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Depressive cognition: Self-reference and depth of processing

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ABSTRACT

Cognitive models of depression, which propose that depression is associated with negatively biased thinking, have typically focused on either the content or the processes of depressive cognition. Content-based models suggest that depressive thought is more negative for self-relevant than for externally-focused content. Process-based models propose that early, automatic processes are not negatively biased in depression, but that deeper processes are biased. The current review evaluates evidence for both the self-relevant content and depth of processing accounts, and concludes that there is substantial evidence for both models. I call for further research which integrates content and process-based approaches by using self-relevant stimuli and cognitive measures which precisely identify the specific attention, memory, and interpretation processes affected in depression.

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Cognitive theories of depression have been prominent for over forty years (Beck, 1967). Such theories have typically focused on either the content or the processes of depressive cognition. Early cognitive models specified the content of depressive thought as negative views of the self, the future, and the world (Beck, 1976). Since Beck's original formulation, theorists have argued that negative views of the world and the future are limited to one's world and one's future, and could be described as specific kinds of negative self-views (Haaga, Dyck, & Ernst, 1991). As I will review below, extensive evidence indicates that depressed individuals hold more negative self-views, blame themselves more than others for negative events, are more pessimistic for themselves than for others, and more adversely affected by self-reflection than nondepressed individuals.

More recent cognitive theories have focused on the process of depressive cognition, rather than its content (Williams, Watts, MacLeod, & Mathews, 1997). One influential model, proposed by Williams and colleagues, argues that early, automatic processes are not biased in depression, but that more strategic, elaborative

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processes are negatively biased.[2] More recent process-based theories have suggested modifications to the Williams and colleagues' model (Mogg & Bradley, 2005; Watkins, 2002). Below, I describe the different process-based models in detail and offer a comprehensive review of the evidence in tests of memory, attention, and interpretation bias in depression. Most of the evidence for such process-based models has come from performance-based measures that are better able to isolate specific cognitive processes than self-report questionnaires. The research using such performance-based measures, however, has not included systematic investigation of self-relevant versus external content.

In the following review, I integrate content- and process-based approaches to depressive cognition.[3] First, I offer evidence that the self-relevance of stimuli affects the level at which these stimuli are processed, drawing upon basic research from the social cognitive and cognitive science literatures not concerned with differences between depressed and nondepressed individuals. I then argue that the effects of self-relevance and depth of processing are confounded in current tests of depressed versus nondepressed cognition. I discuss the negative self-reference effect in memory as one example of this confound. Next, I evaluate evidence from content-focused studies that depressed individuals are more negative for themselves than for others. I then review evidence for process-focused models that depressed and nondepressed people differ in elaborative, but not automatic, processing of negative information. I conclude that there is substantial evidence for both of these models, but that inferences regarding the contributing roles of self-relevance and depth of processing are limited by the confounded nature of most of the current literature. Finally, I discuss the importance of combining a focus on self-referential content with performance-based measures which more closely pinpoint specific cognitive processes.

1. Self-reference and social cognition

People in general, whether depressed or nondepressed, process self-referential stimuli differently from more external stimuli. The self-relevance of information has been found to affect speed of attention, facility of memory, and neurobiological correlates of processing. Some of the earliest evidence of these effects came from dichotic listening paradigms, during which individuals are instructed to attend to one stream of speech while another irrelevant stream of speech is presented in their other ear. Overall, participants recall few words presented in the unattended ear. When the stream of unattended speech contains their own name, however, they are more likely to recall this self-relevant stimulus than the other words presented (Moray, 1959; Wood & Cowan, 1995). This phenomenon is commonly referred to as the "cocktail party effect." Similar effects have been found for other self-referential information, specifically words consistent with one's own self-descriptions. When these self-relevant words are presented in the stream of unattended speech, the task of attending to the target stream of speech requires more attentional resources, suggesting distraction by the self-relevant words (Bargh, 1982).

Similar findings have emerged using other measures of selective attention. One such measure is the Stroop task, in which participants are asked to name the color of words whose content varies. Participants take longer to identify the color of self-relevant words than neutral words, suggesting attentional interference by the self-relevant content (Geller & Shaver, 1976; Algom, Chajut, & Lev, 2004, for a discussion of limitations of this task). Likewise, when participants are asked to identify a name presented in the center of a computer screen, task-irrelevant pictures presented on the side of the screen are more distracting when the pictures are self-relevant (the participant's own face, rather than another face; Bredart, Delchambre, & Laureys, 2006). One's own name also holds attention more than other words when stimuli are presented in rapid succession, as they are in masking procedures (Shelley-Tremblay & Mack, 1999) and rapid serial visual presentation tasks (Shapiro, Caldwell, & Sorenson, 1997).

Neuroimaging results support the notion that self-referential information is processed differently from other kinds of information. In studies directly examining self-reflective thought, greater activation of the medial prefrontal cortex (MPFC) has been consistently associated with self-relevance across a variety of experimental tasks. Ratings of the self-descriptiveness of trait adjectives are associated with greater activation of the MPFC than judgments of how well the adjectives describe others (Craik et al., 1999; Kelley et al., 2002; Schmitz, Kawahara-Baccus, & Johnson, 2004). Self-descriptiveness ratings are also associated with greater activation of the MPFC than ratings of the positivity (Schmitz et al., 2004) or social desirability of words (Craik et al., 1999; Fossati et al., 2003). Even within self-descriptiveness ratings, greater MPFC activation is found when traits are judged to be self-descriptive than when they are judged not to be self-descriptive (e.g., when the answer is "yes" as opposed to "no;" Macrae, Moran, Heatherton, Banfield, & Kelley, 2004; Moran, Macrae, Heatherton, Wyland, & Kelley, 2006). Similarly, participants asked to engage in self-reflective thought demonstrate greater activation of the dorsomedial prefrontal cortex than those asked to consider external, non-self-relevant statements (Johnson et al., 2006), and participants show greater activation of the MPFC when asked to listen to statements that reflect one's own attributes (e.g., "I forget important things") than when they listen to statements of general, non-self-relevant, information (e.g., "Ten seconds is more than a minute;" Johnson et al., 2002). The neuroimaging data corroborate the behavioral evidence that differential processing occurs for self-relevant and non-self-relevant information.

Finally, a large body of literature has examined the "self-reference effect" (SRE) in memory, which refers to the phenomenon that encoding words in reference to the self (by indicating whether or not the word describes oneself) leads to better recall of those words than almost any other kind of encoding strategy. In one of the earliest studies examining the SRE, Rogers, Kuiper, and Kirker (1977) compared self-referential encoding of words to three other encoding conditions (indicating whether the word is presented in uppercase letters, whether it rhymes with another word, or whether its meaning is the same as another word). Participants were more likely to recall self-referentially encoded words than words encoded in any of the other conditions. Since this original study, there have been over one hundred studies examining the presence of the SRE in memory. A meta-analysis found that self-referentially encoded words are remembered better than words encoded according to semantic properties (e.g., "Does the word mean the same as X?") or in reference to someone else (Symons & Johnson, 1997).

[2] The vast majority of the depressive cognition literature relies upon examinations of relative differences between depressed and nondepressed groups. When the depressed group shows relatively more negative thinking, it is often referred to as "negatively biased." Because the bias terminology is commonly used in this literature, I adopt it for this review as well. This terminology has come into question because such group differences could be explained by either a negative bias in the depressed group or a positive bias in the nondepressed group, relative to some objective standard. In fact, several studies have found that such differences are best explained by a lack of positive bias in the depressed group (Alloy & Ahrens, 1987; McCabe & Gotlib, 1995). However, objective standards are difficult to determine for much this research which concerns participants' subjective attitudes and beliefs. For this reason, I use the bias terminology to refer to any thinking that is more negative in depressed individuals than nondepressed individuals, regardless of its relationship to objective truth.

[3] For the purposes of this review, I conducted separate PsycINFO searches including the keywords "Depression" or "Major Depression" or "Depression (Emotion)" and each of the following combinations of keywords, in turn "cognitive bias," "attentional bias" or "attention bias" or "attention," "memory bias" or "memory," "interpretation bias," "self-reference" or "self-relevance." I reviewed the abstracts generated by these searches to identify relevant articles, and conducted a manual search of the reference lists of identified studies.