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A Self-Regulatory Approach to Understanding Boredom Proneness

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Abstract

We investigated the relationship between self-regulation and two types of boredom proneness (perceived lack of internal stimulation, perceived lack of external stimulation) using a variety of measures of self-regulation. These included a general measure of self-control, measures of both regulatory focus (i.e., *promotion* or a sensitivity to gains/non-gains vs. *prevention* or a sensitivity to losses/non-losses) and regulatory mode (i.e., *assessment* or the tendency to compare means and goals vs. *locomotion* or the tendency to initiate and maintain commitment to action), and measures of cognitive flexibility (i.e., a perceived sense of *control* and the tendency to seek *alternative* solutions). Results identified a unique set of factors related to each boredom proneness component. Trait self-control and prevention focus were associated with lower boredom propensity due to a lack of external stimulation. Locomotion and the tendency to seek alternatives were associated with lower boredom propensity due to a lack of internal stimulation. These findings suggest that effective goal pursuit is associated with reduced likelihood of experiencing boredom.

Keywords: boredom, self-regulation, regulatory focus, regulatory mode, cognitive flexibility

A Self-Regulatory Approach to Understanding Boredom Proneness

Despite the growing attention that boredom has gained as a construct of scientific inquiry, it is still poorly understood (Danckert, 2013). Recent research emphasizes the role of boredom in self-regulation, suggesting that the state of boredom leads individuals to change activities or modify behavior to maintain optimal levels of interest, meaning and challenge (Sansone, Weir, Harpster, & Morgan, 1992; Smith, Wagaman, & Handley, 2009; Van Tilburg & Igou, 2011). Individuals who are prone to boredom appear to have a tendency to feel unchallenged and lack a sense of meaning (Van Tilburg & Igou, 2011). Further, it has been recently proposed that the function of boredom may be to regulate behavior, perhaps by signaling to individuals the need to seek out alternative goals that are more meaningful and satisfying (Bench and Lench, 2013; Elpidorou, 2014). Given this association we wanted to investigate the possibility that trait boredom reflects poor self-regulatory ability (i.e., chronic inability to redress this state). Indeed, researchers have suggested that the tendency to experience boredom may depend on an individual's capacity to regulate attention (Eastwood, et al., 2012; Fisher, 1993; Gerritsen, Toplak, Sciaraffa, & Eastwood, 2014; Hamilton, 1981; Harris, 2000). Any decrement in the ability to regulate attention would presumably prevent individuals from effectively satisfying their needs. Consistent with this hypothesis, prior research has found trait boredom to be associated with a range of characteristics thought to be indicative of poor self-regulation. For example, boredom proneness has been associated with impulsive behaviors such as problem gambling (Blaszczynski, McConaghy, & Frankova, 1990; Mercer & Eastwood, 2010), substance abuse (Amos, Wiltshire, Haw, & McNeill, 2006; German & Latkin, 2012; LePera, 2011; Wiesner, Windle, & Freeman, 2005) and binge eating (Stickney & Miltenberger, 1999).

Recent research has identified at least one self-regulatory profile associated with the vulnerability to experience boredom. Specifically, boredom proneness was associated with increased behavioral inhibition system (BIS) sensitivity (Mercer-Lynn, Hunter, & Eastwood, 2013; Mercer-Lynn, Bar, & Eastwood, 2014) – reflecting elevated sensitivity to punishment (Gray, 1970). Blunt and Pychyl (1998) demonstrated a positive association between boredom proneness and a state orientation – an aspect of action control thought to reflect a specific focus on either present, past or future states of an organism, as opposed to a fully developed action plan that would lead to a desired state (Kuhl, 1981, 1994). While this research provides some insights into the relationship between self-regulation and boredom proneness, there is much yet to explore; the goal of the current research was to utilize a self-regulatory approach to understanding boredom proneness.

Boredom is not a Unitary Construct

Much of the previous research assumes boredom is a unitary construct. However, the Boredom Proneness Scale (BPS; Farmer & Sundberg, 1986), the most commonly used measure of trait boredom proneness, has been shown to be multifactorial (Vodanovich & Kass, 1990; Ahmed, 1990). Although there is some disagreement as to the number of factors needed to fully capture the variance in the BPS, a review by Vodanovich and colleagues (2005) suggested that the BPS can be consistently divided into at least two factors – boredom proneness originating from a perceived lack of external stimulation (external factor) and boredom proneness originating from a perceived lack of internal stimulation (internal factor).

Although this distinction is somewhat controversial, the external factor is thought to measure one's inability to satisfy a high need for excitement, challenge, and change (Vodanovich & Kass,

1990). That is, although individuals are motivated to engage in meaningful activities, every attempt to do so is met with a failure to satisfy or expunge feelings of boredom. This kind of boredom proneness, characterized by a heightened need for, but failure to attain, external stimulation, has been implicated in sensation seeking (Vodanovich & Kass, 1990), the tendency to ruminate about oneself (Seib & Vodanovich, 1998), insensitivity to errors of sustained attention, and both inattentive and hyperactive symptoms of attention deficit hyperactivity disorder (ADHD) (Malkovsky, Merrifield, Goldberg, & Danckert, 2012).

In contrast, the internal factor is thought to measure an inability to self-generate interest and engagement (Vodanovich & Kass, 1990). This factor has also been associated with lapses of everyday attention and attention-related cognitive failures (e.g., pouring orange juice on your cereal; Malkovsky et al., 2012). Furthermore, the internal factor has been associated with a reduced ability to identify and process feelings (Harris, 2000; Swinkels & Giuliano, 1995). This factor also seems to be coupled with a lack of awareness of one's internal milieu (Seib & Vodanovich, 1998) – in other words, poor awareness of and insensitivity to one's own thoughts and emotions.

We suggest that if trait boredom proneness is associated with inadequate self-regulation, these distinct boredom proneness cognitive profiles—individuals who experience a perceived lack of external stimulation versus those who experience a perceived lack of internal stimulation—may reflect *distinct* self-regulatory profiles by which each type of boredom propensity originates. To explore this, we examined the relationship between the two boredom proneness factors and various facets of self-regulation. We contrasted the strength of those relationships across each boredom proneness factor, and explored whether each factor was predicted by a unique set of self-regulatory variables. Such an approach should permit

identification of key boredom proneness vulnerabilities, and thus may lead to the development of interventions specific to each boredom proneness component.

Self-Regulation, Goal Pursuit and Boredom Proneness

Self-regulation is regarded as the process by which people bring their behaviors in line with standards and goals (Baumeister & Vohs, 2003; Rawn & Vohs, 2006). Pursuing goals effectively often involves the exertion of effort, overriding automatic affective reactions to bring our actions in line with important goals. Self-regulation involves not only the regulation of behavior, but also the regulation of thoughts, emotions, and impulses (Baumeister, Heatherton, & Tice, 1994). Failures of self-regulation have been shown to play a significant role in a number of social and personal problems, while self-regulation success is related to better well-being across many dimensions (Duckworth & Kern, 2011; Moffitt et al., 2011; Tangney et al., 2004). One prominent measure of general self-regulatory effectiveness is the trait self-control scale developed by Tangney and colleagues (2004). Since boredom proneness, as assessed by either subscale, seems to be associated with aspects of self-regulatory failure, we hypothesize that this will be reflected in this broad measure of self-control. That is, we expect that individuals who are high in trait self-control will be *less* prone to experiencing boredom, regardless of whether it originates from a perceived lack of external or internal stimulation. In other words, we have no reason to suspect that the *magnitude* of the association between trait self-control and each of the BPS factors would differ.

One critical aspect of effective self-regulation is the ability to flexibly shift behavior and adjust to change (Kashdan & Rottenberg, 2010). Individuals who can flexibly select different means to accomplish a goal (Vallacher & Wegner, 1987) and flexibly shift goals in the face of

obstacles and opportunities, can be more effective in life pursuits (Jostmann & Koole, 2009; Wrosch, Scheier, Miller, Schulz, & Carver, 2003). Dennis and Vander Wal (2010) recently developed the cognitive flexibility inventory to capture two key aspects of effective adjustment: first, an individual's sense of control in difficult situations (CFI-control), and second, the tendency to seek multiple solutions to difficult problems and explanations of events (CFI-alternatives). We expect that individuals who can flexibly adapt to changes and new environments should be less prone to boredom since they will be able to find new and engaging activities. Although cognitive flexibility is likely to be associated with both boredom proneness components, we hypothesize that CFI-control will be more strongly *negatively* related to a perceived lack of external stimulation, since the CFI-control measure is an indicator that individuals are capable of satisfying their need for challenge. In other words, we predict that the relationship between the external factor of boredom proneness and CFI-control measure will be stronger than that of the internal factor and CFI-control. Likewise, we hypothesize that the CFI-alternatives measure will be *negatively* associated with both boredom proneness components. However, given that individuals who report a perceived lack of internal stimulation could be described as having difficulty in self-generating interest and engagement, we expect that the relationship with the internal factor will be larger in magnitude than that of the external factor.

Individuals may differ not only in the extent to which they tend to be generally effective or ineffective at self-regulation, but also in the types of goals and strategies they tend to value and pursue. Regulatory focus theory distinguishes between self-regulation in the pursuit of nurturance (promotion focus), as compared to self-regulation in the pursuit of security (prevention focus; Higgins, 1997). Promotion-focused individuals represent goals as hopes and aspirations, prefer eager strategies, and are particularly sensitive to opportunities for gains and

advancement. In contrast, prevention-focused individuals represent goals as duties and obligations, prefer vigilant strategies, and are particularly sensitive to lurking threats and losses (Scholer & Higgins, 2012). We predict that both promotion- and prevention-focused individuals may be less likely to experience boredom as these measures reflect self-reported *success* in applying distinct goal-pursuit strategies. In other words, regardless of whether you tend towards a promotion or prevention focus, *success in goal pursuit via either system* is likely to be negatively associated with boredom proneness, regardless of whether boredom stems from a perceived lack of external or internal stimulation. As such, we do not expect any difference in the magnitude of these relationships across the boredom proneness subtypes. More specifically, promotion-focused individuals may be less susceptible because of their ability to identify and seize opportunities in the service of maximizing outcomes, whereas prevention-focused individuals may be less susceptible because of their ability to remain vigilant to their surroundings in the service of maintaining security. In the discussion, we explore further the potential ways in which a promotion- or prevention-focus may operate differently to ward off boredom.

In addition to distinctions between the types of goals that individuals pursue, individuals also differ in how they go about pursuing those goals. In particular, people differ in the extent to which they emphasize exhaustive comparison of alternative options (making sure to do the "right" thing) versus implementation of actions ("getting on with it"). Individual differences in these emphases are highlighted in regulatory mode theory that distinguishes between assessment (the comparative aspect of self-regulation) and locomotion (the aspect of self-regulation focused on moving from state to state; Higgins, Kruglanski, & Pierro, 2003; Kruglanski et al., 2000). We hypothesize that those high on the assessment approach to goal pursuit may be more vulnerable

to boredom proneness arising from a perceived lack of external stimulation. Given that both the external factor of boredom proneness and assessment are characterized by self-evaluative concerns (for review see Higgins et al., 2003), we expect the relationship between assessment and the external factor to be of greater strength than the relationship between assessment and the internal factor. In contrast, we hypothesize that those high on the locomotion approach to goal pursuit may be less vulnerable to boredom proneness that originates from a perceived lack of internal stimulation, as locomotion is characterized by high motivation to engage in absorbing or intrinsically interesting activities – sometimes referred to as 'flow proneness' (Harris, 2000; for review see Higgins et al., 2003). We therefore expect the relationship between locomotion and the internal factor to be of greater magnitude than the relationship between locomotion and the external factor.

Methods

As recommended by Simmons, Nelson, and Simonsohn (2012), here we report how we determined our sample size, all data exclusions, all manipulations, and all measures in the study.

Participants and Procedure

One hundred and thirty-nine United States participants (67 females; mean age = 28.6 years, SD = 11.34) were recruited using Amazon Mechanical Turk, and completed a questionnaire package online. It was determined, a priori, that we would collect as many participants as permitted by allocated funding. All participants were remunerated 50 cents. Additionally, seventy-four undergraduates (45 females; mean age = 20.3 years, SD = 1.8) from the University of Waterloo, who participated in a separate study exploring the cognitive correlates of boredom

not reported here, were included in the analysis, all these participants completed the same questionnaire package in exchange for course credit, prior to tasks of interest. It was determined, a priori, that we would collect as many participants as possible before the end of the academic term. We did not analyze data until the entire samples have been collected. The order of presentation for questionnaires was counterbalanced in both samples.

Materials

The BPS was used to measure an individual's propensity to experience boredom (Farmer & Sundberg, 1986). It is a self-report questionnaire that consists of 28 items rated on a 7-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree." High scores indicate higher proneness to the experience of boredom. Farmer and Sunberg (1986) report that the BPS has an internal consistency of 0.79 and a test-retest reliability of .83. Prior factor analyses divide the BPS into at least two factors (a perceived lack of external stimulation [external factor], or a perceived lack of internal stimulation [internal factor]; Vodanovich & Kass, 1990; Vodanovich, Wallace, & Kass, 2005; Ahmed, 1990; Gana & Akremi, 1998; Melton & Schulenberg, 2009; Gordon, Wilkinson, McGown, & Jovanoska, 1997). The items that appeared most commonly (in at least 3 out of 6 prior factor analyses) within the same factor were used in this study. Thus, the items included for the external factor were items 5, 6, 9, 10, 12, 15, 17, 19, 20, 21, 25, 26, 27, and 28 (e.g., "Many things I have to do are repetitive and monotonous"), while those used for the internal factor were items 1, 7, 8, 13, 18, 22, 23, and 24 (e.g., "I find it easy to entertain myself"; see Appendix for the full set of items).

The Self-Control Scale (SCS) was used as a general measure of trait self-control (Tangney, Baumeister, & Boone, 2004). It is a self-report questionnaire that consists of 36 items (e.g.,

"Pleasure and fun sometimes keep me from getting work done") rated on a 5-point Likert scale ranging from "not at all" to "very much." High scores indicate a good ability to exert self-control. Items tap into the ability to control one's thoughts, feelings, impulses, and performance. Tangney and colleagues (2004) report that the SCS has an internal consistency of 0.83 and a test-retest reliability of 0.89.

The Regulatory Focus Questionnaire (RFQ) was used to assess promotion and prevention focus (Higgins et al., 2001). The RFQ is a self-report questionnaire that consists of 11 items, 6 promotion focus items (e.g., "Compared to most people, are you typically unable to get what you want out of life?"), and 5 prevention focus items (e.g., "Not being careful enough has gotten me into trouble at times") rated on a 5-point Likert scale ranging from "never or seldom" to "very often." Subscales assess the *history of success* in self-regulating within either the promotion or prevention systems. Higgins and colleagues (2001) report an internal consistency of 0.73 for the promotion and 0.80 for the prevention scales; and a test-retest reliability of 0.79 for the promotion and 0.81 for the prevention scale.

The Regulatory Mode Questionnaire (RMQ) was used to measure individual differences in regulatory mode – locomotion and assessment – orientations (Kruglanski et al., 2000). This questionnaire consists of 24 items; 12 locomotion items (e.g., "I don't mind doing things even if they involve extra effort"), and 12 assessment items (e.g., "I often critique work done by myself and others") rated on a 6-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree." High scores on each subscale reflect greater emphasis on locomotion or assessment, respectively. Kruglanski and colleagues (2000) reported an internal consistency of 0.82 for the locomotion and 0.78 for the assessment scales, and a test-retest reliability of 0.77 for the locomotion and 0.73 for the assessment scales.

The Cognitive Flexibility Inventory (CFI) was used to measure two aspects of cognitive flexibility. The control subscale (CFI-control) measured perceived control in difficult situations, whereas the alternatives subscale (CFI-alternatives) measured the ability to generate alternative solutions to problems, and explanations for events and behavior (Dennis & Vander Wal, 2010). This questionnaire is composed of 20 items; 12 CFI-alternatives items (e.g., "I consider multiple options before making a decision"), and 8 CFI-control items (e.g., "When I encounter difficult situations, I feel like I am losing control.") rated on a 7-point Likert scale ranging from "Strongly Disagree" to "Strongly Agree." High scores reflect a better capacity to flexibly shift behavior and adjust to new situations. Dennis & Vander Wal (2010) reported an internal consistency of 0.91 for the CFI-alternatives and 0.84-0.86 for the CFI-control; and a test-retest reliability of 0.75 for the CFI-alternatives and 0.77 for the CFI-control.

Results

Descriptive Statistics and Gender Differences

Sample sizes, means, standard deviations, and reliabilities for all variables are presented in Table 1. As the table indicates, when accounting for multiple comparisons, the two samples only differed in mean age. There were no gender differences evident across any study variables in either sample. Given that there were no gender differences, the remaining analyses were conducted on the combined male and female samples.

(Table 1 about here)

Table 1. *Means and Standard Deviations for All Study Variables in Each Sample, and Between Sample Differences.*

	Sample							
	Online (n=139)			UW (n=74)				
	Mean	SD	α	Mean	SD	α	t-score	p
Age	28.62	11.34	-	20.35	1.76	-	6.02	<0.01
BPS	96.12	19.96	0.86	97.81	19.13	0.85	0.60	0.55
External Factor	52.32	12.88	0.82	51.00	11.89	0.81	0.73	0.47
Internal Factor	27.40	7.48	0.77	29.82	7.05	0.69	2.30	0.02
Promotion	3.60	0.66	0.69	3.48	0.62	0.69	1.32	0.19
Prevention	3.14	0.82	0.81	3.25	0.78	0.75	0.90	0.37
Locomotion	4.25	0.73	0.85	4.12	0.63	0.82	1.30	0.20
Assessment	3.89	0.71	0.77	4.02	0.62	0.76	1.36	0.18
Self-control	116.80	18.58	0.91	113.13	17.24	0.91	1.41	0.16
CFI	105.15	16.78	0.90	103.43	11.80	0.82	0.34	0.73
CFI-control	33.65	8.40	0.81	31.89	7.11	0.78	0.89	0.41
CFI-alternatives	71.50	10.93	0.99	71.54	7.48	0.84	0.30	0.98

Note. BPS = Boredom Proneness Scale; CFI = Cognitive Flexibility Inventory; "Online" refers to the Mechanical Turk Sample and "UW" refers to the on campus undergraduates from the University of Waterloo. It is worth noting that the difference between the two samples in BPSint is not significant after controlling for multiple comparisons.

Correlations

We first examined zero-order correlations across all measures in each sample separately. Both samples demonstrated largely similar correlations in terms of direction and magnitude (Table 2). Nevertheless, we directly tested whether the correlations differed between the two samples. Correlations between the external and internal factors of the BPS and all other measures were contrasted across the groups using z-scores (DeCoster, 2007). After Bonferroni correction for multiple comparisons no significant differences were found across the two samples. Given that the two samples only differed in mean age, and that all correlations were in the same

direction and did not differ in magnitude, we merged the samples and conducted partial correlations, controlling for age (Table 3). All further analyses were conducted using the merged sample.

(Table 2 and 3 about here)

Table 2. Correlations for All Study Variables in the Online Mechanical Turk Sample (above major diagonal) and UW Undergraduate Sample (below major diagonal).

	1	2	3	4	5	6	7	8	9	10	11
1. BPS		.866**	.585**	-.731**	-.388**	-.651**	.240**	-.655*	-.564**	-.609**	-.398**
2. External Factor	.868**		.156	-.556**	-.404**	-.345**	.303**	-.580**	-.358**	-.512**	-.156
3. Internal Factor	.698**	.307**		-.538**	-.130	-.739**	-.021	-.351**	-.548**	-.359**	-.566**
4. Promotion	-.675**	-.544**	-.524**		.266**	.643**	-.084	.462**	.634**	.601**	.536**
5. Prevention	-.240*	-.311**	0.016	0.166		.222**	-.294**	.477**	.218**	.265**	.151
6. Locomotion	-.638**	-.385**	-.646**	.578**	0.062		.010	.456**	.612**	.512**	.557**
7. Assessment	0.047	0.085	-0.045	-0.039	0.183	-0.018		-.366**	-.083	-.263**	.035
8. Self-Control	-.634**	-.527**	-.363**	.538**	0.156	.530**	-0.078		.420**	.504**	.295**
9. CFI	-.591**	-.485**	-.455**	.463**	0.123	.426**	0.134	.403**		.787**	.936**
10. CFI-control	-.556**	-.486**	-.357**	.461**	0.096	.353**	-0.084	.436**	.765**		.521**
11. CFI-alternatives	-.404**	-.303**	-.379**	.318**	0.104	.349**	.260*	.250*	.867**	.342**	

Note: Online Mechanical Turk Sample (N=139). UW Undergraduate Sample (N=79). * p < .05. ** p < .01. BPS = Boredom Proneness Scale; CFI = Cognitive Flexibility Inventory.

Table 3. *Partial Correlations and Reliability for All Study Variables in the Combined Sample Controlling for Age*

	1	2	3	4	5	6	7	8	9	10	11
1. BPS	(.852)	.851**	.612**	-.699**	-.336**	-.655**	.135	-.602**	-.542**	-.562**	-.382**
2. External Factor		(.816)	.160*	-.522**	-.382**	-.337**	.202**	-.509**	-.350**	-.462**	-.167*
3. Internal Factor			(.743)	-.522**	-.061	-.716**	-.041	-.337**	-.505**	-.347**	-.496**
4. Promotion				(.691)	.218**	.630**	-.035	.453**	.574**	.552**	.465**
5. Prevention					(.792)	.159*	-.155*	.364**	.191**	.223**	.131
6. Locomotion						(.843)	.004	.482**	.563**	.467**	.500**
7. Assessment							(.768)	-.249**	.002	-.174*	.108
8. Self-Control								(.911)	.384**	.459**	.257**
9. CFI									(.883)	.771**	.924**
10. CFI-control										(.803)	.469**

	11. CFI-alternatives
11. CFI-alternatives	(.905)

Note: Chronbach's α levels are presented on the main diagonal in parentheses. (df = 203) * p < 0.05. ** p < 0.01. BPS = Boredom Proneness Scale; SCS = Self-Control Scale; CFI = Cognitive Flexibility Inventory. "Online" refers to the Mechanical Turk Sample and "UW" refers to the on campus undergraduates from the University of Waterloo.

Next, in order to determine whether the observed correlations between our study variables and boredom proneness originating from a perceived lack of external stimulation differed in magnitude from the correlations with boredom proneness due to a lack of internal stimulation, we directly contrasted them. After Bonferonni correction for multiple comparisons, z-tests for dependent correlations (DeCoster, 2007) revealed that the prevention, locomotion and CFI-alternatives measures differed significantly across the two boredom proneness subtypes (Figure 1).

(Figure 1 about here)

Regression

The fact that we observed differences in the magnitude of the observed relationships between our study variables and the external and internal factors of the BPS, suggested that the two boredom proneness factors may be associated with *distinct* self-regulatory profiles. However, given the broad inter-relationship between our self-regulatory variables, we felt it was warranted to conduct a regression analysis in an attempt to identify unique significant predictors of each boredom proneness factor. Multivariate linear regression analysis was performed using the enter method for the external and internal factors subscales separately. As recommended by

Mundfrom and colleagues (2006), for the purpose of identifying unique significant predictors, a Bonferroni corrected alpha level of ($p<0.0065$; i.e., 0.05/8) was used. When the external factor was the dependent variable (Table 4), results showed that promotion focus ($\beta = -0.391$, $p < 0.001$), prevention focus ($\beta = -0.195$, $p < 0.001$), and trait self-control ($\beta = -0.242$, $p < 0.001$) were significant *negative* predictors of the external factor score. Neither locomotion ($\beta = 0.046$, $p = 0.537$), assessment ($\beta = 0.065$, $p = 0.266$), CFI-control ($\beta = -0.114$, $p = 0.111$), CFI-alternatives ($\beta = 0.128$, $p = 0.062$), nor age ($\beta = -0.034$, $p = 0.552$), significantly predicted the external factor score and failed to improve the fit of the model. The overall model fit was significant $F(7,205) = 20.051$, $p < 0.001$, adjusted $R^2 = 0.448$.

(insert Figure 2 and Table 4 about here)

Table 4. *Regression Analysis Statistics for Boredom Proneness: External Factor as Dependent Variable*

						95% Confidence Interval for B		Correlations		
Predictor	B	SE	β	t	p	Lower Bound	Upper Bound	Zero-order	Partial	VIF
Age	-.042	.071	-.034	-.596	.552	-.182	.098	-.201	-.041	1.149
Promotion	-7.521	1.457	-.391	-5.161	.000	-10.395	-4.647	-.537	-.345	2.053
Prevention	-2.992	.881	-.195	-3.396	.001	-4.730	-1.255	-.387	-.235	1.177
Locomotion	.823	1.330	.046	.619	.537	-1.801	3.447	-.341	.044	2.006
Assessment	1.206	1.082	.065	1.115	.266	-.928	3.340	.243	.080	1.233
Self-control	-.168	.049	-.242	-3.398	.001	-.265	-.070	-.528	-.235	1.822
CFI-control	-.235	.147	-.114	-1.600	.111	-.524	.055	-.434	-.114	1.803
CFI-alternatives	.156	.083	.124	1.878	.062	-.008	.320	-.177	.132	1.566

Note: Results are based on a merged sample (df = 206). B = unstandardized beta coefficient; SE = standard error of unstandardized beta coefficient; ß = standardized beta coefficient; t = t-score; p = significance value; VIF = variance inflation factor.

When we performed the same regression analysis with the internal factor subscale as the dependent variable (Table 5), results showed that locomotion (β = -0.601, $p < 0.001$), and CFI-alternatives (β = -0.195, $p < 0.001$), were significant *negative* predictors of the internal factor score. Neither promotion focus (β = -0.139, $p = 0.041$), prevention focus (β = 0.061, $p = 0.232$), assessment (β = 0.007, $p = 0.894$), trait self-control (β = 0.013, $p = 0.841$), CFI-control (β = 0.121, $p = 0.58$), nor age (β = -0.057, $p = 0.263$) were significant predictors of the internal factor score and failed to improve the fit of the model to the data. The overall model fit was significant $F(7,205) = 31.546$, $p < 0.001$, adjusted $R^2 = 0.560$.

(insert Figure 3 and Table 5 about here)

Table 5. *Regression Analysis Statistics for Boredom Proneness: Internal Factor as Dependent Variable*

						95% Confidence Interval for B		Correlations		
Predictor	B	SE	β	t	p	Lower Bound	Upper Bound	Zero-order	Partial	VIF
Age	-.042	.038	-.057	-1.123	.263	-.116	.032	-.090	-.063	1.149
Promotion	-1.59	.773	-.139	-2.060	.041	-3.118	-.068	-.528	-.139	2.053
Prevention	.560	.467	.061	1.198	.232	-.362	1.482	-.066	.085	1.177
Locomotion	-6.36	.706	-.601	-9.003	.000	-7.747	-4.963	-.717	-.537	2.006
Assessment	.076	.574	.007	.133	.894	-1.056	1.208	-.017	.014	1.233
Self-control	.005	.026	.013	.201	.841	-.046	.057	-.329	.012	1.822
CFI-control	.148	.078	.121	1.903	.058	-.005	.301	-.325	.129	1.803
CFI-alternatives	-.146	.044	-.195	-3.305	.001	-.233	-.059	-.499	-.233	1.566

Note: Results are based on a merged sample (df = 206). B = unstandardized beta coefficient; SE = standard error of unstandardized beta coefficient; ß = standardized beta coefficient; t = t-score; p = significance value; VIF = variance inflation factor.

To more directly test the assertion that each boredom proneness factor significantly differed in terms of the associated pattern of self-regulatory predictors, we examined the difference between partial correlations of each significant predictor variable (e.g., those found to be unique predictors for either boredom proneness factor; Tables 4 and 5; Figures 2 and 3), across each boredom proneness factor. For example, the partial correlation observed between the prevention focus and the internal factor was directly compared to the partial correlation observed between prevention focus and the external factor. Our logic here was that the observed relationship found to be significant for one factor may not differ statistically from the non-significant relationship observed for the other factor. Thus, this additional test provides a stronger test of our hypotheses. The William's T_2 statistic (Steiger, 1980) was used to determine whether there was a significant difference between the two correlations. To correct for multiple comparisons, a Bonferroni corrected family wise alpha level of 0.01 was used. As expected results showed that prevention focus and self-control were both more strongly *negatively* related to the external factor of boredom proneness than the internal factor ($t(200) = 3.66$, $p < 0.005$ and $t(200) = 2.81$, $p < 0.01$ respectively). In contrast, locomotion was more strongly *negatively* related to the internal as opposed to the external factor ($t(200) = 7.64$, $p < 0.001$). Furthermore, the CFI-alternatives was also differentially related to each boredom proneness factor such that, it was positively related to the external factor and negatively related to the internal factor ($t(200) = 4.22$, $p < 0.001$). Finally, contrary to our prediction, promotion focus was equally predictive of each boredom proneness factor ($t(200) = 2.41$, $p = 0.017$). Thus the relationships highlighted by our regression analyses (Figures 2 and 3) are supported by the direct contrast of partial correlations arising from the regressions – each boredom proneness subtype has a distinct self-regulatory profile.

Discussion

Given the broad relationships between boredom proneness and traits indicative of poor self-regulation, the present study aimed to assess the relationship between specific aspects of self-regulatory function and two distinct types of boredom proneness. In particular, we wanted to investigate whether each boredom proneness factor was differentially associated with different self-regulatory profiles. Consistent with our predictions, results indicated that each boredom proneness factor was associated with distinct measures of self-regulation, and the magnitude of these relationships differed significantly between the two factors.

External and Internal Boredom Proneness are Negatively Associated with Self-Control

As predicted, both boredom proneness factors were negatively related with a general measure of trait self-control (Figure 2). In other words, individuals who are high in trait self-control are less likely to experience boredom regardless of the means by which it originates. In general, this suggests that individuals who are effective at regulating engagement in meaningful activities are less likely to be prone to boredom.

External and Internal Boredom Proneness are Negatively Associated with Promotion Focus

As predicted, promotion focus – an index of success in pursuing goals within the promotion system – was negatively associated with both boredom proneness factors. This suggests that goal pursuit in service of nurturance promotes effective regulation of both internal and external stimulation, perhaps by allowing individuals to remain engaged through eager pursuit of goals. In other words, a tendency to initiate positive behavioral changes – a

characteristic of promotion focus – may be an effective way to remain satisfied. This speculation is consistent with the notion that the experience of boredom is related to higher levels of mind wandering (Cheyne et al., 2006), an indicator that an individual is not fully committed to the stimulus or task at hand. Additionally, these findings are consistent with prior work that demonstrates the importance of the promotion focus in interest enhancement strategies (Smith, Wagaman, Handley, 2009), suggesting that elevated boredom proneness may reflect inadequate self-regulation of interest.

Boredom Proneness Factors are Differentially Associated with Prevention Focus Failure

Although we expected that prevention focus – an index of success in pursuing goals within the prevention system – to be negatively associated with both boredom proneness factors, it was only strongly negatively associated with boredom related to the perceived lack of external stimulation (Figure 2). This relationship suggests that individuals with a strong tendency to avoiding losses and approaching non-losses (i.e., high prevention focused individuals) are more effective at regulating external stimulation, perhaps by fulfillment of their duties and obligations through the use of vigilant strategies. Indeed, prior research has shown that those scoring high on the external factor of the BPS also demonstrate higher rates of ADHD symptomatology and are insensitive to having made errors of sustained attention, reflective of poor sustained attention (Malkovsky et al, 2012). This result could be recast as inefficient use of vigilant strategies, particularly in monotonous tasks or circumstances. Interestingly, ineffectiveness in utilizing a prevention self-regulatory system has also been associated with increased anxiety (Higgins, Shah, & Friedman, 1997). Such a finding may account for the high arousal states associated with boredom (Merrifield & Danckert, 2014) and the reports of a concurrence of dejection and

agitation related emotions during episodes of boredom (Harasymchuk & Fehr, 2010). This feature of boredom, which stems from a perceived lack of external stimulation, is consistent with an early description of boredom, characterizing it as an agitated state (Greenson, 1953). Given that boredom proneness has been associated with behavioral inhibition system sensitivity (Mercer-Lynn, Hunter, & Eastwood, 2013; Mercer-Lynn, Bar, & Eastwood, 2014), it is important to distinguish this relationship from the current findings. Specifically, prevention motivation should not be confused with avoidance behavior and is not synonymous with BIS (Haws, Dholakia, & Bearden, 2010; Mooradian, Herbst, & Matzler, 2008; Scholer & Higgins, 2008). The BIS underlies sensitivity to cues of punishment (both lack of reward and withdrawal of safety) and can be seen as an underlying avoidance motivation. In contrast, prevention focus reflects a preference for addressing security needs (approaching safety, avoiding danger) through the use of vigilant strategies, which can be accomplished by either avoiding losses or approaching non-losses. Prior work has established that regulatory focus is orthogonal to approach/avoidance goals (Haws et al., 2010; Scholer & Higgins, 2008). In other words, the current results are silent on the relationship between avoidance goal motivation and boredom, but do suggest that vigilance in the pursuit of security goals (i.e., a prevention focus) correlates negatively with a perceived lack of external stimulation.

Boredom Proneness Factors are Differentially Associated with Locomotion and Assessment

As predicted, although locomotion was negatively related to both boredom proneness factors, this relationship was strongest for those reporting higher levels of a perceived lack of internal stimulation. These findings suggest that individuals who value movement from state to state – either physical or mental – may be less susceptible to experiencing boredom. In other

words, keeping oneself continuously engaged, regardless of the goal value, may have the potential to stave off boredom. This finding is consistent with prior work suggesting that boredom prone individuals are fixated on only a single aspect of an intended action instead of appreciating a more complex, variegated, or fully developed action plan (Blunt & Pychyl, 1998). These results provide further evidence that each boredom proneness factor is associated with a distinct self-regulatory profile. In this instance, a distinction in the manner in which, individuals pursue their goals. Unlike individuals who experience a perceived lack of external stimulation, individuals experiencing a perceived lack of internal stimulation are less likely to initiate and maintain goal directed action – evident in their low locomotion scores. Assessment, on the other hand, was only weakly positively related to the external factor. However, contrary to our prediction, the strength of this relationship did not differ significantly when compared to the relationship between assessment and the internal factor of the BPS.

Boredom Proneness is Negatively Associated with Perceived Sense of Control

We predicted that CFI-control measure would have a stronger negative relationship with the external than the internal factor of boredom proneness. In contrast, the results indicated that both factors demonstrated negative relationships with CFI-control that did not differ in magnitude (Figure 1). Our finding suggest that having a sense of self-efficacy in problem solving may be associated with the ability to flexibly regulate challenges related to both external and internal stimulation. Indeed, this is consistent with the observation that boredom prone individuals tend to adopt an external locus of control (Hunter & Csikszentmihalyi, 2003; Workman & Studak, 2007) – characterized by a belief that events and actions are a result of chance or are under the control of others (Rotter, 1966).

Boredom Proneness Factors are Differentially Associated with the Ability to Generate Alternatives Solutions

The CFI-alternatives measure was negatively related to both BPS factors. However, as predicted, the association with the internal factor was stronger when compared directly to the relationship with the external factor. This suggests that being able to self-generate multiple alternatives is related to a reduced likelihood of experiencing boredom, perhaps by enabling discovery of adequate sources of stimulation. It is perhaps not surprising that this relationship was stronger in individuals whose boredom proneness originates from a perceived lack of internal stimulation as they are unable to effectively self-generate interest and engagement. Such a difference provides further evidence that the two boredom proneness factors represent distinct self-regulatory profiles. Unlike individuals reporting a perceived lack of external stimulation, individuals who perceive a lack of internal stimulation are unable to generate alternative solutions that may be instrumental in sustaining effective engagement with their environment.

Conclusion and Directions for Future Research

Our results suggest that boredom proneness is strongly related to an individual's effectiveness in goal pursuit. Within this framework, we speculate that boredom proneness may arise from an inability to effectively regulate oneself in a goal-directed manner. Therefore, addressing self-regulatory failure may provide novel avenues for boredom proneness intervention. Despite the controversial nature of the BPS factor structure, our findings do suggest

that distinct aspects of boredom proneness (here characterized as a perceived lack of external stimulation or a perceived lack of internal stimulation) are in turn related to distinct profiles of self-regulatory failure, and thus may reflect different means by which boredom originates and manifests itself.

Indeed, our findings suggest that those prone to experiencing boredom characterized by a perceived lack of external stimulation may also be less effective at pursuing goals within both the promotion and prevention motivational systems. However, although both internal and external factors were negatively associated with promotion focus, we found that when controlling for all variables, the external factor was uniquely negatively associated with trait self-control and a prevention focus. We therefore speculate that trait self-control and effective regulation within the prevention system in particular, play an important role in an individual's ability to regulate external stimulation. This suggests that chronic inabilities to exert self-control or effectively harness prevention motivation will increase the likelihood of experiencing boredom. Future research should further explore this hypothesis, perhaps by assessing an individual's tendency to experience boredom when goal pursuit effectiveness is hindered in some way. In contrast, the internal factor of boredom proneness was uniquely negatively associated with a locomotion orientation and the CFI-alternatives measure. Thus, in contrast to the external factor, boredom stemming from a perceived lack of internal stimulation may be better characterized as an inability to generate and initiate goal-directed behavior. In this case we speculate that poor accessibility of internal states characteristic of a perceived lack of internal stimulation may prevent individuals from finding and engaging in satisfactory outlets in order to ward off boredom.

The current study also suggests the potential for developing novel interventions to reduce boredom based on the observed relationships. Although there are a number of known boredom coping strategies, it appears that strategies rooted in either approach or avoidance behaviors show some level of efficacy (Nett, Goetz, & Daniels, 2010). Given that regulatory foci and regulatory modes are thought to influence both approach and avoidance motivation, manipulation of these regulatory orientations may increase the use of effective boredom coping strategies. For instance, both a promotion focus and a high locomotion motivation can be experimentally induced (Avnet & Higgins, 2003; Higgins, et al., 2001). Given that both of these self-regulatory orientations are associated with reduced boredom, experimental induction of either may reduce the likelihood that individuals will experience boredom. In addition, the current study suggests the exciting possibility of developing self-regulation training – directed in specific ways depending on the subtype of boredom proneness most commonly experienced – to reduce boredom proneness. By recognizing that different types of boredom are associated with distinct self-regulatory profiles, it may be possible to help individuals more effectively maintain desired levels of both internal and external stimulation.

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Appendix A

BPS

Each of the following statements is rated on a 7-point Likert scale ranging from "1" (highly disagree) to "7" (highly agree). Items that are were used as part of external and internal factors are designated with letter “E” and “I” respectively.

1. It is easy for me to concentrate on my activities. (I)
2. Frequently when I am working I find myself worrying about other things.
3. Time always seems to be passing slowly.
4. I often find myself at "loose ends", not knowing what to do.
5. I am often trapped in situations where I have to do meaningless things. (E)
6. Having to look at someone's home movies or travel slides bores me tremendously. (E)
7. I have projects in mind all the time, things to do. (I)
8. I find it easy to entertain myself. (I)
9. Many things I have to do are repetitive and monotonous. (E)
10. It takes more stimulation to get me going than most people. (E)
11. I get a kick out of most things I do.
12. I am seldom excited about my work. (E)
13. In any situation I can usually find something to do or see to keep me interested. (I)
14. Much of the time I just sit around doing nothing.
15. I am good at waiting patiently. (E)
16. I often find myself with nothing to do, time on my hands.
17. In situations where I have to wait, such as a line I get very restless. (E)
18. I often wake up with a new idea. (I)
19. It would be very hard for me to find a job that is exciting enough. (E)
20. I would like more challenging things to do in life. (E)
21. I feel that I am working below my abilities most of the time. (E)

22. Many people would say that I am a creative or imaginative person. (I)
23. I have so many interests, I don't have time to do everything. (I)
24. Among my friends, I am the one who keeps doing something the longest. (I)
25. Unless I am doing something exciting, even dangerous, I feel half-dead and dull. (E)
26. It takes a lot of change and variety to keep me really happy. (E)
27. It seems that the same things are on television or the movies all the time; it's getting old. (E)
28. When I was young, I was often in monotonous and tiresome situations. (E)

Figure captions

Figure 1. Correlations between external factor, internal factor and the study variables. Partial correlations based on a combined UW and Online Sample (df = 203), controlling for age. SCS = Self-Control Scale, CFI = Cognitive Flexibility Inventory.

Figure 2. Beta coefficients and 95% confidence intervals with External Factor as DV. Significant negative predictors of boredom are highlighted in grey bars.

Figure 3. Beta coefficients and 95% confidence intervals with Internal Factor as DV. Significant negative predictors of boredom are highlighted in grey bars.