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Memory biases in remitted depression: The role of negative cognitions at explicit and automatic processing levels



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ABSTRACT

Background and objectives: Cognitive models propose that depression is caused by dysfunctional schemas that endure beyond the depressive episode, representing vulnerability factors for recurrence. However, research testing negative cognitions linked to dysfunctional schemas in formerly depressed individuals is still scarce. Furthermore, negative cognitions are presumed to be linked to biases in recalling negative self-referent information in formerly depressed individuals, but no studies have directly tested this association.

In the present study, we evaluated differences between formerly and never-depressed individuals in several experimental indices of negative cognitions and their associations with the recall of emotional self-referent material.

Methods: Formerly ($n = 30$) and never depressed individuals ($n = 40$) completed measures of explicit (i.e., scrambled sentence test) and automatic (i.e., lexical decision task) processing to evaluate negative cognitions. Furthermore participants completed a self-referent incidental recall task to evaluate memory biases.

Results: Formerly compared to never depressed individuals showed greater negative cognitions at both explicit and automatic levels of processing. Results also showed greater recall of negative self-referent information in formerly compared to never-depressed individuals. Finally, individual differences in negative cognitions at both explicit and automatic levels of processing predicted greater recall of negative self-referent material in formerly depressed individuals.

Limitations: Analyses of the relationship between explicit and automatic processing indices and memory biases were correlational and the majority of participants in both groups were women.

Conclusions: Our findings provide evidence of negative cognitions in formerly depressed individuals at both automatic and explicit levels of processing that may confer a cognitive vulnerability to depression.

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1. Introduction

Cognitive models of depression (Beck, 1967; Teasdale, 1988) propose that depressed mood states are maintained by biases in cognitive processing in favor of mood-congruent information. Beck's model (1967) postulates that existing schemas lead individuals to select and remember information congruent with their schemas. This theory proposes that schemas of depressed people include themes of loss, separation, failure, worthlessness, and rejection; consequently, depressed individuals are hypothesized to

remember information relevant to and congruent with those schemas. Research has consistently shown that depressed compared to nondepressed individuals are characterized by greater retrieval of negative material (Gotlib & Joormann, 2010; Matt, Vazquez, & Campbell, 1992). Furthermore, this mood-congruent memory bias has been found to be stronger when depressed individuals have to retrieve negative self-referent information (Wisco, 2009).

Dysfunctional schemas and cognitive biases are presumed to endure beyond a depressive episode, representing stable vulnerability factors for depression recurrence (Beck, 1967). Thus, formerly depressed individuals are expected to maintain these biases after the depressive episode remits. Memory biases in remitted depressed samples have been mostly evaluated through the incidental recall of positive and negative adjectives previously presented. Empirical evidence of memory biases in formerly

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depressed individuals has been mixed. Some studies have shown that formerly depressed individuals do not differ from never-depressed individuals in their retrieval of negative material (e.g., Bradley & Mathews, 1988; Teasdale & Dent, 1987). Other studies have revealed that formerly compared to never-depressed individuals show memory biases for negative material but only after receiving a negative mood induction (see Scher, Ingram, & Segal, 2005 for review). These findings have been interpreted as dysfunctional schemas might be not stable structures. For instance, Beck's reformulated model (Beck, 1987; Clark, Beck, & Alford, 1999) proposes that once depression has remitted, dysfunctional schemas are dormant until activated in response to negative stressors. Thus, once a negative mood is experienced in response to stress, dysfunctional schemas in formerly depressed individuals would become more accessible, generating negative memory biases (Gilboa & Gotlib, 1997; Timbremont & Braet, 2004). Furthermore, the differential activation hypothesis (Teasdale, 1988) assumes that during a depressive episode an association between depressed mood and negative thinking patterns is established. According to this model, when depression has remitted, a subsequent depressed mood could re-activate those negative thinking patterns, which in turn would generate memory biases to negative information. In contrast, other current accounts (e.g., Joormann, Yoon, & Zetsche, 2007) do not specify that a depressed mood state is required to activate memory biases in formerly depressed. These accounts propose that cognitive biases may operate as a function of the capacity to control for the accessibility of negative cognitions. Thus, memory biases would operate as a function of formerly depressed individuals' capacity to control or inhibit the activation of negative cognitions in working memory (Joormann, 2010).

A critical issue in clarifying the role of depressive schemas in memory processing once depression has remitted is how negative cognitions have been assessed. Previous studies have mostly employed self-report measures of depressive cognitions, such as the Dysfunctional Attitudes Scale (Weissman, 1979), a scale intended to measure dysfunctional beliefs that are thought to reflect a person's self-evaluation. Studies using this scale have reported that formerly depressed individuals did not differ from never-depressed individuals in their levels of dysfunctional attitudes (e.g., Miranda, Persons, & Byers, 1990). However, Hedlund and Rude (1995) suggested that the use of self-reported measures may be relatively insensitive to the detection of negative cognitions in remitted individuals. Furthermore, consistently with recent views that propose that cognitive biases depend upon individuals' available cognitive control (Joormann et al., 2007), some authors have argued that the failure to find evidence of dysfunctional schemas in formerly depressed individuals may be due to effortful mental strategies used to reduce the report of unwanted negative thinking (Wegner, 1994; Wegner & Wenzlaff, 1996). To overcome this issue, researchers have developed experimental tasks to detect depressive cognitions through the assessment of cognitive processes under conditions that interfere with vulnerable individuals' attempts to control the mind (Wenzlaff & Wegner, 2000). For instance, the scrambled sentence test (SST; Wenzlaff & Bates, 1998) is a task aimed to assess interpretation processes, in which individuals have to use scrambled words to form self-referent statements in a positive or negative way while performing an additional task (e.g., keeping a number in mind) that interferes with cognitive control. Using this approach, research has shown that formerly compared to never depressed individuals form more negative statements (Rude, Covich, Jarrold, Hedlund, & Zentner, 2001; Watkins & Moulds, 2007; Wenzlaff & Bates, 1998). In fact, some studies have found that whereas formerly and never depressed individuals did not differ on the DAS, they did differ on this interpretation measure

under reduced cognitive control (e.g., Hedlund & Rude, 1995; Rude et al., 2001).

A more direct approach to detect negative cognitions uninfluenced by cognitive control has involved the use of priming tasks. These tasks assess activation of negative meanings in the absence of conscious information processing (Phillips, Hine, & Thorsteinsson, 2010). For instance, in the lexical decision task (LDT), participants have to identify if verbal stimuli previously presented subliminally represent real words or nonwords. Using this paradigm, studies have shown that depressed compared to nondepressed participants are faster at responding to negative adjectives (Bradley, Mogg, & Millar, 1996; Bradley, Mogg, & Williams, 1995; Scott, Mogg, & Bradley, 2001). These results suggest that automatic activation of negative concepts in depression facilitates the processing of that negative information. However, no studies have used this approach to test if an effect of automatic activation to negative cognitions is also evident once depression has remitted.

Further research is necessary to clarify the presence of negative cognitions in formerly depressed individuals at both automatic and explicit processing levels under reduced cognitive control. The present study was aimed at examining these questions by comparing cognitive processing of formerly and never-depressed individuals. First, as shown by previous research (e.g., Hedlund & Rude, 1995; Rude et al., 2001), we hypothesized that formerly compared to never-depressed individuals would complete more negative sentences in the SST (Wenzlaff & Wegner, 2000), showing negative interpretation biases under reduced cognitive control. Second, we expected that negative cognitions activation would be evident in formerly depressed individuals at an automatic processing level. We hypothesized that formerly compared to never-depressed individuals would show a greater detection of subliminally primed negative words in the LDT.

We also aimed to test how negative cognitions detected by these methods may be linked to memory biases for negative information in formerly depressed individuals. As proposed by Joormann et al. (2007), memory biases to negative information may be not only dependent on negative mood states, as explained by traditional cognitive models of depression (Clark et al., 1999; Teasdale, 1988), but also operate as a function of individuals' capacity to inhibit negative processing. Consequently, individuals characterized by higher negative processing under reduced cognitive control (i.e., in the SST and the LDT) should be those who would exhibit higher memory for negative material. Thus, we expected that higher negative processing observed under reduced mental control in these tasks would predict individuals' retrieval of negative self-referent material in a subsequent memory task. Specifically, we expected that higher levels of negative processing in the SST and the LDT would predict greater retrieval of negative self-referent material in formerly depressed individuals.

2. Methods

2.1. Participants

Two hundred eight undergraduate students were initially contacted to complete the Diagnostic Inventory for Depression (DID; Zimmerman, Sheeran, & Young, 2004) and the second edition of the Beck Depression Inventory-II (BDI-II; Beck, Steer, & Brown, 1996). These instruments were used to divide participants into the formerly and never-depressed groups. The DID was used to diagnose lifetime history of major depression according to DSM-IV criteria. The formerly depressed group comprised participants reporting a past major depressive episode. Participants whose depressive symptoms had been due to physical illness or substance abuse were excluded, and a minimum recovery time of 2 months

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