An experimental investigation of the cognitive vulnerability to depression

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Abstract

The present study employed an experimental design, to examine the role of metacognitive processing in the prevention of relapse to depression. Eighty remitted depressed participants were randomly allocated to receive training in the metacognitive style of rumination, distraction, acceptance or no training control prior to a negative mood induction. Rumination prolonged the intensity of the negative mood consistent with no training, whereas both distraction and acceptance reduced the intensity of the negative mood. Changes in attitudes were only found in the acceptance condition, as participants in this condition reduced negative attitudes towards negative experiences. These results are consistent with information processing theory, and imply that acceptance-based preventative interventions may operate by both reducing the intensity of sad moods and altering one’s attitudes towards temporary moments of sadness.

Keywords: Major depression; Metacognition; Relapse; Cognitive processes; Cognitive therapy

Introduction

Given the evidence that depression is often a recurrent disorder (e.g., Judd, 1997), recent efforts have been directed to the prediction of relapse and relapse prevention (Dobson & Ottenbreit, 2004; Teasdale et al., 2002). Teasdale, Segal, and Williams (1995) have described an information processing theory for relapse that proposes that formerly depressed individuals are at risk for relapse because of an information processing style that perpetuates the accessibility of negative schema, memories and attitudes during periods of low mood. When these schemas are continuously activated, negative specific meanings are generated such as negative predictions for the future, attributions of failures to personal inadequacy, negative evaluations of interpersonal interactions, and retrieval of memories of previous failures or difficulties. Teasdale et al. (1995) postulated that when experiencing negative affect, individuals at risk for depressive relapse tend to reactivate the thinking styles associated with previous sad moods. Specifically, they tend to ruminate or dwell on the reasons for their low mood, which in turn perpetuates a negative cognitive set and through this chronicity, predisposes individuals to future depressive relapse.
Rumination has been defined in the literature as behaviors and thoughts that focus one’s attention on depressive symptoms, and the implications and consequences of these symptoms (Nolen-Hoeksema, 1991). Individuals who ruminate tend to negatively appraise themselves, their feelings, behaviors, situations, life stresses, and ability to cope. By engaging in rumination, negative self-schemas become continuously activated, leading to the continuation of distorted beliefs and perceptions of past experiences. In support of this model, Nolen-Hoeksema and Morrow (1991) found that individuals reporting a ruminative style prior to an earthquake also reported more symptoms of depression following the earthquake. In other research, dysphoric individuals who were instructed to ruminate following a mood induction demonstrated more negative, biased interpretations of events and impaired problem solving in the presence of negative mood when compared to dysphoric individuals who distract (Lyubomirsky & Nolen-Hoeksema, 1995). Rumination has also been found to predict the severity of depressive symptoms (Nolen-Hoeksema, 2000) and to enhance negativity in the recall of autobiographical memories (Lyubomirsky, Caldwell, & Nolen-Hoeksema, 1998).

It has been proposed that a ruminative information processing style is the result of problems with metacognition, or thinking about thinking (Nelson, Stuart, Howard, & Crowley, 1999). Metacognition serves two functions including the monitoring of thoughts and emotions, and the capacity to exert control over thoughts and feelings. In particular, it has been proposed that rumination is the result of a ‘positive’ metacognitive appraisal of negative thinking (Papageorgiou & Wells, 2001); that is, individuals who ruminate may do so in the belief that repeated thinking about problems will somehow lead to their solution.

Individuals can also make a ‘negative’ metacognitive appraisal of their thoughts (i.e. “I should avoid these negative thoughts”), which might lead to attempts to avoid or distract from the negative thoughts and feelings. Distraction is defined as the purposeful act of shifting attention away from the symptoms of depression towards more pleasant or neutral thoughts and actions (Nolen-Hoeksema & Morrow, 1991). Research suggests that depressed individuals who engage in distraction demonstrate significantly decreased depressed mood when compared to individuals who ruminate (Nolen-Hoeksema & Morrow, 1991). Unfortunately, although distraction may be sufficient to temporarily dispel a negative mood state through the deployment of attention, the schemas underlying negative states are still readily accessible in memory and are likely to recapture attention when the distraction task is completed. In the absence of distraction, individuals will still process information according to these negative schemas when faced with an experience that is highly personally relevant, leading to the re-emergence of a depressive response style and stronger vulnerability to depression (Teasdale et al., 1995).

A third alternative to a positive or a negative metacognitive appraisal is to be aware of negative thoughts and feelings, but to remain open toward these experiences. Individuals can become aware of the present moment including negative experience, and evaluate the thoughts and feelings as simply passing events in the mind. There is a heightened sense of being in the ‘here and now’, which is thought to assist in the disengagement from ruminative processing (Teasdale et al., 1995). Evidence suggests that when compared to never depressed people, depressed individuals showed significantly less evidence of metacognitive awareness in relation to thoughts and feelings in their accessed autobiographical memories of negative experiences (Teasdale et al., 2002). In addition, a deficit in metacognitive awareness significantly predicted relapse in recovered depressed individuals over a 5-month follow-up (Teasdale et al., 2000), suggesting the prevention of relapse might occur through changes in metacognitive awareness and acceptance.

The implication of information processing theories of relapse is that preventative interventions can exert influence by changing the metacognitive appraisal made in times of negative experience, thereby altering the patterns of cognitive processing activated during negative mood states. It has been proposed that this metacognitive stance of awareness and acceptance can alter individuals’ relationship to their thoughts and feelings by creating greater decentering from them and their personal meaning, thereby reducing the magnitude of negative moods and dysfunctional attitudes (Segal, Williams, & Teasdale, 2002). Several theorists have discussed the concept of acceptance as an important therapeutic tool in the treatment of emotional disorders (cf. Hayes, 2004; Linehan, 1989). Specifically related to depression, Mindfulness-Based Cognitive Therapy (MBCT; Segal et al., 2002) builds upon the theoretical framework of the information processing theories, and teaches individuals who have recovered from depression to disengage from ruminative processing, by increasing their awareness and acceptance of negative thoughts and feelings, at times of potential relapse (Teasdale et al., 2000). Recent studies have shown that MBCT is efficacious in
reducing the risk of relapse in individuals who have suffered from previous episodes of depression. Two randomized trials that compared MBCT to treatment as usual demonstrated that MBCT reduced the risk for relapse by 26–42% (Ma & Teasdale, 2004; Teasdale et al., 2000).

While results from the efficacy research on MBCT are promising, there have been few experimental studies that have investigated the proposed mechanism behind MBCT. Watkins, Teasdale, and Williams (2003) conducted a study in which never depressed participants underwent a negative mood induction. They were then randomly assigned to either an ‘awareness’ group, which received questions designed to increase metacognitive awareness or a control group, which received distraction questions. As predicted by the information processing theory of depression, in comparison to the control group, a significantly greater proportion of participants in the awareness group demonstrated recovery from the induced negative mood and reported shifts in perspective concerning mood states.

An important step in the investigation of MBCT is the study of the effects of training in metacognitive awareness and acceptance (referred to as ‘acceptance’ in the present study) in reducing negative mood states in formerly depressed individuals, who are theoretically at risk for relapse. Although, there are a number of studies that have investigated the role of rumination in depression in college samples and currently depressed individuals (Nolen-Hoeksema, 2000; Nolen-Hoeksema and Morrow, 1991), there are far fewer studies that have studied experimentally the effect of a rumination induction in individuals who have remitted from depression.

The current study was designed to test the cognitive vulnerability to depression in a well-controlled experimental design with procedures in place to enhance internal validity. Adapted from Watkins et al. (2003), formerly depressed participants received training in rumination, distraction, acceptance or no training control prior to a negative mood induction. Following the negative mood induction, participants engaged in the training they had received previously, and the intensity of the negative mood state and the time to recovery from the negative mood was measured. The effect of the conditions on the intensity of induced moods and changes in attitudes towards negative experience were examined. It was predicted that:

1. Rumination would significantly increase the intensity of negative mood, while distraction and acceptance would decrease the intensity of negative mood.
2. Participants who ruminated would be less likely to recover from the negative mood state compared to those individuals who accepted or distracted.
3. After training in acceptance, participants would demonstrate an increased acceptance towards depressive experience, reduced negative and positive attitudes towards negative experiences, and reduced positive beliefs about rumination.

Method

Participants

A total of 161 individuals were recruited for the study. The inclusion criteria for participation included adult status (between 18 and 65 years of age) and meeting the DSM-IV-TR (APA, 2000) criteria for past Major Depressive Disorder as defined by the consensus criteria specified by Frank et al. (1991) for “remission” or “recovery” from major depression. Remission was defined as an asymptomatic period (no longer meet the criteria for major depression) for more than 2 weeks and scores of less than 13 on the Beck Depression Inventory-2nd edition (BDI-II; Beck, Steer, & Brown, 1996). The criteria for recovery, on the other hand, required an asymptomatic period for more than 6 months and are considered more stringent (Frank et al., 1991). Both remitted and recovered individuals were included in this study because remission reflects the possibility that formerly depressed individuals may still suffer from mild symptoms and therefore, are vulnerable to relapse. Consistent with Teasdale et al. (2002), exclusion criteria included (1) a history of past mania or hypomania, (2) a history of schizophrenia or schizoaffective disorder, (3) current substance abuse, eating disorder, or obsessive compulsive disorder (OCD), and (4) organic mental disorder or pervasive developmental delay. Of the people recruited, 24 did not appear for their scheduled appointment, and 25
individuals did not meet the inclusion and exclusion criteria for eligibility, leaving 112 participants who were entered into the study.

**Measures**

**Structured Clinical Interview for Diagnosis**

The Structured Clinical Interview for Diagnosis SCID-I (SCID-I; First, Spitzer, Gibbons, & Williams, 1997) is a semi-structured interview for making the major DSM-IV-TR Axis I diagnoses (American Psychiatric Association [APA], 2000). The inter-rater agreement was established by having an experienced rater (KSD) review 12 SCID interviews. The inter-rater agreement was 100%.

**Beck Depression Inventory—second edition**

The Beck Depression Inventory-II (BDI-II; Beck et al., 1996) is a 21-item self-report questionnaire that assesses current levels of depressive symptomatology. The BDI-II demonstrates excellent internal consistency (Cronbach’s alpha = 0.93) and test–retest reliability ($r = 0.93$; Beck et al., 1996).

**Beck Anxiety Inventory**

The Beck Anxiety Inventory (BAI; Beck & Steer, 1996) is a 21-item self-report scale that was used to assess participants’ current level of anxiety. The BAI demonstrates excellent internal consistency (Cronbach’s alpha = 0.92) and good test–retest reliability ($r = 0.75$, Beck & Steer, 1996).

**Visual Analogue Scale**

Participants rated the severity of their negative mood using the visual analogue scale (VAS), by placing a slash along a 10 cm line. The VAS was presented with 0 on one end with the descriptive word “positive” and 10 on the other end with the descriptive word “negative”. The VAS has been used in previous studies of negative mood inductions (Teasdale, Taylor, & Fogarty, 1980; Watkins et al., 2003).

**Attitude towards Negative Experience Scale**

The Attitude Towards Negative Experience Scale (ATNES) was created for the purposes of this study because at the time that this study was developed, there was no valid or reliable measure of state-like beliefs in depressive experiences. The ATNES measured positive and negative beliefs about depressive experiences, as well as acceptance of negative experiences. A positive attitude was defined as a belief in which rumination is considered a useful coping strategy (e.g., “Thinking a lot about my feelings of sadness helps me to cope with it”). A negative attitude was defined as a belief in which rumination is considered uncontrollable and harmful, resulting in attempts to voluntarily control thinking (e.g., “It is safer to avoid negative thoughts and feelings”). An acceptance attitude was defined as a belief in which thinking is evaluated without triggering full-blown self-focused processing (e.g., “Remaining mindful of the present moment is helpful in reducing depressing feelings”). The scale was comprised of 5 items for each type of attitude. Attitudes towards negative experiences were rated on a 5-point scale as follows: 1 (strongly disagree), 2 (agree), 3 (neither disagree or agree), 4 (agree) and 5 (strongly agree). A total score for positive attitude, negative attitude, and acceptance was determined from the responses to each set of items. The correlation between pretest measures of positive and negative attitudes was $r(80) = -0.41, p < 0.001$. The correlation between pretest measures of positive and acceptance attitudes was $r(80) = 0.27, p < 0.05$. Cronbach’s coefficient alphas for the current sample were 0.76 for positive attitudes, 0.67 for negative attitudes, and 0.53 for acceptance attitudes.

**Positive Beliefs about Depressive Rumination Scale**

The Positive Beliefs About Depressive Rumination Scale (PBRS; Papageorgiou & Wells, 2001) is a 9-item self-report scale that measures participant’s positive beliefs about rumination. Sample questionnaire items include: “I need to ruminate about my problems to find answers to my depression” and “ruminating about the past helps me to prevent future mistakes and failures”. Individuals responded to items about positive metacognitive beliefs regarding rumination on a 4-point rating scale as follows: 1 (do not agree), 2 (agree slightly), 3 (agree moderately), and 4 (agree very much). The PBRS has demonstrated high internal
consistency with a Cronbach’s coefficient alpha of 0.89. Based on 60 college students, the PBRS has also demonstrated good test–retest reliability, with a Pearson product-moment correlation of 0.85 (Papageorgiou & Wells, 2001). The PBRS was positively correlated with the positive attitudes subscale of the ATNES, $r(80) = 0.41, p < 0.001$.

**Procedure**

Previously depressed participants were recruited from adult mental health programs within the Calgary region and the community at large. After providing informed consent, individuals completed a preliminary VAS. They were then interviewed on the SCID and completed the BDI-II to determine their eligibility to participate. Demographic information was collected as well as current and past treatment history. Participants who met eligibility criteria, but failed to meet exclusion criteria, then completed the dependent measures including the mood rating on the VAS, ATNES, and PBRS.

Participants were then randomly assigned to instruction in one of four conditions: rumination, distraction, acceptance training or a no training control group. The training script can be obtained by contacting the corresponding author. The instruction period lasted for approximately 10 minutes and the instructions were verbally read to each participant. The instructions explained that they were about to learn a technique to deal with sad moods. Participants were also provided with a cue card that had four or five statements that reminded them of how to engage in the thinking technique. They were asked to review the cue card while they were using the technique.

The rumination and distraction conditions were adapted from Nolen-Hoeksema and Morrow (1993). In the rumination condition, they were instructed to focus their attention on thoughts that are symptom-focused, emotion-focused and self-focused. They were asked to “think about what your feelings mean right now”, “think about why you feel this way”, “the possible consequences of how you feel”, “think about the kind of person you are and why you react the way you do” and to “think about what this experience means about you” (Nolen-Hoeksema & Morrow, 1993).

Participants in the distraction condition were instructed to focus their attention on mental images unrelated to the mood or self and to use their ability to visualize and concentrate (Nolen-Hoeksema & Morrow, 1993). They were instructed that, “Distraction means purposefully turning your attention away from the symptoms of sadness. You can do this by focusing instead on more pleasant or neutral thoughts or actions, or simply anything that draws your attention away from your negative mood. This might include thinking about a place that you often visit or thinking about the shape of an object”. They were asked to “walk the entire length of a shopping mall, visualize the stores that you will pass on this walk,” “think about the way the Calgary Tower [a local landmark] looks at sunset”, “think about all the parts that make up an automobile” and “think about all the steps involved in getting from your home to where you are today”.

In the acceptance training condition, participants were taught to bring their awareness to the present moment. They were asked to register their thoughts and feelings, to allow them to be present in the moment and simply hold them in awareness (Segal et al., 2002). The instructions were as follows:

One way to relate to unpleasant experiences is to register that they are here, to allow them to be as they are in this moment and simply hold them in awareness.

Now, closing your eyes, if that feels comfortable for you, the first step is being aware, really aware, of what is going on with you right now. Accepting experience means register the thoughts that are there, to allow them to be there, in this moment and simply hold them in awareness. Think of thoughts as if they were projected on the screen at the cinema. You sit, watching the screen, waiting for the thoughts or images to arise. When it does you pay attention to it so long as it is there “on the screen” and then let it go as it passes away. So rather than try to push the thoughts away or shut them out, just acknowledge them, perhaps saying ‘Ah, there you are, that’s how it is right now.’ And similarly with sensations in the body... ‘Are there sensations of tension, of holding or whatever?’ And again, awareness of them, simply noting them. ‘OK, that is how it is right now.’

The statements on the cue cards were “okay I am feeling sad, that is my experience”, “these thoughts are in my mind, that is how it is right now”, “being sad is part of human experience”, “like other feelings, sadness
comes and goes”, “let me be present with my sadness” and “I can accept this experience”. Participants were encouraged to use the cue card to remind them of how to use the technique when they were in the actual experimental situation. In the control condition, they did not receive any training but simply underwent the mood induction itself. All participants’ moods were rated following the training session, but prior to the mood induction itself.

As others have recommended for increasing the internal validity of experimental designs (Kazdin, 2003), a protocol was developed to make certain that participants were engaging in their randomized condition. To ensure that the training was implemented as intended, a procedure was adapted from standard think aloud protocols (Ericksson & Simon, 1993). Participants were instructed to periodically describe aloud their current thinking while they engaged in the manipulation and rated their mood. In the control condition, they were instructed to describe their current thinking while they were in the negative mood. During the training phase, they were provided with the following instructions on thinking aloud:

What I mean by talk aloud is that I would like you to say out loud everything you say to yourself in your mind. You will be alone in the room so just speak your thoughts out loud. It is important that you continue to talk, even if you repeat yourself so that I know what you are thinking about. If you are silent, just remind yourself to continue thinking out loud. Don’t plan what to say or speak after the thought but rather, let your thoughts speak as if you were really thinking out loud. It is important that you don’t edit or worry about what someone else might think about what you are thinking-just keep on thinking out loud.

Participants were then given the opportunity to practice using the think aloud procedure by asking them to do a small exercise to practice before the actual experiment. They were asked to “imagine you have a goal in work/school that you have been working hard for, but have found out that there is no way this goal will be achieved. Imagine this situation. Using the [randomized] technique, imagine what you would think in this situation.” The participants were asked to practice thinking aloud and any errors were corrected with instruction.

A mood induction procedure, with the highest probability for inducing negative moods (Westermann, Spies, Stahl, & Hesse, 1996), was chosen for the current study. It consisted of mood-suggestive music, combined with autobiographical recall of negative mood-evoking events. The music was 5 min of “Adagio-G Minor” composed by Albinoni and recorded at half speed. The recall task required participants to recall three experiences that made them feel lonely, rejected, defeated or hurt. The three events were progressively sadder and more unpleasant and recalled in detail: “remembering everything that happened and how they felt” (Martin, 1990). Each participant was alone while undergoing the mood induction. This combination of mood inducing music and autobiographical recall has demonstrated an approximate 75% success rate in previous studies (Martin, 1990).

At the end of the mood induction, the experimenter returned to the room and asked the participants to rate their mood on the VAS. Previous research has found that for individuals who have remitted from depression, the cognitive vulnerability is only accessible when activated by a negative mood (Segal & Ingram, 1994), and thus, the decision was made to include only individuals who met the criteria for mood induction in the current study. Consistent with previous studies (cf. Teasdale & Fogarty, 1979), a minimum negative mood shift of 2 points (2 cm on the 10 cm line) was required to verify that the mood induction had been successful. Sixteen (14.3%) participants failed to be mood induced.

Participants who met the criteria for successful mood induction were then asked to apply the training that they had previously learned for 5 min. The experimenter then left the room. The participants rated their mood on the VAS every 30 s, which was prompted by a “beep” sound that played on a tape recorder every 30 s. Four (3.6%) participants did not adequately follow procedures (i.e. failed to rate their mood while engaging in the technique).

Participants periodically described their thinking aloud. These descriptions were audiotaped and later transcribed. The degree to which participants adhered to the task was determined by having raters, who were blind to participants’ conditions, independently rate the transcriptions. Each description was rated for each of the three experimental conditions (rumination, distraction, and acceptance) using a 7-point rating scale. The inter-rater reliability, based on 20 participants, was rumination $r(20) = 0.85$, distraction $r(20) = 0.90$, and acceptance $r(20) = 0.80$. A single rater continued to rate the remaining descriptions. Participants who were
rated as failing to adhere to their technique, as defined as a score less than 5 out of 7 on the specified technique, were replaced in the study. Twelve (10.7%) participants failed to adequately engage in the randomized technique.

At the end of the experimental manipulation, participants then completed post-test measures of the dependent variables. Information regarding the participants’ perceived strategy and efficacy of the coping strategy was also collected. To assess for experimenter effects and demand characteristics, participants were asked about their perception of the purpose of the study, their perception of enthusiasm of the experimenter, and their opinion of how credible the experimenter was. A final mood rating was collected, and a positive mood induction involving the recall of a happy memory while “getting a picture in your head of everything that happened and how you felt” (Martin, 1990), was offered to each participant.

Results

Analysis of demographic and health information for the sample

A total of 80 participants successfully completed and fulfilled all the experimental requirements (see Table 1 for descriptive information). Seventy-six percent of the sample was female and 92.5% were Caucasian. A total of 39% were married and 35% were single. Twenty percent had completed a university degree and 26% more had completed a high school diploma. Forty nine percent were employed full time. Ninety percent of the sample was in full remission from depression and they had experienced an average of 3.5 (SD = 3.5) previous episodes of depression. Twenty-four participants (30%) were currently suffering from another mental disorder (i.e., Social Phobia, Specific Phobia, Panic Disorder, PTSD, dysthymia). Twenty six percent of the participants were currently seeking outpatient treatment and 33.8% were currently taking an antidepressant medication. Eighty percent of the sample had previous treatment with medications and 80% had past experience with psychotherapy.

The demographic and health information variables were analyzed to determine if there were any statistically significant differences between any of the conditions on the demographic variables. ANOVA was used in the case of continuous variables, while $\chi^2$ analyses were used in the case of categorical variables. Although most of the sociodemographic analyses were not significant, there were significant differences among the groups on the number of months they were in remission from depression, $F(3, 76) = 3.18$, $p<0.05$. Pair wise comparisons indicated that the distraction group had been in remission significantly longer than the rumination group, $t(38) = 3.05$, $p<0.01$. Pair wise comparisons also revealed that the acceptance group was significantly older than the rumination group, $t(38) = 2.17$, $p<0.05$.

Because of the above differences, Pearson correlations were conducted to determine if age or number of months in remission correlated significantly with any of the pre-test dependent measures, or with the degree to

<table>
<thead>
<tr>
<th>Variable</th>
<th>Condition</th>
<th>Rumination</th>
<th>Distraction</th>
<th>Acceptance</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (N, %)</td>
<td></td>
<td>3 (15.0)</td>
<td>5 (25)</td>
<td>4 (20.0)</td>
<td>7 (36.8)</td>
</tr>
<tr>
<td>Male</td>
<td></td>
<td>17 (85.0)</td>
<td>15 (75.0)</td>
<td>16 (80.0)</td>
<td>13 (65.0)</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td>38.4 (11.9)</td>
<td>38.5 (12.3)</td>
<td>45.0 (12.5)</td>
<td>36.7 (13.4)</td>
</tr>
<tr>
<td>Age (mean, SD)</td>
<td></td>
<td>36.4 (15.3)</td>
<td>55.8 (64.0)</td>
<td>38.1 (36.1)</td>
<td>32.2 (31.0)</td>
</tr>
<tr>
<td>MDD status (N, %)</td>
<td></td>
<td>2 (10.0)</td>
<td>1 (50)</td>
<td>3 (15.0)</td>
<td>3 (15.0)</td>
</tr>
<tr>
<td>Partial remission</td>
<td></td>
<td>18 (90.0)</td>
<td>19 (95.0)</td>
<td>17 (85.0)</td>
<td>3 (15.0)</td>
</tr>
<tr>
<td>Full remission</td>
<td></td>
<td>18 (90.0)</td>
<td>19 (95.0)</td>
<td>17 (85.0)</td>
<td>3 (15.0)</td>
</tr>
<tr>
<td>Months in remission (mean, SD)</td>
<td></td>
<td>3.5 (0.8)</td>
<td>3.1 (0.8)</td>
<td>3.8 (0.8)</td>
<td>3.6 (0.8)</td>
</tr>
<tr>
<td>Number of previous episodes (mean, SD)</td>
<td></td>
<td>5.7 (4.1)</td>
<td>5.4 (3.4)</td>
<td>4.1 (3.6)</td>
<td>6.0 (4.8)</td>
</tr>
<tr>
<td>BAI (mean, SD)</td>
<td></td>
<td>6.5 (4.9)</td>
<td>5.2 (4.6)</td>
<td>4.8 (4.2)</td>
<td>7.4 (4.8)</td>
</tr>
</tbody>
</table>
which the participants’ mood shifted on the VAS following the mood induction (the difference between their VAS score prior to the presentation of the mood induction and immediately following the mood induction). The analyses were not significant, and so age and time in remission were not employed as covariates in subsequent analyses.

**Analyses of pre-test dependent variables**

A series of ANOVAs was conducted to determine if there were differences among groups on their mood ratings on the VAS before the SCID interview, prior to receiving the training instructions, and prior to the mood induction. There were no significant differences among groups on any of these mood ratings. In addition, ANOVAs were conducted to determine if there were differences among groups on their pre-test measures of the PBRS, as well as positive, negative and acceptance attitudes towards negative experiences. No significant differences emerged among groups on the pre-test measures of the dependent variables.

**Test of experimenter effects and participant demand characteristics**

To test for experimenter effects and possible demand characteristics, a series of ANOVAs was conducted to determine if there were differences among groups on their ratings of the credibility and enthusiasm of the experimenter, as well as their perceived usefulness of the technique. There were no significant differences among groups on these variables, suggesting that to the extent that experimenter effects and participant demand characteristics may have been present, they were equivalent across all 4 conditions.

**The effect of condition on the intensity of the induced negative mood**

The initial and final mood ratings for the four conditions can be found in Table 2. A 4 group (rumination vs. distraction vs. acceptance vs. control) × 2 time (initial vs. final mood rating) repeated measures ANOVA was conducted to determine if there were differences on the mood measures among groups. The main effect of time was statistically significant, $F(1, 76) = 56.71, p<0.001$ and the effect of condition was statistically significant, $F(3, 76) = 7.33, p<0.001$. These main effects were qualified, however, by the condition by time interaction which was also significant, $F(3, 76) = 12.89, p<0.001$. Further analyses revealed that the difference among

| Table 2 | Change in the dependent variables |
|-----------------|-----------------|-----------------|-----------------|-----------------|
| Dependent variable (mean, SD) | Condition |
| | Rumination | Distraction | Acceptance | Control |
| Visual analogue scale (VAS) | | | | |
| Prior to engaging in technique | 5.8 (1.4) | 6.0 (1.2) | 5.7 (1.3) | 6.1 (1.3) |
| Post-engaging in technique | 6.0 (2.3) | 2.8 (1.3) | 3.1 (2.2) | 5.3 (1.9) |
| Positive attitudes towards negative experiences | | | | |
| Pre-test | 15.1 (2.8) | 14.5 (4.5) | 14.6 (3.6) | 13.6 (4.9) |
| Post-test | 15.7 (4.0) | 13.6 (4.2) | 15.5 (4.1) | 15.1 (4.7) |
| Negative attitudes towards negative experiences | | | | |
| Pre-test | 14.8 (4.0) | 15.4 (4.1) | 15.2 (3.5) | 16.6 (3.7) |
| Post-test | 15.5 (4.6) | 16.2 (3.6) | 14.0 (3.1) | 16.8 (4.2) |
| Acceptance attitudes towards negative experiences | | | | |
| Pre-test | 19.0 (3.3) | 17.4 (2.7) | 19.0 (3.0) | 16.9 (3.2) |
| Post-test | 19.6 (2.1) | 18.0 (3.0) | 19.9 (2.6) | 18.0 (2.6) |
| Positive beliefs about rumination (PBRS) | | | | |
| Pre-test | 16.5 (6.9) | 16.5 (8.4) | 16.2 (6.9) | 18.8 (6.9) |
| Post-test | 19.5 (8.1) | 16.6 (8.7) | 16.3 (6.7) | 18.9 (6.9) |
groups was in their final mood ratings. Thus, while there were no significant differences among groups at pretest, the effect of condition on the final mood rating was significant, \( F(3, 76) = 13.00, p < 0.001 \). Pair-wise comparisons indicated that the final negative mood ratings for rumination were significantly higher than distraction, \( t(38) = 5.12, p < 0.001 \) and acceptance, \( t(38) = 4.70, p < 0.01 \). The final negative mood ratings for the controls were also significantly higher than distraction, \( t(38) = 3.94, p < 0.001 \), and acceptance, \( t(38) = 3.52, p < 0.01 \). There were no differences between distraction and acceptance on their final mood ratings and the rumination and the control group on their mood ratings.

A 4 group (rumination vs. distraction vs. acceptance vs. control) 11 times (mood rating every 30 s) was conducted to determine if there were differences among groups in the profile and trends in their mood ratings over time (see Fig. 1). The analysis indicated that the main effect of time was statistically significant, \( F(3, 88) = 31.96, p < 0.001 \) and the main effect of condition was also statistically significant, \( F(3, 76) = 9.13, p < 0.001 \), but that these main effects were qualified by a statistically significant time by condition interaction, \( F(8, 23) = 8.28, p < 0.001 \). Further testing of the interaction revealed that the linear trend was significant, \( F(3, 76) = 13.15, p < 0.001 \), as was the quadratic trend, \( F(3, 76) = 4.21, p < 0.01 \). Pair-wise comparisons indicated that the average mood ratings of the acceptance group were lower than the mood ratings of the rumination group, \( t(38) = -3.57, p < 0.01 \) and the control group, \( t(38) = -3.00, p < 0.01 \). The average mood ratings of the distraction group were also lower than the rumination group, \( t(38) = -4.29, p < 0.001 \). (Fig. 1)

The effect of condition on the likelihood of recovery from the induced negative mood

Consistent with the criteria for mood induction (a 2 cm increase on the VAS), recovery from negative mood was defined by a 2 cm reduction in the negative mood ratings at the end of the manipulation, and comparisons among groups on recovery from the induced mood state were conducted. Three (15%) participants in the rumination group, 16 (80%) members of the distraction group, 13 (65%) participants in the acceptance group, and 5 (25%) members of the control group met the criteria for recovery. A \( \chi^2 \) analysis indicated that the percentage of individuals who reached the standard for recovery was significantly different among groups, \( \chi^2(3) = 23.48, p < 0.001 \). The specific analysis of acceptance versus distraction on recovery from the induced mood was not statistically significant.
The effect of the conditions on changing attitudes towards negative experiences and positive beliefs about rumination

The pre-test and post-test scores on the attitudinal variables and the positive beliefs about rumination are provided in Table 2. Change scores were derived for the ATNES and PBRS, by subtracting the post-test score from the pre-test score for each participant. To control for Type 1 error, a MANOVA was conducted to investigate the effect of condition across the ATNES and PBRS combined. There was a trend for the overall effect of condition on the combined dependent variables $F(4, 75) = 2.35, p < 0.07$. A series of ANOVAs were then conducted on the change scores to determine if there were differences among groups on change in attitudes towards negative experiences and positive beliefs about rumination. Pair-wise comparisons revealed that acceptance significantly reduced negative attitudes towards negative moods, when compared to rumination, $t(38) = -2.00, p < 0.05$ and when compared to distraction, $t(38) = -2.10, p < 0.05$ (Fig. 2). There were no significant differences among groups on change in positive attitudes, acceptance attitudes, or the PBRS. Pair-wise comparisons between acceptance and the other conditions were also not significant.

Discussion

The aim of the present study was to examine if, when compared to rumination, distraction, and a control group, training in the metacognitive skill of acceptance could reduce the intensity of an induced negative mood, change attitudes towards negative experiences, and change positive beliefs about rumination in formerly depressed people. To summarize, we found that rumination maintained the intensity of negative mood, while distraction and acceptance decreased the intensity. The effect of the control condition on the intensity of the negative mood was not significantly different from rumination. Eighty percent of individuals in the distraction condition and 65% in the acceptance condition recovered from the negative mood state, compared to only 15% in the rumination condition and 25% in the control condition. Our results also demonstrated that participants who were trained in acceptance demonstrated a greater reduction in their negative attitudes towards negative experience when compared to those who were trained in rumination and distraction. These results were found in the context of a well-controlled randomized experimental design in which participants were carefully selected using standardized diagnostic procedures, experimenter effects were controlled, and the participants’ adherence to the randomized condition was controlled.

The results from the present study are consistent with previous experimental research that compares rumination to distraction (Lyubomirsky & Nolen-Hoeksema, 1995; Lyubomirsky et al., 1998). However, the present study is novel in that we have investigated the effects of rumination and distraction in a sample of formerly depressed individuals and who are at risk for relapse. In addition, the present study builds upon...
previous research, by comparing the effects of rumination and distraction to the cognitive style of awareness and acceptance. These current results are also consistent with Teasdale et al.’s (1995) information processing theory, which postulates that the risk for depressive relapse lies in a cognitive processing style that perpetuates the impact of negative moods. Our results suggest that rumination prolongs the intensity of negative mood, whereas both distraction and acceptance reduce the intensity of the negative mood and increase the likelihood of recovery. The finding that acceptance was not significantly different from distraction in reducing the intensity of negative mood was unexpected, and somewhat inconsistent with the information processing theory of depression. Teasdale et al. (1995) postulated that individuals who engage in acceptance should be able to remain in the ‘present moment’ of their sadness, but be less distressed by it. Thus, we expected that acceptance training would actually result in more intense negative mood when compared to distraction, but less intense than rumination.

Unlike distraction, acceptance training reduced negative attitudes towards feelings of sadness, which is consistent with Teasdale et al.’s (1995) postulation that a cognitive style of awareness and acceptance can alter one’s relationship to negative thoughts and feelings. Segal et al. (2002) describe how individuals who have experienced the ‘awfulness’ of depression may attempt to avoid or escape depression in times of potential relapse. They propose that individuals, driven to reduce or avoid mild dysphoria, enter into a ruminative state of mind, in a misguided attempt to better understand and solve their problems. The present study demonstrated that even brief acceptance training was able to reduce formerly depressed individuals’ avoidant-like attitudes towards negative experiences. This result implies that acceptance-based interventions may operate by reducing the desire to escape from negative emotions and increase tolerance of temporary sad moods.

The present study’s results, however, did not support the hypothesis that acceptance training would increase acceptance attitudes and reduce positive beliefs about rumination. There may have been methodological and statistical reasons for these non-significant results. The training session in acceptance may have not been strong enough to reduce participants’ long standing bias for rumination. Repeated training sessions may have stronger effects. In addition, the non-significant results may have been due to a ceiling or floor effect, respectively, as many of the participants reported high scores in acceptance attitudes and low scores on positive beliefs about rumination, prior to the training conditions.

Despite the strengths of this study (an experimental design, carefully assessed participants, adherence checks, an operational criterion for mood induction, and the general use of well established measures), there are also limitations that warrant consideration. Although this study was designed to have enhanced internal validity, a more sensitive test of the effect of the independent variable on the dependent variables, the tradeoff is that this experimental precision limits the external validity of the study (Kazdin, 2003). It is unknown how these cognitive processing styles can affect the intensity of spontaneous negative moods in individuals who are at risk for relapse. In addition, the sample was primarily female and Caucasian, and thus limits the applicability of these results with male or ethnically diverse populations. There was also variability in the number of months participants were in remission, and therefore, these results may not generalize to individuals who have very recently remitted from depression. In addition, we incorporated a ‘voluntary’ mood induction to maximize the likelihood of negative mood induction. However, one limitation of this mood induction is that there is the possibility of participant demand characteristics (Westermann et al., 1996). In the case of the current study, to the extent that demand characteristics were present, they appeared to be present across all conditions equivalently, as the groups did not differ on their ratings of the credibility and enthusiasm of the experimenter, as well as their perceived usefulness of the technique. In addition, the questionnaire used to measure attitudes towards negative experiences was developed for the purposes of the study. Our analysis of the scale indicated that the acceptance attitudes subscale, in particular, did not have strong internal consistency. The incorporation of a questionnaire with established validity and reliability would have enhanced our results. Finally, the training session was relatively brief and incorporated only one session of acceptance training. Repeated training sessions might have demonstrated stronger effects, particularly with regard to reducing positive beliefs about rumination and increasing acceptance attitudes.

Despite the above limitations, the results from the present study have implications for clinical practice and future research direction. Our findings provide preliminary experimental evidence for the mechanism behind MBCT, in that individuals can be taught to be more tolerating of negative moods and to disengage from
ruminative processing. These results are consistent with Segal et al.’s (2002) postulation that this metacognitive stance of awareness and acceptance can alter individuals’ relationship to their negative thoughts and feelings by creating greater decentering from them, thereby reducing the magnitude of negative moods and negative attitudes towards sadness. These results suggest that treatment interventions that involve training in metacognitive acceptance can be helpful for individuals who are at risk for relapse to depression.

The present study also demonstrates that, in addition to the cognitive processing styles of rumination and distraction, acceptance can also be studied in an experimental paradigm. Future research incorporating an experimental methodology could investigate other unanswered research questions. The present study needs to be replicated while utilizing a psychometrically sound measure of attitudes towards negative experiences. Future experimental investigations of acceptance training could incorporate a different mood induction procedure, such as the Velten task, to assess if the present study’s results can be replicated under different mood induction conditions. As Kazdin (2003) has suggested, once a finding is established through well-controlled experimental studies, clinical research can then move toward an emphasis on external validity. A study of the cognitive processing styles of formerly depressed individuals while in a spontaneous negative mood is also needed to better understand how individuals process information during naturally-occurring dysphoria. Finally, future research needs to investigate whether metacognitive variables can predict relapse to depression in a longitudinal design. It is anticipated that further research in the area of metacognition in depression will contribute to our understanding of how to better prevent future depressive episodes, in order to reduce the impact of depression for its sufferers.

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