Effects of negative self-evaluation bias on depression, rumination, and distractibility

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ABSTRACT. This study is a follow-up to a previous study on depression, rumination, and distractibility. According to the response styles theory, rumination and distraction are two different ways to respond to a negative stimulus. Previous research on the relationship between rumination and distraction and their effect on depression have focused mainly on the active use of these response styles. In the previous study, we examined how distractibility, or the natural tendency to be distracted, was related to rumination or depression. We found that self-reported distractibility was positively correlated with rumination and depression, whereas objective distractibility was moderately negatively correlated with rumination. To explain the discrepancies in the results of the previous study, we hypothesized that negative self-evaluation bias might be a moderator of both the relationship between self-reported distractibility and objective distractibility and the relationship between self-reported distractibility and self-reported depression and rumination. In this study, we examined how negative self-evaluation bias affected the relationships among depression, rumination, and distractibility. Participants were asked to answer questionnaires to self-evaluation bias, rumination, distractibility, and depression, and to perform an attention task. Self-reported level of rumination, depression, and distractibility all had a positive correlation with each other as expected. However, negative self-evaluation bias was an independent significant predictor for depression and rumination but not a moderator for the relationship between self-reported distractibility and self-reported depression and rumination. Further, it was neither a significant predictor for objective distractibility nor a moderator for the relationship between self-reported distractibility and objective distractibility. Contrary to our hypothesis, negative self-evaluation bias was an independent significant predictor for depression and rumination but not a moderator for any relationship among depression, rumination, and distractibility.

1. Introduction

The relationship between individual differences in distraction and rumination as coping methods to deal with responses to negative stimuli has been extensively explored in numerous studies. Further, Nolen-Hoeksema (Nolen-Hoeksema, 1991; 1998) proposed a theory about the interaction of rumination and depression as vulnerability factors to depression. According to the response styles theory (RST), two different coping styles in response to a negative stimulus are related to one's vulnerability to depression. In this theory, as explained in various studies (Hilt, McLaughlin, & Nolen-Hoeksema, 2010; Nolen-Hoeksema, 1991; Sarin, Abela, & Auerbach, 2005), one is considered to be using a ruminative response to a negative stimulus if one focuses on the negative stimulus (e.g. thinking about a bad grade in a test) and its consequence (e.g. thinking that he or she will fail the class because of the bad grade). On the other hand, one is considered to be using a distractive response to a negative stimulus if one actively attempts to distract oneself from the negative stimulus to replace it with a neutral or positive stimulus (e.g. watching a funny movie when feeling depressed). RST states that those who utilize distraction as a coping method are less likely to be depressed compared to those who utilize rumination as a coping method. Although various papers such as the ones above explore the relationship between depression and distraction as an active attempt to disengage oneself from focusing on negative affect, there is little research on the relation-

is to further explore the relationship among individual differences in cognitive and self-reported measures of distractibility, rumination, and depression, as well as the effect of self-evaluation bias on those measures.

In a large number of empirical studies, depression has been shown to be positively correlated with ruminative responses to negative affect (Nolen-Hoeksema, 1998; Wilkinson, Croudace, & Goodyer, 2013). Furthermore, a meta-analysis by Olatunji, Naragon-Gainey, and Wolitzky-Taylor (2013) showed that self-reported rumination is positively correlated with self-reported depression and that clinically depressed patients have significantly higher self-reported use of rumination than non-patients. Furthermore, a study by Donaldson, Lam, and Mathews (2007) found that self-reported use of ruminative coping style was positively correlated with self-reported depression and anxiety in depressed adolescents and children. Similarly, the same study by Donaldson et al. (2007) found that trait rumination was positively correlated with negative attention bias (e.g. focusing more on a negative stimulus such as insults compared to a neutral or a positive stimulus) for depressed patients. In contrast, other studies have found that use of distractive response style was negatively correlated with self-reported depression. A study by Roelofs et al. (2009) showed that adolescents who have a greater tendency to use distraction compared to rumination are less depressed and anxious over time. Another study by Huffziger and Kuehner (2009) showed that inducing distraction after negative mood induction shows mood improvement for former depressed patients.

As shown in various studies above, it is evident that rumination is positively correlated with depression, whereas distraction as an active coping method is negatively correlated with depression. In addition, a study by Watkins, Teasdale, and Williams (2000) suggested that active distraction disrupts categorical memory recall, one of the mechanisms used for rumination. According to Watkins, Teasdale, and Williams, categorical memory recall is defined as the propensity to remember repeated events in the past. In this study, the participants completed the Autobiographical Memory Test (AMT), which asked them to recall a personal memory tied to six positive words (e.g. happy), six negative words (e.g. failure), or six neutral words (e.g. bread) at three points in the experiment – before distraction/rumination induction, after distraction/rumination induction, and after decentering/control prompt task. In the distraction/rumination induction, the participants were asked to engage in either distraction or rumination based on the given prompts (e.g. "Think about the shape of a large black umbrella" for distraction and "Think about what your feelings might mean" for rumination). The results indicated that participants who underwent the distraction induction had a lower proportion of categorical memory recalled than those who underwent rumination induction, thus consistent with the hypothesis that distraction blocks memory mechanisms that may contribute to rumination.

Although the various studies above explore distraction and rumination as coping methods, there is little research on how one's natural tendency to be distracted affects one's vulnerability to depression. Therefore, a study by Suh and Barch (in press) was conducted in order to examine the relationship among individual differences in cognitive and self-report measures of distractibility, rumination, and depression. In the study, distractibility was defined as one's natural tendency to be more distracted by stimuli, whether it is internal (i.e. occurring within one's own mind, such as daydreaming) or external (i.e. occurring from the outside world, such as a car horn). The results of the study showed that self-reported distractibility was positively correlated with self-reported depression and rumination. In contrast, objective distractibility indexed by attention task accuracy was negatively correlated with self-reported rumination. Furthermore, objective distractibility was not correlated with self-reported distractibility. In the discussion of this study, Suh and Barch conjectured that this discrepancy between objective distractibility and self-reported distractibility may be due to negative self-evaluation bias of those who are more depressed. In other words, it is possible that depressed people may exaggerate their self-reports about their distractibility due to their negative self-evaluation bias. If so, this may be why self-reported distractibility did not correlate with objective measures of distractibility and correlated positively rather than negatively with rumination.

In various studies, negative self-evaluation bias has been associated with depression. Here we define negative self-evaluation bias as the tendency

negative intrusion in recall, produced more false alarms in recognizing negative adjectives, and recognized more negative adjectives correctly than non-depressed participants. Furthermore, depressed patients have been shown to evaluate their competencies, behavior, and self-worth to be worse than the general public (Blatt, 1995; Kovacs & Beck, 1978). In addition, a meta-analysis of longitudinal studies by Sowislo and Orth (2013) showed that low self-esteem is predictive of depression and anxiety.

In this study, we aimed to explore the possible effect of negative self-evaluation bias as a moderator on both the relationship between self-reported distractibility and self-reported rumination and depression and the relationship between self-reported distractibility and objective distractibility. As this study aimed to replicate the results of the previous study as well, it followed a similar procedure as the previous study but with added questionnaires to measure the level of self-evaluation bias. We hypothesized that self-reported depression would be positively correlated with self-reported rumination. Furthermore, we predicted that the relationship between self-reported distractibility and self-reported rumination and depression would vary as a function of negative self-evaluation bias, with lower negative self-evaluation bias associated with a more positive correlation between self-reported distractibility and self-reported rumination and depression and higher negative self-evaluation bias associated with a more negative correlation between self-reported distractibility and self-reported rumination and depression. However, we hypothesized that the correlation between objective distractibility and self-reported rumination and depression would continue to be negative. Furthermore, we predicted that the relationship between self-reported distractibility and objective distractibility would vary as a function of negative self-evaluation bias.

2. Method

Participants

141 undergraduate volunteers (Mage = 19.16, SDage = 1.15; 37 male, 104 female) from Washington University in St. Louis were recruited through a volunteer website maintained by the Psychology Department. All participants met the criteria of minimum age of 18 years old, no self-reported history of mental illness, and no self-reported use of psychotropic medication at the time of the study. Table 1 shows the demographic characteristics of the sample group. All participants were between the ages of 18 and 24 and were Washington University undergraduates with at

Table 1. Demographic characteristics of the sample group

	Male (*N*=37, 26%)	Female (*N*=104, 74%)
Age (*M*, *SD*)	19.19, 1.35	19,14, 1.07
Ethnicity (*N*, %)		
Asian	8, 21.6%	31, 29.8%
Black or African American	1, 2.7%	6, 5.8%
Hispanic	1, 2.7%	4, 3.8%
White	26, 70.3%	59, 56.8%
More than one race	1, 2.7%	4, 3.8%
Education in years (*M*, *SD*)	13.54, 1.07	13.37, 1.03

Measures

Rumination. The Rumination Responses Scale (RRS; Nolen-Hoeksema & Morrow, 1991) is a 22-item scale used to measure everyday ruminative responses to negative affect. The scale ranges from 1 (almost never) to 4 (always), with total scores indicating the overall likelihood of using ruminative responses. It has been shown to be a reliable and valid measure of rumination, with the internal consistency (Cronbach's alpha) of .89 (Nolen-Hoeksema & Morrow, 1991; Roelofs, Muris, Huibers, Peeters, & Arntz, 2006).

Depression and anxiety. The Beck Depression Inventory (BDI-II; Beck, Steer, & Brown, 1996) is a 21-item scale widely used to measure self-reported levels of depression, with internal consistency (Cronbach's alpha) of .93 (Beck et. al., 1996). The Beck Anxiety Inventory (BAI; Beck, Epstein, Brown, & Steer, 1988) is a 21-item scale used to measure self-reported levels of anxiety with internal consistency (Cronbach's alpha) ranging from .92 to .94 (Beck et. al., 1988). This scale was used to address potential confounding variables, as depression is known to positively correlate with anxiety. Thus, BAI was used to determine whether any obtained effects were specific to depression, as compared to anxiety.

Self-Reported Distractibility. A number of measures were used to assess different aspects of self-reported distractibility. The Daydreaming Frequency Scale (DFS; Singer & Antrobus, 1970) is a 12-item subscale of the Imaginal Processes Inventory that measures the self-reported level of mind wandering in everyday life. The option ranges from A (never) to E (most of the time), with total scores signifying the overall likelihood to engage in daydream-

reliability, and good concurrent validity (Giambra, 1993; Tanaka & Huba, 1985). The Mindful Attention Awareness Scale – Lapses Only (MAAS-LO; Carriere, Cheyne, & Smilek, 2008) is a 12-item scale modified from MAAS (Brown & Ryan, 2003), a 14-item scale used to measure the level of everyday lapses of attention (e.g. "I get so focused on the goal I want to achieve that I lose touch with what I'm doing right now to get there."). MAAS-LO aims to only look at attention lapses, so it eliminates two items from MAAS, one related to the consequences of attention lapses and another related to attention lapses while driving. The responses for each item range from 1 (almost always) to 6 (almost never). MAAS has been shown to have good test-retest reliability and validity with Cronbach's alpha of .92 (Brown & Ryan, 2003). The Cognitive Failures Questionnaires (CFQ; Broadbent, Cooper, Fitzgerald, & Parkes, 1982) is a 25-item scale used to measure the level of everyday cognitive failures due to attention lapses (e.g. "Do you find you forget why you went from one part of the house to the other?"). The responses for each item range from 0 (never) to 4 (very often), and the total score corresponds to the overall forgetfulness. It is shown reliable and valid with the Cronbach's alpha ranging from .85 to .89 (Broadbent et al., 1982; Tipper & Baylis, 1987).

Attention task. To measure distractibility during cognitive performance, we used a modified Erikson flanker task (Forster & Lavie, 2014). In this task, the participants were presented with a target, either the name of 6 Disney characters (Mickey, Donald, Pluto, Pooh, Piglet, Tigger) or 6 superheroes (Superman, Spiderman, Hulk, Wolverine, Batman, Robin) for 2000 ms following a central fixation point (500 ms) on a computer screen. The target was presented in one of the six positions from the central fixation point, ranging from 2.3 degrees below to 2.3 degrees above. The majority of the trials (90%) were presented with just the target. The remaining 10% of the trials had an equal chance of having a task-congruent distractor, task-incongruent distractor, or a task-irrelevant distractor. A task-congruent distractor is a picture from the same set as the target (e.g. Mickey if the target is Pooh). A task-incongruent distractor is a picture from the other set (e.g. Superman if the target is Pooh). A task-irrelevant distractor is a picture from neither the Disney nor the superhero set (a picture from a 6 cartoon character set: SpongeBob SquarePants, Hello Kitty, Cartman from the South Park cartoon, Bart Simpson, an Angry Bird, and Pikachu). These distractors were presented either to the left or right to the target. Participants were asked to push buttons to indicate whether the target was a superhero name or a Disney character name as fast and as accurately as possible. Participants completed 6 blocks of 60 trials, and the first three trials of each block were considered practice trials and were excluded from analysis. Participants were asked to verbally identify all of the cartoon characters involved in this task prior to the start of the task to make sure they were already familiar with all the characters. As a measure of distraction, we focused on the difference between the no-distractor condition and the task-incongruent condition by calculating the differences in reaction time (correct trials only) and accuracy between the two conditions.

Self-Evaluation Bias. Three different questionnaires were used to measure different aspects of self-evaluation bias. The Cognitive Styles Questionnaire – Short Form (CSQ-SF; Meins et al., 2012) is an abridged version of the Cognitive Styles Questionnaire (CSQ; Alloy et al., 2000), which contains 24 scenarios (12 positive and 12 negative) with 9 items for each scenario, that measures how one attributes various life events to different causes (e.g. stable vs. unstable, internal vs. external, specific vs. global). The responses for each item use a 5-point Likert scale ranging from strongly agree to strongly disagree, with higher scores indicating more negative cognitive style. Specifically, higher scores suggest the tendency to attribute life events to stable, internal, and global causes, as well as the tendency to assume negative consequences. Furthermore, higher scores suggest more negative self-evaluation. CSQ-SF is shown to be reliable and valid with the Cronbach's alpha of .81 (Meins et al., 2012). The Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965) is a 10-item scale used to measure self-reported levels of self-esteem. The responses for each item use a 4-point Likert scale ranging from strongly agree to strongly disagree. RSES is shown be reliable and valid with the Cronbach's alpha of .91 (Sowislo, Orth, & Meier, 2014). The Generalized Self-Efficacy Scale (GSES; Schwarzer & Jerusalem, 1995) is a 10-item scale used to measure self-reported

Procedure

First, participants completed an informed con

sent form to make sure they knew the general procedure and risk of participating in the study. Then, they completed the modified Eriksen flanker task according to the steps described above. After the task, they completed the battery of questionnaires about depression, rumination, distractibility, and self-evaluation bias as listed above. In the end, they were debriefed with an explanation of the goal of the study. Participants were tested in groups of 4 in individual

Data Analysis

Correlations. All data analysis was performed with SPSS 21. First, to analyze the relationships among the measures of rumination, depression, distractibility, and self-evaluation bias, we computed Pearson Product-Moment correlation among all the questionnaires. Then, to analyze the relationships among all the measures and attention task performance, we computed Pearson Product-Moment correlation for all questionnaires and task reaction time and accuracy. To do so, we first computed the difference between the no-distractor and incongruent distractor conditions for reaction time and accuracy of the attention task. For reaction time, the no-distractor condition was subtracted from the incongruent condition (higher value calculated indicates more distraction), whereas incongruent condition was subtracted from the no-distractor condition for accuracy (higher value calculated also indicates more distraction). We then computed Pearson Product-Moment correlation for all questionnaires and task RT and accuracy difference.

Regressions. Before engaging in regression analysis, we first consolidated the self-report measures of distractibility (CFQ, DFS, and MAAS-LO) and self-evaluation bias (GSES, RSES, and CSQ-SF) into two summary scores, as they all showed strong intercorrelation and this reduced the number of statistical comparisons. All self-report measures were first converted to standardized z-scores. Then, the z-scores for GSES and RSES were reversed, as they were reverse-scored with higher scores suggesting lower negative self-evaluation bias. We then calculated the internal reliability for the self-report measures of distractibility and self-evaluation bias. The self-report measures of distractibility (CFQ, DFS, and MAAS-LO) showed good internal reliability with Cronbach's Alpha of .66. The self-report measures of self-evaluation bias (GSES, RSES, CSQ-SF) showed good internal reliability with Cronbach's Alpha of .77. Therefore, we were able to sum the z-scores for the self-report measures of distractibility, as well as self-evaluation bias, to create summary scores for self-reported distractibility and self-evaluation bias. Then, we performed a series of regression analyses to test our hypothesis. First, we calculated an interaction term between self-reported distractibility and self-evaluation bias by multiplying the summary scores for self-reported distractibility and self-evaluation bias. Then, we used

3. Results

Descriptive Statistics

Table 2 shows the descriptive statistics for the questionnaires used in this study.

Table 2. Descriptive statistics for the questionnaire scores.

	BDI-II	BAI	RRS	CFQ	DFS	MAAS-LO	GSES	RSES	CSQ-SF
M	9.55	9.91	44.794	46.52	21.55	41.80	3.06	19.50	198.85
SD	7.946	9.226	13.02	12.251	8.787	8.702	0.464	4.920	26.302

Note. BDI-II = Beck Depression Inventory – II; BAI = Beck Anxiety Inventory; RRS = Rumination Responses Scale; CFQ = Cognitive Failures Questionnaire; DFS = Daydreaming Frequency Scale; MAAS-LO = Mindful Attention Awareness Scale – Lapses Only; GSES = Generalized Self-Efficacy Scale; RSES = Rosenberg Self-Esteem Scale; CSQ-SF = Cognitive Styles Questionnaire – Short Form

Rumination and Depression

The Pearson Product-Moment correlation coefficients among BDI-II, BAI, RRS, CFQ, DFS, MAAS-LO, GSES, RSES, and CSQ-SF are shown in Table 3. As expected, we were able to replicate the well-documented relationship between rumination and depression. RRS, which measures the self-reported level of rumination, had a strong positive correlation with BDI-II.

Table 3. Pearson Product-Moment correlations among individual measures of self-reported depression, anxiety, rumination, distractibility, and self-evaluation bias.

	BAI	RRS	CFQ	DFS	MAAS-LO	GSES	RSES	CSQ-SF
BDI-II	.47**	.56**	.29**	.27**	.38**	-.37**	-.61**	.55**
BAI		.36**	.20*	.19*	.14	-.26**	-.37**	.27**
RRS			.43**	.43**	.40**	-.21*	-.48**	.45**
CFQ				.38**	.49**	-.23*	-.35**	.40**
DFS					.31**	.02	-.20*	.23**
MAAS-LO						-.18*	-.37**	.38**
GSES							.54**	-.44**
RSES								-.65**

** $p < .01$, 2-tailed.
* $p < .05$, 2-tailed.

Note: BDI-II = Beck Depression Inventory – II; BAI = Beck Anxiety Inventory; RRS = Rumination Responses Scale; CFQ = Cognitive Failures Questionnaire; DFS = Daydreaming Frequency Scale; MAAS-LO = Mindful Attention Awareness Scale – Lapses Only; GSES = Generalized Self-Efficacy Scale; RSES = Rosenberg Self-Esteem Scale; CSQ-SF = Cognitive Styles Questionnaire – Short Form

Self-Reported Distractibility, Rumination, Depression, and Self-Evaluation Bias

We hypothesized that self-reported distractibility and rumination would be positively correlated as observed in the previous study. As expected, RRS had a strong positive correlation with the measures of self-reported distractibility (CFQ, DFS, and MAAS-LO). Similarly, we had also hypothesized that self-reported distractibility and depression would be positively correlated. As expected, BDI-II had a strong positive correlation with CFQ, DFS, and MAAS-LO. Table 4 shows the Pearson Product-Moment correlation coefficients among BDI-II, BAI, RRS, self-reported distractibility summary score, and self-reported self-evaluation bias summary score. As expected, the same relationships as seen in the prior study were observed among all measures. The self-reported distractibility summary score was positively correlated with BDI-II and RRS, and the self-reported self-evaluation bias summary score was also positively correlated with BDI-II and

Table 4. Pearson Product-Moment correlations among summary scores of self-reported distractibility and self-evaluation bias, self-reported depression, anxiety, and rumination.

	BAI	RRS	DIST	BIAS
BDI-II	.47**	.56**	.40**	.61**
BAI		.36**	.23**	.36**
RRS			.55**	.46**
DIST				.40**

** $p < .01$, 2-tailed.
* $p < .05$, 2-tailed.

Note: BDI-II = Beck Depression Inventory – II; BAI = Beck Anxiety Inventory; RRS = Rumination Responses Scale; DIST = Summary score for self-reported distractibility measures (CFQ, DFS, and MAAS-LO); BIAS = Summary score for self-reported self-evaluation measures (GSES, RSES, and CSQ-SF)

Attention Task Performance and Self-Report Measures

Table 5 shows the descriptive statistics for the attention task, including the reaction time differences and the accuracy differences between the no-distractor condition and the incongruent distractor condition. The one-way repeated measures ANOVAs for accuracy and reaction time (RT) comparing the conditions (no distractor, congruent distractor, neutral distractor, and incongruent distractor), replicated the result of the previous study. There was a significant main effect of condition for reaction time, $F(3,128) = 225.68$, $p < .001$. Post-hoc contrasts indicated that the incongruent condition was slower than the neutral condition ($p < .05$). Furthermore, both the incongruent and neutral conditions were significantly slower than the no-distraction condition ($p < .001$). Further, the no-distraction condition was significantly faster than the congruent condition ($p < .001$). There was also a significant main effect for accuracy, $F(3,128) = 85.03$, $p < .001$. Post-hoc contrasts indicated that all conditions were significantly different (ps < .001). Performance was best in the congruent condition, followed by the no-distractor condition, followed by

Table 5. Descriptive statistics for the task data.

	Incongruent Distractor		Irrelevant Distractor		Congruent Distractor		No Distractor	
	RT (ms)	ACC	RT (ms)	ACC	RT (ms)	ACC	RT (ms)	ACC
M	723.309	0.865	704.578	0.919	612.398	0.961	597.168	0.940
SD	103.63	0.08	101.75	0.07	67.67	0.05	54.60	0.04

Note: RT = Reaction time (in ms); ACC = Accuracy.

Table 6 shows the Pearson Product-Moment correlation coefficients among the self-report measures and the task performance. As described in the methods, the dependent variables for the task performance were distractibility scores. As shown in Table 6, DFS was not correlated with the accuracy measure of distractibility, but was positively correlated with the RT measure of distractibility. In other words, greater objective distractibility as measured by RT was associated with greater self-reported distractibility. However, all other self-report measures for distractibility as well as depression, rumination, and self-evaluation bias were not correlated with accuracy or reaction time

Table 6. Pearson Product-Moment correlations among self-reported distractibility, rumination, depression, anxiety and attention task data.

	(No distractor) – (Incongruent)	
	Reaction time	Accuracy
Beck Depression Inventory	.06	-.12
Beck Anxiety Inventory	-.07	.04
Rumination Responses Scale	.07	.00
Cognitive Failures Questionnaire	.13	-.10
Daydreaming Frequency Scale	.18*	-.05
Mindful Attention Awareness Scale – Lapses Only	.12	-.01
Generalized Self-Efficacy Scale	.10	.14
Rosenberg Self-Esteem Scale	.01	.11
Cognitive Styles Questionnaire – Short Form	.08	-.04

* $p < .05$, 2-tailed.

Regression Analysis

As described in the introduction, we hypothesized that the relationship between self-reported distractibility, depression, rumination and objective distractibility would differ as a function of an individual's level of self-evaluation bias. Specifically, we hypothesized that among those individuals with high negative self-evaluation bias, self-reported distractibility would be positively correlated with depression and rumination while relatively uncorrelated with objective distractibility. In contrast, among individuals with low negative self-evaluation bias, we hypothesized that self-reported distractibility would be negatively correlated with depression and rumination but positively correlated with objective distractibility. To test these hypotheses, we conducted a series of linear regressions that included the main effects of self-evaluation bias (using the summary score) and self-reported distractibility (using the summary score) as well as their interaction to predict depression, rumination, and objective distractibility.

For the regression predicting rumination, we found significant main effects of self-evaluation bias (t = 3.66, = .28, p < .001) and self-reported distractibility (t = 5.56, = .43, p < .001). However, the interaction between self-evaluation bias and self-reported distractibility was not significant (t = -.24, = -.02, p = .81). Similarly, for the regression predicting depression, we found significant main effects of self-evaluation bias (t = 7.13, = .54, p < .001) and self-reported distractibility (t = 2.49, = .19, p < .014) but only a marginally significant effect of the interaction between self-evaluation bias and self-reported distractibility (t = 1.95, = .14, p = .053). For the regression predicting RT measure of objective distractibility, we found significant main effects of self-reported distractibility (t = 2.37, = .23, p < .019) but no significant effect of self-evaluation bias (t = -1.06, = -.10, p = .29) and no significant interaction between self-evaluation bias and self-reported distractibility (t = -0.44, = -.04, p = .66). For the regression predicting accuracy measure of objective distractibility, we found no significant main effects of self-reported distractibility (t = -.24, = -.02, p = .81) or self-evaluation bias (t = -1.12, = -.11, p = .26), and no significant interaction between self-evaluation bias and self-reported distractibility (t = -0.34, = -.03, p = .74).

4. Discussion

In this study, we aimed to explore the effects of negative self-evaluation bias on rumination, depression, and distractibility. Specifically, we hypothesized that self-reported depression would be positively correlated with self-reported rumination. Furthermore, we hypothesized that the relationship between self-reported distractibility and self-reported rumination and depression would vary as a function of negative self-evaluation bias. We predicted that lower negative self-evaluation bias would be associated with a more negative correlation between self-reported distractibility and self-reported rumination and depression, whereas higher negative self-evaluation bias would be associated with more positive correlation between self-reported distractibility and self-reported rumination and depression. Lastly, we had also hypothesized that the relationship between self-reported distractibility and objective distractibility would vary as a function of negative self-evaluation bias as well, with lower negative self-evaluation bias associated with a more positive correlation between self-reported distractibility and objective distractibility.

With respect to rumination and depression, we were able to replicate the positive correlation between self-reported rumination and self-reported depression seen in our previous study and in many other studies (Nolen-Hoeksema, 1998; Olatunji et al., 2013; Suh & Barch, in press; Wilkinson et al., 2013). Furthermore, we were able to replicate the overall

positive correlation between self-reported distractibility and self-reported rumination and depression as seen in previous study. However, contrary to our predictions, we did not find any moderating effect of negative self-evaluation bias on either the relationship between self-reported distractibility and self-reported rumination and depression or the relationship between self-reported distractibility and objective distractibility. We had hypothesized that negative self-evaluation bias might be a moderator of the relationship between self-reported distractibility and self-reported rumination and depression. However, the regression analysis showed that self-reported distractibility and negative self-evaluation bias were independent significant predictors of self-reported rumination and self-reported depression, with no significant interaction in predicting rumination. Negative self-evaluation bias was a significant predictor of self-reported rumination and depression, which is consistent with the previous studies described in the introduction. As described in the introduction, prior work suggests that negative self-evaluation bias is positively correlated with depression and that high level of negative self-evaluation bias is predictive of symptoms of depression and anxiety (Blatt, 1995; Kovacs & Beck, 1978; Sowislo & Orth, 2013; Zuroff, Colussy, & Wielgus, 1983). Therefore, the result from the regression analysis, in conjunction with the positive correlation shown between negative self-evaluation bias and self-reported rumination and depression, is consistent with prior research as described above. However, our hypothesis that negative self-evaluation bias would moderate these relationships was not supported.

We had also hypothesized that negative self-evaluation bias may be a moderator of the relationship between self-reported distractibility and objective distractibility. However, the regression analysis showed that the interaction between negative self-evaluation bias and self-reported distractibility in predicting objective distractibility was not significant. Even independently, negative self-evaluation bias was not a significant predictor for either RT or accuracy measures of objective distractibility, whereas self-reported distractibility was a significant predictor for only the RT measure of objective distractibility. Furthermore, it is worth noting that we were not able to replicate our previously reported relationship between self-reported distractibility and objective distractibility. In the previous study, the accuracy measure of objective distractibility was negatively correlated with self-reported rumination, although to only a modest extent. However, in this study, the accuracy measure was not correlated with any other measures, whereas the RT measure was positively correlated with DFS, a scale for self-reported distractibility. The failure to replicate the results from the previous study suggests that the correlation shown in the previous study may have been a chance correlation and that there is no strong or robust relationship between objective distractibility and rumination.

Although we could not find supporting evidence for the hypothesis in regards to negative self-evaluation bias, it is worth nothing that we were able to replicate the previously observed relationship between individual differences among distractibility, rumination, and depression. Self-reported distractibility was positively correlated with self-reported rumination and depression, whereas objective distractibility was not correlated with self-reported depression. This result is contradictory to the well-established relationship between active distraction and depression, as various prior studies show that active distraction works against depression and rumination (Nolen-Hoeksema, 1991; 1998; Roelofs et al., 2009; Huffziger & Kuehner, 2009). Therefore, the results of this study suggest that distractibility, or the natural tendency to be distracted, do not function the same way as distraction as an active coping method. This seems to be true for distractibility measured both objectively (as shown by the correlational results from the attention task) and subjectively (as shown by the correlational results from the self-report measures). Instead, our results suggest that the positive correlation between self-reported distractibility and depression may be evidence of cognitive deficits in executive control, attention, and memory commonly found in depressed patients (Hasselbalch, Knorr, & Kessing, 2011; Rock, Roiser, Riedel, & Blackwell, 2014; Snyder, 2013).

It is worth noting the limitations of the study. The most significant limitation was the sample group composition. Only Washington University undergraduates who signed up via the Psychology Subject Pool were included in the study, and the sample had a high

gender skew towards female (74% of the sample). Thus, our results may not be representative of the general population, and it is possible that different results might be found in a more diverse population. Furthermore, the majority of the relationships that were that were statistically significant were self-report measures, which may not be the most accurate depiction of the participant's behavior in real life due to various biases. For example, the answers may be distorted by the social desirability bias, which could drive an individual exaggerate their answers to fit with what is desirable in society (e.g. saying they are nicer than they actually are). Moreover, participant's answers may be affected by his or her mood at the time (e.g. scoring higher on a happiness scale because he or she just watched something funny). In order to overcome this limitation, in future work it would be informative to gather data from the perspective of the participant's friends or family members in order to obtain a more complete depiction of the participant.

In conclusion, this study showed that negative self-evaluation bias was significantly associated with depression and rumination but was not a moderating factor in the relationship among rumination, depression, and distractibility. Although we could not find any moderating effect for negative self-evaluation bias, we were able to replicate the results shown in prior work, which showed that negative self-evaluation bias was a significant factor in predicting symptoms of depression. We found that negative self-evaluation bias was positively correlated with self-reported rumination and depression and that it was a significant predictor for depression and rumination. Furthermore, we were able to replicate the previously reported relationship between individual differences among distractibility, rumination, and depression. We found that self-reported distractibility was positively correlated with self-reported rumination and depression, whereas objective distractibility was not correlated with self-reported depression. These results suggest that there is a difference between distraction as an active coping method against negative stimuli versus distractibility, or the natural tendency to be distracted.

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