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Foundational Tests of the Need-Support Model: A Framework for Bridging Regulatory Focus Theory and Self-Determination Theory

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Abstract

This article introduces the need-support model, which proposes that regulatory focus can affect subjective support for the needs proposed by self-determination theory (autonomy, competence, and relatedness), and support of these needs can affect subjective labeling of experiences as promotion-focused and prevention-focused. Three studies tested these hypotheses (N = 2,114). Study 1 found that people recall more need support in promotion-focused experiences than in prevention-focused experiences, and need support in their day yesterday (with no particular regulatory focus) fell in between. Study 2 found that experiences of higher need support were more likely to be labeled as promotion-focused rather than prevention-focused, and that each need accounted for distinct variance in the labeling of experiences. Study 3 varied regulatory focus within a performance task and found that participants in the promotion condition engaged in need-support inflation, whereas participants in the prevention condition engaged in need-support deflation. Directions for future research are discussed.

Ferris and Cameron are friends, and Ferris is looking to have a great day—a better day than Cameron is. Although Cameron is not having a bad day, his dad asked him this morning how his college applications are going and mentioned again how important it is for Cameron to get into a top school. Right now, Cameron is feeling less than totally free to do what he wants, less than totally competent, and less than totally close to his dad. But he is still having a pretty good day, and he wants to keep it that way. In contrast, Ferris saw that the morning was beautiful, decided to take the day off, and convinced his parents that he was sick. His parents gave him kisses from across the room before heading off to work. Right now, Ferris is feeling like he can do what he wants, able to take on and master hard challenges, and loved by his parents. He was already having a good day, and now he wants to experience everything great about it—and he wants Cameron to come along. Cameron is currently prevention focused: He wants to maintain the pretty good day he is having. Ferris is currently promotion focused: He wants to gain as many good experiences as he can. Ferris's needs for autonomy, competence, and relatedness are also more supported right now than Cameron's are.

In general, could support of needs for autonomy, competence, and relatedness be higher in promotion focus than in prevention focus? No current theory explicitly makes this prediction, but it pertains to both regulatory focus theory (Higgins, 1997, 1998) and self-determination theory (Deci & Ryan, 2000). Regulatory focus theory emphasizes differences between promotion focus and prevention focus, whereas self-determination theory emphasizes psychological needs for autonomy, competence, and relatedness. The gap between these theories is important because these theories have significantly advanced understanding of motivation and self-regulation, and because work on these theories often has focused on different outcomes. For example, regulatory focus theory has often been applied to social judgment, reasoning, and decision making (for reviews, see Higgins, 1998; Molden, Lee, & Higgins, 2007), whereas self-determination theory has often been applied to preferences for goals such as financial success and friendship (for reviews, see Deci & Ryan, 2000, 2008). A model that bridges this gap could facilitate research that extends both theories.

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The need-support model provides this bridge. This new model highlights the kinds of needs that are important in the two theories, and it proposes how regulatory focus and need support can have reciprocal effects on each other. These effects are possible because need support in an activity and regulatory focus in an activity are subjective experiences that relate to how well things are going or, in the case of subjective judgments about past events, how well things went.

Psychological Needs as Requirements and as Motives

Self-determination theory emphasizes how certain needs are requirements for psychological well-being and optimal performance (Deci & Ryan, 2000), whereas regulatory focus theory emphasizes how certain other needs function as motives (Higgins, 1997, 1998). Specifically, self-determination theory proposes that all humans have needs for autonomy (doing activities that feel freely chosen and personally endorsed),[1] competence (feeling able to take on and master difficult challenges), and relatedness (feeling close and connected to others). In contrast, regulatory focus theory proposes that all humans have survival needs for growth and for security, and that the need for growth motivates a promotion focus on hopes, aspirations, and gaining good things, whereas the need for security motivates a prevention focus on duties, obligations, and maintaining good things. (For other work that distinguishes between needs-as-motives and needs-as-requirements approaches to studying motivation, see Prentice, Halusic, & Sheldon, 2014; Ryan & Deci, 2008; Sheldon, 2011; Sheldon & Gunz, 2009; Sheldon & Schüler, 2011.)

Needs that are requirements could strengthen certain motives, both when people do not experience much need support and when they experience a lot of need support. Conversely, growth versus security-focused motivational orientations could lead perceivers to strengthen or weaken their support of certain requirement needs, even if it is just in their own minds.

How Regulatory Focus Can Influence Subjective Need Support

The need-support model proposes that people can inflate subjective need support to enhance promotion focus in an activity and deflate subjective need support to enhance prevention focus in an activity. This hypothesis extends regulatory fit theory (Higgins, 2000), which proposes that individuals prefer to strive for goals in ways that fit and sustain their current regulatory focus in the activity, because doing so feels right and helps them feel engaged in what they are doing (also see Cesario & Higgins, 2008; Freitas & Higgins, 2002; Higgins, 2006; Vaughn, Dubovi, & Niño, 2013; Vaughn, Malik, Schwartz, Petkova, & Trudeau, 2006). Eager ways to strive for goals, such as thinking of ways to make everything go right, are a good fit for promotion focus. Vigilant ways to strive for goals, such as thinking of ways to avoid anything that could go wrong, are a good fit for prevention focus. When individuals are in a promotion focus—that is, when they are focused on pursuing goals they think of as hopes, ideals, or good things to gain—they are not just motivated to pursue their goals eagerly, they are also motivated to stay eager because eagerness feels right to them and helps them stay engaged (Scholer, Ozaki, & Higgins, 2014). Likewise, when individuals are in a prevention focus—that is, when they are focused on pursuing goals they think of as duties, obligations, or good things to maintain—they are not just motivated to pursue their goals vigilantly, they are also motivated to stay vigilant.

Inflating subjective need support can increase motivation to capitalize on the opportunity that things will go right, whereas deflating subjective need support can make it seem more important to make sure things do not go wrong. The proposal that people can enhance their promotion focus by inflating their subjective need support, and that they can enhance their prevention focus by deflating their subjective need support, extends work by Scholer et al. (2014), who found similar effects of regulatory focus on self-esteem inflation in promotion and self-esteem deflation in prevention. In general, inflating subjective need support or the self may increase eagerness to approach opportunities for gains, whereas deflating subjective need support or the self may increase caution. The need-support model differs from Scholer et al.'s work because it emphasizes support of autonomy, competence, and relatedness, and because it proposes that the relationship can also go the other way: support of autonomy, competence, and relatedness can affect labeling of experiences as promotion-focused and as prevention-focused.

How Need Support Can Influence Subjective Regulatory Focus

The need-support model also proposes that need support can affect subjective experiences of regulatory focus. Specifically, people are likely to view experiences that are highly need-supportive as promotion-focusing, because these experiences subjectively present more opportunities for growth and for making good things happen. Conversely, people are likely to view less need-supportive experiences as prevention-focusing, because these experiences subjectively present fewer opportunities for growth and more pressures to maintain good things in life by making sure bad things do not happen. With that said, if need support in an activity is extremely low and people do not feel capable of self-regulating or see any value in doing so (i.e., they are amotivated; Deci & Ryan, 2000), the activity may not be relevant to either promotion or prevention focus.

These hypotheses draw from both regulatory focus theory and from self-determination theory. Self-determination theory proposes that high levels of psychological need support promote intrinsic motivation and personal ownership of what one

is doing, which are aspects of psychological growth (e.g., Deci & Ryan, 2000; Vansteenkiste & Ryan, 2013). It also proposes that lower psychological need support can cause people feel controlled by internal or external standards that they do not entirely own or endorse, such that people can try to secure meeting standards that they do not feel eager about pursuing (e.g., Deci & Ryan, 2000; Vansteenkiste & Ryan, 2013).

According to self-determination theory, security is not a fundamental need but instead is a need derived from lack of autonomy, competence, and relatedness support (Deci & Ryan, 2000). This position contrasts with regulatory focus theory (e.g., Higgins, 1998), which proposes that both security and growth are fundamental needs (also see Molden & Miele, 2008). The need-support model notes that both needs-as-requirements and needs-as-motives can be viewed as fundamental, but they are fundamental in different ways. Autonomy, competence, and relatedness can be considered to be fundamental needs-as-requirements, whereas growth and security can be considered to be fundamental needs-as-motives. Nonetheless, support for needs-as-requirements and the strength of different needs-as-motives are subjective judgments that relate to how well things seem to be going, which is how judgments about each kind of need can influence judgments about the other.

The Current Research

This article presents three studies that tested basic hypotheses of the need-support model. Study 1 tested the hypothesis that people recall more need support in promotion-focused experiences than in prevention-focused experiences. It also examined whether subjective need support is higher in promotion experiences and lower in prevention experiences than in participants' day yesterday, which has no particular regulatory focus. Study 2 tested the hypotheses that recalled experiences of higher need support are more likely to be labeled as promotion-focused, and that recalled experiences of lower need support are more likely to be labeled as prevention-focused. It also examined whether autonomy, competence, and relatedness each accounts for distinct variance in labeling of experiences as promotion-focused and prevention-focused. Finally, Study 3 tested the hypothesis that participants would report more support of all three needs in a performance task that is promotion-focused than in one that is prevention-focused, and that need support in a task with no specific regulatory focus would tend to fall in between.

General Methods: Participants and Design

Participants of these studies were recruited through Amazon's Mechanical Turk (MTurk) website, so I discuss participant qualifications, exclusion criteria, and basic demographic information for these studies here. Eligible MTurk workers resided in the United States or Canada had an approval rate of at least 95% on MTurk tasks and 500 to 5,000 approved tasks. I chose the 500 to 5,000 range to base the 95% approval criterion on a reasonable minimum number, and to have a maximum number likely to screen out "Super Turkers," who are more likely than other workers to have seen nonnovel research materials before (Chandler, Mueller, & Paolacci, 2014). Participant nonnaivety can reduce effect sizes (Chandler, Paolacci, Peer, Mueller, & Ratliff, 2015). Participants in Studies 1 and 2 were paid between $0.30 and $0.50 per study; these studies typically took 3 to 5 min to complete. Study 3a paid participants $0.50 with a possible $0.30 bonus, and Study 3b paid participants $0.80; these studies took about 7.5 min to complete. All payments were in US dollars.

To discourage multiple responding, I used Peer, Paolacci, Chandler, and Mueller's (2012) procedure, the "Prevent Ballot Box Stuffing" option in Qualtrics, and TurkPrime. I checked the comma separated values files from MTurk that contained participants' MTurk identifiers to minimize the chances that the included participants had done the current study or my previous, related studies more than once. When I found multiple responses from a participant, I used only their first response. Of the 2,212 responses collected in the present three Studies, 24 cases were excluded because of multiple responding. Responses were excluded if the participant reported being less than 18 years old (two participants reported that their age was 2 years), if the participant did not do the writing task ($n = 8$; three in prevention, two in promotion, two in low need support, and one in high need support), or if the latitude/longitude data automatically collected by Qualtrics indicated a location outside the United States or Canada ($n = 16$). In addition, responses from Study 3 were excluded if the participant answered with the high endpoint of the scale on all items of the general need-support measure (on which half the items get reverse-scored; $n = 2$), took more than half an hour to do the study ($n = 6$), got one or more trials of the performance task wrong ($n = 39$; 5.24% of participants in Study 3; 11 in prevention, 16 in promotion, and 12 in no-framing), or whose written impressions of the study indicated that it was about framing effects ($n = 1$).

After excluding 98 cases for the aforementioned reasons, the full sample of Studies 1 to 3 had 2,114 participants. The sample had slightly more women (50.9%, $n = 1,075$) than men (48.4%, $n = 1,024$; 15 participants reported "other" for gender or left this question blank). Mean age was 33.99 ($SD = 11.27$; range = 18-76). Participants were asked to select all the racial/ethnic categories to which they belonged; 77.44% selected White ($n = 1,637$), 8.70% selected Asian ($n = 184$), 8.23% selected African American ($n = 174$), 6.29% selected Hispanic or Latina/Latino ($n = 133$), 1.51% selected multiethnic ($n = 32$), 1.47% selected Native American or Alaska Native ($n = 31$), 0.20% selected Native Hawaiian or Pacific Islander ($n = 4$), and 0.66% selected "Other" ($n = 14$). Most of the participants said they lived in the United States (99.20%, $n = 2,108$).

The studies in this article were two-condition, between-subjects experiments (except for Studies 1d and 3c, which each had one condition), with participants randomly assigned to conditions, and with a page of demographic questions that followed the stimulus materials. I used Faul, Erdfelder, Lang, and Buchner's (2007) software for power analyses. I report all measures, manipulations, and exclusions in these studies, with the exception of one to two pages of pilot materials that came after the stimulus materials in Studies 1b and 1d.[2] All data and materials are available for others to investigate (https//:osf.io/uxneu).

Study 1

Study 1 asked participants to recall either a promotion-focused or prevention-focused experience and to report how need-supportive the experience was. In addition, some participants were just asked to report what their day was like yesterday. I predicted that participants would report more need support in the promotion condition than in the prevention condition. In addition, I predicted that need support would be higher than yesterday in the promotion condition and lower than yesterday in the prevention condition. The design and procedures of Studies 1a to 1d are almost identical, so I describe them together.

Method

Studies 1a to 1c were the regulatory-focus part of Study 1, whereas Study 1d was the "yesterday" part. I ran Study 1a in the first week of October, Study 1b in March and June, and Study 1c in March of the following year. Study 1d, which was not originally part of this research, was retasked to be part of Study 1. I ran Study 1d in the last week of September, the week before Study 1a.

Study 1a. There were 105 participants in Study 1a. I chose the target sample size ahead of time based on a guess and the guideline of 50 participants per condition (Simmons, Nelson, & Simonsohn, 2013).

Participants received two pages of stimulus materials. The first page randomly assigned participants to write about either a promotion-focused experience ("You were doing what you ideally wanted to, in order to fulfill a hope or aspiration you had") or a prevention-focused experience ("You were doing what you believed you ought to, in order to fulfill a duty or obligation you had").

The second page contained a measure of need support. This page automatically piped in what the participant wrote on the first page and asked them to rate how much they agreed with 18 statements about the experience (1 = *strongly disagree*, 7 = *strongly agree*). The statements constituted the Balanced Measure of Psychological Needs (BMPN; Sheldon & Hilpert, 2012), which contains six-item subscales that measure support for autonomy (e.g., "I was free to do things

my own way"), competence (e.g., "I took on and mastered hard challenges"), and relatedness (e.g., "I was lonely"; reverse-scored). I calculated an index for each subscale by taking the mean of the relevant items after appropriate reverse-scoring. Cronbach's alphas for the measures of need support for Studies 1a to 1c, Study 1d, and the Study 1 combined sample are in Tables 1, 2, and 3, respectively.

Study 1b. There were 298 participants in this study. I chose the target sample size ahead of time by conducting a power analysis using data from Study 1a and aiming for 95% power to detect the smallest expected difference between conditions. The procedure of Study 1b was identical to Study 1a, except that there were two pages of pilot materials between the stimulus materials and the demographic questions.[2]

Study 1c. There were 198 participants in this study. I chose the target sample size ahead of time by conducting a power analysis using data from the combined sample of Studies 1a and 1b and aiming for 80% power to detect the smallest expected difference between conditions. The procedure of Study 1c was identical to Study 1a, except that there was an additional page with a nine-item scale between the writing task and the BMPN.[3]

Study 1d. There were 266 participants in this study. These participants reported what their previous day was like using the BMPN, then completed several measures unrelated to the current investigation. I ran this study on a Thursday, Friday, Saturday, and Tuesday. Thus, participants reported their need support for the previous week day.

Study 1a to 1c combined sample. A series of Study × Regulatory Focus ANOVAs on each subscale of the BMPN revealed no significant main or interactive effects involving study (all the study effect ps > .33). Therefore, in addition to analyzing Studies 1a to 1c separately, I analyzed the combined sample for the regulatory-focus conditions of Study 1. A power analysis indicated that the combined sample of 601 participants in Studies 1a to 1c provides slightly more than 95% power to detect a between-condition difference of $d = 0.30$.

Study 1a to 1d combined sample. In addition, I combined the samples of Studies 1a to 1d to compare prevention and promotion conditions of Studies 1a to 1c with the yesterday condition, Study 1d. A power analysis indicated that the combined sample of 867 participants in Studies 1a to 1d provides slightly more than 98% power to detect a small-to-medium-sized, between-condition difference of $f = .15$ in a three-condition, one-way ANOVA.

Results and Discussion

As shown in Table 1, participants reported significantly more need support in the promotion condition than in the

Table 1. Cronbach's Alphas and Tests of Between-Condition Differences in Studies 1a to 1c.

Study and measure	Cronbach's α	df	t	p	M difference	95% CI	d
Study 1a (N = 105)							
Autonomy	.75	103.00	4.93	<.001	1.06	[0.63, 1.49]	0.96
Competence	.74	103.00	2.22	.029	0.48	[0.05, 0.90]	0.43
Relatedness	.74	103.00	2.57	.012	0.59	[0.14, 1.05]	0.50
Study 1b (N = 298)							
Autonomy	.74	296.00	6.33	<.001	0.81	[0.56, 1.06]	0.73
Competence	.68	296.00	2.54	.012	0.30	[0.07, 0.53]	0.30
Relatedness	.74	296.00	3.89	<.001	0.53	[0.26, 0.79]	0.45
Study 1c (N = 198)							
Autonomy	.78	180.68	6.51	<.001	1.09	[0.76, 1.42]	0.93
Competence	.66	196.00	2.78	.006	0.38	[0.11, 0.65]	0.40
Relatedness	.75	186.30	2.63	.009	0.43	[0.11, 0.76]	0.37
Studies 1a-1c, combined (N = 601)							
Autonomy	.76	579.86	10.31	<.001	0.95	[0.77, 1.13]	0.84
Competence	.70	599.00	4.33	<.001	0.36	[0.19, 0.52]	0.35
Relatedness	.74	590.45	5.37	<.001	0.51	[0.32, 0.69]	0.44

Note. Positive *d*s indicate higher means in the promotion condition. CI = confidence interval.

Table 2. Condition Statistics and Differences From Scale Midpoint in the Combined Sample of Studies 1a to 1c and Study 1d.

Condition and measure		Condition statistics			Difference from scale midpoint (4)		
		M	SD	95% CI	t	p	d
Combined studies 1a-1c: Prevention (N = 302)							
Autonomy		4.25	1.23	[4.11, 4.39]	3.52	<.001	0.25
Competence		5.10	1.02	[4.98, 5.21]	18.61	<.001	1.10
Relatedness		4.71	1.24	[4.57, 4.85]	9.93	<.001	0.57
Combined studies 1a-1c: Promotion (N = 299)							
Autonomy		5.19	1.01	[5.08, 5.31]	20.42	<.001	1.18
Competence		5.45	0.99	[5.34, 5.57]	25.39	<.001	1.47
Relatedness		5.21	1.08	[5.09, 5.34]	19.38	<.001	1.12
Study 1d: Yesterday (N = 266)							
Autonomy	(Cronbach's α = .77)	4.83	1.16	[4.69, 4.97]	11.59	<.001	0.71
Competence	(Cronbach's α = .75)	4.86	1.10	[4.73, 4.99]	12.72	<.001	0.78
Relatedness	(Cronbach's α = .80)	5.23	1.18	[5.08, 5.37]	16.98	<.001	1.04

Note. CI = confidence interval.

prevention condition.[4] Table 2 presents descriptive statistics for each of the three conditions in the combined sample. Table 3 presents tests of differences between promotion, prevention, and yesterday conditions, and Figure 1 summarizes these between-condition differences for each need. There were significant differences between the three conditions on autonomy, competence, and relatedness support. Specifically, the promotion condition was significantly higher in autonomy support than the yesterday condition, and the prevention condition was significantly lower in autonomy support than the yesterday condition. Both the promotion and prevention conditions were significantly higher in competence support than the yesterday condition. The prevention condition was significantly lower in relatedness support than the yesterday condition, but the promotion and yesterday conditions did not differ in relatedness support.

These results show that participants rated promotion experiences as more need-supportive than prevention experiences, and that participants who were asked about what their day was like yesterday tended to fall in between. Feeling especially competent and autonomy supported could enhance eagerness, and feeling less relatedness or autonomy supported could enhance vigilance, as long as one feels competent to engage in self-regulation. These differences in need support could reflect motivated inflation versus deflation of need support in promotion-focused versus prevention-focused experiences. In addition, these differences in need

Table 3. Cronbach's Alphas and Tests of Differences Between the Promotion and Prevention Conditions (Studies 1a-1c) and the Yesterday Condition (Study 1d).

Measure and test	Cronbach's α	dfs	F	p	ω^2	M difference	Significance	95% CI
Autonomy	.76							
One-way ANOVA[a]		(2, 565.91)	53.14	<.001	.107			
Post hoc: Prevention–promotion						0.95	<.001	[0.73, 1.16]
Post hoc: Prevention–yesterday						0.58	<.001	[0.35, 0.80]
Post hoc: Yesterday–promotion						0.37	<.001	[0.15, 0.58]
Competence	.71							
One-way ANOVA		(2, 864)	23.41	<.001	.049			
Post hoc: Prevention–promotion						0.36	<.001	[0.16, 0.55]
Post hoc: Prevention–yesterday						−0.24	.024	[−0.44, −0.03]
Post hoc: Yesterday–promotion						0.59	<.001	[0.38, 0.80]
Relatedness	.76							
One-way ANOVA[a]		(2, 569.36)	18.06	<.001	.038			
Post hoc: Prevention–promotion						0.51	<.001	[0.29, 0.73]
Post hoc: Prevention–yesterday						0.52	<.001	[0.28, 0.76]
Post hoc: Yesterday–promotion						−0.01	.993	[−0.24, 0.21]

Note. Cronbach's alphas are for the combined sample of Studies 1a to 1d. CI = confidence interval.
[a]Welch's test results are reported for autonomy and relatedness because of significant heterogeneity of variance. Games–Howell post hoc tests were used for each dependent variable because of unequal condition sizes. Positive mean differences and CIs indicate higher means for the second condition within the pairs.
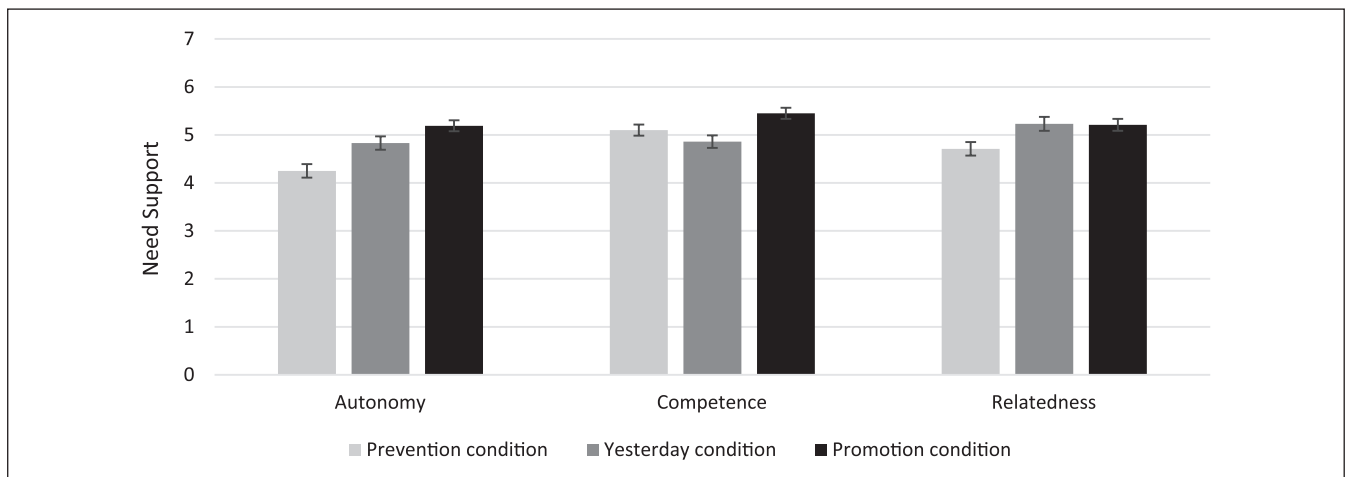
Figure 1. Need support as a function of condition in the Study 1 combined sample.
Note. Error bars represent 95% confidence intervals. Scale midpoint is 4.

support could reflect how the levels of need support in these experiences influenced participants' regulatory focus.

Study 2

Study 2 examined whether differences in subjective need support between activities can affect labeling of the activities as promotion-focused versus prevention-focused. This study asked participants to recall an experience of high versus low need support, indicate how need-supportive the experience was, and report how promotion-focused and prevention-focused the experience was. I predicted that participants would tend to label

highly need-supportive experiences as promotion-focused and less need-supportive experiences as prevention-focused. In addition, I predicted that each need would account for distinct variance in the labeling of experiences as promotion-focused and prevention-focused. The design and procedures of Studies 2a and 2b are almost identical, so I describe them together. Studies 2a and 2b took place in March of subsequent years.

Method

Study 2a. There were 305 participants in this study. I chose the target sample size ahead of time by conducting a power

Table 4. Cronbach's Alphas and Tests of Between-Condition Differences in Studies 2a and 2b.

Study and measure	Cronbach's α	df	t	p	M difference	95% CI	d
Study 2a (N = 305)							
Autonomy	.88	297.13	20.08	<.001	2.33	[2.10, 2.55]	2.30
Competence	.86	283.49	16.56	<.001	1.90	[1.68, 2.13]	1.90
Relatedness	.90	298.99	23.30	<.001	2.63	[2.41, 2.85]	2.67
Prevention	.80	271.88	−2.74	<.001	−0.43	[−0.73, −0.12]	−0.31
Promotion	.86	298.58	4.39	.006	0.77	[0.42, 1.11]	0.50
Relative promotion		303.00	6.81	<.001	1.19	[0.85, 1.54]	0.78
Study 2b (N = 198)							
Autonomy	.87	196.00	16.14	<.001	2.29	[2.01, 2.57]	2.30
Competence	.86	196.00	13.75	<.001	2.04	[1.75, 2.34]	1.96
Relatedness	.87	196.00	18.01	<.001	2.51	[2.24, 2.79]	2.56
Prevention	.80	183.49	−3.03	.003	−0.58	[−0.97, −0.20]	−0.43
Promotion	.88	174.41	4.69	<.001	0.97	[0.56, 1.38]	0.67
Relative promotion		196.00	6.67	<.001	1.55	[1.09, 2.01]	0.95
Study 2, combined sample							
Autonomy	.88	484.59	25.72	<.001	2.31	[2.13, 2.49]	2.29
Competence	.86	465.42	21.37	<.001	1.95	[1.77, 2.13]	1.91
Relatedness	.89	484.71	29.40	<.001	2.58	[2.41, 2.75]	2.62
Prevention	.80	458.77	−4.00	<.001	−0.48	[−0.72, −0.25]	−0.36
Promotion	.87	480.17	6.35	<.001	0.85	[0.59, 1.11]	0.57
Relative promotion		501.00	9.53	<.001	1.33	[1.06, 1.61]	0.85

Note. Positive *d*s indicate higher means in the high need-support condition. CI = confidence interval.

analysis using data from a separate study and aiming for 80% power to detect a small-to-medium-sized difference between conditions.

Participants received three pages of stimulus materials. The first page randomly assigned participants to write about a personal experience of high versus low need support; instructions were based on Milyavskaya, Nadolny, and Koestner's (2014) Study 1. Specifically, participants in the high need-support condition wrote about a time when "You were free to make decisions and to do the things you want, you felt competent, and you felt connected to others." Participants in the low need-support condition wrote about a time when "You had a lot of pressures you could do without, you felt less competent than you would like to be, and you felt like you were not particularly connected to others."

The second page contained the BMPN as a manipulation check. This page automatically piped in what the participant wrote on the first page and asked them to respond to the BMPN about the experience they had described, with the same 7-point scale as in Study 1. Cronbach's alphas for the autonomy, competence, and relatedness subscales are in Table 4.

The third page contained a six-item measure of regulatory focus that I designed to be about a recalled experience. This page automatically piped in what the participant wrote on the first page and asked them to indicate how much they agreed with each statement about the experience they had described (1 = *not at all*, 7 = *very much*). The measure of recalled promotion and prevention focus contained two 3-item subscales. An

example of a promotion item is "During the experience, I was focused on how to achieve my hopes and aspirations," and an example of a prevention item is "During the experience, I was focused on how to achieve my duties and obligations." Using exploratory factor analysis with maximum likelihood extraction and direct oblimin rotation, I found two factors (with eigenvalues > 1) that explained 76.58% of the variance in these items. The first factor (accounting for 51.81% of the variance) included the three promotion items, each of which loaded .77 or higher; I averaged these items to form a promotion index (α = .86). The second factor (accounting for 23.10% of the variance) included the three prevention items, each of which loaded .72 or higher; I averaged these items to form a prevention index (α = .80). In addition, because many studies that use measures of regulatory focus also calculate an index of relative promotion focus (promotion minus prevention; for example, Cesario, Grant, & Higgins, 2004; Cesario & Higgins, 2008; Hong & Lee, 2008; Lisjak, Molden, & Lee, 2012), I calculated an index of relative promotion focus by subtracting prevention scores from promotion scores.

Study 2b. There were 198 participants in this study. I chose the target sample size ahead of time by conducting a power analysis using data from Study 2a and aiming for 80% power to detect the smallest expected difference between conditions.

The procedure of Study 2b was identical to Study 2a, except that there was an additional page with a nine-item scale between the writing task and the BMPN.[5] I analyzed the items about recalled regulatory focus as in Study 2a.

Table 5. Condition Statistics and Differences From Scale Midpoint in the Combined Samples of Studies 2a and 2b.

Condition and measure	Condition statistics			Difference from midpoint		
	M	SD	95% CI	t	p	d
Low need support (N = 249)						
Autonomy	3.25	1.09	[3.12, 3.39]	−10.89	<.001	−0.69
Competence	3.73	1.15	[3.59, 3.88]	−3.69	<.001	−0.23
Relatedness	3.15	1.06	[3.02, 3.28]	−12.62	<.001	−0.80
Prevention	5.29	1.12	[5.15, 5.43]	18.14	<.001	1.15
Promotion	4.48	1.64	[4.28, 4.69]	4.65	<.001	0.29
Relative promotion	−0.80	1.61	[−1.00, −0.60]	−7.99	<.001	−0.50
High need support (N = 254)						
Autonomy	5.57	0.92	[5.45, 5.68]	27.24	<.001	1.71
Competence	5.67	0.95	[5.55, 5.79]	28.01	<.001	1.76
Relatedness	5.72	0.93	[5.60, 5.83]	29.46	<.001	1.85
Prevention	4.79	1.57	[4.59, 4.98]	7.99	<.001	0.50
Promotion	5.33	1.35	[5.17, 5.50]	15.72	<.001	0.99
Relative promotion	0.53	1.53	[0.34, 0.72]	5.51	<.001	0.35

Note. Scale midpoint for relative promotion is 0. For the other measures, it is 4. CI = confidence interval.

Using exploratory factor analysis with maximum likelihood extraction and direct oblimin rotation, I found two factors (with eigenvalues > 1) that explained 76.58% of the variance in these items. The first factor (accounting for 47.58% of the variance) included the three promotion items, each of which loaded .77 or higher; I averaged these items to form a promotion index (α = .88). The second factor (accounting for 29.01% of the variance) included the three prevention items, each of which loaded .67 or higher; I averaged these items to form a prevention index (α = .80). As in Study 2a, I also calculated an index of relative promotion focus.

Study 2 combined sample. A series of Study × Need Support ANOVAs on each subscale of the BMPN and each measure of regulatory focus revealed no significant main or interactive effects involving study (all the study effect *p*s > .18). Therefore, in addition to analyzing Studies 2a and 2b separately, I analyzed the combined sample of Study 2. A power analysis indicated that the combined sample of 503 participants in Study 2 provides slightly more than 90% power to detect a between-condition difference of *d* = 0.30.

Results and Discussion

Table 4 shows that the need-support manipulation was effective. In addition, participants in the high need-support condition reported more promotion focus and less prevention focus in the experiences they described. Table 5 reports condition descriptive statistics and tests of condition differences from scale midpoints, and Table 6 presents bivariate correlations between each kind of need support and labeling of experiences as promotion-focused and prevention-focused.

Table 7 presents results of multiple regression analyses exploring how much each need accounted for distinct variance in participants' labeling of experiences. The multiple regression results show that all three types of need support accounted for distinct variance in participants' labeling of experiences. Specifically, labeling of experiences as prevention-focused was positively related to competence support and was negatively related to autonomy and relatedness support. In contrast, labeling of experiences as promotion-focused was positively related to each kind of need support. Finally, relative promotion focus was unrelated to competence support and was positively related to autonomy and relatedness support.[6]

These multiple regression results are similar to the between-condition results of the combined sample of Studies 1a to 1d. These relationships suggest that experiences with lower autonomy and relatedness support could enhance the likelihood that people view their situation-specific goals as duties or obligations, as long as they also feel competent to pursue these goals. In contrast, experiences with higher support of all three needs could enhance the likelihood that people view their situation-specific goals as hopes and aspirations.

Study 3

A limitation of Studies 1 and 2 is that they focused on self-guide definitions of promotion and prevention focus—that is, promotion in terms of hopes, aspirations, and ideal goals, and prevention in terms of duties, obligations, and ought goals. There are other ways to manipulate regulatory focus, such as by framing a performance task in terms of gaining versus maintaining positive outcomes. Viewing a task as a

Table 6. Correlations Between Need Support and Labeling of Experiences as Promotion- and Prevention-Focused in Study 2.

Study and variable	Autonomy	Competence	Relatedness	Prevention	Promotion	Relative promotion
Study 2a (*N* = 305)						
Autonomy	—	.70 ***	.81***	−.15**	.37***	.48***
Competence		—	.72***	.03	.38***	.34***
Relatedness			—	−.17**	.33***	.46***
Prevention-focused				—	.39***	−.46***
Promotion-focused					—	.64***
Relative promotion						—
Study 2b (*N* = 198)						
Autonomy	—	.74***	.82***	−.22**	.40***	.50***
Competence		—	.74***	−.06	.45***	.42***
Relatedness			—	−.22**	.37***	.49***
Prevention-focused				—	.24***	−.57***
Promotion-focused					—	.66***
Relative promotion						—
Study 2, combined sample						
Autonomy	—	.70***	.81***	−.18***	.33***	.49***
Competence		—	.73***	.01	.40***	.37***
Relatedness			—	−.18***	.35***	.47***
Prevention-focused				—	.33***	−.51***
Promotion-focused					—	.65***
Relative promotion						—

Note. CI = confidence interval.
*p < .05. **p < .01. ***p < 001.

Table 7. Multiple Regressions Modeling Relationships Between Need Support and Labeling of Experiences as Promotion- and Prevention-Focused in Study 2.

Study and predictor	Prevention-focused				Promotion-focused				Relative promotion			
	β	*B*	*p*	95% CI for *B*	β	*B*	*p*	95% CI for *B*	β	*B*	*p*	95% CI for *B*
Study 2a (*N* = 305)												
Autonomy	−.26	−.23	.003	[−0.38, −0.08]	.29	.30	<.001	[0.14, 0.47]	.34	.37	<.001	[0.18, 0.55]
Competence	.23	.23	.002	[0.08, 0.37]	.08	.09	.291	[−0.07, 0.25]	−.07	−.08	.387	[−0.25, 0.10]
Relatedness	−.29	−.24	.001	[−0.38, −0.09]	.12	.11	.175	[−0.05, 0.27]	.23	.23	.011	[0.05, 0.41]
The other focus[a]	.49	.43	<.001	[0.34, 0.52]	.45	.52	<.001	[0.41, 0.63]				
Study 2b (*N* = 198)												
Autonomy	−.29	−.27	.018	[−0.49, −0.05]	.21	.21	.066	[−0.01, 0.44]	.30	.36	.010	[0.09, 0.63]
Competence	.18	.17	.092	[−0.03, 0.37]	.25	.26	.012	[0.06, 0.46]	.05	.07	.580	[−0.17, 0.31]
Relatedness	−.25	−.22	.041	[−0.43, −0.01]	.09	.09	.438	[−0.13, 0.30]	.20	.23	.085	[−0.03, 0.48]
The other focus[a]	.37	.34	<.001	[0.21, 0.47]	.32	.35	<.001	[0.22, 0.49]				
Study 2, combined sample												
Autonomy	−.30	−.27	<.001	[−0.40, −0.15]	.30	.31	<.001	[0.17, 0.44]	.33	.37	<.001	[0.22, 0.51]
Competence	.23	.22	<.001	[0.11, 0.34]	.12	.13	.039	[0.01, 0.25]	−.01	−.02	.805	[−0.15, 0.12]
Relatedness	−.26	−.22	<.001	[−0.34, −0.10]	.09	.08	.200	[−0.05, 0.21]	.22	.23	.003	[0.08, 0.37]
The other focus[a]	.44	.39	<.001	[0.32, 0.47]	.40	.44	<.001	[0.36, 0.53]				

Note. CI = confidence interval.
[a]Analyses on each regulatory focus controlled for its relationship with the other focus.

way to gain a positive outcome activates a promotion focus, whereas viewing a task as a way to maintain a positive outcome activates a prevention focus (for reviews, see Higgins, 1998; Molden et al., 2007).

Study 3 used gain/maintain framing of performance tasks to manipulate regulatory focus. Participants' goal in the performance task was to find requested shapes in a 10 × 10 grid and report the coordinates. If participants correctly reported

Table 8. Cronbach's Alphas and Tests of Between-Condition Differences in Study 3a.

Measure	Cronbach's α	df	t	p	M difference	95% CI	d
General need support							
Autonomy	.63	496	2.79	.006	0.21	[0.06, 0.36]	0.25
Competence	.81	496	2.48	.014	0.23	[0.05, 0.41]	0.22
Relatedness	.78	496	2.64	.009	0.25	[0.07, 0.44]	0.24
Shapes-task need support							
Autonomy	.67	496	3.20	.001	0.37	[0.14, 0.60]	0.29
Competence	.87	496	1.80	.073	0.22	[−0.02, 0.45]	0.16
Relatedness	.95	496	2.39	.017	0.38	[0.07, 0.70]	0.21

Note. General need support was measured between the regulatory-focus manipulation and the target trials of the shapes task. Shapes need support was retrospective need support in the shapes task, measured at the end of the shapes task. Positive *d*s indicate higher means in the promotion condition. CI = confidence interval.

all the requested shapes, they would gain (vs. maintain) a bonus for doing the study. I predicted that participants would report higher support of all three needs in the promotion-focused, gain-framed condition than in the prevention-focused, maintain-framed condition. Additionally, I predicted that need support in a no-frame condition would tend to fall in between. The procedures of Studies 3a and 3b are almost identical, so I describe them together.

Method

Study 3a. There were 498 participants in this study. I chose the target sample size ahead of time by conducting a power analysis using data from a separate pilot study with similar procedures and participants, and aiming for 80% power to detect a small-to-medium-sized difference between conditions. Study 3a took place in August, and running times were 9:00 a.m. to 9:00 p.m. eastern standard time (EST).

Participants learned that participation in this approximately 5-min study was worth $0.50, with the possibility of earning up to $0.30 bonus. The first page of stimulus materials introduced the shape-finding task as something that "can be used to measure the ability and motivation to sustain attention on a performance task, which is an important predictor of success in life." The page displayed a 10 × 10 grid containing geometric shapes and their alphanumeric coordinates, gave the coordinates of one kind of shape (a solid diamond), and asked participants to give the coordinates of the other solid diamond.

The following page piped in their answer from the previous page, showed the correct answer in writing, and showed the target shape in red within the grid. At the bottom of this page was the regulatory-focus manipulation. The promotion condition described how to gain the bonus, whereas the prevention condition described how to maintain the bonus (bold font in the original).

You start with a payment of $0.50 [$0.80] for this HIT, which does not include [includes] your $0.30 possible bonus. Your goal on the following pages will be to **gain [maintain]** as much of your $0.30 possible bonus as you can.

For each grid of the following 6 grids that you get right, you will gain [maintain] $0.05 of your possible bonus.

Gaining [Maintaining] all of your possible bonus will ensure that you receive $0.80 for this HIT.

The following page repeated the gain/maintain instructions ("**You will gain [maintain] $0.05 bonus for each of the following 6 grids you get right**"). It also stated that before the target shape-finding task, the researchers wanted to learn more about what the participant was like in general. This page contained the BMPN. Table 8 shows the Cronbach's alphas for Study 3.

The next few pages contained the target shape-finding task. Each of the six randomly ordered trial pages showed a new grid, repeated the sentence with the gain/maintain instructions ("**You will gain [maintain] $0.05 bonus if you get this grid right**"), and asked participants to find the solid diamond in the grid. The page after each trial page piped in the participant's answer from the previous page, showed the correct answer in writing, and showed the target shape in red within the grid.

The page after the shape-finding task contained a measure of need support in the shape-finding task. For brevity, this measure included just the positively worded items from the BMPN. In addition, the competence-support items of this measure referred to only one task or challenge (e.g., "I took on and mastered a hard challenge" rather than "I took on and mastered hard challenges").

Finally, participants completed a demographics page and a page that asked them about their impressions of the study. Then they received a debriefing page.

Study 3b. There were 246 participants in this study. The procedure of this study was identical to Study 3a, except that all participants were paid $0.80, and the study did not mention a bonus or manipulate regulatory focus.

Study 3a and 3b combined sample. In addition, I combined the samples of Studies 3a and 3b to compare prevention and promotion conditions of Study 3a with the no-framing condition, Study 3b. A power analysis indicated that the combined sample of 744 participants in Study 3 provides slightly more

than 96% power to detect a small-to-medium-sized, between-condition difference of $f = .15$ in a three-condition, one-way ANOVA.

Results and Discussion

As shown in Table 8, all the effects in Study 3a were in the expected direction, and all were significant except for competence support in the shapes task. (Participants received feedback immediately, so there was no ambiguity about how well they did.) Table 9 shows that need support in Study 3b, which had no regulatory-focus manipulation, fell in between the promotion and prevention conditions of Study 3a and tended not to differ significantly from them. Table 9 presents descriptive statistics for each condition, and Table 10 presents tests of the differences between promotion-frame, prevention-frame, and no-frame conditions.[7]

In short, although Study 3a did not vary objective need support, participants in the promotion condition reported more need support than participants in the prevention condition. The findings of Studies 3a and 3b suggest that participants in the promotion condition inflated their subjective need support, and participants in the prevention condition deflated their subjective need support. This inflation and deflation occurred in both their general need support as they were about to start the target trials of the performance task and their recalled need support in the task itself.

In Study 3, the performance task was low-stakes (the maximum bonus was only \$0.30), and the effect sizes tended to be small. Effects may be larger when the bonus is more valuable and motivating to participants. Pilot testing with smaller samples at the author's home institution suggests that this task produces stronger regulatory-focus effects when the performance task is higher stakes (e.g., when the performance task is for extra credit in participants' psychology classes, and the bonus is double the amount of extra credit that participants would otherwise get for the study). Future research could examine how well the present findings extend to different performance tasks and types of reward.

General Discussion

The purpose of this research was to test fundamental predictions of the new need-support model. Results supported the hypotheses that regulatory focus can affect subjective need support, and that need support can affect subjective labeling of experiences as promotion-focused and as prevention-focused.

Specifically, Study 1 showed that promotion-focused experiences are higher in support for autonomy, competence, and relatedness than prevention-focused experiences. In addition, it showed that promotion-focused experiences were higher in autonomy support and competence support than experiences that had no particular regulatory focus (participants' day yesterday). In contrast, prevention-focused experiences were lower in autonomy support and competence support—and slightly higher in competence support—than participants' day yesterday.

Study 2 showed that participants tended to view highly need-supportive experiences as promotion-focused and less need-supportive experiences as prevention-focused. In addition, it showed that all three kinds of need support accounted for distinct variance in the labeling of experiences as promotion- and prevention-focused. When controlling for relationships between the three needs, autonomy support and competence support related positively to labeling an experience as promotion-focused. In contrast, autonomy support and relatedness support related negatively—and competence support related positively—to labeling an experience as prevention-focused. Moreover, autonomy support and relatedness support related positively to an index of relative promotion focus (promotion minus prevention labeling), whereas competence support was unrelated to this index. Together, the results of Studies 1 and 2 suggest that feeling highly competent and autonomy supported could enhance promotion-focused eagerness, and that not feeling very relatedness or autonomy supported could enhance prevention-focused vigilance, as long as one feels competent to engage in self-regulation.

Study 3a used a different, commonly used type of regulatory-focus manipulation: providing performance-task instructions that emphasized gaining a reward in the promotion condition and maintaining a reward in the prevention condition. These conditions did not vary objective need support. Nonetheless, participants in the promotion condition reported higher support of all three needs both in general and in the performance task. Comparisons of Study 3a with Study 3b, which did not mention a bonus and did not manipulate regulatory focus, suggest that participants in the promotion condition of Study 3a engaged in need-support inflation, and that participants in the prevention condition of Study 3a engaged in need-support deflation.

Altogether, the present studies provide support for the need-support model's hypotheses that regulatory focus can affect subjective need support, and that need support can affect subjective regulatory focus. These predictions go beyond those of regulatory focus theory (e.g., Higgins, 1998) in proposing that support for autonomy, competence, and relatedness can influence subjective regulatory focus. In addition, they go beyond predictions of self-determination theory (e.g., Deci & Ryan, 2000) in proposing that promotion focus can cause inflation of subjective need support, whereas prevention focus can cause deflation of subjective need support.

Future Directions of Research on the Need-Support Model

To date, other new research on the need-support model has examined people's motives for striving toward promotion-focused and prevention-focused goals, and how regulatory focus can affect self-compassion. The research on regulatory focus and motives for goal pursuit shows that people experience more intrinsic and identified motivation to

Table 9. Condition Statistics and Differences From Scale Midpoint in Studies 3a and 3b.

Condition and measure		Condition statistics			Difference from scale midpoint (4)		
		M	SD	95% CI	t	p	d
Prevention frame (Study 3a, N = 244)							
General need support							
Autonomy		4.64	0.83	[4.53, 4.74]	12.08	<.001	0.77
Competence		4.82	1.01	[4.69, 4.94]	12.62	<.001	0.81
Relatedness		4.98	1.09	[4.85, 5.12]	14.14	<.001	0.91
Shapes-task need support							
Autonomy		4.83	1.34	[4.66, 4.99]	9.60	<.001	0.61
Competence		5.22	1.29	[5.05, 5.38]	14.74	<.001	0.94
Relatedness		4.14	1.78	[3.91, 4.36]	1.19	.235	0.08
Promotion frame (Study 3a, N = 254)							
General need support							
Autonomy		4.85	0.87	[4.74, 4.96]	15.58	<.001	0.98
Competence		5.04	1.04	[4.92, 5.17]	16.03	<.001	1.01
Relatedness		5.24	1.04	[5.11, 5.36]	18.88	<.001	1.19
Shapes-task need support							
Autonomy		5.20	1.25	[5.04, 5.35]	15.27	<.001	0.96
Competence		5.43	1.39	[5.26, 5.60]	16.41	<.001	1.03
Relatedness		4.52	1.80	[4.30, 4.74]	4.60	<.001	0.29
No frame (Study 3b, N = 246)							
General need support							
Autonomy	(Cronbach's α = .74)	4.73	0.94	[4.61, 4.85]	12.14	<.001	0.77
Competence	(Cronbach's α = .80)	5.01	0.96	[4.89, 5.13]	16.53	<.001	1.05
Relatedness	(Cronbach's α = .81)	5.12	1.12	[4.98, 5.26]	15.72	<.001	1.00
Shapes-task need support							
Autonomy	(Cronbach's α = .68)	4.85	1.36	[4.68, 5.02]	9.79	<.001	0.62
Competence	(Cronbach's α = .90)	5.39	1.36	[5.22, 5.56]	16.00	<.001	1.02
Relatedness	(Cronbach's α = .95)	4.31	1.79	[4.08, 4.53]	2.68	.008	0.17

Note. CI = confidence interval.

pursue promotion-focused goals and more external and introjected motivation to pursue prevention-focused goals (Vaughn, 2016). These findings are consistent with self-determination theory research on how support for autonomy, competence, and relatedness in an activity can enhance self-determined motivation (for a review, see Deci & Ryan, 2000). The research on regulatory focus and self-compassion (a coping process that involves self-kindness, mindfulness, and common humanity; Neff, 2003) shows that people report more self-compassion in promotion-focused experiences than in prevention-focused experiences, and that competence and relatedness are the kinds of need support that account for distinct variance in self-compassion (Vaughn & Arnault, 2016). Together, these new findings suggest the potential of the need-support model to enhance understanding of motivation and self-regulation in ways that extend both regulatory focus theory and self-determination theory.

Future research on the need-support model could examine whether different methods of varying regulatory focus can influence subjective need support, and vice versa. For

example, research suggests that varying stereotype threat (Seibt & Förster, 2004), temporal distance (Pennington & Roese, 2003), or nurturance versus security cues (Friedman & Förster, 2001) can affect regulatory focus. The current research suggests that manipulating these variables could also influence need support. Other research suggests that certain kinds of sentence unscrambling (Hodgins, Brown, & Carver, 2007) and task framing (Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004) can vary need support. The current research suggests that these procedures could also vary regulatory focus.

Future research could also use the need-support model as a framework for extending self-determination theory to outcomes more commonly studied with regulatory focus theory, and vice versa. For example, research on regulatory focus theory often has studied phenomena related to information processing, such as persuasion (for reviews, see Cesario, Higgins, & Scholer, 2008; Ludolph & Schulz, 2015; Vaughn, Childs, Maschinski, Niño, & Ellsworth, 2010). Future research could examine whether psychological need support can influence persuasion and other

Table 10. Cronbach's Alphas and Tests of Differences Between the Promotion-Frame and Prevention-Frame Conditions (Study 3a) and the No-Frame Condition (Study 3b).

Measure and test	Cronbach's α	*df*s	*F*	*p*	ω^2	M difference	Significance	95% CI
General autonomy	.67							
One-way ANOVA		(2, 741)	3.62	.027	.007			
Post hoc: Prevention–promotion						0.21	.020	[0.03, 0.40]
Post hoc: Prevention–no frame						0.09	.477	[−0.28, 0.09]
Post hoc: No frame–promotion						0.12	.284	[−0.07, 0.30]
General competence	.81							
One-way ANOVA		(2, 741)	3.67	.026	.007			
Post hoc: Prevention–promotion						0.23	.031	[0.02, 0.44]
Post hoc: Prevention–no frame						0.19	.088	[−0.02, 0.40]
Post hoc: No frame–promotion						0.04	.915	[0.38, 0.80]
General relatedness	.79							
One-way ANOVA		(2, 741)	3.38	.035	.006			
Post hoc: Prevention–promotion						0.25	.026	[0.02, 0.78]
Post hoc: Prevention–no frame						0.14	.330	[−0.09, 0.37]
Post hoc: No frame–promotion						0.11	.474	[−0.11, 0.34]
Shapes-task autonomy	.68							
One-way ANOVA		(2, 741)	6.27	.002	.014			
Post hoc: Prevention–promotion						0.37	.005	[0.09, 0.65]
Post hoc: Prevention–no frame						0.02	.979	[−0.26, 0.30]
Post hoc: No frame–promotion						0.35	.009	[0.07, 0.63]
Shapes-task competence	.88							
One-way ANOVA		(2, 741)	1.76	.172	.002			
Post hoc: Prevention–promotion						0.22	.174	[−0.07, 0.50]
Post hoc: Prevention–no frame						0.17	.342	[−0.12, 0.46]
Post hoc: No frame–promotion						0.05	.924	[−0.24, 0.33]
General relatedness	.95							
One-way ANOVA		(2, 741)	2.88	.057	.005			
Post hoc: Prevention–promotion						0.38	.045	[0.01, 0.76]
Post hoc: Prevention–no frame						0.17	.545	[−0.21, 0.45]
Post hoc: No frame–promotion						0.21	.375	[−0.16, 0.59]

Note. Cronbach's alphas are for the combined sample of Studies 3a and 3b. Tukey's HSD post hoc tests were used for each dependent variable. Positive mean differences and CIs indicate higher means for the second condition within the pair. CI = confidence interval; HSD = honest significant difference.

information-processing phenomena via regulatory focus. In contrast, research on self-determination theory often has studied how different goal contents, such as financial success or friendship, relate to performance and well-being (for reviews, see Deci & Ryan, 2000, 2008; Ryan & Deci, 2000, 2008; Vansteenkiste & Ryan, 2013). Future research could examine whether regulatory focus influences how important people find goal contents like friendship versus financial success, which are more versus less likely to support needs for autonomy, competence, and relatedness (e.g., Deci & Ryan, 2000).

In addition, future research on the need-support model could examine how regulatory focus and need support jointly influence processes of goal pursuit. One such process is choice of goals that are subjectively higher or lower in self-determined motivation. Need support in an activity can affect the goals people choose to pursue in an activity, with higher need support increasing the likelihood that

people choose goals that they experience as self-determined (Milyavskaya et al., 2014). In combination with the current research, Milyavskaya et al.'s (2014) work suggests that promotion-focused individuals could be more sensitive to variations in need support when judging the value of current or future activities. In addition, the current research tended to show stronger effects of regulatory focus on autonomy support than on competence support and relatedness support. This finding suggests that individuals in a promotion focus could be especially sensitive to variations in autonomy support when judging the value of activities and setting goals. (For results that are consistent with this hypothesis, see Hui, Molden, & Finkel, 2013.) Future research should test this hypothesis in different domains, because research on regulatory focus and self-compassion (citation blinded) suggests that the importance of autonomy support in accounting for regulatory-focus effects depends on the outcomes being measured.

Although the focus of the current research was on situational differences in regulatory focus and need support, future research could examine individual differences. A challenge for such research is that there are numerous individual-difference measures of regulatory focus, and no consensus exists about which measure is best to use for which purpose (Gorman et al., 2012). Regulatory-focus measures differ in how much they emphasize particular aspects of the promotion and prevention systems (Haws, Dholakia, & Bearden, 2010; Summerville & Roese, 2008) and in their internal consistency, homogeneity, test–retest reliability, and ability to predict various outcomes (Haws et al., 2010). There also are numerous measures of psychological need support (e.g., Longo, Gunz, Curtis, & Farsides, 2016; Sheldon & Hilpert, 2012). Exploring relationships between each measure of regulatory focus and each measure of psychological need support was beyond the scope of this article, and it is a rich area for future research.

Limits on Generality of the Present Findings

I expect that the results will reproduce across historical periods and cultures as long as they have similar definitions of hopes and duties. Cultures can differ in assumptions of about need-supportiveness of duties and obligations (Miller, Das, & Chakravarthy, 2011), so smaller effect sizes could occur in cultures that emphasize the satisfactions of fulfilling duties and obligations to important others. When doing cross-cultural research on the need-support model, it will be important to remember that the need-support model defines autonomy the same way self-determination theory does (Deci & Ryan, 2000)—specifically, as really wanting to do an activity rather than as independence from others.[1]

In addition, although results with MTurk participants tend to replicate findings obtained in laboratory settings (e.g., Klein et al., 2014; Paolacci, Chandler, & Ipeirotis, 2010), differences could occur between laboratory and online settings. For example, participants' need support in a laboratory performance task could be influenced by whether they see they see others finishing faster or slower than themselves. In addition, times of the year that are tough on students (e.g., near finals) could produce stronger or weaker results in both online and lab studies, depending on how the time of year influences how motivated they are to get a bonus for succeeding at the performance task.

Conclusion

The need-support model proposes that regulatory focus and support for autonomy, competence, and relatedness can influence each other, which is possible because regulatory focus and need support pertain to judgments about how well things seem to be going. This model expands regulatory focus theory by adding differences in support for autonomy, competence, and relatedness, which have not been part of the past models of regulatory focus. However, the need-support model does not reduce promotion and prevention foci to these needs, because regulatory focus can influence subjective need support. The need-support model also expands self-determination theory by adding differences in promotion and prevention focus, which have not been part of the past models of self-determination. However, the need-support model does not reduce support for autonomy, competence, and relatedness to promotion focus and prevention focus, because levels of need support can influence how much of each regulatory focus people experience. In short, the need-support model expands rather than subsumes regulatory focus theory and self-determination theory, and it does not privilege one theory over the other.

What is needed at the current time is for researchers to test the need-support model on many phenomena. This future research could identify where to expand or modify the need-support model, and it will increase understanding of how needs-as-requirements relate to needs-as-motives.

Supplemental Material

The online supplemental material is available at http://pspb.sage-pub.com/supplemental.

Notes

1. There are many ways to define autonomy, and the need-support model defines it the same way self-determination theory does. In self-determination theory, *autonomy* means personally endorsing and feeling choiceful in activities rather than independence (e.g., Deci & Ryan, 2000). For example, if a situation is high in pressure to conform and causes someone to experience reactive independence because taking a stand is what they feel they have to do, the situation is low in autonomy support.

2. Studies 1b and 1d had one to two pages of pilot materials between the stimulus materials and the demographic questions. The topics of the pilot materials differed between these studies. Pilot materials and their results are not reported in this article, because the studies did not have a back button. Thus, participants' responses to the pilot materials could not have affected their responses to the stimulus materials.

3. The additional nine-item scale was the Emmons Mood Indicator (Diener & Emmons, 1984), on which higher scores indicated more positive mood (Cronbach's α = .92). In addition to testing the main hypotheses, Study 1c also examined whether participants would report more positive mood and higher overall need support in the promotion condition than in the prevention condition, and whether the regulatory-focus effect on overall need support would remain significant when controlling for mood. To test these hypotheses, I averaged the Balanced Measure of Psychological Needs (BMPN) items (with appropriate reverse-scoring) to create an index of overall need support (Cronbach's α = .86). There were significant effects of regulatory focus on mood, $t(183.89) = 3.34$, $p = .001$, $d = 0.47$, 95% confidence interval (CI) = [0.24, 0.94], and on the need-support index, $t(196) = 5.02$, $p < .001$, $d = 0.71$, 95% CI = [0.38, 0.88], with more positive scores in the promotion condition. Regressing need support on regulatory focus and mood showed significant effects of mood, $t = 7.80$, $b = .43$, $p < .001$, 95% CI = [0.20, 0.65], and of regulatory focus, $t = 3.76$, $β = .23$, $p < .001$, 95% CI = [0.26, 0.44]. Thus, although writing about promotion experiences put people in a better mood, controlling for mood did not eliminate the regulatory-focus effect on need support.

4. For all independent-samples t tests reported in this article, I conducted Levene's tests for homogeneity of variances and adjusted degrees of freedom accordingly, as shown in Tables 1, 4, and 6.

5. The additional nine-item scale was the Emmons Mood Indicator (Cronbach's α = .93). In addition to testing the main hypotheses, Study 2b also examined whether participants would report more positive mood in the high need-support condition and whether the need-support effect on promotion and prevention labeling would remain significant when controlling for mood. There was a significant need-support effect on mood, $t(196) = 6.34$, $p < .001$, 95% CI = [0.75, 1.50], $d = 0.90$, with more positive mood in the higher need-support condition. Regressing promotion labeling on mood and effect-coded need support (low = −1, high = 1) showed significant effects of need support, $t = 3.43$, $b = .77$, $p = .001$, 95% CI = [0.33, 1.22], and of mood, $t = 2.12$, $b = .17$, $p = .035$, 95% CI = [0.01, 0.33]. Regressing prevention labeling on mood and effect-coded need support showed a significant effect of need support, $t = −2.81$, $b = −.60$, $p = .006$, 95% CI = [−1.03, −0.18], but no significant effect of mood, $t = 0.24$, $β = .02$, $p = .813$, 95% CI = [−0.13, 0.17]. Thus, although writing about more need-supportive experiences put people in a better mood, mood accounted for little or no variance in labeling of experiences as promotion- or prevention-focused when controlling for manipulated need support.

6. Variance inflation factors (VIFs) were satisfactory in the multiple regression models within Studies 2a, 2b, and the Study 2 combined sample. Autonomy VIFs ranged from 3.11 to 3.59, competence VIFs ranged from 2.25 to 2.67, relatedness VIFs ranged from 3.31 to 3.57, and other-focus VIFs ranged from 1.09 to 1.27.

7. Results were almost identical when including the 27 participants in Study 3a who got one or more trials of the performance task wrong (5% of the sample, 11 in prevention and 16 in promotion). The same between-condition effects on general autonomy, competence, and relatedness, and on shapes autonomy, competence, and relatedness were significant (ps = .012, .035, .039, .006, .104, and .044, respectively) and effect sizes were slightly smaller (ds = 0.22, 0.19, 0.18, 0.24, 0.14, and 0.18, respectively).

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