success and emotional well-being. Among individuals who do not pursue activities for autonomous reasons, by contrast, goal progress can be compromised and theymay experience a threat to their subjective well-being (Sheldon and Elliot 1999 ; Sheldon and Houser-Marko

2001 ; Sheldon and Kasser 1998).

We note that SDT also addresses controlled motivation (Deci and Ryan 1985), which relates to behavior that is driven by contextual contingencies, such as avoiding punishment or earning rewards, as in operant conditioning, or by internal pressures (e.g., feelings of guilt) and ego-involvement (Vallerand 1997). Individual differences in global controlled motivation have been associated with aggressive achievement patterns, poor academic performance, and negative emotions (Deci and Ryan 1985 ; Koestner and Zuckerman 1994 ; Vallerand 1997). Since controlled motivation is typically not associated with the same benefits as autonomous motivation (Deci and Ryan 2000), and because low levels of controlled motivation do not necessarily imply high levels of autonomous motivation, our theoretical model focuses on global autonomous motivation.

Benefits of perceived control. While individuals differ in their general reasons for pursuing activities, they also differ in how much control they generally perceive over their pursuits. Traditional approaches to control emphasize the extent to which an individual perceives he or she has control over desired outcomes (Gerstorf et al. 2010 ; Jacelon 2007). From this perspective, changes in actual control have psychological impact when acknowledged by the individual, making subjective control, rather than objective control, of central interest (Skinner 1996). Global perceptions of control have been defined as ‘‘the extent to which one regards one’s life-chances as being under one’s own control’’ (Jacelon 2007 ; Pearlin and Schooler 1978). Global perceived control, as conceptualized here, incorporates beliefs about one’s capacity for control, locus of control and optimism about factors in the environment cooperating with one’s pursuits across multiple life domains and over time (Pearlin and Schooler 1978).Note that this

definition differs from other constructs, such as self-efficacy or perceived competence. While self-efficacy typically refers to a person's feeling of confidence to perform, or engage in, a specific and adaptive behavior (Berry and West 1993), perceived competence is associated with the perception of opportunities to use one's capacities as well as feelings of effectiveness concerning ongoing environmental interactions (Ryan and Deci 2002). Thus, while global perceived control concerns one's general beliefs regardless of particular circumstances (i.e., generalized across life domains), self-efficacy and perceived competence are more situation-specific.

For the purpose of this study, we focus on global perceived control as a robust predictor of subjective well-being (Baltes and Baltes 1986 ; Eccles and Simpson 2011 ; Fiske and Taylor 1991 ; Gerstorf et al. 2010 ; Lachman and Agrigoroaei 2012 ; Lachman and Weaver 1998 ; Martin and Dixon 1994 ; Rodin 1986). Research has shown that no matter how little actual control an individual has, the perception that positive change can be achieved is psychologically beneficial (Skinner 1996). This effect may be observed because a general sense of control fulfills a fundamental psychological need for competence (White 1959). In addition, perceptions of control can fuel the use of adaptive control strategies or coping behaviors and through this mechanism benefit a person's subjective well-being (Heckhausen and Schulz 1995 ; Lang and Heckhausen 2001). In support of this assumption, research has demonstrated that high perceptions of control forecast increased effort and persistence, sustained attention, and effective problem solving (Lang and Heckhausen 2001 ; Skinner 1996). With the perception of little control, by contrast, individuals tend to withdraw and become fearful, depressed, or angry (Seligman 1975).

Can autonomous motivation and perceived control work together? The previous discussion suggests that there are reliable individual differences in levels of global autonomous motivation and global perceived control. In addition, it shows that both constructs are important determinants of adaptive outcomes and likely to promote an upward spiral characterized by persistence, progress towards goal attainment, and increased subjective well-being (Patrick et al. 1993 ; Sheldon and Houser-Marko 2001 ; Skinner 1995).

What is not well understood, however, is how global autonomous motivation and global perceived control are related to each other and whether they work together in influencing emotional well-being. One possibility is that perceptions of control and autonomous motivation largely overlap in their influence on emotional well-being. In other words, the shared variance of the two constructs may relate to emotional well-being in the same way. For instance, individuals who generally perceive high, as compared to low, levels of control may be more likely to select goals that they feel autonomously motivated towards. A strong sense of control could thus be closely associated with autonomous reasons for pursuits, as well as their benefits on goal progress and emotional well-being. From this perspective it would be unlikely for an individual to be high in one construct without also being high in the other, and a strong correlation would be expected between autonomous motivation and perceived control.

Different from the latter possibility, theorists in the domain of motivation have argued that these constructs are conceptually distinct (Connell and Wellborn 1991 ; DeCharms 1981 ; Deci and Ryan 1985 ; Dweck and Leggett 1988 ; Harter 1981 ; Nicholls 1984 ; Patrick et al. 1993 ; Skinner 1996). In fact, individuals with varying

levels of autonomous motivation could perceive either high or low levels of control, and vice versa (Patrick et al. 1993). Thus, high perceptions of control could influence emotional wellbeing by increasing the likelihood that the pursuits of autonomously motivated individuals are regulated successfully. Moreover, high levels of global perceived control could be necessary for attaining goals, and without it, autonomous motivation may not strongly predict adaptive behavioral and emotional outcomes.

From this perspective, it is possible that individuals who have high levels of autonomous motivation towards their life goals, but perceive a lack of the control necessary to achieve their goals, may not take steps towards their goals in the same way as individuals with equally high levels of autonomous motivation and higher levels of perceived control. Indeed, they could at times fail in achieving their goals and the associated emotional response to this frustrating consequence of high autonomous motivation and low perceived control is likely to be relatively negative. Moreover, it is also possible that individuals low in autonomous motivation, but high in perceived control, would not enjoy the pursuit and achievement of goals as much or make relatively little progress towards them because they would not experience them as fulfilling. It might thus be that autonomously motivated individuals who perceive high levels of control make the most progress towards their goals and reap the associated emotional benefits.

We note, that self-determination theory would argue that a certain level of perceived control may be a necessary, but insufficient condition for experiencing high global autonomous motivation (Ryan and Deci 2000). That is, in the total absence of control perceptions, individuals would not feel motivated at all, but instead experience

helplessness. However, most individuals perceive some degree of control, which could allow disentangling control perceptions and autonomous motivation empirically. In addition, it has been argued that to be autonomously motivated, one must also feel volitionally involved in the pursuit of goals (Deci and Ryan 1985). As a consequence, it is also possible that global autonomous motivation and perceived control are partially independent constructs that interact synergistically in producing beneficial behavioral and emotional outcomes.

Empirical evidence for interactive effects of global autonomous motivation and global perceived control on adaptive behaviors and emotions is lacking. However, some studies have examined such interaction effects either on a domain-specific level (e.g., school, Patrick et al. 1993) or by measuring control-related constructs that could be affected by global perceptions of control (e.g., actual autonomy, O'Connor and Vallerand 1994 or implementation intentions, Koestner et al. 2002). Results from these studies are mixed. For example, Patrick et al. (1993) work did not confirm significant interactions between school-related control perceptions and autonomous motivation on school-age children's behavioral and emotional outcomes. By contrast, Koestner et al. (2002) demonstrated in two experimental studies of university students that goal self-concordance (a construct that is conceptually close to autonomous motivation and addresses the extent to which goals are close to a person's self) is a particularly strong predictor of goal progress when participants are instructed to develop intentions about how and when to implement their goals, which could increase feelings of control (for research on implementation intentions, see Gollwitzer 1999). Similarly, O'Connor and Vallerand (1994) showed in a cross-sectional study of older nursing home residents that

high levels of objective opportunities for freedom and choice were associated with increased positive effects of self-determined motivation on residents' psychological adjustment.

Although there may be a number of different reasons (e.g., using different methods or constructs), we think that these mixed findings could be associated with developmental factors. Considering that autonomous motivation represents regulations that are wholly integrated with one's identity (Deci and Ryan 2000), the development of a well-defined core self is key. Typically, the development of autonomy accelerates in adolescence and goals become more idiosyncratic, as self-reliance, decisionmaking, and identity are consolidated, and emotion, cognition and behavior are increasingly regulated (Zimmer-Gembeck and Collins 2003). In a similar vein, lifespan developmental theory suggests that biological and societal influences shape levels of control capacity across the life span with a steep increase in adolescence and young adulthood (Heckhausen et al. 2010). Thus, interactions between autonomous motivation and perceived control may be less likely to occur in childhood because a general sense of control and identity-related goals are not fully developed. By contrast, beginning in young adulthood, individuals can be expected to have developed a greater range of identity relevant activities, across different life domains, and individual differences in how close these activities are to a person's core self may be more reliable. Likewise, there may be higher levels and more reliable individual differences in adults' general sense of control as compared to their younger counterparts. As a consequence, interactions between perceived control and autonomous motivation may be more common in adult samples compared to children.

For these reasons, we argue that it is important to study young adults' global

sense of control across different areas of life, as well as their global motivation towards their pursuits. Such an approach may capture reliable individual differences in both the reasons why individuals pursue a variety of different goals and their general sense of control over achieving desired outcomes across different life domains. In addition, it may discover that individual differences in global perceived control and autonomous motivation become paramount in young adulthood and forecast progress towards attaining important life goals and ensuing levels of emotional well-being.

Present study. This study examined the association between global autonomous motivation, global perceived control, progress towards the most important life goal, and emotional well-being in a 6-month longitudinal study of young adults. We chose a six month study interval because it provides sufficient time for goal progress to emerge (e.g., finishing a semester or resolving a personal problem). We expected that baseline measures of perceived control and autonomous motivation would interact in predicting goal progress and associated improvements in emotional well-being over time. Among autonomously motivated participants, high levels of perceived control were expected to predict adaptive outcomes, while low levels of perceived control should reduce the benefits derived from autonomous motivation. We further hypothesized that participants who are not autonomously motivated would generally show lower levels of adaptive outcomes. To this end, we also expected that perceived control would exert less pronounced effects among participants who are not autonomously motivated, as goals that are not close to a person's core identity should be less likely to be actively pursued and attaining such goals may have weaker effects on increases in emotional well-being. Finally, we hypothesized that goal progress would statistically mediate the hypothesized

interaction effects of global autonomous motivation and perceived control in predicting emotional well-being. We also examined the effects of controlled motivation. However, because we did not formulate a priori hypotheses about controlled motivation (see introduction), we only explored in our analyses whether controlled motivation would also interact with levels of perceived control in predicting the study's outcome variables.

Method

Participants and Procedure

The study included 162 young adult students who were recruited at Concordia University throughout the fall semester from the end of August to the beginning of November. A table was set up on campus and undergraduate students walking by were asked to participate in the study. Participants had to be between 18 and 35 years old (M = 22.98, SD = 3.43). They were invited to the laboratory and asked to respond to a questionnaire. Approximately six months later (M = 5.90, SD = .76), participants were contacted again and sent an additional questionnaire by mail. For each assessment, they were compensated for their time with $10. One hundred and twenty-five students (77 %) participated in the follow-up and were included in the analyses. Of these 125 participants, 56.8 % were female (n = 71). Study attrition was not significantly associated with baseline measures of any of the variables used in this study. The project was approved by the Human Research Ethics Committee at Concordia University (Montréal, Canada), and informed written consent was obtained from all participants.

Measures

Emotional well- being was assessed at baseline and follow-up with the *Positive*

and Negative Affect Schedule (Watson et al. 1988). This scale consists of 10 items measuring positive affect (e.g., interested, excited, or proud) and 10 items assessing negative affect (e.g., distressed, irritable, or afraid). At baseline, participants indicated the extent to which they experienced the 20 emotions over the past year, using 5-point Likert-type scales (endpoints: 1 = *very slightly or not at all*, 5 = *extremely*). At follow-up, participants responded to the same items with respect to their emotional experiences over the past few months. For baseline and follow-up, we computed mean scores of the 10 positive (M_{T1} = 3.66, SD_{T1} = .71, α_{T1} = .87; M_{T2} = 3.51, SD_{T2} = .71, α_{T2} = .88) and the 10 negative emotions (M_{T1} = 2.48, SD_{T1} = .77, α_{T1} = .87; M_{T2} = 2.25, SD_{T2} = .69, α_{T2} = .86). Consistent with past research (Watson et al. 1988), positive and negative affect was either uncorrelated (T1) or showed only a weak negative correlation in our study (T2, see Table 1). Levels of positive affect, $t(124) = -2.86$, $p < .01$, and levels of negative affect, $t(124) = -3.89$, $p < .01$, declined significantly across time.

Goal progress. At baseline, participants were asked to write down up to 10 life goals and to select one goal that they considered to be their most important goal. This approach was chosen because self-identified goals incorporate both ideographic and nomothetic aspects and take into account that goal importance is strongly associated with subjective well-being (Emmons 1986). The baseline measure also asked participants to report how close they were to achieving their most important goal (5-point Likert- type scale; endpoints: 1 = *very far*, 5 = *completed goal*, M = 2.30, SD = .86). At follow-up, participants were reminded of the goal they had deemed ‘‘most important’’ at baseline and asked whether they made any progress towards achieving this goal over the past few

months. Goal progress was assessed using a 5-point Likert type scale (endpoints: 1 = *no progress*, 5 = *much progress*; $M = 3.90$, $SD = 1.17$).

Global perceived control was measured at baseline by administering the *Self-Mastery* scale (Pearlin and Schooler 1978); a construct that has been discussed in the literature as synonymous with perceived control (Jacelon 2007). Participants were asked to respond to seven items with respect to how much control they feel over their lives. Sample items included ‘‘I can do just about anything I really set my mind to do.’’ or ‘‘I have little control over the things that happen to me.’’ Participants responded to the items by using 4-point Likert-type scales (endpoints: 1 = *strongly disagree*, 4 = *strongly agree*). Negatively formulated items were reverse coded and we computed a mean score of the seven items ($M = 3.16$, $SD = .48$, $\alpha = .77$).

Global autonomous motivation and controlled motivation were measured as separate constructs at baseline with 16 items from the *Global Motivation Scale* (GMS; Guay et al. 2003).[1] Participants were instructed to indicate the extent to which different items generally correspond to the reasons why they do different things in their lives, using 7-point Likert-type scales (endpoints: 1 = *does not correspond accordingly* , 7 = *corresponds completely*). Autonomous motivation was assessed by administering four items that measured intrinsic motivation towards accomplishments (e.g., ‘‘**…** because of the satisfaction I feel in trying to excel in what I do’’ or ‘‘**…** for the pleasure I feel mastering what I am doing’’), and four items that measured identified motivation (e.g., ‘‘**…** because I chose them as means to attain my objectives’’ or ‘‘**…** because I chose

[1] We note that previous research (Guay et al. 2003) calculated difference scores between autonomous and controlled motivation. However, since research has established the independence of both dimensions, creating such an index is no longer the norm in SDT literature (Edwards 2001; Stephan et al. 2008).

them in order to attain what I desire'').[2] Controlled motivation was assessed with four items that measured introjected motivation (e.g.,''**…** because I would beat myself up for not doing them'' or ''**…** because otherwise I would feel guilty for not doing them'') and four items that measured external motivation (e.g.,''**…** because I do not want to disappoint certain people'' or ''**…** because I want to be viewed more positively by certain people''). We computed a mean score of the 8 items addressing intrinsic and identified motivation to obtain a global measure of autonomous motivation (M = 5.59, SD = 1.01, α = .90), and a mean score of the eight items referring to introjected and external motivation to obtain a measure of controlled motivation (M = 4.28, SD = 1.07, α = .79).

Covariates. To minimize the presence of spurious associations, we evaluated the study's hypotheses in the context of controlling for participants' sex, age, goal domain, and baseline levels of closeness to goal attainment (see earlier description for the operationalization of goal closeness). Age and sex was assessed at baseline through self-reports. Indicators of goal domain were obtained by coding participants' most important goals according to major life domains. Within the sample, 44.8 % selected an education/career goal, 24 % a relationship goal, 13.6 % a personal self-improvement goal, 8.8 % a health goal, and the remaining 8.8 %were other types of goals. Four dummy variables were created as covariates, contrasting participants who reported a goal in one of the first four domains with all other participants.

Results

The results are presented in four sections. First, we report zero-order correlations.

[2] Other items on this scale measuring intrinsic motivation towards sensation and knowledge were excluded from our analysis as they were not related to goal pursuits.

Second, we examine the associations between baseline measures of global perceived control and autonomous motivation with changes in emotional well-being. Third, we investigate whether perceived control and motivation predict goal progress. Finally, we examine whether goal progress would statistically mediate the interaction effects of perceived control and autonomous motivation on changes in emotional well-being.

Zero-Order Correlations

Table 1 presents the zero-order correlations between the main constructs. Perceived control was moderately and positively correlated with autonomous motivation and moderately and negatively correlated with controlled motivation. In addition, baseline levels of perceived control were positively associated with higher levels of positive affect and lower levels of negative affect at baseline and follow-up. Perceived control was also associated with higher levels of goal progress at follow-up. Autonomous motivation was positively associated with higher baseline and follow-up levels of positive affect, and controlled motivation was positively correlated with higher levels of negative affect at baseline and follow-up.

Table 1

Zero-Order Correlations Between Main Constructs

	1	2	3	4	5	6	7
1. Perceived control (baseline)							
2. Autonomous motivation (baseline)	.37**						
3. Controlled motivation (baseline)	-.32**	.10					
4. Positive affect (baseline)	.53**	.49**	-.14				
5. Positive affect (6-month)	.57**	.41**	-.12	.69**			
6. Negative affect (baseline)	-.38**	-.03	.44**	-.12	-.14		
7. Negative affect (6-month)	-.31**	-.02	.42**	-.09	-.29**	.60**	
8. Goal progress (6-month)	.25**	.10	-.01	.20*	.40**	-.05	-.17

** $p < .01$; * $p < .05$.

Autonomous Motivation, Perceived Control, and Emotional Well-being

We examined the hypothesis that the interaction between global perceived control and global autonomous motivation is associated with changes in emotional well-being by conducting two separate regression analyses, which predicted follow-up levels of positive affect and negative affect. To operationalize an analysis of change in emotional well-being, we entered in the first step of the analyses the baseline levels of both positive and negative affect, in addition to the main effects of baseline levels of perceived control,

autonomous motivation, and controlled motivation.[3] We also controlled the main effects for participants' sex, age, goal domain, and baseline closeness to goal achievement. The second step of the analyses tested in separate analyses the interaction terms between perceived control and autonomous motivation, and between perceived control and controlled motivation, for significance. Predictor variables were standardized before conducting the regression analyses.

The results of the analyses are presented in Table 2. The first step of the analyses showed that baseline levels of positive affect were significantly associated with follow-up levels of positive affect, $F(1, 112) = 37.37$, $p < .01$, and baseline levels of negative affect were significantly associated with follow-up levels of negative affect, $F(1, 112) = 37.10$, $p < .01$. Sex, age, goal domain, and closeness to achieving the most important goal did not predict changes in positive affect or negative affect. The main effect of perceived control significantly predicted increases in positive affect, $F(1, 112) = 12.73$, $p < .01$. Perceived control was not associated with changes in negative affect, and autonomous motivation or controlled motivation did not predict changes in any of the emotional outcomes. In support of our hypotheses, the second step of the analyses demonstrated significant interaction effects between perceived control and autonomous motivation in predicting changes in positive affect, $F(1, 111) = 4.76$, $p = .03$, and negative affect, $F(1, 111) = 5.08$, $p = .03$. The analysis did not show significant interaction effects between perceived control and controlled motivation in predicting emotional well-being outcomes

[3] We included baseline levels of both positive and negative affect into the analyses because we attempted to document independent effects. We note that the obtained interaction effects on follow-up levels of positive and negative affect were also significant if the outcomes were controlled only for the matching baseline affect.

in the second step.[4]

Table 2

Regression Analyses Examining Effects of Perceived Control and Autonomous Motivation on 6-Month Changes in Emotional Well-Being

	6-Month positive affect		6-Month negative affect	
	R^2	β	R^2	β
Baseline main effects				
Positive affect	.14**	.51**	.00	-.01
Negative affect	.00	.04	.19**	.54**
Perceived control (PC)	.05**	.30**	.00	-.05
Autonomous motivation (AM)	.00	.06	.00	.00
Controlled motivation (CM)	.00	.04	.01	.14
Interaction				
AM X PC	.02*	.15*	.03*	-.18*
CM X PC	.00	-.02	.00	-.05

Note. Effects were controlled for baseline closeness to goal attainment, goal domain, age, and sex. R^2s represent the amount of variance explained in each step of the analyses.

** $p < .01$; * $p < .05$.

[4] Note that additionally conducted analyses showed that there were no significant three way interactions, including motivation, control, and gender in predicting either emotional well-being or goal progress, all ***F***s(1, 115) < 0.08, all ***p***s > .78.

The significant interaction effects are illustrated in Figure 1. We plotted the associations between baseline levels of perceived control and changes in positive affect (upper panel) and negative affect (lower panel), separately for participants who scored one standard deviation above and below the mean of autonomous motivation. The pattern of results indicated that particularly large increases in positive affect, and particularly large declines in negative affect, were obtained among participants who were autonomously motivated *and* perceived high levels of control. By contrast, highly autonomously motivated participants who perceived low levels of control experienced much smaller increases in emotional well-being over time, similar to participants with generally low levels of autonomous motivation. Consistent with this interpretation, analyses of the simple slopes confirmed that perceived control predicted larger increases in positive affect, $\beta = .45$, $p < .01$, and declines in negative affect, $\beta = -.25$, $p = .07$, among participants who were autonomously motivated, as compared to their counterpart who were not autonomously motivated (positive affect: $\beta = .17$, $p = .10$; negative affect: $\beta = .10$, $p = .38$). Conversely, autonomous motivation was more strongly associated with improvements in emotional well-being among participants with high levels of perceived control (positive affect, $\beta = .26$, $p = .03$, negative affect, $\beta = -.24$, $p = .09$), as compared to low levels of perceived control (positive affect: $\beta = -.02$, $p = .86$; negative affect: $\beta = .09$, $p = .36$).

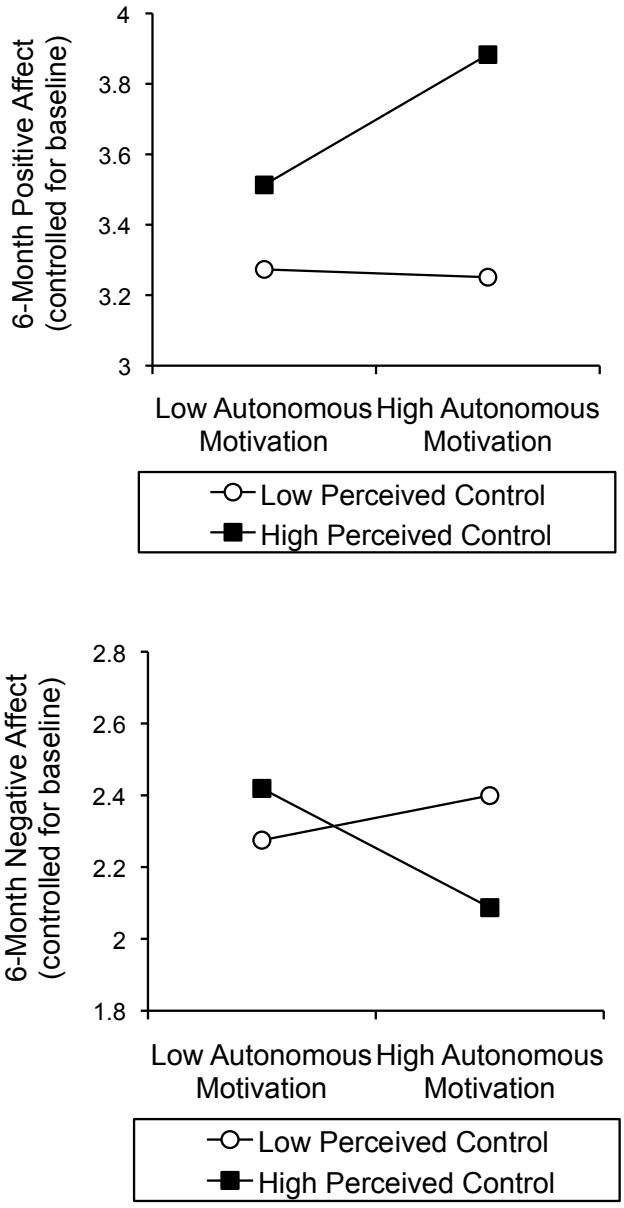

Figure 1. Associations between baseline levels of perceived control and 6-month changes in positive affect (upper panel) and negative affect (lower panel), separately for participants with low versus high baseline autonomous motivation. Effects are presented one standard deviation above and below the sample mean of the predictor variables.

Autonomous Motivation, Perceived Control, and Goal Progress

Next, we examined whether we would obtain a similar pattern of results by examining the effects of global perceived control and global autonomous motivation on participants' amount of progress towards attaining their most important current life goal. To this end we conducted a regression analysis predicting follow-up levels of participants' goal progress as the dependent variable. In the first step of the analysis, we incorporated baseline measures of perceived control, autonomous motivation, and controlled motivation, followed in the second step by the interaction terms between perceived control and autonomous motivation, and between perceived control and controlled motivations. The analysis additionally controlled for participants' sex, age, goal domain, and baseline closeness to goal attainment.

The results of the analyses are reported in Table 3. Sex and age were not significantly associated with amount of goal progress. One goal domain, education/career goals, was significantly associated with higher levels of goal progress, $F(1, 114) = 1.92$, $\beta = .38$, $R^2 = .05$, $p < .05$. As well, baseline levels of closeness to goal attainment were associated with more goal progress at follow-up, $F(1, 114) = 17.48$, $\beta = .35$, $R^2 = .12$, $p < .01$. The main effects of perceived control, autonomous motivation, and controlled motivation were not associated with participants' goal progress. In the second step of the analyses, the interaction effect between perceived control and autonomous motivation significantly predicted amount of goal progress, $F(1, 113) = 4.14$, $p < .05$. Controlled motivation did not significantly interact with perceived control in predicting goal progress.

Table 3

Regression Analysis Examining Effects of Perceived Control and Autonomous Motivation on 6-Month Goal Progress

	6-Month goal progress	
	R^2	β
Baseline main effects		
Perceived control (PC)	.02	.17
Autonomous motivation (AM)	.00	-.01
Controlled motivation (CM)	.01	.13
Interaction		
AM X PC	.03*	.18*
CM X PC	.01	-.08

Note. Effects were controlled for baseline closeness to goal attainment, goal domain, age, and sex. R^2s represent the amount of variance explained in each step of the analysis.
** $p < .01$; * $p < .05$.

We illustrated the significant interaction effect in Figure 2 by plotting the associations between baseline levels of perceived control and follow-up levels of goal progress, separately for participants who scored one standard deviation above and below the mean of autonomous motivation. Similar to the effects for predicting emotional well-being, Figure 2 shows that participants who perceived high levels of control and were

autonomously motivated reported the largest amount of progress towards attaining their most important goal. By contrast, autonomously motivated participants who perceived low levels of control reported less goal progress, similar to participants with generally low levels of autonomous motivation. In support of this interpretation, simple slope analyses demonstrated that perceived control was more strongly associated with goal progress among participants who were autonomously motivated, $\beta = .38$, $p < .01$, as compared to participants with low levels of autonomous motivation, $\beta = .03$, $p = .83$. Conversely, autonomous motivation was more strongly associated with goal progress among participants who perceived high of control, $\beta = .23$, $p = .15$, as compared to their counterparts who perceived low levels of control, $\beta = -.12$, $p = .29$.

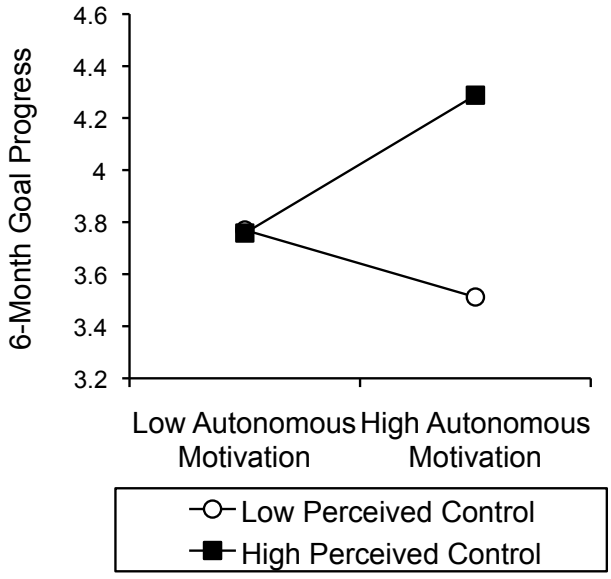

Figure 2. Associations between baseline levels of perceived control and 6-month levels of goal progress, separately for participants with low versus high autonomous motivation. Effects are presented one standard deviation above and below the sample mean of the predictor variables.

Mediation Pathways

We finally tested whether the interaction effects between perceived control and autonomous motivation on changes in positive and negative affect were statistically mediated by individual differences in goal progress. To this end, we repeated the previously reported regression analyses for predicting emotional well-being and included goal progress as potential mediator into the analyses (using the "indirect SPSS macro", Preacher and Hayes, 2008). According to Preacher and Hayes (2008), this approach indicates the presence of mediation if the predictor exerts a significant indirect effect on the outcome through the potential mediator. The analyses were based on 5000 bootstraps and indirect effects were evaluated as significant if the 95% bias-corrected confidence interval (BCI) of the indirect effect did not cross zero (Preacher and Hayes, 2008). Note that age, sex, goal domain, closeness to goal, controlled motivation, and baseline levels of positive and negative affect were included as covariates in the analysis.

The results of the mediation analyses are illustrated in Figure 3. Consistent with the above results, the interaction between autonomous motivation and perceived control significantly contributed to participants' amount of goal progress. In addition, Figure 3 documents that goal progress was associated with increases in positive affect, $\beta = .24$, $p < .01$, as well as declines in negative affect, $\beta = -.19$, $p < .05$. Moreover, Figure 3 shows that the significant interaction effects between autonomous motivation and perceived control on changes in positive affect and negative affect were rendered non-significant when goal progress was included into the analyses. Finally, the bootstrap analysis demonstrated that goal progress exerted significant indirect effects on the interaction between autonomous motivation and perceived control in predicting changes in positive

affect (95% BCI [.0071, .1062]) and negative affect (95% BCI [-.0932, -.0021]).

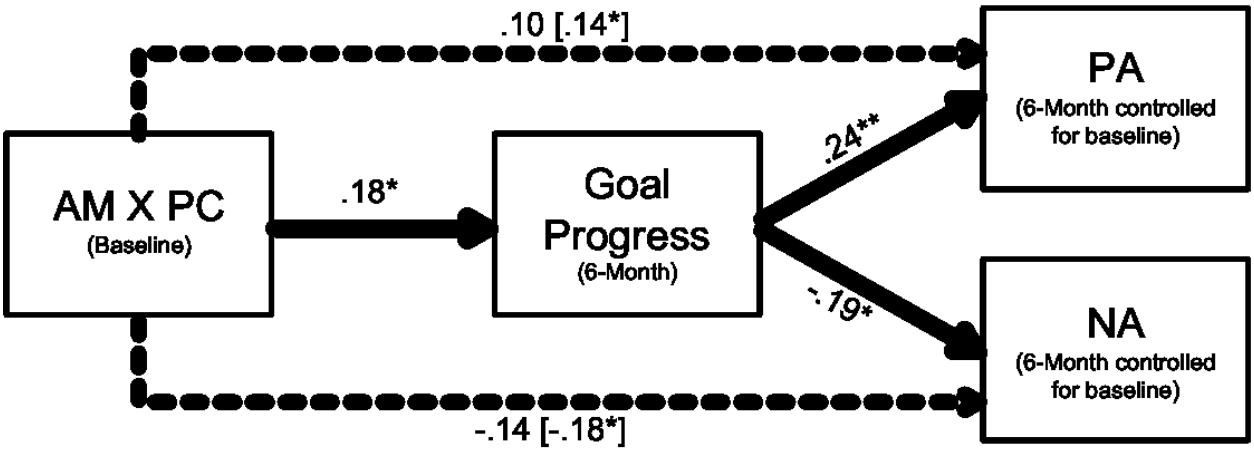

Figure 3. Mediation models examining the indirect effects of amount of goal progress on the associations between the interaction effects of perceived control (PC) and autonomous motivation (AM) on 6-month levels positive affect (PA) and negative affect (NA) controlled for baseline emotions. Values represent standardized regression coefficients. The coefficients in brackets represent the direct effects without incorporating the mediator. Solid lines indicate significant paths in the mediation analysis. Bootstrap analyses showed significant mediation effects for goal progress in predicting changes in positive affect and negative affect.

Discussion

The study's findings support the theoretical claim that global autonomous motivation and global perceived control are conceptually distinct constructs that are only moderately associated with one another (Connell and Wellborn 1991 ; DeCharms 1981 ; Deci and Ryan 1985 ; Dweck and Leggett 1988 ; Harter 1981 ; Nicholls 1984 ; Patrick et al. 1993 ; Skinner 1996). Furthermore, they demonstrate significant interaction effects

between baseline levels of global autonomous motivation and global perceived control on 6-month levels of progress towards the most important life goal and 6-month changes in positive and negative affect. More specifically, the highest levels of goal progress, and the largest improvements in emotional well-being, were observed among autonomously motivated participants who perceived high levels of control. By contrast, the benefits of high autonomous motivation were reduced among participants with low levels of perceived control. In addition, participants with generally low levels of autonomous motivation—independent of perceived control—showed relatively low levels of goal progress and fewer improvements in emotional well-being. Finally, mediational analyses demonstrated that the obtained interaction effects on changes in emotional wellbeing were statistically attributable to the amount of progress participants made towards their most important goal.

Note that this pattern of results was independent of participants' sex, age, and how close they were with respect to achieving their most important goal at study entry, as well as their levels of controlled motivation. In addition, controlled motivation did not interact with levels of perceived control in predicting participants' goal progress or their emotional well-being. However, controlled motivation was correlated with negative affect (but did not predict changes in negative affect), and closeness to goal attainment predicted more goal progress at follow-up. The adverse emotional association of controlled motivation is consistent with assumptions of self-determination theory, stating that controlled motivation can exert a negative influence on subjective well-being and is not associated with the same benefits as autonomous motivation (Deci and Ryan 2000). In addition, these findings suggest that individual differences in perceived control may

not matter if young adults pursue activities for controlled reasons. To provide an explanation for the latter conclusion, we suggest that individuals may be less likely to invest sufficient effort in the attainment of controlled goals, even if they perceive high levels of control. As a consequence, they may also not experience the emotional benefits associated with making progress towards the attainment of important life goals.

Overall, the study's findings have important implications for theory and research in the area of self-determination and control. First, they suggest that integrating different traditions in motivational psychology may contribute to a more comprehensive understanding of the determinants of adaptive goal striving and subjective wellbeing. Approaches that examine why individuals pursue goals (e.g., for autonomous reasons, Deci and Ryan 2000) may underestimate the consequences on adaptive goal striving and subjective well-being if they do not take into account individual differences in perceived control. By the same token, theories that focus on the impact of control (e.g., Skinner 1995 ; Heckhausen et al. 2010) may fall short if they do not address that individual differences in the reasons for goal pursuits contribute to adaptive goal striving and subjective well-being. Our findings support these conclusions by demonstrating that young adults with low levels of perceived control could have difficulty achieving autonomously motivated goals and reaping the emotional benefits of such goal attainments. By contrast, high levels of autonomous motivation and perceived control together can exert synergetic effects and foster adaptive goal striving and subjective well-being. Such qualifying effects of perceived control among autonomously motivated individuals may be observed because perceptions of control are important determinants of using effective control strategies (e.g., investing more effort or building

implementation intentions) and through this mechanism can influence goal progress and associated psychological outcomes (Heckhausen and Schulz 1995 ; Lang and Heckhausen 2001). Similarly, perceiving high levels of control over one's pursuits may be less beneficial when individuals do not also feel autonomously motivated towards their pursuits.

Furthermore, the current study contributes to reconciling inconsistent findings in the literature on domain specific interaction effects of autonomous motivation and control related constructs. While such effects have not been found in studies of school age children (Patrick et al. 1993), they have been shown in research on young and older adults (Koestner et al. 2002 O'Connor and Vallerand 1994). To address these mixed findings, we had suggested that developmental factors might play a role in identifying reliable interaction effects between autonomous motivation and perceived control on adaptive outcomes. In particular, adolescence-related increases in the development of individuals' core self and control capacity (Heckhausen et al. 2010 ; Zimmer-Gembeck and Collins 2003) may make it more likely that high levels of perceived control contribute in adulthood to the successful pursuit of goals that are closely related to a person's identity. Without an elaborated development of a core self; however, attaining relative autonomous goals may be less influential for an individual and the emotional effects of goal progress may be reduced. In a similar vein, higher levels of perceived control may be less effective for predicting goal progress and emotional outcomes, if individuals have not yet fully developed their control capacities.

Finally, the presented results extend research on goal-specific motivation and control in young adulthood (Koestner et al. 2002) by showing that interaction effects on

adaptive control striving and subjective well-being can also be observed with respect to individuals' global tendencies for motivation and control. From our perspective, these findings are important because global motivational factors can predict individual differences in goal-specific motivational states (Knee et al. 2005 ; Vallerand 1997) and thus may underlie some of the effects found in previous research. This possibility may further raise the question of whether it is more important to examine global or goal-specific autonomous motivation and control-related constructs. To this end, we suggest that both levels of motivational functioning are important (e.g., McAdams and Olson 2010) and including them simultaneously in research may shed more light on the interplay between global and specific motivation and their consequences on adaptive goal-striving and subjective well-being (Vallerand 1997).

Limitations and future direction

There are limitations to this study that need to be addressed in future research. First, the analyses were based on self-report measures, which implies that associations between variables could be inflated to some extent by common method variance. However, we note that our longitudinal analyses for predicting emotional well-being controlled for previous levels of affect, which is likely to partial out some of the potential biases associated with self-reports.

Second, our study measured amount of goal progress only at follow-up and did not include a baseline measure of goal progress. This implies that this portion of our study is based on longitudinal, but not prospective, data. In addition, it makes it possible that other variables (e.g., inflated view of self) could have influenced baseline motivation and perceived control as well as goal progress measured at follow-up. However, we note

that we controlled our analyses for individual differences in how close participants were with the attainment of their most important goal at baseline. Given that such reports of closeness to goal attainment may equally be biased by other variables, controlling for goal closeness may partial out some of the general biases associated with other potentially influencing variables. We therefore feel that this limitation is unlikely to compromise the interpretation of our findings.

Third, we note that the reported mediation analyses showed that follow-up levels of amount of goal progress exerted significant indirect effects on the interaction between autonomous motivation and perceived control in predicting 6-month changes in positive and negative affect. However, our analyses were not able to demonstrate that goal progress mediated subsequent changes in emotional well-being beyond this 6-month window. Although our hypotheses are consistent with motivational theories postulating that successful goal striving can benefit emotional well-being (Carver and Scheier 1998 ; Deci and Ryan 2000 ; Emmons 1986 ; Heckhausen et al. 2010 ; Higgins 1987), the reported analysis cannot rule out the possibility that improvements in emotional well-being could also have contributed to higher perceptions of goal progress. To address this alternative interpretation of the data, we suggest that future research should conduct more fine-grained studies to examine how goal striving influences changes in subjective well-being, and vice versa.

Fourth, our measure of goal progress was specific to participants' most important life goal. While this approach adds an important ideographic component to our analysis (Emmons 1986) because the participant is free to select a goal from whichever life domain is most important to him or her, our analysis did not consider individual

differences in the importance of participants' most important goals. Given that variability in goal importance could further contribute to the motivational and emotional consequences of autonomous motivation and perceived control, effects of goal importance should be examined in future research. In addition, our theoretical framework assumes that motivational tendencies can influence goal-related behaviors across a variety of different areas of life. Considering that autonomous motivation can facilitate progress with goals across a variety of domains (e.g., relationships, health, or leisure, Blais et al. 1990 ; Mata et al. 2009 ; Vallerand 2007), future research should further extend our analysis by examining potential synergistic effects on individuals' progress with respect to multiple goals from different domains. From our perspective, we would expect that such an approach is likely to explain a larger amount of variance in general indicators of emotional well-being.

Fifth, although our findings were independent of variation in goals across major life domains, there may be other important distinctions between different types of goals (e.g., mastery versus performance goals or agency versus communion goals, Bleidorn et al. 2010 ; Hulleman et al. 2010). While we would expect that other goal distinctions somewhat overlap with differences in major life domains, future research should assess a variety of differences between goals more explicitly and examine the roles of perceived control and autonomous motivation in the pursuit of these goals.

Sixth, our study only included measure of hedonic wellbeing (e.g., positive and negative affect). Thus, future studies may extend this approach and examine the interactive effects of global autonomous motivation and global perceived control on eudaimonic outcomes (Huta and Ryan 2010) to provide a more comprehensive picture of

the effects of motivation and control on well-being.

Finally, based on the inconsistent findings in the extant literature, we argued that developmental factors may make it particularly likely that interaction effects between autonomous motivation and perceived control emerge in young adulthood. While our findings were consistent with this assumption, our study did not include a comparison group of younger individuals (i.e., children or adolescents). As a consequence, we suggest that future research should conduct age-comparative longitudinal studies to substantiate the conclusions drawn from our study. To this end, it would also be important to examine middle-aged and older adults because certain control-related constructs become particularly adaptive in later stages of the life course (e.g., self-protective strategies and goal disengagement, Heckhausen et al. 2010), and may therefore interact with autonomous motivation among older adults (Vallerand et al. 1995 ; Stephan et al. 2008) in predicting adaptive outcomes. We feel that future research along these lines is warranted and likely to contribute to more comprehensive picture on how different reasons for goal pursuits work together with individuals' control capacity and result in life-long pathways of successful development.

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