

Cognitive Defusion Versus Cognitive Restructuring in the Treatment of Negative Self-Referential Thoughts: An Investigation of Process and Outcome

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Within traditional cognitive therapy, cognitive restructuring is often used to challenge the veracity of dysfunctional thoughts. In contrast, acceptance and commitment therapy (ACT) uses “cognitive defusion” techniques to change the function of negative thoughts rather than modify their content. Previous research has shown that a cognitive defusion technique known as the “milk exercise” (rapidly repeating a self-referential, one-word thought such as “fat”) reduces the discomfort and believability associated with negative thoughts. This study sought to replicate and extend these findings by comparing the impact of cognitive defusion with that of cognitive restructuring in a sample of participants distressed by negative thoughts about their body shape. Participants received a detailed rationale and training followed by instructions to practice the assigned technique as homework for 1 week. Results indicated that both cognitive techniques produced substantial improvements that generalized well beyond the specific thoughts targeted for treatment. Clear differences in treatment process and the course of improvement were evident. Findings are discussed in the context of theoretical and practical similarities and differences between these two approaches.

Keywords: cognitive therapy; cognitive restructuring; acceptance and commitment therapy; cognitive defusion

Cognitive models of psychopathology (e.g., Beck, 1976) posit that dysfunctional cognitions directly contribute to negative emotions. Accordingly, a common technique in traditional cognitive behavioral therapy (CBT) is cognitive restructuring, in which the therapist and patient collaboratively identify irrational or maladaptive thoughts and challenge their veracity using strategies such as logical disputation, Socratic questioning, and behavioral experiments (Hofmann & Asmundson, 2008). The goal of this process is to encourage patients to think in more accurate and adaptive ways, which facilitate effective problem solving and living a more satisfying life (Beck, Rush, Shaw, & Emery, 1979).

CBT is a highly effective treatment for a wide range of mental disorders (Butler, Chapman, Forman, & Beck, 2006). CBT consists of various techniques, however, and the specific contribution of cognitive restructuring to the overall efficacy of CBT has recently come under scrutiny. In their review of treatment studies for anxiety and depression, Longmore and Worrell (2007) concluded that cognitive interventions do not consistently provide added value to behavioral interventions. Cognitive restructuring has also been criticized on theoretical grounds by proponents of mindfulness and acceptance-based approaches such as acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999). For example, Eifert and Forsyth (2005) characterize the process of challenging dysfunctional thoughts as engaging patients in an attempt to “master” and “control” their thoughts. These authors suggest that cognitive restructuring aims to “teach clients to become better suppressors and avoiders of their unwanted thoughts” (p. 39), thereby arming them with a potentially unworkable strategy to avoid experiencing negative emotions.

Cognitive therapists have vigorously disputed the notion that cognitive restructuring encourages the suppression and avoidance of negative thoughts and emphasize the contradiction between the negative depiction of cognitive restructuring by ACT proponents and the observation that cognitive therapy is “the most clearly established effective psychotherapy that exists” (Leahy, 2008, p. 149). Nevertheless, a cardinal feature of “third wave” approaches (Hayes, 2004) is their marked departure from traditional CBT approaches toward negative thoughts. Rather than directly challenge the *content* (e.g., accuracy) of negative thoughts, these methods emphasize changing the *function* of thoughts by encouraging patients to adopt a different awareness of and relationship to thoughts (Segal, Teasdale, & Williams, 2004). Various “cognitive defusion” techniques teach patients to see the “bad thought as a thought, no more, no less” (Hayes et al., 1999, p. 20) and to refrain from trying to change thought content or responding to dysfunctional thoughts with experiential avoidance. This approach is designed to circumvent the struggle to more effectively regulate negative emotions by abandoning the agenda of emotion regulation itself (Eifert & Forsyth, 2005).

One of the many cognitive defusion techniques in ACT consists of having the patient rapidly speak a negative self-referential word (e.g., “fat”) until the word appears to lose its literal meaning. Known as the “milk exercise,” this technique was first studied by experimental psychologists a century ago (Severance & Washburn, 1907) and was a frequent topic of investigation in the mid-1900s under the label “semantic satiation” (Amster, 1964; Esposito & Pelton, 1971). Numerous studies demonstrated that continuous, fast verbal repetition of a word produced a temporary decrease or loss in the word’s meaning (e.g., Lambert & Jakobovits, 1960).

Masuda, Hayes, Sackett, and Twohig (2004) conducted a preliminary investigation of this technique’s potential as a clinically active procedure. An unselected sample of eight undergraduate students generated two self-relevant negative thoughts and reduced them to a single word (e.g., fat). Participants received an ACT cognitive defusion rationale and practiced repeating one of the one-word thoughts, out loud and as quickly as possible, for 30 seconds. Using an alternating treatments design, this defusion exercise reduced the discomfort and believability associated with negative thoughts more than comparison distraction and thought suppression interventions. As noted by the authors, these encouraging findings warrant additional research on the clinical utility of this technique.

Two subsequent studies by Masuda and colleagues have further examined the effects of this cognitive defusion technique. Masuda et al. (2009) examined the effects of varying the length of word repetition on the emotional discomfort and believability of one-word negative thoughts. Using an unselected undergraduate sample, the authors found that decreases in emotional discomfort decreased significantly within 3–10 seconds but that 20–30 seconds of repetition was more effective than 3–10 seconds for reducing believability. Using between-groups design, Masuda et al. (2010) compared the effectiveness of the cognitive defusion exercise reported in Masuda et al. (2004) to a thought distraction and non-thought distraction control condition.

As hypothesized, the milk exercise was superior to the control interventions in reducing the believability and emotional discomfort associated with negative self-referential thoughts.

The results of Masuda et al. (2004, 2009, 2010), combined with the promising efficacy of ACT-based approaches more generally (Hayes, Luoma, Bond, Masuda, & Lillis, 2006), raise the possibility that cognitive defusion techniques may have considerable clinical utility. However, numerous unanswered questions remain regarding the effectiveness of the cognitive defusion technique studied by Masuda and colleagues. In each study, the distress and believability of negative thoughts were assessed immediately following the cognitive defusion technique. As such, all measures in these studies were collected within a 5–10-minute period. Although consistent with the semantic satiation literature in demonstrating an immediate decrement in the meaning of the satiated word, the more clinically relevant issue of whether changes in the distress and believability of dysfunctional thoughts persist in the longer term is unknown. In addition, Masuda and colleagues did not examine whether the beneficial effects of semantic satiation extend beyond the repeated word itself. For this technique to be clinically useful, it should reduce the emotional impact of the concept the word represents; for example, semantic satiation to the word fat should generalize to thoughts synonymous with fat. Next, because the thought distraction and thought suppression comparison groups used by Masuda et al. (2004, 2010) were intended simply as control conditions, it is unclear how this defusion technique compares to credible, active alternative interventions designed to target negative thoughts. Lastly, owing to their use of an unselected sample of participants, it remains to be shown that this technique is useful among individuals with more distressing self-relevant thoughts.

This study was conducted to replicate and extend the work of Masuda et al. (2004, 2009, 2010) on the potential clinical utility of semantic satiation for reducing the impact of negative self-referential thoughts. We attempted to replicate the beneficial short-term effects of this cognitive defusion technique on the distress and believability of negative thoughts. We sought to extend the findings of Masuda and colleagues by examining its longer-term effectiveness and the generalizability of its effects in a clinical analogue sample of individuals with highly distressing self-referential thoughts. We also conducted the first known comparison of cognitive defusion to an active and credible alternative condition: *cognitive restructuring*. Participants were randomly assigned to receive a rationale and training in either cognitive defusion or cognitive restructuring and to practice the assigned technique on a daily basis as homework for 1 week. Despite the analog nature of this study, our design represents an attempt to approximate the manner in which these techniques might be introduced, practiced, and assigned as homework in routine clinical practice.

We hypothesized that both cognitive defusion and cognitive restructuring would produce significant improvement in the distress and believability associated with negative self-referential thoughts. The extent to which these improvements would be evident in body image concerns more generally, both immediately following the rationale and training and following the homework week, was also explored. Consistent with the findings of Masuda et al. (2004, 2009, 2010), we hypothesized that the benefits of cognitive defusion would be apparent immediately following the rationale and training. We explored the extent to which practice of this technique during the homework week conveyed additional improvement. Because cognitive restructuring is thought to be an acquired skill whose benefits accrue after repeated real-world practice, we hypothesized that the beneficial effects of restructuring would be significantly less than those of cognitive defusion following the rationale and training but that this intervention would be associated with efficacy comparable to that of cognitive defusion following the homework week.

In addition to these outcome-based hypotheses, we expected group differences in the process of improvement. Because both cognitive defusion and cognitive restructuring aim to reduce the believability of negative thoughts, we hypothesized that decreased believability of negative self-referential thoughts would significantly predict a decrease in the distress elicited by these thoughts in each treatment condition. Based on the centrality of acceptance (Hayes et al., 2006) as

a key process underlying improvement in ACT, we hypothesized that a decrease in the perceived importance of not having negative self-referential thoughts (i.e., increased acceptance of negative thoughts) would significantly predict improvement among those receiving cognitive defusion. In contrast, we expected that this process would not predict improvement among individuals receiving cognitive restructuring who were engaged in efforts to directly challenge and modify their negative thoughts.

METHODS

Participants

Introductory psychology students at a mid-sized Western university completed a questionnaire packet for course credit that included the 14-item Body Shape Questionnaire (BSQ; Dowson & Henderson, 2001). From an initial pool of 478 women, we identified 95 with scores higher than the mean of 60 as reported by Dowson and Henderson (2001) for women with eating disorders and a history of self-induced vomiting. Twenty-six individuals responded to e-mail solicitations and volunteered to participate in this study. The mean age was 19.4 years ($SD = 2.1$) and 23 individuals (88.5%) described themselves as White. The average participant reported weighing 71.1 kg ($SD = 17.7$) and standing 166.6 cm ($SD = 6.1$) tall, and had a body mass index (BMI) at the lower end of the overweight range ($M = 25.3$, $SD = 4.7$).

Experimental Design

Participants were randomly assigned to one of two conditions: cognitive defusion ($n = 13$) or cognitive restructuring ($n = 13$). During an initial 90-minute session, participants received a detailed rationale and training in the assigned cognitive technique and instructions to practice the technique as homework on a daily basis for the upcoming week. Participants returned to the laboratory for an assessment-only session following the homework week. Outcome assessments were obtained at prerationale (Session 1), postrationale (Session 1), and post-homework (Session 2).

Measures

Body Shape Questionnaire (BSQ). We sought to recruit an analogue sample of participants who were distressed by a self-referential thought easily pared down to a single word. Toward this end, we administered the 14-item BSQ (Cooper, Taylor, Cooper, & Fairburn, 1987; Dowson & Henderson, 2001), a measure of distress and preoccupation with one's body weight and shape, to identify individuals likely distressed by the one-word thought, fat. BSQ items are answered based on how respondents have felt about their appearance over the past 2 weeks (example item: "Have you felt ashamed of your body?"). For the post-homework assessment, participants answered based on the past week. Responses to each item are provided on a 6-point Likert scale; total scores range from 14 to 84. The 14-item BSQ has excellent internal consistency ($\alpha = .93$) and good convergent validity with measures of cognitions, behaviors, and symptoms associated with anorexia and bulimia (Dowson & Henderson, 2001). The BSQ's internal consistency at the prerationale and post-homework assessments was excellent (both α 's = .95). In this study, BSQ scores declined significantly during the 2–4-week interval from the initial screening ($M = 71.8$; $SD = 7.5$) to the first study assessment ($M = 58.2$; $SD = 13.1$), $t(25) = 7.19$, $p < .001$. Despite this apparent regression to the mean, BSQ scores at the prerationale assessment closely approximated the eating disorder patient norms reported by Dowson and Henderson (2001).

Mirror Task. Participants accompanied the experimenter into a small, windowless room in the laboratory containing a 51 × 122 cm full-length mirror. Individuals were instructed to examine their fully clothed bodies in the mirror while carefully considering their body shape and

paying particular attention to “bothersome” body parts. The experimenter set a small electronic alarm to go off in 2 minutes, closed the door, and left the room. Participants had the option to lock the door from the inside.

After shutting off the alarm, participants remained in the room and provided ratings of distress and degree of satisfaction with their body shape. Distress was assessed with the question “How uncomfortable were you while looking at yourself in the mirror?” and was answered on a 0–100 visual analog scale (VAS) with responses anchored between *not at all uncomfortable* and *very uncomfortable*. Body satisfaction was evaluated with the item “How satisfied are you with your body right now?” and was rated on a 100-point VAS with responses anchored between *not at all satisfied* and *very satisfied*. All other study procedures occurred in an adjacent, windowless room.

Ratings of the Thought of Being Fat. Participants provided three separate ratings associated with the thought of being fat. Distress was assessed through responses to the question, “How uncomfortable is the thought of being fat right now?” Accuracy was assessed with the question, “To what extent do you believe this thought accurately describes you?” Note that in contrast to Masuda et al.’s (2004) use of the term “believability,” we use the term *accuracy* to highlight this item’s intended purpose of assessing the perceived accuracy or truth of the thought. Finally, the perceived importance of the thought of being fat was assessed with the item, “How important is it to you not to have this thought?” Responses were provided on a 100-point VAS anchored between *not at all* and *very uncomfortable*, *believable*, or *important*, respectively.

Ratings of Thoughts Synonymous With Fat. Participants were asked to generate three self-relevant negative thoughts they closely associated with the thought of being fat and to rank each thought as the first, second, or third synonym based on the strength of its association with fat. With the experimenter’s assistance, each thought was reduced to the single word that best captured its essence. The most common one-word thoughts participants generated were “lazy” ($n = 12$), “unattractive” ($n = 10$), “unhealthy” ($n = 4$), and “unhappy” ($n = 3$). Using the same procedures described previously for the thought of being fat, ratings of distress, accuracy, and importance were obtained for each synonym.

Treatment Credibility and Expectancy. Following the rationale and training for the assigned cognitive technique, participants rated the technique’s credibility (“How believable or credible does the rationale behind this technique seem to you?”) and probable effectiveness (“How helpful do you think this technique will be to cope with your negative body image thoughts?”). Two 100-point VAS were employed with the anchors *not at all believable* to *very believable* and *not at all helpful* to *very helpful*, respectively.

Procedure

Procedures Common to Both Conditions. After providing informed consent, participants completed the BSQ followed by the mirror task. Participants then provided distress, accuracy, and importance ratings for the thought of being fat. Next, three self-relevant, one-word thoughts associated with fat were generated and separately rated for distress, accuracy, and importance. Participants then received an approximately 15-minute detailed rationale and training on how to perform the assigned cognitive technique (see subsequent texts). Following the rationale and training, participants provided ratings of treatment credibility and expectancy, repeated the mirror task, and, once again, provided distress, accuracy, and importance ratings for the thought of being fat. At 1-week post-homework assessment session, all study assessments were repeated and participants were debriefed. This study was approved by the university’s institutional review board (IRB), and all individuals who received informed consent volunteered to participate.

Cognitive Defusion. This condition closely resembled the cognitive defusion intervention used by Masuda et al. (2004),¹ which was derived from the ACT manual (Hayes et al., 1999). Participants were informed that the content of their thoughts, per se, does not cause distress.

Rather, despite its advantages, language was said to play an instrumental role in human suffering by causing people to view their thoughts as literally true. Direct attempts to change the content of thoughts were described as only increasing their literality and capacity to induce distress. Accepting the content of one's thoughts while working to reduce their literality was described as the most effective method of coping with emotional distress. To demonstrate the effects of cognitive fusion, participants were first asked to repeat the word "milk" once and to notice all of the images and thoughts that are associated with it (e.g., creamy, white, cold). Milk was then quickly repeated out loud for 60 seconds, after which, all participants described a decrease in the literal meaning of the word. The experimenter then suggested that this exercise could be used to defuse the meaning and emotional impact of negative body image thoughts. Participants repeated the 60-second defusion exercise two more times in the same manner, once for the word fat and again using the most distressing one-word synonym of fat. Following these practices, all participants reported that the words became less meaningful and distressing.

Participants were instructed to practice the milk exercise with negative body image thoughts on a daily basis during the upcoming week. Negative thoughts were to be reduced to a single word and the defusion technique applied until "the meaning of the word disappears and all that is left is just a sound." Each individual was given a supply of forms on which to record the one-word thought and provide ratings of distress, accuracy, and importance after practicing the technique. Participants were instructed to carry the forms on their person and complete at least two per day during or immediately following periods of significant body image distress. If individuals did not experience body image distress on a given day, they were asked to complete two forms using the negative body image thoughts they most often experienced.

Cognitive Restructuring. This condition was adapted from an empirically supported CBT manual for binge eating and bulimia nervosa (Fairburn, Marcus, & Wilson, 1993). Participants were informed that emotional distress regarding one's appearance was caused by negative body image thoughts. Identifying and disputing unrealistic or unhelpful body image thoughts was described as the most effective method of coping with this distress. Using a recent situation in which the participant was distressed by the thought of being fat, the experimenter assisted the participant in challenging this thought by completing a thought record form consisting of the following sections: (a) situation, (b) negative automatic thought, (c) supporting evidence, (d) disconfirming evidence, and (e) balanced conclusion. The experimenter coached participants through this process in an individualized manner, taking into account factors such as the participant's BMI. For example, women who were significantly overweight were encouraged to engage in decatastrophizing strategies such as generating alternative meanings (e.g., "Being overweight doesn't mean I have to be unhappy.") rather than questioning the objective accuracy of their negative thoughts about being fat. A list of four "key questions" (e.g., "If my concerns are true, is it really so bad?") was provided to help participants evaluate the evidence. Lastly, participants were assisted in generating a balanced conclusion that could be used to deal with the negative thought in the future (e.g., "Other people don't seem to care about the size of my thighs," and "It is better to accept my body as it is than to hold myself to an unattainable standard").

Participants were instructed to practice this "accurate thinking exercise" on a daily basis for the upcoming week, during, or immediately following periods of significant body image distress. Each individual was given a supply of thought record forms and was asked to complete at least two forms per day. If participants did not experience body image distress on a given day, they were instructed to complete two forms using the negative body image thoughts they most often experienced.

Data Analysis

Improvement in body image concerns was examined using a series of mixed analyses of variance (ANOVAs). Ratings of distress and body satisfaction during the mirror task, and of fat

distress, accuracy, and importance, were obtained at all three study assessment timepoints and were analyzed using a series of 3 (time: prerationale vs. postrationale vs. post-homework) \times 2 (group: cognitive defusion vs. cognitive restructuring) mixed ANOVAs. BSQ scores and ratings of distress, accuracy, and importance for the three self-generated synonyms of fat were obtained at the prerationale and post-homework assessments and were analyzed using a series of 2 (time) \times 2 (group) mixed ANOVAs.

The process of improvement in each treatment condition was explored using hierarchical linear modeling (HLM; Raudenbush & Bryk, 2002). HLM is useful in analyzing repeated measures data (Level 1 data) nested within subjects (Level 2 data; Bryk, Raudenbush, & Congdon, 1996). For these analyses, ratings of the accuracy of the thought of being fat, as well as the importance of the thought of being fat, were considered measures of treatment process, whereas the distress rating associated with the thought of being fat was the outcome measure. HLM was used to examine the extent to which changes in fat accuracy and importance across the three assessment periods uniquely predicted decline in fat distress for participants in the cognitive defusion and cognitive restructuring conditions, respectively. For each HLM, fat accuracy and importance were entered simultaneously as Level 1 predictors of fat distress, with treatment condition entered as a Level 2 predictor.

We note that the risk of Type I error is inflated in this study because of the large number of outcomes examined. As recommended by Perneger (1998), results are reported without Bonferroni correction to avoid inflation of Type II error, given the relatively small sample size to detect differences among active treatments. We encourage the reader to interpret our findings with this caveat in mind and pay special attention to the effect sizes, which are reported throughout. Following the recommendations of Cohen (1988), effects of .2, .5, and .8 may be interpreted as small, medium, and large effects, respectively. Effect size estimates were calculated in accordance with the recommendations of Morris and DeShon (2002) for independent group's pretest–posttest designs. To measure between-groups effect sizes, we compared standardized mean differences from pretreatment to posttreatment in each condition using the formula $[(M_{\text{post, CD}} - M_{\text{pre, CD}}) / SD_{\text{pre, CD}}] - [(M_{\text{post, CR}} - M_{\text{pre, CR}}) / SD_{\text{pre, CR}}]$, where CD = cognitive defusion and CR = cognitive restructuring. Uncontrolled within-group effect sizes, computed to characterize the magnitude of change within each treatment condition, were calculated as the difference between pretreatment and posttreatment means divided by the pretreatment standard deviation. Uncontrolled effect size estimates should be interpreted with caution, because they do not take into account the effects of nonspecific influences on improvement, such as the placebo effect and regression to the mean.

RESULTS

Baseline Equivalence

To confirm that the randomization procedure resulted in comparable groups, we examined baseline differences using independent samples of *t* tests. Participants in the cognitive defusion and cognitive restructuring conditions did not significantly differ with respect to age or BMI (all *ps* > .60). Similarly, ratings of treatment credibility and treatment expectancy did not significantly differ between the groups (both *ps* > .20). Cognitive defusion received mean ratings of 71.3 (*SD* = 19.5) for credibility and 63.2 (*SD* = 22.0) for probable effectiveness. Cognitive restructuring received mean ratings of 78.1 (*SD* = 10.7) and 73.4 (*SD* = 24.6) for credibility and probable effectiveness, respectively. Whereas these differences did not attain statistical significance, effect size estimates indicate that participants tended to rate cognitive restructuring as somewhat more credible (*d* = .43) and more likely to be effective (*d* = .44) than cognitive defusion.

Improvement in Body Image Concerns

A 2 (time) \times 2 (group) mixed ANOVA yielded a significant within-subjects effect of time for the BSQ, $F(1, 24) = 9.65, p < .01$. The time \times condition interaction was nonsignificant, $F(1, 24) = 0.02, p > .10$, indicating equivalent improvement from the prerationale to post-homework assessments in both groups. In the cognitive defusion condition, BSQ scores decreased from a mean of 59.2 ($SD = 12.9$) to 52.9 ($SD = 14.1$), $d = 0.49$. In the cognitive restructuring condition, mean BSQ scores decreased from 57.2 ($SD = 13.7$) to 50.2 ($SD = 10.7$), $d = 0.50$. The controlled (between-groups) effect size was $d = 0.01$. Notably, this improvement in BSQ scores occurred following the significant reduction in BSQ scores observed from initial screening to the prerationale assessment, suggesting that both interventions produced effects beyond those attributable to regression artifacts.

Table 1 presents descriptive statistics and results of mixed ANOVAs for outcome measures obtained at all three study assessments. A significant main effect of time was evident for mirror task body satisfaction ($p < .01$), and a trend for significance was evident for mirror task distress ($p < .10$). Nonsignificant time \times condition interactions indicated that the magnitude of these improvements was comparable across the two conditions. A similar pattern of findings was obtained for fat distress. For fat accuracy, a significant time \times condition interaction ($p < .05$) was obtained, indicating larger reductions in the perceived accuracy of the thought of being fat among participants in the cognitive restructuring condition than those in the cognitive defusion

TABLE 1. DESCRIPTIVE STATISTICS AND BETWEEN-GROUP COMPARISONS ON OUTCOME MEASURES AT PRERATIONALE, POSTRATIONALE, AND POST-HOMEWORK ASSESSMENTS

| Measure | Cognitive Defusion <i>M (SD)</i> | Cognitive Restructuring <i>M (SD)</i> | Main Effect of Time <i>F (2, 48)</i> | Main Effect of Condition <i>F (1, 24)</i> | Time \times Condition Interaction <i>F (2, 48)</i> |
|--------------------------|-------------------------------------|--|---|--|---|
| Mirror distress | | | 2.99 \pm | 0.83 | 0.81 |
| Prerationale | 46.03 (23.41) | 52.98 (25.11) | | | |
| Postrationale | 37.78 (24.92) | 45.97 (20.26) | | | |
| Post-homework | 39.21 (26.85) | 35.67 (23.18) | | | |
| Mirror body satisfaction | | | 7.25** | 1.36 | 0.80 |
| Prerationale | 29.16 (19.70) | 35.73 (25.29) | | | |
| Postrationale | 45.16 (23.15) | 38.28 (20.74) | | | |
| Post-homework | 46.90 (25.09) | 50.50 (27.03) | | | |
| “Fat” distress | | | 6.61** | 0.53 | 0.35 |
| Prerationale | 77.48 (16.38) | 73.57 (20.26) | | | |
| Postrationale | 63.21 (21.23) | 62.41 (22.17) | | | |
| Post-homework | 64.08 (25.11) | 53.60 (26.38) | | | |
| “Fat” accuracy | | | 13.96*** | 0.64 | 4.95* |
| Prerationale | 62.22 (11.36) | 61.41 (21.19) | | | |
| Postrationale | 48.57 (21.54) | 51.92 (24.11) | | | |
| Post-homework | 51.55 (23.98) | 32.75 (18.14) | | | |
| “Fat” importance | | | 0.11 | 1.45 | 3.18* |
| Prerationale | 85.36 (19.44) | 78.54 (25.12) | | | |
| Postrationale | 79.40 (23.88) | 87.84 (14.64) | | | |
| Post-homework | 71.71 (28.32) | 90.94 (10.28) | | | |

$\pm p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

condition. Lastly, fat importance yielded a nonsignificant main effect of time but a significant time \times condition interaction ($p < .05$). Participants in the cognitive defusion condition rated not having the thought of being fat as less important, whereas those in the cognitive restructuring condition reported higher importance of not having this thought.

Improvement During the Rationale Phase. Effect size estimates, calculated separately for the rationale and homework phases, are summarized in Table 2. Participants in the cognitive defusion condition experienced modest improvements in fat importance and mirror task distress, and larger improvements in mirror body satisfaction, fat distress, and especially, fat accuracy. Participants in the cognitive restructuring condition reported less improvement in each index of body image distress, with within-group effect sizes ranging from small (mirror body satisfaction) to medium (fat distress). Between-group effect size estimates yielded greater improvement in the cognitive defusion condition on each outcome measure and indicated a substantial advantage of cognitive defusion over cognitive restructuring regarding fat importance, mirror body satisfaction, and fat accuracy (range in d s = 0.68–0.75).

Improvement During the Homework Phase. Participants in the cognitive defusion condition experienced little change in body image concerns during the homework phase (range in d s = -0.14 – 0.32). In contrast, participants in the cognitive restructuring condition showed moderate levels of improvement in fat distress and mirror task ratings, as well as large decreases in fat accuracy. The importance of not having the thought of being fat continued to increase during the homework phase. Between-group effect sizes substantially favored the cognitive restructuring condition on all outcome measures (range in d s = 0.51–0.94) with the exception of fat importance, which was lower in the cognitive defusion group than the cognitive restructuring group.

TABLE 2. WITHIN-GROUP AND BETWEEN-GROUP EFFECT SIZE ESTIMATES (d) FOR THE RATIONALE AND HOMEWORK PHASES

| Measure and Phase | Cognitive Defusion | Cognitive Restructuring | Between Group $d \pm$ |
|--------------------------|-----------------------|----------------------------|-----------------------|
| | Within Group d^* | Within Group d^* | |
| Mirror distress | | | |
| Rationale | 0.35 | 0.28 | 0.07 |
| Homework | -0.06 | 0.51 | -0.57 |
| Mirror body satisfaction | | | |
| Rationale | 0.81 | 0.10 | 0.71 |
| Homework | 0.08 | 0.59 | -0.51 |
| “Fat” distress | | | |
| Rationale | 0.87 | 0.55 | 0.32 |
| Homework | -0.04 | 0.48 | -0.52 |
| “Fat” accuracy | | | |
| Rationale | 1.20 | 0.45 | 0.75 |
| Homework | -0.14 | 0.80 | -0.94 |
| “Fat” importance | | | |
| Rationale | 0.31 | -0.37 | 0.68 |
| Homework | 0.32 | -0.21 | 0.53 |

Note. *Positive values indicate change in the direction of improvement. \pm Positive values indicate greater improvement in the cognitive defusion condition; negative values indicate greater improvement in the cognitive restructuring condition.

Generalizability of Improvements to Synonyms of Fat. A series of 2 (time) \times 2 (condition) mixed ANOVAs were conducted to examine changes in distress, accuracy, and importance associated with the three self-generated synonyms of fat. As shown in Table 3, a significant ($p < .05$) main effect of time was obtained for the distress and accuracy of each synonym. The time \times condition interaction was significant only for Synonym 1 accuracy, indicating greater reductions in the perceived accuracy of negative thoughts in the cognitive restructuring condition compared to the cognitive defusion condition. Significant main effects of time were also evident on importance for Synonym 2 and Synonym 3. The absence of a significant time \times condition interaction for these variables indicates that, contrary to the results for the thought of being fat, participants in both groups generally rated negative body image thoughts as less important.

Relation Between Body Mass Index and Improvement. Ten participants (38.5%) had a BMI at or more than the overweight range (≥ 25), including five individuals assigned to each

TABLE 3. DESCRIPTIVE STATISTICS AND BETWEEN-GROUP COMPARISONS ON ONE-WORD THOUGHTS SYNONYMOUS WITH “FAT” AT PRERATIONALE AND POST-HOMEWORK ASSESSMENTS

| Measure | Cognitive Defusion <i>M (SD)</i> | Cognitive Restructuring <i>M (SD)</i> | Main Effect of Time <i>F</i> (1, 24) | Main Effect of Condition <i>F</i> (1, 24) | Time \times Condition Interaction <i>F</i> (1, 24) |
|----------------------|-------------------------------------|--|---|--|---|
| Synonym 1 distress | | | 5.59* | 0.63 | 0.20 |
| Prerationale | 72.15 (23.95) | 66.00 (30.12) | | | |
| Post-homework | 57.44 (26.26) | 49.44 (32.30) | | | |
| Synonym 1 accuracy | | | 16.99*** | 0.37 | 4.29* |
| Prerationale | 60.00 (23.34) | 65.63 (22.69) | | | |
| Post-homework | 49.81 (22.71) | 34.93 (23.56) | | | |
| Synonym 1 importance | | | 2.68 | 0.57 | 2.19 |
| Prerationale | 84.93 (14.56) | 82.75 (22.00) | | | |
| Post-homework | 67.99 (32.14) | 81.89 (24.72) | | | |
| Synonym 2 distress | | | 4.50* | 0.76 | 1.62 |
| Prerationale | 68.92 (23.04) | 69.73 (23.33) | | | |
| Post-homework | 63.52 (23.46) | 48.14 (35.33) | | | |
| Synonym 2 accuracy | | | 8.61** | 0.01 | 0.43 |
| Prerationale | 56.39 (18.49) | 59.74 (21.14) | | | |
| Post-homework | 42.25 (26.84) | 37.47 (30.74) | | | |
| Synonym 2 importance | | | 3.416 | 0.05 | 0.09 |
| Prerationale | 80.71 (14.99) | 84.12 (13.73) | | | |
| Post-homework | 70.78 (30.22) | 70.29 (30.92) | | | |
| Synonym 3 distress | | | 4.68* | 1.43 | 0.68 |
| Prerationale | 81.02 (12.94) | 65.76 (28.95) | | | |
| Post-homework | 61.29 (28.82) | 56.95 (32.25) | | | |
| Synonym 3 accuracy | | | 16.02*** | 0.21 | 0.80 |
| Prerationale | 61.29 (21.17) | 61.29 (28.95) | | | |
| Post-homework | 45.04 (33.14) | 35.67 (33.17) | | | |
| Synonym 3 importance | | | 4.36* | 0.52 | 0.40 |
| Prerationale | 84.37 (17.05) | 86.48 (17.07) | | | |
| Post-homework | 69.23 (32.61) | 78.35 (27.43) | | | |

$\pm p < .10$. * $p < .05$. ** $p < .01$. *** $p < .001$.

intervention. To examine whether participants with a higher BMI evidenced less improvement in body image concerns during the study, Pearson correlations were calculated between continuous baseline BMI scores and change scores on indices of improvement during the two study phases in each condition. For participants who received cognitive restructuring, BMI was not significantly correlated with changes in any index of body image concerns during the rationale phase (range in $r_s = -.13-.15$, all $p_s > .60$) and homework phase (range in $r_s = -.27-.24$, all $p_s > .30$). For those in the cognitive defusion condition, BMI was also not significantly correlated with improvement during the rationale phase (range in $r_s = -.24-.37$, all $p_s > .20$). However, a higher BMI was associated with significantly less improvement during the homework phase for fat distress ($r = .54$, $p < .05$), fat believability ($r = .60$, $p < .05$), and mirror body satisfaction ($r = .78$, $p < .01$).

Homework Compliance

Participants in the cognitive defusion condition turned in more forms following the week-long homework phase ($M = 11.1$, $SD = 4.1$) than those in the cognitive restructuring condition ($M = 6.8$, $SD = 2.2$), $t(24) = 3.33$, $p < .01$. At least one homework form for each day of the homework phase was completed by seven cognitive defusion participants (53.8%) and four cognitive restructuring participants (30.8%). Although the differences did not reach traditional levels of statistical significance, participants who completed homework forms each day were somewhat more likely, than those who did not, to rate their assigned cognitive technique as credible ($t[24] = 1.75$, $p < .10$, $d = 0.72$) and likely to be effective ($t[24] = 1.64$, $p < .15$, $d = 0.68$). On the other hand, daily completion of homework forms was not significantly associated with improvement on any outcome variable during the rationale or homework phases (all $p_s > .10$).

Treatment Process

HLM analyses indicated that for participants in the cognitive defusion condition, decreases in fat accuracy across the three study assessments significantly predicted decreases in fat distress, $\beta = 0.67$, $t(72) = 7.10$, $p < .001$, after controlling for changes in fat importance. Likewise, decreases in fat importance (i.e., less importance of not having the thought of being fat) uniquely predicted improvement in fat distress, $\beta = 0.22$, $t(72) = 2.78$, $p < .05$, after controlling for changes in fat accuracy.

For participants in the cognitive restructuring condition, decreases in fat accuracy significantly predicted decreases in fat distress, $\beta = 0.47$, $t(72) = 2.19$, $p < .05$, after controlling for changes in fat importance. Fat importance was also a significant, unique predictor of fat distress, $\beta = -0.24$, $t(72) = -3.58$, $p < .001$. In contrast to results for the cognitive defusion condition, *increases* in fat importance (i.e., greater importance of not having the thought of being fat) significantly predicted improvement in fat distress for participants receiving cognitive restructuring.

The extent to which decreases in fat accuracy uniquely predicted improvement in fat distress was not significantly different between the cognitive defusion and cognitive restructuring conditions, $\beta = 0.20$, $t(72) = 0.88$, $p = .30$. Consistent with the findings, mentioned previously, a significant effect of treatment condition was evident for fat importance, indicating that the extent to which changes in importance of not having the thought of being fat predicted improvement in fat distress was significantly different between the two treatments, $\beta = 0.45$, $t(72) = 3.66$, $p < .001$.

DISCUSSION

The purpose of this study was to compare the outcome and process of the milk exercise, an ACT cognitive defusion technique, with cognitive restructuring in a clinical analogue sample of individuals distressed by negative self-referential thoughts. As hypothesized, both cognitive techniques produced substantial and comparable levels of improvement on measures of body image

concerns among undergraduate women distressed by their body shape. Our findings replicate the short-term benefits of cognitive defusion reported by Masuda et al. (2004, 2009, 2010) and suggest that this technique engenders longer term improvements that generalize well beyond the specific thought targeted for defusion, even for individuals whose self-relevant negative thoughts are highly distressing. The effectiveness of this cognitive defusion technique is also similar to that of a credible, alternative active technique for treating negative thoughts.

Despite the comparable improvement observed in cognitive defusion and cognitive restructuring from the pretreatment to post-homework assessments, clear differences in outcomes and process between these techniques were evident. As hypothesized, defusion produced larger reductions in body image concerns immediately following the rationale and training. Our findings suggest that practicing this technique with self-referential negative thoughts in the context of a cognitive defusion rationale produces immediate and meaningful changes in the emotional impact of the thoughts and related stimuli. As expected, a cognitive rationale and practice in logical and evidentiary disputation of a dysfunctional thought was associated with less immediate benefit in this study.

Participants instructed to practice cognitive restructuring on a daily basis reported considerable improvements in body image concerns following the homework week. These findings are consistent with the notion that the benefits of cognitive restructuring increase with repeated practice (Beck et al., 1979). Although participants receiving cognitive defusion largely maintained their improvements following the homework week, there was little apparent benefit of using this technique to cope with negative thoughts in the natural environment. This was true despite the fact that cognitive defusion participants completed significantly more homework forms than those who received cognitive restructuring. Defusion's relative ineffectiveness in a homework context may have been caused by participants not implementing the procedure in a functionally correct manner. For example, despite instructions to the contrary, some individuals may have used this technique in an attempt to suppress or dispute the veracity of their negative thoughts rather than accepting and defusing from them. Alternatively, the strong and negative association between BMI and improvement during the homework phase suggests another possibility: Cognitive defusion may have worked less well when used with thoughts that were perceived to be accurate, such as the thought "I am fat" for overweight individuals. As noted by Arch and Craske (2008), the rationale for cognitive defusion does not specify which thoughts to defuse, and the notion that "thoughts are just thoughts" may be easier to accept for some thoughts than for others. Overall, these findings are consistent with the proposed value of the milk exercise as a demonstration of the effects of cognitive defusion (Hayes et al., 1999) but do not support the efficacy of this technique as a habitual behavioral response as recommended by Hayes and Smith (2005), at least as a stand-alone procedure implemented outside of a supportive therapeutic context.

Similarities and differences between the cognitive techniques were evident in terms of treatment process. The cognitive defusion and cognitive restructuring techniques substantially reduced the perceived accuracy of negative body image-related thoughts. As hypothesized, a decrease in the accuracy of the thought of being fat was associated with better outcomes in each condition. It is notable that the perceived accuracy of negative thoughts can be decreased without directly addressing their veracity. In this study, cognitive restructuring elicited somewhat larger reductions in the perceived accuracy of the thought of being fat than did cognitive defusion. It is possible that different results would have been obtained had the believability of fat been assessed in a more ACT-consistent manner, such as by asking participants to rate the extent to which they experienced the thought "simply as a mental event, rather than as an absolute fact about you" (Masuda et al., 2010; p. 16).

As predicted by theoretical accounts of ACT processes (Hayes et al., 2006), participants in the cognitive defusion condition rated the thought of being fat as less important, and this decreased importance was a significant, unique predictor of reduced distress in response to the thought of

being fat. The opposite pattern of findings was evident for cognitive restructuring. Participants in this condition rated “fat” thoughts as more important, and this greater importance significantly predicted less fat distress. From an ACT perspective, an increase in the importance of not having fat thoughts could be construed as a form of deliberate nonacceptance associated with attempts to avoid or suppress unwanted experiences. However, the specific type of importance measured in this study may connote a different process. The increased importance of not having the thought of being fat evident in the cognitive restructuring condition may simply indicate compliance with the instructions for implementing this technique. Specifically, participants likely attempted to challenge and dispute, rather than accept, the validity of the thought “I am fat.” An increase in the importance of not having fat thoughts may, thus, reflect efforts to directly change the content of negative thoughts. Although attempting to control unwanted thoughts has been characterized as inherently dysfunctional within an ACT context (Eifert & Forsyth, 2005), our findings suggest such efforts may result in positive outcomes in a CBT context, in which the emphasis is on actively challenging dysfunctional thoughts with the goal of thinking in more realistic and adaptive ways. As noted by Leahy (2008), cognitive restructuring directly encourages the elicitation of negative thoughts rather than their avoidance or suppression, and our findings suggest that encouraging individuals to “struggle” with the content of their thoughts is not necessarily harmful.

The present results are preliminary and should be interpreted in the context of the limitations of this study. The relatively small sample size limited our ability to detect significant differences between the treatment conditions. Similarly, the risk of Type I error is inflated in this study because of the large number of outcomes examined. We note that despite the large number of analyses conducted in this study (and the resultant inflated family-wise error rate), many statistically significant findings emerged, and very few analyses revealed trends that may have achieved traditional levels of significance with the inclusion of additional participants. To illustrate, in order to have 80% power to detect a statistically significant ($p = .05$) difference between conditions on improvement in mirror distress, mirror body satisfaction, fat distress, and BSQ scores from pretreatment to follow-up, data would have to have been collected from more than 250 participants. As a result, the recruitment of a larger sample would have had little effect on most of our findings. A related limitation of this study concerns the potential unreliability of statistical findings obtained in a relatively small sample. Our sample size approximates the “15 participants per participants” rule of thumb recommended by some authors for the adequate use of regression (Pedhazur, 1997; Stevens, 1996), but falls short of the recommended sample size of 100 or more participants recommended by other experts (e.g., Tabachnick & Fidell, 2001). Our results should be considered preliminary, and replication of this study in a larger sample of participants would bolster confidence in the reliability of the present findings.

Although the rationale phase of this study was highly standardized, we were not able to control the context of the homework phase as it occurred outside the laboratory. Given this lack of methodological control, the degree to which post-homework improvement is specifically attributable to the homework exercises is unclear. An additional limitation concerns the fact that all outcome variables were self-report measures. As a result, relationships among these variables may have been artificially inflated because of shared method variance. The absence of a wait list or alternative treatment condition leaves open the possibility that improvement was influenced by expectancies, regression to the mean, and other factors not specific to the interventions employed. The rationale and training sessions for each condition were brief, delivered in isolation from other treatment components, and are not representative of the manner in which ACT and CBT are delivered in clinical practice. It is possible that the techniques examined in this study are less effective when delivered in isolation from the broader therapeutic context in which they are typically implemented. Conversely, studying these therapeutic techniques in isolation avoids the ambiguities inherent in evaluating large treatment packages composed of diverse procedures, some of which may be unhelpful (Hayes et al., 2006).

This investigation should not be construed as a test of the relative efficacy of ACT and CBT. There are many cognitive defusion techniques with ACT, and there are many cognitive modification procedures within CBT. We sought to compare the outcome and process of two specific techniques borrowed from these multicomponent treatments that are designed to address dysfunctional thoughts. Because of the analog nature of our sample and methodology, it remains to be shown that this ACT cognitive defusion technique is clinically useful among individuals with bona fide psychological disorders. However, taken together with the results of Masuda et al. (2004, 2009, 2010), our findings support the hypothesized outcomes and processes of this technique and warrant additional research on its clinical utility. This study also highlights the possibility, demonstrated by Forman, Herbert, Moitra, Yeomans, and Geller (2007), that ACT and CBT may achieve similar outcomes via different mediating processes.

NOTE

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