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Dimensions of perfectionism, behavioral inhibition, and rumination

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ABSTRACT

The behavioral inhibition system (BIS) is believed to underscore individual differences in perfectionism, but existing research has yielded an inconsistent pattern of associations. The current study sought to clarify the associations among trait perfectionism, behavioral inhibition, and behavioral activation in two samples (N 's of 112 and 234). We also investigated the association between these factors and rumination. All participants completed measures of perfectionism and BIS/BAS activation. Sample 2 participants also completed a trait measure of rumination. Data analyses showed across samples that self-oriented perfectionism is associated with BAS and BIS activation, suggesting approach and avoidance tendencies. Self-oriented perfectionism was associated with BAS-Drive but not with BAS fun-seeking. In contrast, socially prescribed perfectionism was linked with BIS scores. Further, socially prescribed perfectionism was correlated with trait rumination, and behavioral inhibition partially controlled this relationship. These results demonstrate links between perfectionism and BIS activation and suggest that anxious forms of distress and maladaptive cognitive styles among perfectionists are mediated by BIS activation. The findings suggest that certain perfectionists are predisposed to distress and cognitive rumination as a result of a strong BIS.

1. Introduction

In recent years, there has been increasing attention paid not only to the deleterious effects of trait perfectionism, but also to factors involved in its development and maintenance. One area receiving substantial interest is the cognitive processing of threat and reward stimuli. Perfectionism is marked by several cognitive biases, including a tendency towards rumination and generalization of failures, strong attention to errors and a tendency to interpret ambiguous feedback as critical or negative (Alden, Bieling, & Wallace, 1994; Gilbert, Durrant, & McEwan, 2006). Recent attempts to explain these biases have focused on sensitivity of the behavioral inhibition and approach systems (BIS/BAS), a neurologically based model of goal regulation. However, the mixed findings to date necessitate further research. Accordingly, the current study re-examines the extent to which trait perfectionism is associated with indices representing the behavioral activation and behavioral inhibition systems. Furthermore, the BIS is proposed as a mediating variable in the association between perfectionism and rumination, strengthening the argument for its role in the development and maintenance of perfectionism.

1.1. Trait perfectionism

This research focuses primarily on the Hewitt and Flett (1991) tripartite model of perfectionism. In this model, self-oriented perfectionism (SOP) is defined broadly as a strong internal motivation to be perfect and to set unrealistic standards for oneself. Socially prescribed perfectionism (SPP) reflects a need to earn and maintain approval from others, coupled with the belief that others expect perfection. The third MPS variable, other-oriented perfectionism, is not considered in this study, as it has been associated with interpersonal difficulty, but not consistently with negative personal symptoms related to cognitive processing (Flett, Besser, Davis, & Hewitt, 2003; Hewitt & Flett, 1991).

Whether SOP is maladaptive is controversial, as it is related positively to conscientiousness (Klibert, Langhinrichsen-Rohling, & Saito, 2005) but negatively with self-actualization, unconditional self-acceptance, and tolerance for failure (Flett et al., 2003). The diathesis-stress view proposed by Hewitt and Dyck (1986) highlights the need to consider contextual factors. Self-oriented perfectionists may exhibit strong drive and resourcefulness, but they also are more vulnerable to depression in the face of serious crises or failures that trigger cognitive biases (see Hewitt & Flett, 2002).

Socially prescribed perfectionism (SPP) is primarily maladaptive. SPP is associated with depression, suicidal ideation, anxiety, and stress, partially due to a motivation to avoid failure (Blankstein, Lumley, & Crawford, 2007). People with high levels of SPP also

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respond to ambiguous or critical feedback as very negative (Gilbert et al., 2006) and view their own social behavior as negative, even when others observe their interactions as successful (Alden et al., 1994). These pessimistic interpretations and the need to avoid failure may partially be caused by a cognitive predisposition towards vigilance and sensitivity to threat (Flett, Hewitt, Oliver, & MacDonald, 2002), cognitive styles that should be closely linked with high BIS functioning.

1.2. Behavioral inhibition and approach systems

Reinforcement Sensitivity theory posits that three neurologically distinct mechanisms within the brain influence our emotions, cognitions and behavior, with respect to appetitive and aversive stimuli (Gray & McNaughton, 2000). The behavioral inhibition system (BIS) and behavioral approach system (BAS) are systems that moderate goal-oriented behavior. Although both systems are necessary for survival, they can lead to psychopathological conditions when operating in the extremes of hyper- or hypo-activation. The Fight, Flight or Freeze System (FFFS) responds to immediate threats of harm, as well as both conditioned and unconditioned threats. Although the FFFS is not central to the concerns of this article, it is worth noting that, to date, no one has considered the role high sensitivity to punishment may play in the development of perfectionism. That is, perfectionists may not only reflect greater concern about punishment, but also greater emotional pain when experiencing punishment.

The BAS is a reward-sensitive system that mediates goal-oriented behavior (Gray & McNaughton, 2000). It responds to rewards or the cessation of punishments by activating emotions that encourage approach behaviors, such as happiness, hope or zeal (Gray, 1990; McGregor, Gailliot, Vasquez, & Nash, 2007). High BAS sensitivity is believed to be linked with seeking incentives and rewards by pursuing exceptionally high goals (Johnson & Carver, 2006), and this suggests that the exceptional goal striving of perfectionists may, at least in part, reflect BAS sensitivity. Extreme BAS sensitivity should not be regarded as adaptive because it is linked with lifetime levels of hypomania (Johnson & Carver, 2006).

The BIS also mediates goal behavior by responding to stimuli indicating a blocked goal or the presence of conflicting goals. Although it was previously understood that the BIS responded to expectation of threats or aversive stimuli that are certain to come, this role has been re-assigned to the FFFS, in both the neurological structures involved (Gray & McNaughton, 2000) and in its measurement as a personality construct (Heym, Ferguson, & Lawrence, 2008; Smillie, Jackson & Dalgleish, 2006). The BIS is closely associated with negative affect and depression (Gable, Reis, & Elliot, 2000; Kasch, Rottenberg, Arnow, & Gotlib, 2002). High BIS scores predict anhedonic depression when BAS is low and mixed anxiety–depression when BAS is high (Hundt, Nelson-Gray, Kimbrel, Mitchell, & Kwapił, 2007). The authors suggest that the latter effect may be due to the constant experience of approach/avoidance conflicts.

Recent studies relating the BIS/BAS and perfectionism have resulted in mixed findings. There is ample indirect evidence linking the BIS¹ and aspects of perfectionism. For instance, an indirect link is suggested by measures of anxiety sensitivity, which have been significantly associated with not only self-oriented perfectionism (SOP) and socially prescribed perfectionism (SPP), but the BIS ($r = .58$) as well (Flett, Greene, & Hewitt, 2004). In addition, socially prescribed perfectionists are highly sensitive to criticism, evaluate their own social behavior more negatively than others and are more likely to

interpret ambiguous feedback as negative (Alden et al., 1994; Hewitt & Flett, 1993).

Despite theoretical expectations, recent findings for BIS/BAS and perfectionism combine to provide an unclear picture. Two studies have found a strong link between perfectionism and high BIS sensitivity. In one, all perfectionism dimensions were strongly associated with BIS sensitivity (.50–.61), while SOP was associated with BAS-Drive and Reward, but not fun-seeking (Flett et al., 2002). O'Connor and Forgan (2007) replicated these findings using the same measures with a larger sample, though the correlations were more modest. Again, SOP and SPP were associated with the BIS subscale ($r = .33$ and $.35$, respectively) while SOP was associated positively but weakly with BAS-Drive ($r = .14$).

In contrast, other studies have yielded results not in keeping with these findings. One study with the Frost MPS (Frost, Marten, Lahart, & Rosenblate, 1990) found that the personal standards subscale (which is similar to SOP) yielded similar correlations to previous studies, but only one of the other five MPS dimensions (Doubts about Actions) was linked with BIS (Chang et al., 2007). Overall, the authors expressed surprise over the fact that few significant correlations with the BIS subscale emerged. In related research conducted while developing a new performance perfectionism scale, Chang (2006) found that BIS was associated positively with a measure of negative self-oriented perfectionism but it was entirely unrelated to measures of socially prescribed perfectionism.

A unique and unexpected pattern emerged from a study by Kaye, Conroy, and Fifer (2008). This study of 372 college students found that the associations obtained were small in magnitude, and SPP and SOP were both associated with *lower BIS scores*. Although the perfectionism dimensions were linked with reduced BIS scores, both perfectionism dimensions were associated with higher levels of fear of failure.

The current study not only re-examined the associations between perfectionism and BIS and BAS indices, it also tested the extent to which the BIS could mediate the often-found link between trait perfectionism and rumination (Harris, Pepper, & Maack, 2008; O'Connor and Forgan, 2007). Rumination is focused on here because of the theoretical support for BIS being linked to rumination and an underlying proneness to anxiety (Gray & McNaughton, 2000). This association was summarized aptly by Corr and Perkins (2006) who noted that goal conflicts (e.g., approach versus avoidance conflicts) are addressed by the BIS. Specifically, the BIS "... resolves conflicts by increasing, by recursive loops, the negative valence of stimuli ... until behavioral resolution occurs in favor of approach or avoidance. Subjectively, this state is experienced as worry and rumination" (p. 371). Beyond theoretical support, there is growing empirical evidence of a strong link between the BIS and rumination (see Leen-Feldner, Zvolensky, Feldner, & Lejuez, 2004; McGregor et al., 2007). Thus, the current study explored the possibility that the perfectionism–rumination link is, in part, a byproduct of their mutual association with an overactive BIS, which chronically conveys the emotional message that one's goals are being blocked and threats of possible failure and humiliation are looming.

We hypothesized that our results would most closely resemble those of O'Connor and Forgan (2007) and Flett et al. (2002), as this pattern is firmly supported by theory on both perfectionism and behavioral inhibition sensitivity. Specifically, our first hypothesis was that SPP would show the strongest link to BIS and show no association with BAS measures. SOP was expected to show a moderate link to BIS, as well as to BAS-Drive and Reward. SOP was not expected to be associated with BAS fun, in keeping with observations suggesting that there are key differences among the BAS subscales and only drive and reward responsiveness reflect complex approach tendencies (see Corr, 2008; Leone, 2009).

¹ Studies discussed in this section all used the Carver and White (1994) measure of BIS/BAS sensitivity.

Our second hypothesis was that SPP and SOP would be associated significantly with trait rumination and that this link would be partially or fully controlled for by the shared variance with BIS sensitivity.

2. Method

Two samples of introductory Psychology students participated for course credit and they completed the measures outlined below. The first sample consisted of 112 students (96 women). Our second sample consisted of 234 students (203 women). The respective mean ages were 20.8 years ($SD = 6.5$) and 20.5 years ($SD = 4.7$).

2.1. Materials

Hewitt and Flett Multidimensional Perfectionism Scale: This is a 45-item measure of self-oriented, other-oriented and socially prescribed perfectionism. This measure has been shown to be reliable across time, have strong content and convergent validity and is not affected by social desirability bias (see Hewitt & Flett, 1991, 2004). Although other-oriented perfectionism was not of central concern in this study, the entire scale was administered and is reported here for future meta-analytic needs.

Carver and White (1994) BIS/BAS Scales: The BIS scale was originally meant to focus on reactivity to threats and abstract worrying. It is now seen as measuring the strength of responses to goal-conflicts (i.e. as approach-avoidance). The BIS items have been divided into the 2-factor BIS/FFFS model recommended by Heym et al. (2008). Original BIS scores are reported in Table 1 alongside the revised BIS (BIS-R) scores. The BIS-R factor is reported in the results. BAS measurement is subdivided into three facets reflecting approach behavior. Drive is concerned with goal persistence and effort. Fun-seeking reflects the pursuit of new rewards and spontaneous approach behavior. Finally, reward responsiveness reflects a positive response or orientation to actual or anticipated rewards. The four factors have adequate internal reliability ($\alpha = .66-.76$) and each BAS scale showed moderate inter-correlations, but loaded strongly onto a second order factor (.75), with BIS loading onto a separate second order factor (.93).

Rumination Scale: Trait rumination was measured using the subscale of the Rumination-Reflection Questionnaire (RRQ) (Trapnell & Campbell, 1999). This scale consists of 12 items that measure the tendency toward preoccupation with disturbing thoughts about oneself ($\alpha = .88$). The scale includes items such as "I spend

a great deal of time thinking back over my embarrassing or disappointing moments". Extensive evidence attests to the validity of the RRQ subscales (see Siegle, Moore, & Thase, 2004).

3. Results

As men comprised only a small fraction of either sample, all analyses were conducted irrespective of sex.²

Pearson correlations were completed for each sample independently (see Table 1). Results from Sample 1 supported the first hypothesis, with SOP and SPP significantly correlating with the BIS-R measure (r 's of .26 and .37 respectively, $p < .01$). Furthermore, SPP was not correlated significantly with any BAS measure ($p > .05$). In contrast, SOP had a moderate correlation with BAS-Drive ($r = .29, p < .01$) and a positive but non-significant association with BAS-Reward ($r = .17, p < .10$).

Results from Sample 2 were generally similar. Once again, the SOP and SPP measures had significant positive correlations with the BIS-R measure (r 's of .31, and .22, respectively, $p < .01$). SOP also was correlated significantly with BAS-Drive ($r = .29, p < .01$) and BAS-Reward ($r = .28, p < .01$). One unexpected finding was that SPP also had a small but significant link with BAS-Reward (.15, $p < .01$).

The correlations involving the rumination measure are also shown in Table 1. SPP was associated significantly with trait rumination ($p < .01$). Most noteworthy was the robust association between the BIS subscale and rumination ($r = .55, p < .01$).

Hypothesis 2 was partially supported. Using data from Sample 2, SPP was put into a 2-step linear regression model with BIS to test the relationship with rumination. A model testing the relationship with SOP was not explored further given its non-significant relationship with rumination. In this model, BIS is a significant predictor of rumination when controlling for SPP ($B = .31, t_{230} = 5.0, p < .01$) (see Table 2). Furthermore, although the regression coefficient for SPP is reduced with BIS-R in the model, it continues to predict unique variance when controlling for BIS-R. The reduction in regression weight of SPP was evaluated using the Sobel test as outlined by Baron and Kenny (1986) and satisfied the test at significant levels ($p < .01$).³

4. Discussion

The current study evaluated the associations between trait perfectionism and self-report indices of behavioral inhibition and behavioral activation. The results across our two samples were generally consistent. As expected, self-oriented perfectionism (SOP) was associated significantly with elevated BIS scores. Thus, people with elevated levels of SOP tend to be anxiety prone in a manner consistent with previous evidence linking SOP with anxiety sensitivity and a predisposition to experience anxiety (see Flett et al., 2004). SOP was also associated consistently with BAS-Drive, which accords with data linking BAS-Drive with heightened levels of ambition (Jackson & Smillie, 2004) as well as with case accounts of "driven perfectionists" (Spence & Robbins, 1992). In one sample, SOP was also associated with the BAS-Reward Responsiveness subscale, though the association did not reach significance in our other sample. Evidence linking SOP with drive but not fun-seeking is in

Table 1
Pearson correlations for Sample 1 and Sample 2.

	SOP	SPP	OOP	BIS	BASR	BASD	BASF	BIS-R	FFFS	RUM
SOP	—	.37**	.48**	.22*	.17*	.29**	.00	.26**	.08	
SPP	.40**	—	.35**	.24*	-.06	.09	-.13	.37**	-.02	
OOP	.49**	.34**	—	-.01	.14	.15	.06	.08	-.11	
BIS	.23**	.25**	.05	—	.24*	-.03	-.19*	.85**	.77**	
BASR	.28**	.15*	.14*	.32**	—	.30**	.32**	.20*	.20*	
BASD	.29**	.11	.26**	-.04	.41**	—	.31**	-.05	.00	
BASF	.10	.04	.07	-.13*	.35**	.45**	—	-.12	-.20*	
BIS-R	.31**	.22**	.14*	.45**	.46**	.44**	.32**	—	.32**	
FFFS	-.05	.00	-.15*	.53**	-.08	-.16*	-.30**	.25*	—	
RUM	.13*	.28**	.03	.55**	.23**	-.02	-.05	.35**	.42**	—

Note: Values above the diagonal are from Sample 1. The values below the diagonal are from Sample 2. SOP, self-oriented perfectionism; SPP, socially prescribed perfectionism; OOP, other-oriented perfectionism; BIS, behavioral inhibition system; BASR, behavioral approach system-reward; BASD, behavioral approach system-drive; BASF, behavioral approach system-fun-seeking; BIS-R, revised BIS; FFFS, Fight, Flight or Freeze System; RUM, rumination.

** $p < .01$.
* $p < .05$.
+ $p < .10$.

² Reliability and mean scores for each measure (α , mean). Scores are weight-averaged over the two samples. SOP = (.84, 4.7), SPP = (.72, 3.8), OOP = (.55, 4.0), BIS = (.63, 3.7), BAS-R = (.69, 4.3), BAS-D = (.57, 3.5), BAS-F = (.60, 3.6), BIS-R = (.59, 3.8), FFFS = (.51, 3.1), RUM = (.89, 3.4).

³ Although the Sobel test is typically used in a mediation analysis, MacKinnon, Warsi, and Dwyer (1995) have shown that analysis of mediation A-B is analytically identical to C-C, where C is the effect of predictor 1 (in our case, perfectionism) on the criterion and C' is the effect of predictor 1 when controlling for predictor 2 (BIS).

Table 2
Regression analyses for the mediation of socially prescribed perfectionism with rumination by BIS.

Predictors	Betas		Standard error		t-value	Standardized beta		R ²	F-value				
SPP	SPP	.216	.219	.048	.044	4.5**	3.5**	.28	.21	.08	.16	19.8	23.2
	BIS-R		.266		.036		5.0**		.31				

Dependent variable: Rumination.

All columns are split so that values in the left pertain to step 1 and values in the right pertain to step 2.

** <.01.

keeping with suggestions that fun-seeking is more reflective of impulsivity while drive and reward responsiveness reflect complex goal-oriented approach orientations (see Corr, 2008; Leone, 2009).

The overall pattern of findings suggests that self-oriented perfectionists are driven, yet prone to experience anxiety stemming from the BIS, leaving them prone to the approach-avoidance conflicts described in Covington and Mueller's (2001) account of overstrivers. Overstrivers are individuals who respond to feelings of anxiety and self-esteem threat by working tenaciously, not only in an attempt to be successful but also to stave off failure and the possibility of humiliation and embarrassment. As noted by Spence and Robbins (1992), when taken to the extreme, this pattern of striving can result in workaholic tendencies that are seemingly fuelled by the behavioral inhibition system. Initially, Flett and Hewitt (2006) advanced the possibility that extreme self-oriented perfectionism may reflect an approach-avoidance conflict. This possibility fits with the current data and evidence suggesting that self-oriented perfectionism reflects self-determined approach motives and non-self-determined avoidance motives (Van Yperen, 2006).

In both of our samples, analyses revealed the expected link with socially prescribed perfectionism (SPP) and the BIS. This pattern was consistent with either the original or revised BIS scale. The results also indicate that trait rumination is a consistent cognitive process employed by participants with SPP.

As expected, the correlation between BIS and trait rumination proved to be robust, as has been found in past studies (Leen-Feldner et al., 2004; McGregor et al., 2007). Authors such as Nigg (2000) have speculated that high BIS activity and high anxiety can result in continued cognitive intrusions due to checking and sensitivity to signals of punishment or non-reward. Our results suggest that the cognition intrusions may come in the form of ruminations about personal characteristics and experiences; this kind of ruminative self-focus that is typically linked with distress (see Mor & Winquist, 2002).

Additional analyses confirmed that the BIS factor *partially* controls and underscores the links between SPP and rumination, suggesting that a high sensitivity to threat and criticism plays a key role in the tendency for certain perfectionists to ruminate. These findings support the possible role of the BIS, but also highlight the fact that the perfectionism-rumination link is not solely due to BIS activation. The fact that the link to the BIS and rumination was stronger with SPP over SOP fits with previous data, suggesting these dimensions more closely relate to inhibitory behaviors as well as to anxiety or depression in general.

Our results have implications in terms of possible reactions to negative life events. Theoretical models of perfectionism, stress, and depression tend to highlight the vulnerability of perfectionists following the experience of negative life events (see Hewitt & Flett, 2002). Parallel research indicates that people with high BIS scores have stronger affective reactions and emotional responsiveness to negative events that may connote a vulnerability to stress (see Gable et al., 2000). One interpretation of our results is that certain perfectionists will have a tendency to experience strong emotional reactions following negative events and setbacks. It follows that those perfectionists characterized by strong BIS activation will be particularly at risk for prolonged, intense bouts of emotional distress when negative events are experienced.

The limitations of the current study should be noted. First, the current study is based on cross-sectional data, so no causal links should be inferred. Specifically, this data does not speak to the causal relationship of perfectionism and rumination. It is yet to be seen whether a predisposition to rumination increases perfectionist tendencies, or whether a need for perfection increases ruminative thought. Second, our results were based on self-report measures and the findings should be re-evaluated in research that includes informant ratings of perfectionism and distress. Third, the generalizability of these results needs to be examined; in particular, research is needed to examine these constructs in clinical samples. Finally, although this is the first study to report the relationship between perfectionism and the FFFS, the results should be interpreted cautiously. The measure is based on three items, initially meant to tap a construct other than fearful response to punishment. This relationship should be re-examined as reliable measures of the FFFS are developed.

In summary, the current study clarified the associations between perfectionism and BIS/BAS indices by showing that self-oriented perfectionism is associated jointly with the BIS subscale as well as a BAS subscale (BAS-Drive), while socially prescribed perfectionism was associated with the BIS. As expected, we also found that trait rumination was associated with aspects of perfectionism, but there was a stronger association between trait rumination and the BIS. In addition, the BIS accounts, in part, for the link between perfectionism and trait rumination. These data suggest that multiple factors contribute to the emotional distress experienced by certain perfectionists and the vulnerability to distress that has been detected among perfectionists.

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