The Structure of the Self-Schema in Clinical Depression:

Differences Related to Episode Recurrence

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Abstract

A central tenet of cognitive theories of depression implicates the organization of self-referential material in the depressive process. However, few studies have extended beyond the examination of cognitive products and processes to assess the interconnectedness of the depressive self-schema. Clinically depressed participants completed a computerized measure of the cognitive organization of positive and negative adjectives. Participants organized adjectives according to two dimensions (i.e., valence and self-descriptiveness), and an interstimulus distance index of interconnectedness was computed. The sample was divided into two groups to assess whether differential organization was associated with the number of previous episodes individuals had experienced. Analyses indicated that the patient groups did not differ from one another on demographic characteristics, severity of symptomatology or comorbidity. Those individuals with more recurrent depression demonstrated significantly greater organization of negative content and less interconnectedness of positive content than those with less recurrent depression. The implications of these results for the organization of cognitive content in depression are discussed and directions for future research are provided.

Key words: Cognitive Structure, Interconnectedness, Depression, Chronicity

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Cognitive models of depression assume that depressed individuals differ from nondepressed persons in the content and process of their thinking, and that these differences are implicated in the etiology and pathogenesis of this debilitating disorder. Beck's theory (Beck, Rush, Shaw, & Emery, 1979), for example, emphasizes depressive schemata that develop early in childhood and remain dormant until they are triggered by untoward circumstances such as loss or rejection. Once activated, these schemata influence the filtering, encoding, processing, interpretation, storage, and retrieval of information in a negatively biased fashion (Beck et al., 1979; Clark, Beck, & Alford, 1999). Consistent with this view, Ingram and colleagues (1984; Ingram, Miranda, & Segal, 1998) distinguished among four interrelated but conceptually discrete elements of cognition associated with depression. These components include the structure, content, operations, and products of cognition. Cognitive structure is defined as the architecture of the cognitive taxonomic system and refers to the internal organization, representation and storage of information in memory (Ingram et al., 1998). Cognitive propositions, on the other hand, pertain to the actual content of information that is stored in memory. Both structural and propositional elements are subsumed under the rubric of the schema concept. Cognitive processes, which refer to the mechanisms by which an individual perceives and interprets both internal and external stimuli such as attention, encoding, and retrieval, are believed to be influenced by the schema. Finally, cognitive products are the ensuing thoughts that result from

the dynamic and reciprocal interactions among the structures, content, and operations of the cognitive system.

Most research to date has focused either on the products of the cognitive system or its processes (Glass & Arnkoff, 1997; Ingram et al., 1998), from which researchers have inferred that depressed individuals must also possess a well-organized structure or depressive self-schema. There has been a relative neglect for the empirical investigation of cognitive structures within the self-system of depressives (Glass & Arnkoff, 1997; Clark, et al, 1999), however, despite recommendations that researchers begin to investigate the "clustering or interconnectedness among mental operations" in depression (Segal, 1988, p. 157). What limited work that does exist has employed adaptations of cognitive tasks to examine efficiency in information processing (cf., Segal, Hood, Shaw, & Higgins, 1988; Segal & Gemar, 1997; Segal, Gemar, Truchon, Guirguis, & Horowitz, 1995; Segal & Vella, 1990).

In two previous articles we showed that the structure, or organization, of thinking in clinical depression differs from the cognitive patterns evident in nondepressed psychiatric outpatients and nonpsychiatric controls (Dozois & Dobson, 2001b) and that the structure of negative cognition is stable upon remission (Dozois & Dobson, 2001a). The primary objective of the current study was to investigate whether cognitive organizational differences also exist between individuals who have experienced multiple episodes and those who have succumbed to depression less frequently.

The vast majority of persons who experience depression do so recurrently (Solomon et al., 2000). Between 50% and 85% of depressed patients experience multiple subsequent episodes (Coyne, Pepper, & Flynn, 1999), with an average of 5 throughout their lifespan. It also

appears that the probability that an individual will experience a recurrence of depression increases with the number of past episodes (see Kessing, 1998). What combinations of factors specifically contribute to the chronic nature of depression are not currently known. However, one possible cognitive explanation for the increased probability of recurrence is that the organization of one's negative self-schema becomes increasingly more interconnected and/or that one's positive view of self becomes less well-organized as the depressed individual experiences recurrent episodes (Segal, Williams, Teasdale, & Gemar, 1996). Based upon the work of Post (1992), Segal et al. (1996) argued that "cognitive processes that dominate in major depression reflect the activation of knowledge structures *with dense interconnections* to depressed mood and memories (p. 372, emphasis added). However, few studies have examined whether negative content actually becomes more strongly interconnected with repeated episodes.

Although there are multiple dimensions that individuals can use to organize information in psychological space, valence (e.g., "how positive or negative is this adjective for you?") and self-reference (e.g., "how descriptive is this adjective for you?") are of primary interest in the area of depression (Clark et al., 1999; Glass & Arnkoff, 1997). Having participants organize information with respect to these variables yields a two-dimensional space in which each stimulus adjective is represented, and the psychological distances among adjectives can be calculated. The Psychological Distance Scaling Task (PDST; see Dozois, 2002; Dozois & Dobson, 2001a, 2001b;) involves the computation of interstimulus distances among adjective stimuli having to do with self-representation. This task is conceptually consistent with associative network theories of cognitive organization (e.g., Bower, 1981) and with Ingram's notion of cognitive structure (Ingram et al., 1998).

In summary, the objective of this research was to examine how recurrent episodes of depression affect the cognitive organization of positive and negative self-relevant stimuli. The main hypothesis was that individuals with more recurrent episodes of depression would show less interstimulus distance among negative adjectives and greater distance among positive adjectives than would individuals with less recurrent depression.

Method

Participants

Participants were 50 female outpatients recruited from an earlier study examining cognitive organization in depression (Dozois & Dobson, 2001a, 2001b) who met diagnostic criteria of Major Depressive Disorder according to the Structured Clinical Interview for DSM-IV Axis I Disorders - Research Version (SCID-I, Version 2.0; First, Gibbon, Spitzer, & Williams, 1996). The inclusion and exclusion criteria are presented in an earlier report (Dozois & Dobson, 2001b). During data analysis, the depressed group was further divided into two groups on the basis of the median number of previous depressive episodes. Individuals with more than 5 episodes are labeled recurrently depressed (RD; $n = 22$; previous episodes, $M = 9.59$, $SD = 1.99$, range = 6-15) and those with 5 or fewer episodes are labeled depressed (D; $n = 28$; previous episodes, $M = 2.50$, $SD = 1.69$, range = 0-5).

Measures

1) Beck Depression Inventory - II (BDI-II). The BDI-II (Beck, Steer, & Brown, 1996) is a 21-item questionnaire that is presented in a multiple choice format. Each item is scored in terms of intensity, with total scores ranging from 0 - 63. This instrument has demonstrated high internal consistency and good factorial validity (Dozois & Covin, in press).

2) <u>Beck Anxiety Inventory (BAI)</u>. The BAI (Beck, & Steer, 1990) is a 21-item self-report measure that assesses the severity of anxiety symptoms. Each item is rated on a 4-point scale to yield a total score which ranges from 0 – 63. Beck, Epstein, Brown, and Steer (1988) reported high internal consistency coefficients, and strong convergent and discriminant validity in clinical samples.

3) <u>Psychological Distance Scaling Task</u>. Participants were presented with a 16 x 16 cm square grid, divided into four quadrants on the computer screen. The abscissa reflected self-descriptiveness, and was anchored with the description "Very much like me" on the left and "Not at all like me" on the right. The ordinate related to valence, and was anchored with the description "Very positive" at the top and "Very negative" at the bottom. Stimulus adjectives were presented in random order and displayed individually in the middle of the grid. Participants were instructed to consider both axes to decide where each word should be located in psychological space, as they placed each adjective on the grid with the use of the computer mouse. In order to reduce the possibility of error, 10 practice trials were conducted and, throughout the task, participants confirmed their placement by pressing either the Y-key on the keyboard (for "yes"), or the N-key (for "no"). If a given response was not intended, participants were given another opportunity to make the correct placement. After each response, a new grid and new adjective were displayed on the screen, until all 60 adjectives had been presented.

The stimuli used in this study consisted of 30 positive (e.g., admired, connected) and 30 negative (e.g., criticized, lonely) interpersonally-oriented adjectives. Interpersonal stimuli were chosen over other content domains for two primary reasons. First, several researchers have found a strong connection between depression and interpersonal problems (e.g., Gotlib,

Lewinsohn, & Seeley, 1998). A second and related reason for using interpersonal stimuli stems from the literature on social dependency or sociotropy, which has consistently supported the idea that the match between interpersonal stress and social dependency is strongly associated with depression (Alford & Gerrity, 1995; Clark et al., 1999). The final 60- word list was developed from an initial pool of 180 adjectives using an empirical stategy, and ensuring that the words were comparable on emotionality, imaginability, word frequency (Carroll, Davies, & Richman, 1971), and word length (see Dozois & Backs-Dermott, 2000).

Scores were calculated on the basis of the ratings on each axis, using horizontal and vertical pixel lengths that were standardized by the computer. Average interstimulus distances for the self-referent positive and self-referent negative adjectives were employed as dependent variables. An idiographic approach was used for two primary reasons: (1) the nature of the task made it possible that highly non-self-descriptive content could be clustered tightly simply because it was not relevant to the individual and, (2) interstimulus distances were meant to reflect the organizational aspects of the self-schema construct.

Although this task represents a new methodology for assessing the interconnectedness of the schema in depression, previous data revealed convergent and discriminant validity (Dozois, 2002; Dozois & Dobson, 2001a, 2001b). Scores on this measure significantly differ among depressed, anxious and nonpsychiatric individuals. Negative and positive interstimulus distances are also associated with a number of other indices. For example, high interconnectedness (low interstimulus distance) of negative adjective stimuli correlates with depression, anxiety, recall of negative adjectives on the self-referent encoding task, and negative self-complexity (see Dozois & Dobson, 2001b).

<u>Procedure</u>

The sample was recruited from four main hospitals in Calgary, Alberta, and from media advertisements. Participants were tested individually. Following structured diagnostic interviews, participants were administered the WAIS-R Vocabulary subtest to ensure that their verbal ability was sufficient to complete the self-report instruments and to conduct the cognitive task. Participants then completed the BDI-II, the BAI, and the cognitive organizational task, and were debriefed and thanked for their participation.

<div align="center">Results</div>

<u>Sample Characteristics</u>

Information about the full sample may be obtained from Dozois and Dobson (2001a; 2001b). There were no statistically significant differences between groups on age, t (48) = .63, p = ns, education, t (48) = -.96, p = ns, WAIS-R Vocabulary scores, t (48) = -.56, p = ns, employment status, χ^2 (3) = 5.65, p = ns, marital status, χ^2 (3) = 3.13, p = ns, or ethnicity, χ^2 (2) = 2.71, p = ns. The RD and D samples were also compared on patient-related variables. There were no significant group differences on the proportion of individuals treated with medication, χ^2 (1) = .33, p = ns, or psychotherapy, χ^2 (1) = .18, p = ns. There were also no significant differences between these groups on the duration of the present depressive episode, t (48) = -.27, p = ns, or the number of past suicide attempts, t (48) = -.43, p = ns. The comorbidity rate of depression and anxiety was 52%, and 64% for any disorder. There were no significant differences between patient groups on the proportion of individuals with co-occurring anxiety, χ^2 (1) = .10, p = ns, or overall comorbidity, χ^2 (1) = .30, p = ns. Thus, the RD and D groups in the

present analysis are independent of the comorbid and 'pure' depression samples in the earlier analyses (i.e., Dozois & Dobson, 2001b). There was, in fact, an equal distribution of participants in each depressed group from the earlier report (RD = 14 comorbid depression/anxiety and 14 'pure' depression; D = 12 comorbid depression/anxiety and 10 depression). The RD group had an earlier age of first onset than the D group, t (48) = 3.46, p < .001 (M = 21.14, SD = 10.04 versus M = 33.07, SD = 13.49). The RD and D groups were also equivalent on BDI-II, t (48) = -.45, p = ns, and BAI, t (48) = -.67, p = ns, scores.

Cognitive Structure/ Interstimulus Distance

The results of the Psychological Distance Scaling Task were analyzed by examining interstimulus distances for self-relevant positive and negative content. Self-relevant interstimulus distances were computed idiographically for positive and negative content separately. The computations used to derive self-relevant distances entailed dividing the mean positive or negative self-relevant distance by the total number of possible yes-rated positive or negative distances (see Dozois & Dobson, 2001b). One participant's data were missing from the depressed group because this individual rated no positive adjectives as self-relevant.

Self-relevant interstimulus distances were characterized by positive and significant skewness and kurtosis, suggesting that these data were not normally distributed. In order to improve pairwise linearity, self-relevant interstimulus distances were transformed logarithmically. The means (standard deviations) for interstimulus distances for the transformed self-relevant positive and negative adjectives for the recurrently depressed group were 1.28 (1.17) and 0.60 (0.73), respectively, and 0.62 (0.75) and 1.05 (0.89), respectively, for the depressed group. A 2 Group (RD, D) x 2 Content (Positive, Negative) split-plot ANOVA

revealed a significant interaction, F (1, 47) = 8.83, p < .01. Consistent with hypotheses, tests of simple effects indicated that there were significant group differences for both positive, t (48) = 1.91, p < .05 (one-tailed), and negative, t (48) = 47, p < .01 (one-tailed), content. Recurrently depressed individuals demonstrated less interstimulus distance for negative content and greater interstimulus distance for positive content than the depressed participants. A further test involved entering the endorsement of positive and negative adjectives as covariates when examining the Group by Content interaction for interstimulus distance. This interaction remained significant even after partialling out the variance due to adjective endorsement, F (1, 45) = 4.12, p < .05.

Discussion

The purpose of this reanalysis was to investigate whether the interconnectedness of positive and negative adjectives differs between individuals who have experienced greater or fewer numbers of episodes of depression. In our previous report, depressed groups showed greater interconnectedness of negative content than nonpsychiatric controls, findings that suggest that negative information is highly interconnected in the self-system of clinical depressives while positive information may be less well-organized (Clark et al., 1999; Segal, 1988). The findings from this study further indicate that the interconnectedness of adjective stimuli varies as a function of the recurrence of depression. The recurrently depressed group displayed significantly greater interconnectedness for negative content than a depressed group with fewer recurrences of depression. Significant group differences also emerged in the analysis of positive content, with the more chronically depressed group showing less interconnectedness than the depressed group.

The current data suggest that negative information pertaining to self is well-organized,

but positive material becomes less well-integrated within an individual's self-concept, when depressed persons experience relapses (Segal et al., 1996). Increased interconnectedness may reduce the activation threshold for negatively-related information about self. Studies which have tested differences between remitted depressives and never-depressed persons are consistent with this idea (Hedlund & Rude, 1995; Ingram, Bernet, & McLaughlin, 1994; Miranda, Persons, & Byers, 1990; Lewinsohn, Allen, Seeley, and Gotlib, 1999). Additionally, findings of increased risk of relapse after each episode (e.g., Judd et al., 2000; Kessing, 1998), and epidemiological data indicating that more than 50% of first-onset major depressions are associated with a history of subclinical depressive symptomatology (Horwath, Johnson, Klerman, & Weissman, 1992) strengthen the proposal that negative cognitive structures become more interconnected with experience.

This study also showed that positive cognitive structures are less interconnected and may be less amenable to activation in persons with multiple episodes of depression. There is less evidence in the literature related to deficits in positive cognition in depression (Clark et al., 1999), but what is available suggests that the more severe an episode of depression the more positive cognition is affected. This study adds to this sparse literature and implies that individuals with a greater number of depressive episodes also lack positive interconnectedness in their self-system, even when compared to an equally severe depressed group with fewer past episodes.

A stronger test of our hypotheses would have involved inclusion of a currently nondepressed sample with a history of recurrent depression. Such a group would have provided greater control over the influence of mood on these data. It is worth noting, however, that both

groups in the current study had nearly identical scores on both the BDI-II and BAI and did not differ statistically on these or sociodemographic characteristics. Thus, the observed relationship between cognitive organization and chronicity does not appear to be due to these possible alternative factors.

Notwithstanding the empirical support for the experimental hypotheses of this study, conceptual arguments may be advanced regarding the Psychological Distance Scaling Task as an index of cognitive structure. The schema is an elusive construct -- its structure is necessarily inferred and in many respects unknowable (Clark, et al, 1999; Ingram, et al, 1998; Power & Champion, 1986). This task represents a "neomentalistic" (see Kuiper, MacDonald, & Derry, 1983, p. 195) attempt to make inferences about the covert structure of negative schemata in clinical depression.. While some researchers have recently attempted to measure cognitive structure (e.g., Segal & Gemar, 1997), few studies exist to address this clinically and theoretically important construct. Future research will be required to fully evaluate the predictive validity of this measure for assessing cognitive vulnerability to depression.

Several qualifications pertain to this study. Gender differences were not investigated. Models of depression have highlighted the differential importance of interpersonal relations and events in defining self for women relative to men (e.g,. Carter & Kaslow, 1992), and several other variables that may apply more to the experience of depression in women than in men (e.g., Nolen-Hoeksema, 1987). Further research is necessary to ascertain the extent to which these results apply to males and to identify how depression and gender interact to influence the cognitive organization of interpersonal information.

The adjective lists used in this study were both a strength and limitation in this study. A

particular strength was that these adjectives were highly relevant to interpersonal aspects of depression and were derived from a rigorous conceptually- and empirically-driven pilot study. However, the fact that these adjectives were entirely interpersonal in content limits this study's generalizability. Additional research is necessary to determine whether these results extend to other content domains.

These findings are consistent with Beck's cognitive model of depression, Ingram's important distinction among products, processes and structure, and Segal et al's (1996) kindling and episode sensitization model. This study also provides some of the first data to assess the organizational properties of schematic structure in recurrent depression and to suggest that these cognitive elements are highly related. Further research is needed in this area in order to determine whether these cognitive-organizational patterns actually predict relapse or recurrence. Another important direction for future research is to examine whether cognitive organization shifts as a function of the therapeutic modality used (cf., Segal, Gemar, & Williams, 1999).

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