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Testing a “content meets process” model of depression vulnerability and rumination: Exploring the moderating role of set-shifting deficits



Chrystal Vergara-Lopez¹, Hector I. Lopez-Vergara², John E. Roberts^{*}

University at Buffalo, State University of New York, Park Hall, Buffalo, NY 14260, USA

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ABSTRACT

Background and objectives: MacCoon and Newman's (2006) “content meets process” model posits that deficits in cognitive control make it difficult to disengage from negative cognitions caused by a negative cognitive style (NCS). The present study examined if the interactive effect of cognitive set-shifting abilities and NCS predicts rumination and past history of depression.

Methods: Participants were 90 previously depressed individuals and 95 never depressed individuals. We administered three laboratory tasks that assess set-shifting: the Wisconsin Card-Sorting Task, the Emotional Card-Sorting Task, and the Internal Switch Task, and self-report measures of NCS and rumination.

Results: Shifting ability in the context of emotional distractors moderated the association between NCS and depressive rumination. Although previously depressed individuals had more NCS and higher trait rumination relative to never depressed individuals, shifting ability did not moderate the association between NCS and depression history.

Limitations: The cross-sectional correlational design cannot address the causal direction of effects. It is also not clear whether findings will generalize beyond college students.

Conclusions: NCS was elevated in previously depressed individuals consistent with its theoretical role as trait vulnerability to the disorder. Furthermore, NCS may be particularly likely to trigger rumination among individuals with poor capacity for cognitive control in the context of emotional distraction.

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1. Introduction

According to the hopelessness theory of depression, negative cognitive style (NCS) entails attributing negative events to causes that are stable (i.e., enduring over time) and global (i.e., affecting many life domains), thinking that these events will lead to other negative consequences, and that these events imply negative characteristics of the self (Abramson, Metalsky, & Alloy, 1989). Numerous studies have found that NCS retrospectively and prospectively predicts both depressive symptoms and episodes, suggesting that it functions as a trait vulnerability to depression (e.g.,

Abela, Brozina, & Seligman, 2004; Alloy et al., 2000; Hankin & Abramson, 2002). However, while there is a robust association between NCS and risk for depression, not all individuals with a NCS develop depression. This phenomenon has led researchers to postulate the conditions by which NCS confers risk for depression.

The degree to which individuals are able to control and disengage from negative cognitions may be critical. MacCoon, Wallace, and Newman (2004) distinguish between dominant cognitions, which are well rehearsed responses in interpreting the environment, and non-dominant cognitions, which are only sporadically used responses. They posit that executive control processes are required to shift from automatically deployed dominant cognitions to less practiced non-dominant cognitions. Their “content meets process” model (MacCoon & Newman, 2006) further posits that depression prone individuals have relatively limited cognitive control, which makes it difficult for them to switch attentional focus to non-dominant content when dominant content has been activated. Given the presence of NCS among depression prone individuals, it is likely that they perseverate on negative content. This

* Corresponding author. 221 Park Hall, Department of Psychology, University at Buffalo, State University of New York, Buffalo, NY 14260, USA.

E-mail address: robertsj@buffalo.edu (J.E. Roberts).

¹ Present address: Centers for Behavioral and Preventive Medicine, The Miriam Hospital/Alpert Medical School Brown University, Coro West, Suite 314, 1 Hoppin Street, Providence, RI 02903, USA.

² Present address: Center for Alcohol and Addiction Studies, Brown University, 121 South Main Street, Providence, RI 02903, USA.

perseveration and difficulty disengaging from negative cognitions would likely take the form of depressive rumination, and would further fuel depressive symptomatology.

Depressive rumination is a repetitive self-focus on negative aspects of the self (Nolen-Hoeksema, 1991), and is a robust correlate of depression. There is a great deal of research that has shown that rumination maintains negative affect, precedes depressive episodes, and leads to longer depressive episodes (see Nolen-Hoeksema, Wisco, & Lyubomirsky, 2008 and Smith & Alloy, 2009 for reviews). Several researchers have proposed that a NCS leads to depression because depression prone individuals tend to ruminate on this content (e.g., Abramson et al., 2002; Alloy & Abramson, 2007; Lo, Ho, & Hollan, 2008; Spasojevic & Alloy, 2001). In addition, consistent with MacCoon and Newman's (2006) hypothesis, impairments in cognitive control are associated with rumination and depression (see Gotlib & Joormann, 2010 for a review). In short, there is support for the claims that both rumination and depression are products of NCS and impaired cognitive control. From a content meets process perspective it can be hypothesized that deficits in cognitive control amplify the effect of a NCS to produce rumination, and in turn depression. However, it is empirically unknown if the potential synergistic effect of NCS and cognitive control exerts a direct risk for depression or indirect risk via rumination, or both. Thus, the current study will examine the influence of NCS and cognitive control on both rumination and depression history.

However, it is important to recognize that cognitive control is a multifaceted construct that refers to several higher order abilities (e.g., Miyake et al., 2000), and that the content meets process model posits set-shifting to be the most relevant executive process in the etiology of depression. In line with this framework, there is evidence to suggest that rumination (Davis & Nolen-Hoeksema, 2000) and current depression (e.g., Grant, Thase, & Sweeney, 2001; Harvey et al., 2004; Merriam, Thase, Haas, Keshayan, & Sweeney, 1999) are associated with set-shifting deficits as measured by the Wisconsin Card Sorting Task (WCST). However, these studies examined the concurrent association between set-shifting and both depression and rumination, and therefore do not address the issue of whether set-shifting deficits are trait vulnerabilities to depression or simply a consequence of a depressive state. Studies that used a remission-design (which compare previously depressed individuals with never depressed individuals) have not found performance differences on the WCST (Biringer et al., 2005; Nakano et al., 2008). Together, these findings suggest that set-shifting deficits may be a state dependent effect of current depression rather than a trait vulnerability.

In efforts to clarify the role of cognitive control in the etiology of depression, some researchers have argued that vulnerability to depression involves set-shifting deficits in the context of emotional information (e.g., De Lissnyder, Koster, Derakshan, & De Raedt, 2010; Deveney & Deldin, 2006). Because the WCST only presents neutral stimuli, a new generation of set-shifting tasks, including the Emotional Card Sorting Task (ECST) and the Internal Shift Task (IST), have been developed to investigate the role of set-shifting ability in the context of valenced information (De Lissnyder, Koster, & De Raedt, 2012; Deveney & Deldin, 2006). The ECST functions very similarly to the WCST, but assesses the degree of perseveration in the presence of negatively, positively, or neutrally valenced distracting stimuli. In contrast, the IST assesses how quickly individuals can update and switch between both emotion and non-emotion mental sets that are held in working memory.

In the one previous study using the ECST, Deveney and Deldin (2006) found that currently depressed individuals made more perseverative errors relative to healthy controls during the presence of negative distractors, but not during positive or neutral distractors. However, to our knowledge no previous studies have

examined whether rumination or depression vulnerability are associated with poor set-shifting specific to the presence of negative information using the ECST. Using the IST De Lissnyder et al. (2012) found that difficulty updating and switching between (from or towards) emotion mental sets held in working memory was associated with rumination, but not concurrent depressive symptoms. However, in a sample of previously depressed individuals, impairments in updating and switching between emotion mental sets held in working memory were found to prospectively predict rumination and depressive symptoms (Demeyer, De Lissnyder, Koster, & De Raedt, 2012). Importantly, past research has not investigated if set-shifting deficits specific to the presence of negative information or difficulty updating and switching between emotionally valenced stimuli amplify the impact of negative cognitive content on the development of rumination and risk for depression.

The goal of the current study was to examine the association between different types of set-shifting and both rumination and depression history. Furthermore, we investigated if the interactive effect of NCS and set-shifting was associated with rumination and depression history. We hypothesized that perseverative errors during the negative block of the ECST (but not during the positive or neutral blocks) would predict rumination and the likelihood of having a previous depressive episode. Similarly, we expected that IST emotion switch costs (but not non-emotion switch costs) would predict rumination and likelihood of having a previous depressive episode. We posited that NCS would be more strongly associated with rumination and probability of having a past history of depression among individuals with greater ECST perseverative errors during the negative block (but not during the positive and neutral blocks) and higher IST emotion switch costs (but not non-emotional switch costs). Lastly, to compare the current sample to previous studies we administered the WCST. In line with past research that did not select participants based on rumination or current depression we did not expect the WCST to yield significant effects.

2. Method

2.1. Participant overview

Participants were 185 (81 male) undergraduate students enrolled in an introductory psychology course at a large public university in the Northeastern United States. The majority self-identified as Caucasian (72.0%), 8% as Hispanic, 6.5% as African American, 6.5% as other (e.g., multiracial), 6% as Asian, and 1% as American Indian. Participants received course credit in partial fulfillment of a course requirement.

2.2. Measures

2.2.1. Depression screen

The Patient Health Questionnaire-9 current and lifetime (PHQ and PHQ-L; Cannon et al., 2007; Spitzer, Kroenke, & Williams, 1999) are self-report measures that assess symptoms of Major Depressive Disorder (MDD) consistent with DSM-IV diagnostic criteria. These measures have good agreement with diagnoses made by mental-health professionals using clinical interviews. For example, the PHQ has shown sensitivity of .75 and specificity of .90 (Spitzer et al., 1999), whereas the PHQ-L has shown sensitivity of .71 and specificity of .84 (Cannon et al., 2007).

2.2.2. Depressive symptoms

The depression subscale of the Depression Anxiety Stress Scale (DASS-21; Lovibond & Lovibond, 1995) includes a 7-item subscale

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