Examining the role of approach-avoidance and autonomous-controlled motivation in predicting
goal progress over time

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Abstract

In the present research, we examined the role of approach-avoidance and autonomous-controlled motivation in predicting goal progress over time. At the beginning of the semester, participants ($n_1 = 240$; $n_2 = 159$) identified goals that they planned to pursue and reported their motivation. At the end of the semester, they indicated how much progress they made on each goal. Multilevel analyses confirmed our hypothesis that autonomous motivation was the most consistent predictor of goal progress, especially at the within-person level. That is, people made more progress on goals that were pursued for autonomous reasons compared to their other goals, whereas controlled, approach, and avoidance motivation were unrelated to goal progress. Across both studies, interactions between autonomous-controlled and approach-avoidance were inconsistent. Bayesian model comparison further substantiated our finding that autonomous motivation was the best predictor of goal progress.

Examining the role of approach-avoidance and autonomous-controlled motivation in predicting goal progress over time

Jen is pursuing the goal to lose 10 pounds. Despite this being a common goal held by many (Milyavskaya & Nadolny, 2017), the underlying motivation may vary from person to person. For example, Jen may be pursuing the goal to lose weight for health reasons, or because she feels pressured by society to be thin. In the first instance, she may be pursuing this goal because her health is personally important, and therefore losing weight is something that she genuinely wants to do. In the second, she is doing it because of external pressure (e.g., to be accepted by her peers), and therefore losing weight is something she feels she has to do to fit in. At the same time, Jen can also choose the direction of her goal by focusing on attaining positive outcomes (to have better health) or avoiding negative outcomes (to avoid getting fat). It is also possible that she is pursuing this goal for a combination of all these reasons, but how do these underlying reasons and the direction of her goal affect her progress? The purpose of the present research is to examine this question by integrating two popular perspectives on motivation – self-determination theory (Deci & Ryan, 2000) and approach-avoidance motivation (Elliot & Friedman, 2007).

Approach and Avoidance Motivation

The differentiation between approach and avoidance motivation is considered to be one of the most fundamental aspects of human behavior (e.g., Davidson, 1998; Elliot, Chirkov, Kim, & Sheldon, 2001; Elliot & Niesta, 2009). At its core, approach motivation is driven by an appetitive system resulting in a propensity toward positive stimuli (e.g., pleasure), whereas avoidance motivation is more aversive, resulting in behavior that is directed away from negative stimuli (e.g., pain) (see Elliot & Fryer, 2008; Elliot & Niesta, 2009). With regard to personal

goals, approach and avoidance motivation provides the direction (or valence) of a goal, such that an approach goal is pursued in order to attain desired end-states, whereas avoidance goals are directed toward avoiding undesired end-states: (Elliot et al., 2001; Elliot, Murayama, & Pekrun, 2011; Elliot, Sheldon, & Church, 1997).

The distinction between approach and avoidance motivation is important because the direction that our goals take play a fundamental role in the process of goal pursuit, which ultimately affects goal attainment. For example, people are more likely to engage in positive self-evaluations (Coats, Janoff-Bulman, & Alpert, 1996), demonstrate greater commitment (Schlier, Engel, Fladung, Fritzsche, & Lincoln, 2017), and have greater self-esteem (Heimpel, Elliot, & Wood, 2006) when pursuing approach goals compared to avoidance goals. Pursuing approach goals is also directly associated with greater attainment, whereas the pursuit of avoidance goals detracts from goal progress; this has been demonstrated across domains (e.g., education; Elliot, McGregor, & Gable, 1999; sports; Spray, John Wang, Biddle, & Chatzisarantis, 2006) and with personal goals more broadly (e.g. Elliot et al., 1997).

Autonomous and Controlled Motivation

Much like the approach-avoidance perspective, self-determination theory (Ryan & Deci, 2017) proposes that there are two qualitatively different types of motivation that influence goal attainment. These two types of motivation serve as the self-regulatory mechanisms that underlie goal pursuit, specifically the extent to which an individual pursues a goal for autonomous (*want-to*) or controlled (*have-to*) reasons (Deci, Eghrari, Patrick, & Leone, 1994; Koestner, Lekes, Powers, & Chicoine, 2002; Milyavskaya, Inzlicht, Hope, & Koestner, 2015; Ryan & Connell, 1989; Sheldon & Elliot, 1999).

Autonomous motivation refers to the extent to which a person pursues a goal with a sense

of volition – it is something that they genuinely *want* to do. This may include pursuing a goal because it is personally meaningful (*identified*), it is connected to an individual's broader life values (*integrated*), or simply because it is fun and enjoyable (*intrinsic*). For example, Jen may pursue the goal to lose weight because she wants to develop a healthier lifestyle that will enable her to spend time with her grandchildren. Conversely, controlled motivation refers to pursuing a goal out of obligation or pressure – it is something that the person feels that they *have* to do. This may include pursuing a goal to attain a separable outcome (e.g., money) or satisfying some external demand (e.g., a child trying to please his parents; *external*), and to avoid feeling guilty or ashamed (*introjected*). For example, Jen wanting to lose weight to fit in with her peers would be controlled because the goal is based on social acceptance. While past research consistently finds that autonomous motivation is associated with greater goal progress, the results for controlled motivation on goal progress are inconsistent across studies (Koestner et al., 2002; Milyavskaya et al., 2015).

An Integration of Two Theories

Given that autonomous-controlled and approach-avoidance motivation are both considered to be fundamental aspects of goal pursuit, it is not surprising that there have been some attempts at merging these two theories. While both perspectives focus on two contrasting types of motivation, approach-avoidance refers to the aim or direction of our goals, whereas autonomous-controlled motivation represent the underlying reasons. In other words, approach and avoidance motivation seek to address the “where¹” of goal pursuit, whereas self-determination theory addresses the “why.” The attempts at merging these two theories, however,

¹ Vansteenkiste et al. (2014) label approach and avoidance aims as the “what” of achievement goals; however, given that “what” refers to specific goal types in self-determination theory (i.e., intrinsic and extrinsic goal content; Deci & Ryan, 2000), here we chose the term “where” to coincide with the notion of directionality.

have all occurred within the achievement literature (i.e., looking at the underlying reasons for pursuing performance-approach or performance-avoidance goals). For example, in the context of education, Vansteenkiste, Smeets, and colleagues (2010) found that the underlying autonomous and controlled reasons, but not the strength of the performance-approach aim, significantly predicted positive (e.g., engagement, positive processing) and negative (e.g., cheating) behaviors, respectively. Similarly, Vansteenkiste, Mouratidis, and Lens (2010) found that pursuing performance-approach goals for controlled reasons was associated with more aggressive behavior among soccer players, whereas the strength of the approach aim was unrelated to such behaviors. While there has been some evidence to suggest that both reasons and aims uniquely contribute to domain-specific outcomes (e.g., Benita, Roth, & Deci, 2014), the unique contribution of achievement aims were often minimal (e.g., Michou, Vansteenkiste, Mouratidis, & Lens, 2014) or were only qualified by the underlying reasons (e.g., Gaudreau, 2012).

The literature thus far seems to suggest that the underlying reasons may play a more fundamental role in goal pursuit than the aims. However, there are several limitations to the previous studies, which preclude us from drawing such conclusions just yet. For instance, recent research tends to place an over-emphasis on performance goals (rather than personal goals more broadly), not all types of motivation were always assessed (e.g., focusing only on performance-approach; Vansteenkiste et al, 2010), the measures used for approach and avoidance motivation are often confounded by other constructs (e.g., Benita et al., 2014), and most importantly, there is very little research actually assessing goal progress over time. This leads us to the present research, where our goal was to provide a more comprehensive attempt at integrating approach-avoidance and autonomous-controlled motivation to predict goal progress.

The Present Research

The purpose of the present research was to increase our understanding of the process of goal pursuit by combining two popular accounts of motivation. Specifically, we examined the ways in which both approach-avoidance and autonomous-controlled motivation influence goal attainment. One of the more prominent limitations in this line of research is that the predominant method has been cross-sectional. While such studies provide a snapshot of the behavioral outcomes associated with different types of motivation at the domain-specific level, goal pursuit is not a stagnant process and so longitudinal methods are required in order to examine progress. Further, it is important to consider that both types of motivation have been exclusively examined at the between-person level, treating motivation as an individual difference (i.e., some people are more approach oriented across all their goals, while others are more avoidance oriented). However, recent research has consistently shown that over 75% of the variation in goal progress occurs at the within-person level (Milyavskaya et al., 2015; Werner, Milyavskaya, Foxen-Craft, & Koestner, 2016; Hope, Milyavskaya, Holding & Koestner, 2016). To address these issues, herein we provide two studies that incorporate a multi-level longitudinal design that examines motivation and goal progress at both the between (i.e., comparing motivation and goal progress between different people) and within (i.e., comparing motivation and goal progress among an individuals' own set of goals) person levels.

Based on the existing literature thus far, we hypothesized that when reasons and aims are all taken into account, only autonomous motivation would predict goal progress. Because we were also interested in attempting to integrate these two motivational perspectives, we took an exploratory approach to see how the various combinations of motivation may interact with each other in predicting actual goal progress. Having two studies with a similar design allows us to

provide a replication of the key test of our hypotheses, and also to allow us to confirm any exploratory results found in Study 1.

Statement of Transparency

The data used in Study 1 and Study 2 were initially collected as part of larger (but independent) longitudinal studies on goal pursuit. The data set that served as Study 1 and Study 2 was chosen at random prior to all analyses. In both studies, we aimed to recruit at least 150 participants (consistent with past studies) in the first month of the Fall semester, and stopped recruiting new participants once September ended. While no power analyses were conducted, the large sample size and within-person analyses should bolster available power. All hypotheses and exploratory questions, as well as a draft of the analytical strategy for this particular manuscript were posted on the Open Science Framework (OSF) prior to data analysis. All study materials, syntax, statistical output, and amendments documenting any changes pertaining to these studies are also available. Project link:

https://osf.io/s7epc/?view_only=950492aba9114644b3f1c2543220f265

Study 1: Exploratory

Method

Participants and Procedure

Participants were 240 undergraduate students (72% female, $M_{\text{age}} = 20.2$) who took part in a year-long study on goal pursuit. At the beginning of each term, participants were asked to identify three goals they planned to pursue, and subsequently rated their motivation for pursuing them. Progress for each goal was assessed at the end of the term. For the purposes of the present study, we focused on the second semester goals, as this was the only time when all motivation

constructs were assessed simultaneously. Finally, 35 cases were excluded for missing values on all variables, resulting in a final sample of 205 participants and 615 goals.

Measures

Goal Descriptions. At the beginning of the semester, participants were asked to list three personal goals that they planned to pursue during the term. Examples of goals listed by participants include “get a good GPA,” “volunteer in the community,” “go to the gym 3x a week,” and “improve my French.”

Autonomous-Controlled Motivation. In accordance with self-determination theory, participants were asked to rate the extent to which they were pursuing each goal for extrinsic, introjected, identified, integrated, and intrinsic reasons. As with previous longitudinal research (e.g., Koestner et al., 2008; Milyavskaya et al., 2015; Sheldon & Elliot, 1998), each type of motivation was assessed using a single item, but was combined to create autonomous (intrinsic, integrated, identified) and controlled (extrinsic, introjected) subscales. Responses were made using a seven-point Likert scale ranging from 1 (*not at all for this reason*) to 7 (*completely for this reason*).

Approach-Avoidance Motivation. Participants were asked to rate the extent to which they pursued each goal with an emphasis on approach (i.e., *to get closer to something you want*) or avoidance (i.e., *to avoid negative consequences of not pursuing this goal*) motivation. These face valid items directly correspond to moving toward desired end states (approach) and avoiding undesirable end states (avoidance). Past work has also been successful in using single item assessments of approach and avoidance motivation (e.g., as part of the striving assessment scale; Moffitt & Singer, 1994), although we conducted an additional study to further validate these items (see OSF).

Goal Progress. Consistent with previous research (e.g., Koestner, Lekes, Powers, & Chicoine, 2002), goal progress was assessed at the final follow-up using three items for each goal: “I have made a lot of progress toward this goal”, “I feel like I am on track with my goal plan”, and “I feel like I have achieved this goal.” All ratings were made on a seven-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

Analytic Strategy

We conducted multilevel SEM analyses (Preacher, Zyphur, & Zhang, 2010) using Mplus version 7.4 with goals nested within person. Full information maximum likelihood (FIML) approach was used to deal with missing data (Enders & Bandalos, 2001), all effects were modeled as fixed, and all variables were grand mean centered. In order to compare the effects across both studies, all results are reported from the STDYX standardization procedure². To test our hypothesis, we first examined a two-level (i.e., between and within-person) main effects-only model including autonomous, controlled, approach, and avoidance motivation. For our exploratory analyses, we modeled a series of interactions between autonomous-controlled and approach-avoidance motivation (i.e., autonomous-approach, autonomous-avoidance, controlled-approach, controlled-avoidance) predicting goal progress at both the between and within-person levels. In order to determine the unique contribution of each motivation type, in both models we controlled for the correlations among all independent variables.

² For the interaction models, we also looked at the unstandardized results for greater interpretability. However, the pattern of results was exactly the same and so we provide the standardized version here for consistency.

Results

Preliminary Results

Table 1 includes the means, variances, and intraclass correlations (ICCs) of all study variables. Results suggest that 60-75% of the variance in motivation and 90% of the variance in goal progress was between goals (within-person). Table 2 presents the correlations among all independent variables at both the within and between-person levels.

Table 1.
Descriptive Statistics for All Variables in Studies 1 and 2.

	Study 1			Study 2		
	Mean	SD	ICC	Mean	SD	ICC
Autonomous	5.32	1.24	.27	5.64	1.20	.26
Controlled	3.99	1.60	.40	3.60	1.77	.47
Approach	5.58	1.58	.25	5.48	1.50	.17
Avoidance	5.10	1.89	.26	4.50	2.06	.34
Goal Progress	4.27	1.75	.10	4.26	1.54	.08

Note. All variables were measured using a 7-point Likert scale.

Hypothesis Testing

To test our hypothesis, we first examined whether autonomous, controlled, approach, and avoidance motivation independently predicted goal progress. As presented in Table 3, results from the main effects model indicate that autonomous motivation was the only significant predictor of goal progress at both the within ($b = 0.21$, $SE = 0.05$, $p < .001$, 95% CI [.10, .31]) and between-person ($b = 0.73$, $SE = 0.30$, $p = .014$, 95% CI [.15, 1.31]) levels. Controlled, approach, and avoidance motivation were not significantly associated with goal progress at the end of the semester (see Table 3).

Table 2.

Between and within-person correlation matrices for all independent variables in Studies 1 and 2.

	1	2	3	4
<i>Within</i>				
1. Autonomous	--			
2. Controlled	-0.37 [-.45, -.28] / -0.39 [-.48, -.31]	--		
3. Approach	-0.04 [-.14, .06] / 0.01 [-.09, .11]	0.30 [.21, .38] / 0.21 [.11, .31]	--	
4. Avoidance	-0.37 [-.46, -.29] / -0.30 [-.39, -.21]	0.46 [.38, .53] / 0.43 [.35, .51]	0.32 [.24, .41] / 0.20 [.10, .30]	--
<i>Between</i>				
1. Autonomous	--			
2. Controlled	0.03 [-.21, .28] / -0.06 [-.33, .21]	--		
3. Approach	0.52 [.25, .79] / 0.75 [.45, 1.05]	0.16 [-.08, .41] / -0.06 [-.37, .25]	--	
4. Avoidance	0.31 [.01, .62] / 0.14 [-.16, .44]	0.45 [.25, .64] / 0.48 [.29, .67]	0.50 [.27, .74] / 0.40 [.11, .69]	--

Note. For ease of comparison, correlations are presented as Study 1 / Study 2 with confidence intervals (from the standardized covariance matrix; see Mplus output on OSF for more details) in brackets. Bold correlations are significant at $p < .05$ or less.

Table 3.

Multi-level main effects model predicting goal progress in Study 1 and Study 2.

	Study 1 (n = 615)					Study 2 (n = 499)				
	Effect	SE	Est/SE	p-value	95% CI	Effect	SE	Est/SE	p-value	95% CI
<i>Within-person</i>										
Autonomous	0.21	0.05	3.776	<.001	[.10, .31]	0.31	0.06	5.217	<.001	[.19, .43]
Controlled	-0.04	0.06	-0.638	.523	[-.15, .08]	-0.02	0.06	-0.313	.754	[-.15, .11]
Approach	-0.01	0.05	-0.116	.908	[-.11, .10]	0.01	0.06	0.237	.813	[-.10, .13]
Avoidance	0.07	0.06	1.223	.221	[-.04, .19]	0.08	0.06	1.379	.168	[-.04, .20]
<i>Between-person</i>										
Autonomous	<i>0.73</i>	<i>0.30</i>	<i>2.452</i>	<i>.014</i>	<i>[.15, 1.31]</i>	-0.09	0.82	-0.108	.914	[-1.69, 1.51]
Controlled	-0.09	0.21	-0.455	.649	[-.50, .31]	<i>0.82</i>	<i>0.41</i>	<i>1.992</i>	<i>.046</i>	<i>[.01, 1.62]</i>
Approach	-0.47	0.33	-1.425	.154	[-1.12, .18]	0.25	0.98	0.259	.796	[-1.67, 2.18]
Avoidance	0.09	0.31	0.300	.765	[-.52, .71]	-0.32	0.51	-0.62	.535	[-1.32, .68]

Note. Results are standardized using the STDYX procedure in Mplus. Effects that are consistently significant in both studies are in bold and those that are significant in only one study are italicized. n = the number of goals used in the analysis.

Post-Hoc Analyses

Next, we modeled the exploratory interactions between autonomous-controlled and approach-avoidance motivation at both the within and between-person levels (see Tables 4 and 5, respectively). As illustrated in Figure 2, results from the within-person analyses indicate a significant interaction between approach and controlled motivation ($b = -0.17$, $SE = 0.06$, $p = .005$, 95% CI $[-.29, -.05]$). Results from the between-person analyses did not yield any significant interactions (see Table 5). In these analyses, autonomous motivation emerged as the only significant main effect on goal progress at both the within ($b = 0.20$, $SE = 0.06$, $p = .001$, 95% CI $[.09, .31]$) and between-person ($b = 0.69$, $SE = 0.31$, $p = .028$, 95% CI $[.08, 1.30]$) levels.

Figure 1. Simple slopes for the significant interactions between reasons (autonomous, controlled) and aims (approach-avoidance) predicting goal progress in Study 1 and Study 2.

Table 4.

Within-person interaction model predicting goal progress in Study 1 and Study 2.

	Study 1 (n = 585)					Study 2 (n = 488)				
	Effect	SE	Est/SE	p-value	95% CI	Effect	SE	Est/SE	p-value	95% CI
Autonomous	0.20	0.06	3.456	.001	[.09, .31]	0.30	0.06	5.108	<.001	[.19, .42]
Controlled	-0.04	0.06	-0.718	.473	[-.16, .07]	-0.01	0.06	-0.130	.897	[-.13, .12]
Approach	-0.05	0.06	-0.834	.404	[-.16, .06]	0.02	0.06	0.372	.710	[-.09, .14]
Avoidance	0.07	0.07	1.054	.292	[-.06, .20]	0.04	0.06	0.652	.514	[-.08, .17]
Autonomous x Approach	-0.10	0.06	-1.760	.078	[-.21, .01]	-0.06	0.06	-0.968	.333	[-.18, .06]
Autonomous x Avoid	0.03	0.06	0.429	.668	[-.09, .15]	<i>-0.15</i>	<i>0.06</i>	<i>-2.606</i>	<i>.009</i>	<i>[-.26, -.04]</i>
Controlled x Approach	<i>-0.17</i>	<i>0.06</i>	<i>-2.839</i>	<i>.005</i>	<i>[-.29, -.05]</i>	-0.01	0.07	-0.097	.923	[-.13, .12]
Controlled x Avoid	0.02	0.06	0.311	.756	[-.10, .14]	<i>-0.14</i>	<i>0.06</i>	<i>-2.273</i>	<i>.023</i>	<i>[-.26, -.02]</i>

Note. Results that are consistently significant in both studies are in bold. Significant results in only one study are italicized. n = the number of goals used in the analysis.

Table 5.
Between-person interaction model predicting goal progress in Study 1 and Study 2.

	Study 1 (n = 585)					Study 2 (n = 488)				
	Effect	SE	Est/SE	p-value	95% CI	Effect	SE	Est/SE	p-value	95% CI
Autonomous	<i>0.69</i>	<i>0.31</i>	<i>2.199</i>	<i>.028</i>	<i>[-.08, 1.30]</i>	-0.07	0.68	-0.108	.914	[-1.10, .98]
Controlled	-0.07	0.21	-0.31	.759	[-.48, .35]	<i>0.74</i>	<i>0.35</i>	<i>2.112</i>	<i>.035</i>	<i>[-.03, .56]</i>
Approach	-0.35	0.35	-0.99	.322	[-1.04, .34]	0.21	0.83	0.247	.805	[-1.09, 1.40]
Avoidance	-0.00	0.36	-0.01	.995	[-.71, .70]	-0.20	0.49	-0.411	.681	[-.45, .29]
Autonomous x Approach	-0.02	0.97	-0.02	.984	[-1.93, 1.89]	0.97	1.75	0.557	.578	[-3.32, 6.02]
Autonomous x Avoid	0.04	1.15	0.031	.975	[-2.22, 2.29]	-1.30	2.66	-0.489	.625	[-4.08, 2.44]
Controlled x Approach	0.33	0.63	0.529	.597	[-.90, 1.56]	0.80	1.95	0.410	.682	[-1.63, 2.50]
Controlled x Avoid	-0.18	0.61	-0.301	.763	[-1.37, 1.00]	-0.91	1.94	-0.471	.637	[-1.27, .77]

Note. Results that are consistently significant in both studies are in bold. Significant results in only one study are italicized. n = the number of goals used in the analysis.

Brief Discussion

The results of the current study confirmed our pre-registered hypothesis, such that autonomous motivation was the sole predictor of goal progress over time, whereas controlled, approach, and avoidance motivation were unrelated to goal progress. These findings suggest that pursuing one's goals for more autonomous reasons (i.e., because they wanted to) was associated with greater overall goal progress, and, more importantly, that people made more progress on goals that were pursued for autonomous reasons *compared to their other goals*.

Additionally, in an attempt to further integrate these two sets of constructs, we were also interested in examining potential interactions among autonomous-controlled and approach-avoidance motivation. The only significant interaction that emerged was between controlled and approach motivation. Specifically, it appears as though pursuing a goal for controlled reasons undermined the positive effects that would be expected with approach goals. However, given the mixed literature on these interactions, these findings are exploratory and require further investigation.

Study 2: Confirmatory

The purpose of Study 2 was to confirm the previous results and so the analytical strategy and measures were the same as in Study 1. However, in the present study participants were asked to list four goals instead of three. Additionally, because only autonomous and controlled motivation were assessed at the start of the semester (i.e., without approach and avoidance), we used motivation from mid-semester to predict goal progress at the end of the semester.

Participants and Procedure

At the beginning of the term, 159 undergraduate students (116 female, $M_{\text{age}} = 18.05$, $SD_{\text{age}} = 1.04$) were asked to identify four goals they planned to pursue. During the middle of the

semester, participants provided assessments of goal motivation. At the end of the term, participants reported on the progress they made for each goal. Thirty-four cases were excluded for missing values on all variables, resulting in a final sample of 125 participants and 499 goals.

Results

Preliminary Results

Table 1 includes the means, variances, and intraclass correlations (ICCs) of all study variables. Consistent with the previous study, results suggest that 53 to 83% of the variance in motivation and 92% of the variance in goal progress was between goals (within-person). As presented in Table 2, the pattern of correlations is relatively consistent with the results from Study 1, with the exception that autonomous motivation was no longer significantly correlated with avoidance motivation at the between-person level.

Primary Analyses

Consistent with the previous study, results from the main effects model (see Table 3) indicate that autonomous motivation significantly predicts goal progress at the within-person level ($b = 0.31$, $SE = 0.06$, $p < .001$, 95% CI [.19, .43]). There were no significant main effects for controlled motivation at the within-person level, nor were approach or avoidance motivation significant at either the between or within-person levels. Unlike the previous study, there was no significant main effect of autonomous motivation on goal progress at the between-person level ($b = -0.09$, $SE = 0.82$, $p = .914$, 95% CI [-1.69, 1.51]), and instead there was a significant effect for controlled motivation ($b = 0.82$, $SE = 0.41$, $p = .046$, 95% CI [.01, 1.62]). This counterintuitive finding suggests that people who set more controlled goals actually made more progress compared to people with more autonomous goals.

Next, we modeled the interactions between autonomous-controlled and approach-avoidance motivation at both the between (see Table 4) and within-person (see Table 5) levels. Consistent with the previous study, results from the between-person analyses did not yield any significant main effects or interactions. However, results from the within-person analyses indicate a significant interaction between avoidance and autonomous motivation ($b = -0.15$, $SE = 0.06$, $p = .009$, 95% CI $[-.26, -.04]$), with people making the most progress on goals that were low in avoidance and high in autonomy. Results also revealed a significant interaction between avoidance and controlled motivation ($b = -0.14$, $SE = 0.06$, $p = .023$, 95% CI $[-.26, -.02]$; see Figure 1).

Revisiting the Interactions from Studies 1 and 2: A Bayesian Model Comparison Approach

Given the inconsistent results for the interactions across both studies and in the literature, we used a Bayesian model comparison approach (e.g., Kass & Raftery, 1995; Raftery, 1995) to compare models with and without the interactions (i.e., with the interactions all fixed to 0). This allowed us to determine whether adding the interaction terms improve the models, and also to examine evidence for the null hypotheses (i.e., that those interaction terms are equivalent to 0; Anderson & Maxwell, 2016), something that is not possible with frequentist statistics (Wagenmakers, 2007). For each comparison, we calculated a Bayes factor (BF_{01}) using the Bayesian Information Criteria (BIC), which represents a ratio contrasting the likelihood of the data under both the constrained and unconstrained models (see Wagenmakers, 2007).

Specifically, we examined the following models³: including interactions (Model 1), constraining

³ We also examined a series of model comparisons where Model 1 removed the interaction terms entirely (i.e., it only contained the main effects). All Bayes Factors were infinitely in favour of Model 1, however, because BIC tends to favor more parsimonious models, here we only report the results where interactions are fixed to 0 (Models 2-5). Results for Model 1 can be found on OSF.

all interactions to 0 (Model 2), constraining only the within interactions to 0 (Model 3), and constraining only the between-person interactions to 0 (Model 4). Results indicate that the constrained model (where all interactions are fixed to 0; Model 2) predict the observed data 686 million (Study 1) and 223 million (Study 2) times better than the interaction model (Model 1), which is considered an overwhelming level of statistical support (see Table 6). In other words, results from both studies provide strong evidence that the interactions between autonomous-controlled and approach-avoidance motivation are unrelated to goal progress.

Table 6.

Results for Model Comparison for Between and Within-Person Main Effects and Interactions Predicting Goal Progress

Model	Parameters	Study 1			Study 2		
		BIC	$\Delta BIC_{ M1 - Mi }$	BF_{01}	BIC	$\Delta BIC_{ M1 - Mi }$	BF_{01}
Model 3	Main effects, all interactions*0	22359.871	--	--	17652.564	--	--
Model 2	Main effects, interactions	22400.566	40.695	686,763,129	17689.659	37.095	223,521,182
Model 3	Main effects, all interactions*0	22359.871	--	--	17652.564		
Model 4	Main effects, within interactions*0	22384.770	28.499	255,123	17675.674	23.110	104,297
Model 3	Main effects, all interactions*0	22359.871	--	--	17652.564		
Model 5	Main effects, between interactions*0	22376.077	16.206	3,304	17665.785	13.221	743

Note. $\Delta BIC = |BIC_{H1} - BIC_{H0}| > 10$ provides “strong” evidence for the more parsimonious model (Kass & Raftery, 1995).

Brief Discussion

The purpose of Study 2 was to replicate the results found in Study 1. Consistent with Study 1, autonomous motivation was the sole predictor of goal progress at the within-person level, again suggesting that people made more progress on goals that were pursued for autonomous reasons *compared to their other goals*. The significant interaction from Study 1 was not replicated, but instead, two new interactions emerged, both of which centered on avoidance motivation. In order to elucidate these findings, we used a Bayesian model comparison approach to determine whether the interactions in both studies provided a meaningful contribution when predicting goal progress. Results provided evidence in favor of models where the interactions were excluded or fixed to 0, indicating that greater emphasis should be placed on the main effects.

General Discussion

The purpose of the present research was to examine the dynamics between autonomous-controlled and approach-avoidance motivation in predicting progress on personal goals over time. Across two longitudinal studies, we found support for our hypothesis that autonomous motivation was the only consistent predictor of goal progress over time. This was especially true at the within-person level, which suggests that people tend to make more progress on autonomous goals compared to their other goals. At the between-person level, autonomous motivation was a significant predictor in Study 1, whereas controlled motivation was, surprisingly, a significant predictor in Study 2. This latter finding is inconsistent with both theory and an extensive body of previous research, which shows that pursuing goals for controlled reasons leads to less goal progress compared to pursuing goals for autonomous reasons (e.g., Werner et al., 2016). This finding should be interpreted with caution since it did not emerge in

Study 1 (nor in previous research). Consistent with previous studies in the achievement domain, neither approach or avoidance motivation were significant predictors of goal progress.

Moving on to our exploratory analyses, we were interested in examining whether autonomous-controlled and approach-avoidance motivation produced any synergistic effects in predicting goal progress over time. Results from Study 1 showed a significant interaction between approach and controlled motivation at the within-person level. In Study 2, however, this interaction was not significant and two different interactions emerged (between avoidance motivation with both autonomous and controlled motivation). Follow-up analyses using Bayesian model comparison indicate that adding the interactions does not contribute any real value above the main effects in predicting goal progress, as a model constraining these interactions to zero was hundreds of millions times better than a model including them.

Overall, these current findings indicate that autonomous motivation is the only consistent predictor of goal progress over time, and that these effects occur at the within-person level. In contrast, all previous studies attempting to combine the approach-avoidance perspective and self-determination theory have only examined person-level (between-person) effects. In the present studies, at least 90-92% of the variance in goal progress is at the within-person level, highlighting the importance of examining goal-specific predictors of successful goal attainment (see Milyavskaya & Werner, 2018). In the present studies, we do not find strong evidence for between-person effects. For example, between-person autonomous motivation was only a significant main effect in Study 1. Taking into consideration both our findings and the inconsistent pattern of results found in previous studies, it seems to be the case that researchers have been focusing on the wrong level of analysis, and if we want to truly understand motivation and goal pursuit, more work needs to be done at the within-person level.

Research on approach and avoidance motivation has had a strong impact in the realm of motivation research, as these constructs span across many other motivation and goal theories in psychology. For example, Regulatory Focus Theory (Higgins, 1998) proposes that all goal-directed behavior is regulated by either promotion (e.g., emphasis on positive gains) or prevention (e.g., emphasis on avoiding negative outcomes) systems, which respectively utilizes approach and avoidance strategies to attain one's goals. While in general we agree with the notion that goals require a sense of direction, the findings both within the current research and in previous literature provide mixed results regarding the influence approach and avoidance motivation play in the context of personal goal attainment. One potential explanation for why the effects of approach and avoidance may get "washed out" is that goals by nature must be approach-oriented to some extent. For example, a student pursues the goal to avoid getting a bad grade in school (avoidance) in order to please their parents (approach). In this case, an individual may simply write that their goal is to avoid getting a bad grade because that is the component that is most salient, however the latter component is likely still influencing the individual's behavior, even if it is doing so unconsciously. Some support for this explanation comes from the moderately positive correlation between approach and avoidance motivation at both the within and between-person levels in Study 1 and Study 2. If they were truly on opposite sides of the valence dimension as previously suggested, this correlation should be negative.

Limitations and Future Directions

One limitation of the current research surrounds the way we assessed motivation. All motivation items were assessed using a single item, however the autonomous and controlled composites have been used extensively in previous research. While face-valid, this is the first time the approach and avoidance items have been used, so future research would benefit from

further testing these items in order to replicate this pattern of results. That said, one of the benefits to the current items is that they are not conflated by other motivational terms (e.g., autonomous or intrinsic motivation), like with previous scales (see Benita et al., 2014).

Additionally, the use of university students limits the generalizability of our findings to other samples, especially since research has suggested that the process of goal pursuit varies between adolescents and older adults. For example, Freund, Hennecke, and Mustafić (2012) suggested that people tend to become more process-focused and less outcome-focused during adulthood. They postulate that this may be because outcomes (e.g., getting a high GPA) are more salient to young adults, especially students, whereas as people get older they focus more on maintaining their lifestyle. Similarly, research shows that older adults tend to focus on avoiding losses (Freund, 2006), and so it may also be the case that other types of motivation would differentially predict goal progress in older samples.

Finally, it is important to note that in the present studies we only focused on two theories. Within psychology, there are many other constructs, both at the individual and goal level that can influence the process of goal pursuit (for a recent review, see Milyavskaya & Werner, 2018). It is imperative that future research begins to examine, compare, integrate, and refine these ideas in order to (a) fully determine the proximal and distal components of a goal, and (b) tease apart what factors actually predict goal progress.

Conclusion

The present research is the first to longitudinally examine both the between and within-person dynamics of approach-avoidance and autonomous-controlled motivation in predicting goal progress over time. Drawing from self-determination theory (Deci & Ryan, 2000) and theories of approach and avoidance motivation (Carver & Scheier, 1998; Elliot, Thrash, &

Murayama, 2012), our results consistently find that pursuing a goal for autonomous reasons (i.e., because you want to) facilitates goal attainment, whereas controlled, approach, and avoidance motivations were unrelated to goal progress. This was especially true when considering the variation in motivation and goal progress among an individual's own goals. The lack of consistent interactions also suggests that there is no synergistic relation between motivation types, and instead, pursuing a goal because you want to is fundamental for success. From a methodological perspective, our findings also indicate that goal researchers should shift their attention to the motivational dynamics within a person over time.

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