Contrasting regulatory focus and reinforcement sensitivity: A daily diary study of goal pursuit and emotion.

By: Kari M. Eddington, Catherine Majestic, & Paul J. Silvia

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Abstract:

This study examined the moderating effects of motivational orientation on daily affect and goal pursuit. Based on recent revisions to Reinforcement Sensitivity Theory, measures of BIS (BIS-r and Fight–Flight–Freeze System or FFFS), BAS, and regulatory focus (Promotion and Prevention) were administered to 84 college students who participated in a 14-day diary study. Diary items assessed goal-directed activities and positive and negative affect (PA and NA). Results showed that higher FFFS and Promotion were consistently associated with higher NA and PA, respectively, and FFFS was also associated with avoidance of responsibilities. Higher Promotion predicted greater daily goal progress and tendencies to rate goals as more promotion- and prevention-focused. Relationships between daily goal-directed activities and both sadness and satisfaction were moderated by BIS-r. Inconsistent with our hypothesis, low BAS Reward Responsiveness predicted increased enthusiasm with greater goal progress. A trend in the data showed evidence of regulatory fit in daily activities predicted by both Promotion and Prevention. Implications for the theoretical and practical distinctions between measures of motivational orientation are discussed.

Keywords: motivation | goal pursuit | regulatory focus | reinforcement sensitivity | diary study | emotion | psychology | personality

Article:

1. Introduction

Motivational theories distinguish between two broad classes of self-regulatory systems, one involving an orientation toward approach-type goals and sensitivity to reward and the other involving an orientation toward avoidance-type goals and sensitivity to punishment. Within this

broad framework, biobehavioral models of reinforcement sensitivity and social cognitive models of self-regulation have been proposed. Biobehavioral models (e.g., Depue and Collins, 1999, Fowles, 1988 and Gray, 1990) focus on the neurophysiological substrates of motivational systems (the behavioral approach system or BAS, and the behavioral inhibition system or BIS) and their contributions to personality and behavior. Social cognitive models of self-regulation, such as Higgins' Regulatory Focus Theory (RFT) focus on how aspects of social development and cognition influence the internalization of goal representations within the promotion or prevention system (e.g., Higgins, 1997 and Higgins et al., 2001).

Across both categories of models, the process of goal pursuit is closely tied to emotion, but in somewhat different ways. The approach system associated with Reinforcement Sensitivity Theory (RST) is thought to be inherently linked with positive affect (PA) and the avoidance system with negative affect (NA; Depue and Iacono, 1989, Fowles, 1988, Gray, 1990 and Maxwell and Davidson, 2007). However, there has been some debate about this simple distinction. Carver (2004), for example, has shown that negative emotions such as sadness and anger (see also Harmon-Jones, 2003) can arise in the approach system, particularly when progress toward approach goals is perceived as slow or insufficient. This view is consistent with a control-process model of goal pursuit in which emotions are contingent upon ongoing feedback regarding goal progress (Carver & Scheier, 1990). Furthermore, Corr (2001) has suggested a joint subsystems hypothesis (JSH) proposing that BIS and BAS may exert both facilitatory and antagonistic effects. JSH predicts that appetitive responses and PA should be highest with high BAS combined with low BIS, while aversive responses and NA should be highest with high BIS combined with low BAS, particularly when stimuli are mild (not strongly emotionally evocative) and BIS/BAS function is normal (Corr, 2002).

Social cognitive models also make predictions about emotion and goal pursuit. RFT suggests that when one's dispositional orientation toward promotion or prevention matches the strategy required by a task or goal (termed "regulatory fit"), performance improves and goal attainment is more likely (Higgins et al., 2001). Promotion goal success leads to cheerfulness and pride while failure leads to dejection and sadness; prevention goal success leads to calmness and relief while failure leads to anxiety and fear (Higgins et al., 1997 and Strauman, 1989). The connection between regulatory fit and performance or goal attainment is supported by numerous studies (e.g., Keller and Bless, 2006 and Spiegel et al., 2004). However, the secondary link to emotional outcomes (and the specificity thereof) is less well established (Silvia & Eddington, 2012).

Both categories of models assume that there are stable, measurable individual differences in dispositional tendencies toward approach/promotion and avoidance/prevention. BAS has been conceptualized as multidimensional in nature (Carver & White, 1994), and recent refinements of

RST (McNaughton & Gray, 2000) have subdivided the BIS system into two separate but related components (Pickering & Corr, 2008). RFT postulates that dispositional tendencies toward promotion or prevention follow from a history of successful goal attainment in that domain. An important question for researchers concerns the conceptual boundaries that distinguish regulatory focus from reinforcement sensitivity. Furthermore, few studies have examined the correspondence of these dispositional tendencies with actions and reactions in "real life".

Gable, Reis, and Elliot's (2000) daily diary study found that BIS moderated the relationship between negative events and negative mood: higher BIS participants reported a more negative mood associated with negative events. BAS did not moderate the relationship between positive events and mood. However, the authors used only global BIS and BAS scores, and given more recent conceptualizations of these scales as multidimensional, subscales may show differential moderating effects. The primary aim of the current study was to extend the daily diary approach to contrast reinforcement sensitivity and regulatory focus in everyday emotion and goal-directed activities. As such, this study addresses two important limitations in the current literature, the lack of direct comparisons of motivational constructs and the paucity of data on the relationship between underlying motivational systems and everyday self-regulation.

We had several hypotheses. First, people high in BIS should show higher ratings of daily NA, greater behavioral avoidance, and a stronger relationship between NA and goal-directed activities (making poor goal progress or avoiding responsibilities). Revisions to RST divided the BIS system into a BIS component (referred to here as BIS-r) plus a Fight–Flight–Freeze System (FFFS). The FFFS mediates reactions to conditioned and unconditioned stimuli and is associated with fear and avoidance. BIS-r is thought to be activated by goal conflict and generates anxiety (e.g., worry), driving resolution of the conflict (Pickering & Corr, 2008). Both are strongly correlated with neuroticism, depression, and anxiety (Keiser & Ross, 2011) and load on a factor with NA (Gomez & Corr, 2010).Therefore, we expected that BIS-r and FFFS would be correlated with daily NA and that higher FFFS would be associated with higher avoidance.

The relationship between BAS and positive affect (PA) has had mixed support. BAS is more consistently associated with trait PA (e.g., Heubeck et al., 1998 and Quilty and Oakman, 2004) but not always (Levinson, Rodebaugh, & Frye, 2011). Attempts to predict actual experiences of PA with BAS either in daily life or lab scenarios have been less successful (e.g., Levinson et al., 2011). However, we expected that BAS should be associated with higher daily PA, and people high in the reward responsiveness component of BAS (BAS-RR) should have a stronger relationship between PA and goal progress. Although not our primary aim, we also explored whether the relationships between goal-directed activities and affect were moderated by the

interaction of BIS and BAS. Consistent with JSH, reactivity to anticipated reward or punishment in everyday life may be better explained by the interactive effects of the two motivational systems than by either system alone.

Finally, consistent with RFT, we expected that measures of Promotion and Prevention, but not BIS/BAS, would moderate the relationships between goal progress and the extent to which people are focused on a promotion or prevention goal, respectively. Specifically, among those with a stronger prevention (or promotion) orientation, greater perceived goal progress would occur when focused on pursuing a prevention (or promotion) goal.

2. Method

2.1. Participants

Participants were 89 students from introductory psychology courses (66 women, M = 18.5 years old, SD = 0.89) who completed one laboratory visit and the online daily diary and received course credit for participation.

2.2. Questionnaires

2.2.1. Behavioral inhibition system/behavioral activation system scales

The BIS/BAS scales (Carver & White, 1994) have 20 items rated with a 4-point Likert scale (1 = strongly agree, 4 = strongly disagree). The BAS scale has three subscales: Reward Responsiveness (RR), Drive (D) and Fun Seeking (FS), which showed good reliability (Cronbach's α = 0.74, 0.79, and 0.75, respectively), consistent with previous studies (Carver & White, 1994). Heym, Ferguson, and Lawrence (2008) used confirmatory factor analysis to generate subscales for FFFS and BIS-r. Reliability of the FFFS and BIS-r scales was marginal (α = 0.66 and 0.69, respectively) in the current study (compared to α = 0.75 and 0.73 in Heym et al., 2008).

2.2.2. Regulatory Focus Questionnaire

The RFQ (Higgins et al., 2001) has 11 items rated on a scale from 1 (*never or seldom*) to 5 (*very often*) yielding scores for Promotion and Prevention. The RFQ scales have good internal consistency (α = 0.73 for Promotion, α = 0.80 for Prevention; Higgins et al., 2001), and in our sample alphas were similar (α = 0.87 for Promotion, α = 0.75 for Prevention).

2.3. Daily diary items

The daily diary assessed five broad domains: affect, physical functioning, social functioning, activities/stressors, and cognition. Ratings for all items ranged from 1 (“not at all”) to 7 (“extremely”). The current study focused only on goal-related activities and affect. Two items assessing goal-related activity were created for the current study: *I made good progress toward my goals today* and *I avoided things that I needed to do today*. To assess promotion or prevention goal focus, two items asked the respondent to rate the extent to which the most important goal of the day *involved trying to make something good happen*(promotion) or *involved trying to keep something bad from happening* (prevention).

The affect domain included four positive (happy, proud, satisfied, enthusiastic) and four negative (sad, anxious, guilty, feel like a failure) items, several of which have been used in previous experience sampling studies (e.g., Kwapil et al., 2011). We intentionally included items that reflected self-evaluative emotions, which might be particularly relevant in daily self-regulation.

2.4. Procedures

After providing informed consent, participants completed a battery of questionnaires that included the BIS/BAS and RFQ scales and received detailed instructions for completing the 14-day diary, administered using an online survey platform. A daily e-mail link to the survey was sent for 14 consecutive days. Each entry had a computer-generated time stamp. For diary entries completed less than 18 h apart, only the first entry was included in the analyses to avoid having daily evaluations that substantially overlapped in time, excluding 19 entries. We required a minimum of 5 completed entries, excluding five participants and yielding a final sample of 84.

2.5. Data structure and analytic strategy

Diary data have a two-level structure: a between-person level (Level 2: BIS/BAS and RFQ) and a within-person level (Level 1: variables assessed daily). We centered the Level 2 variables at the sample’s grand mean and the Level 1 variables at each person’s own mean (i.e., group-mean centering; Enders & Tofighi, 2007). The models were estimated with Mplus 6.1, using maximum likelihood with robust standard errors. The coefficients from the multilevel models were unstandardized. For models testing the main effects of the Level 2 on the Level 1 variables (affect indicators and goal-directed activities), all of the BIS/BAS (three BAS and two BIS subscales) and RFQ scales were included in each model.

For testing specific hypotheses about motivational orientation as a moderator, Level 2 avoidance-related scales (BIS-r, FFFS, and Prevention) were entered together as predictors in one set of models and approach-related scales (BAS-RR, BAS-Drive, BAS-FS, and Promotion)

were entered as predictors in a separate set of models. For testing JSH predictions and to enable comparisons with previous studies, we ran a separate set of models entering the overall BIS and BAS total scores (rather than subscales) along with a BIS × BAS interaction term (using mean-centered BIS and BAS values). Each set of models included each combination of Level 1 variables (goal progress with each affect item, and avoiding responsibilities with each affect item) to produce slopes.

3. Results

3.1. Survey completion

On average the participants completed 9.8 (SD = 3.0) of 14 surveys (70%) and took about 16 min to complete each. The time stamps on the surveys showed that most (67%) were completed between the hours of 3:00 pm and 1:00 am.

3.2. Motivational orientations as predictors of affect and goal-directed behavior

Table 1 shows the intercorrelations among the motivational orientation scales. We detected one outlier (an extreme low score that was more than one SD below the next lowest score) in the distribution of BIS-r and another in the distribution of BAS-RR; these scores were excluded from subsequent analyses.

Table 1. Descriptive statistics and correlations among BIS/BAS and RFQ scales.

Scale	M, SD	1	2	3	4	5	6
1. BIS-r	2.74, 0.52	1.00					
2. FFS	3.12, 0.45	0.52[a]	1.00				
3. BAS-Drive	2.74, 0.52	−0.12	−0.02	1.00			
4. BAS-FS	2.83, 0.57	−0.18[c]	0.01	0.53[a]	1.00		
5. BAS-RR	3.44, 0.40	0.00	0.16	0.50[a]	0.50[a]	1.00	
6. RFQ-Prom	4.19, 0.59	−0.11	−0.05	−0.12	0.10	0.20[c]	1.00
7. RFQ-Prev	3.98, 0.82	−0.08	0.01	0.10	0.03	0.25[b]	0.18[c]

a $p < 0.001$.

b $p < 0.01$.

c $p < 0.05$.

Table 2 shows the results from models testing the relationships among the diary items and measures of motivational orientation. All four NA items were predicted by FFFS, and higher BIS-r predicted higher sadness and lower pride. BAS-RR was inversely related to guilt, sadness, and feeling like a failure. All four PA items were predicted by Promotion, but Prevention was unrelated to affect. Regarding goal-directed activities, higher Promotion and Prevention predicted greater perceived daily goal progress; Promotion also predicted higher ratings on both promotion and prevention goal focus. Higher FFFS, and lower BAS-Drive, predicted more avoidance of daily responsibilities.

Table 2. Diary item descriptive statistics and relationships with motivational orientation.

Diary Item			**BIS-r**		**FFFS**		**BAS-Drive**		**BAS-Fun Seeking**		**BAS-RR**		**RFQ-Promotion**		**RFQ-Prevention**	
	M	ICC	b	z	b	z	b	z	b	z	b	z	b	z	b	z
Happy	4.91	0.38	−0.21	−1.82	−0.16	−1.42	0.06	0.44	0.02	0.18	0.01	0.09	**0.42**	**3.28a**	0.02	0.19
Satisfied	1.79	0.29	−0.21	−1.44	−0.13	−1.02	0.20	1.68	−0.04	−0.37	−0.12	−0.88	**0.42**	**3.58a**	0.16	1.86
Proud	4.02	0.48	**−0.34**	**−1.97c**	−0.07	−0.46	0.20	1.26	0.00	0.03	−0.06	−0.32	**0.43**	**2.60b**	0.20	1.33
Enthusiastic	4.23	0.37	−0.23	−1.42	−0.05	−0.38	0.20	1.42	0.08	0.62	−0.07	−0.45	**0.50**	**3.50a**	0.05	0.45
Anxious	2.74	0.42	0.21	1.30	**0.33**	**2.22c**	0.08	0.49	0.07	0.44	−0.33	−1.76	−0.07	−0.37	0.13	0.93
Guilty	1.83	0.40	0.03	0.28	**0.44**	**3.72a**	0.00	−0.03	−0.02	−0.17	**−0.35**	**−2.48b**	−0.17	−1.43	0.09	0.89
Sad	2.24	0.34	**0.23**	**1.98c**	**0.34**	**2.90b**	−0.03	−0.23	0.07	0.62	**−0.29**	**−2.17c**	−0.19	−1.42	0.16	1.70
Feel like a failure	1.71	0.51	0.13	1.40	**0.39**	**3.54a**	−0.09	−1.01	0.06	0.70	**−0.32**	**−2.42c**	**−0.24**	**−2.22c**	0.02	0.17
Goal progress	4.84	0.29	−0.21	−1.61	0.01	0.06	0.21	1.59	0.01	0.11	0.04	0.26	**0.44**	**3.87a**	**0.25**	**2.79b**
Avoid responsibili	2.42	0.36	0.04	0.31	**0.29**	**2.09c**	**−0.24**	**−2.03c**	0.06	0.43	−0.09	−0.61	−0.22	−1.48	−0.02	−0.19

Diary Item			BIS-r		FFFS		BAS-Drive		BAS-Fun Seeking		BAS-RR		RFQ-Promotion		RFQ-Prevention	
	M	ICC	b	z	b	z	b	z	b	z	b	z	b	z	b	z
ties																
Promotion goal focus	5.27	0.47	0.06	0.29	−0.26	−1.46	0.28	1.38	0.05	0.28	0.03	0.16	**0.50**	**3.09 a**	0.17	1.18
Prevention goal focus	4.52	0.33	0.06	0.31	−0.07	−0.41	0.18	0.97	0.08	0.51	0.16	0.79	**0.39**	**2.24 c**	0.11	0.79

Note: ICC = intraclass correlation.Significant relationships are shown in bold.

a $p < 0.001$.

b $p < 0.01$.

c $p < 0.05$.

3.3. Moderation of relationships between goal-related activity and affect

Consistent with our hypothesis, BIS-r (but not FFFS) significantly moderated the linear relationships between sadness (but not other NA items) and avoiding responsibilities (b = 0.12, z = 2.28, p < 0.05) and between sadness and goal progress (b = 0.11, z = 2.27, p < 0.05). Fig. 1 illustrates the distribution of slopes for avoidance and sadness across the range of BIS-r scores. Although we did not have specific hypotheses about PA, analyses on the four PA items showed that BIS-r moderated the relationship between goal progress and satisfaction (b = −0.17, z = −2.92, p < 0.01); people lower in BIS-r experienced more satisfaction when making better goal progress. Prevention scores did not moderate any of the relationships between affect and goal-directed activities.

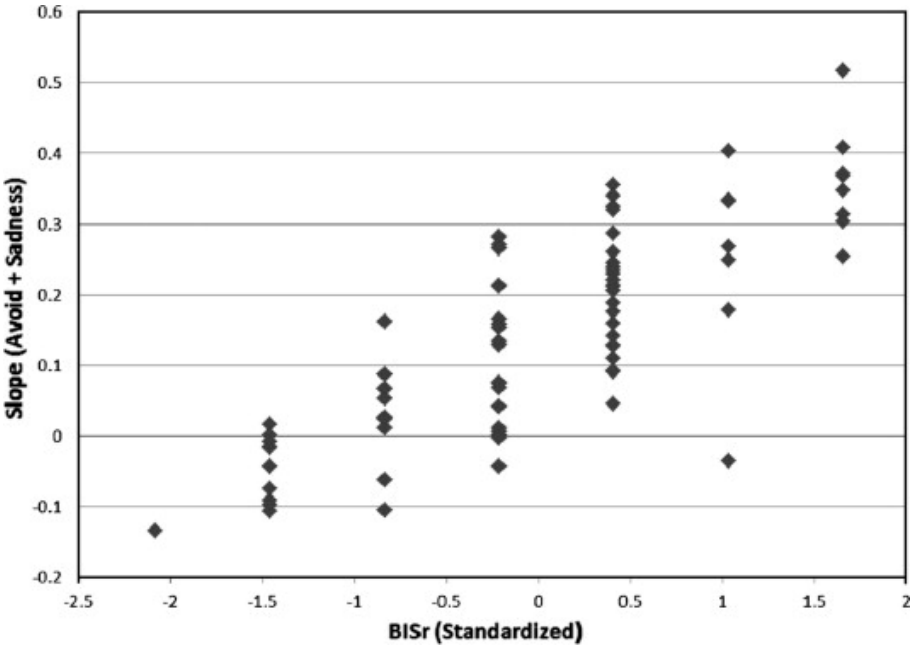

Fig. 1. Slope of avoiding responsibilities and sadness across the range of BIS-r scores.

We also predicted that BAS-RR would moderate the relationship between PA and goal progress. BAS-RR did moderate the relationship between enthusiasm and goal progress ($b = -0.14$, $z = -2.27$, $p < 0.05$) and showed a nonsignificant trend in moderating goal progress and happiness ($b = -0.11$, $z = -1.91$, $p = 0.06$) but not the other two PA items. However, as illustrated in Fig. 2, these results are not consistent with our hypotheses. The slopes in the figure show that people lower in BAS-RR felt more enthusiastic and happy on days in which they made more goal progress. Similarly, BAS-RR moderated the relationship between avoiding responsibilities and happiness ($b = 0.16$, $z = 3.16$, $p < 0.01$) as well as enthusiasm ($b = 0.25$,$z = 4.37$, $p < 0.001$), again such that people with lower BAS-RR scores tended to feel less happy and enthusiastic when avoiding responsibilities. The moderating effects of BAS-Drive, BAS-FS, and RFQ-Promotion were all non-significant.

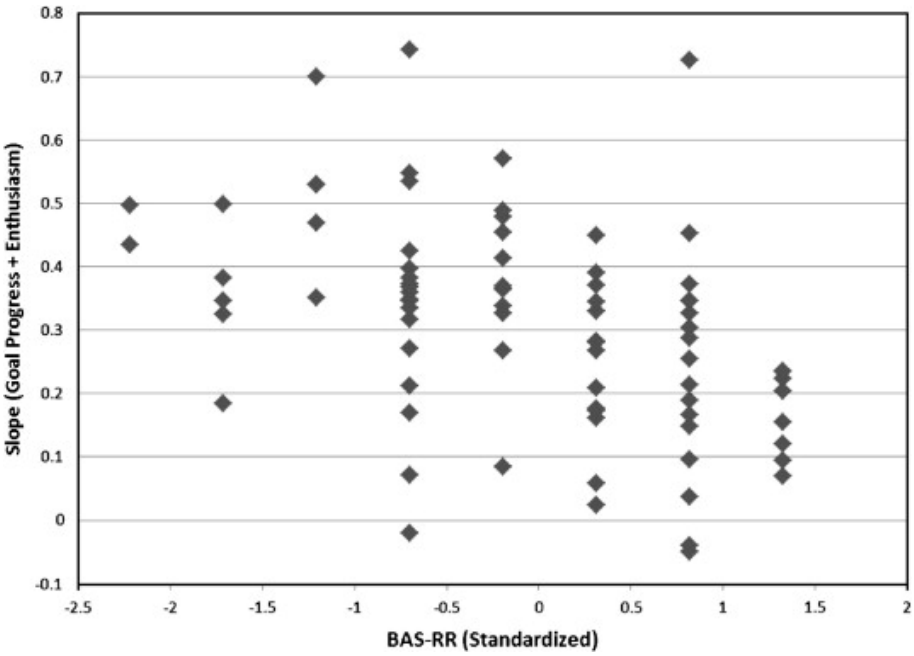

Fig. 2. Slope of goal progress and enthusiasm across the range of BAS-RR scores.

Although we did not have specific hypotheses about NA, we ran post hoc analyses on the four NA items. Promotion moderated the relationship between goal progress and guilt ($b = -0.08$, $z = -2.14$, $p < 0.05$), suggesting that people high in promotion felt less guilty when they were making more goal progress. No moderating effects were found for avoidance and NA, and no moderating effects were found for any of the BAS scales.

Our exploratory models of JSH testing the moderating effects of a BIS × BAS interaction showed largely null results. The only significant effect involved the relationship between goal progress and feeling like a failure ($b = 0.47$, $z = 2.38$, $p < 0.05$), indicating that participants with high BIS and high BAS or low BIS and low BAS tended to report feeling more like a failure when making good goal progress, while those with a high score on only BIS or BAS (but not both) reported feeling less like a failure when making good progress.

3.4. Regulatory fit and goal progress

Our test of regulatory fit in daily life showed a nonsignificant trend for Prevention to moderate the relationship between perceptions of goal progress and ratings of daily prevention goal focus ($b = 0.10$, $z = 1.76$, $p = 0.07$) and for Promotion to moderate goal progress and promotion goal focus ($b = 0.11$, $z = 1.79$, $p = 0.07$). Specifically, people scoring higher in Prevention (or Promotion) reported making more goal progress on days in which their most important goal was more strongly prevention (or promotion) focused. None of the BIS/BAS scales showed similar moderating effects of goal progress and goal focus.

4. Discussion

This study examined the relationship between trait-level motivational orientations and daily goal-related activities and emotions. We sought to contrast two popular models of motivational orientation: reinforcement sensitivity (taking into account recent revisions to RST) and regulatory focus. The revised BIS scales showed an interesting pattern of results. Higher FFFS was consistently associated with higher daily NA, while a relationship between BIS-r and NA was observed only in the context of slowed or stalled goal pursuit. Specifically, individuals with higher BIS-r reported feeling greater sadness (and also less satisfaction) on days when perceived goal progress was lower or when avoidance of responsibilities was higher.

These findings suggest that FFFS may measure vulnerability to negative emotions more broadly, a notion supported by previous studies (Gomez and Corr, 2010 and Keiser and Ross, 2011). To the extent that the BIS-r scale is assessing an underlying system activated by goal conflict, the moderating effect of BIS-r raises the question of whether the problems with goal progress may be attributable to goal conflict (e.g., knowing you need to study for an exam but also wanting to increase social engagement by going out with friends). These findings suggest that BIS-r might be measuring a component of BIS that is more responsive to the ups and downs of dynamic self-regulation.

Previous studies have failed to support the relationship between BAS scores and daily PA, either broadly or in relation to daily life events (e.g., Gable et al., 2000). Our results were consistent, although BAS-RR was associated with lower NA. A counterintuitive finding suggests that people with lower BAS-RR scores experience greater enthusiasm and happiness on days in which goal progress was higher or avoidance was lower. One possible explanation may be that the diary items did not assess the attainment of rewards per se. Progress on goals does not equate to achievement, and it may be that people who are high on sensitivity to reward may be reactive to the final outcome (achievement) and may be relatively unreactive to progress leading up to that final outcome. We also found that higher BAS-RR was associated with lower avoidance in general, suggesting a quality of persistence in goal pursuit that may increase the likelihood of eventual achievement. Replication and expansion of these findings, perhaps with a longer time frame and more explicit assessment of achievement, are needed to further examine the role of BAS in everyday goal-directed activities.

Our data did not show strong support for the JSH. Several previous studies have either failed to find a significant effect of a BIS × BAS interaction term, or have reported mixed results, in models predicting affect and behavior (Gomez et al., 2004, Hundt et al., 2007 and Kimbrel et al., 2010). These studies have all used different measures of BIS- and BAS-related constructs along with different outcomes. As noted by Corr (2001), the lack of consensus regarding optimal

measurement of these constructs is a major impediment to progress in this area. Furthermore, the presence of a significant interaction is only one indication of joint subsystems effects, which assume that the presence of important BIS and BAS inputs influence outcomes (Corr, 2002).

We did not expect to find a significant role for the RFQ scales in predicting relationships between daily goal-related activities and emotion, so the null results were not surprising. An unexpected finding was the relationship between Promotion and measures of daily PA. The strongest empirical support for regulatory focus has come primarily from studies of regulatory fit, while evidence supporting predictions about emotional experiences has been scarce. We are unaware of any other published studies that have used the RFQ in relation to daily diary measures, so our results should be interpreted with caution. Our data also showed that both Promotion and Prevention were associated with greater perceived goal progress, and that Promotion was associated with both higher promotion and prevention goal focus. Thus, it seems that these scales are tapping into a construct that is more strongly associated with daily goal-related activities and possibly goal representations, but the specificity of the two scales with daily ratings of goal focus was not observed.

Our hypotheses regarding regulatory fit in everyday life were supported only at the trend level. We found that people with higher Prevention tended to report more goal progress on days in which their most important goal was rated higher on prevention focus (i.e., keeping something bad from happening). Likewise, people with higher Promotion tended to report more goal progress on days in which their most important goal was rated higher on promotion focus (i.e., making something good happen). However, given that the results did not meet traditional standards of statistical significance, they must be interpreted with caution. Still, the findings suggest that regulatory fit may apply in everyday self-regulation, expanding the ecological validity of RFT.

Although our study focused on healthy young adults, populations with known deficits in self-regulation such as people with mood disorders may differ. Goals are fundamental in shaping one’s sense of self and are interwoven with emotional experiences (Silvia & Eddington, 2012), and the ability to respond in an adaptive way to disappointments or failures is critical to well-being (Wrosch, Scheier, Miller, Schulz, & Carver, 2003). Studies that use intensive, repeated assessments of daily life experiences allow researchers to identify characteristics associated with an increased risk for a breakdown in adaptive self-regulation.

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