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Empirical research

Exploring process variables through which acceptance-based behavioral interventions may improve weight loss maintenance

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ABSTRACT

Objective: A previously published randomized trial with individuals reporting high internal disinhibition showed significant differences in post-treatment weight change favoring Acceptance-Based Behavioral Intervention (ABBI) when compared to standard behavioral treatment (SBT). This paper examines process variables that might contribute to the observed differences in weight change.

Methods: Participants were 162 adults with overweight or obesity (mean BMI 37.6) randomly assigned to ABBI or SBT. Both interventions provided the same calorie intake target, exercise goal, and self-monitoring skills training. SBT incorporated current best practice interventions for addressing problematic thoughts and emotions. ABBI utilized acceptance-based techniques based on Acceptance and Commitment Therapy. ABBI and SBT were compared on process measures hypothesized to be related to outcome in ABBI and SBT and their association with weight loss outcomes using linear and non-linear mixed models methods and exploratory correlational analyses.

Results: Both the SBT and the ABBI groups showed significant changes over time on all process variables. The only significant between group difference was for values consistent behavior, with the ABBI group improving more as compared to SBT ($t = 2.45$, $p = 0.016$); however, changes in values consistent behavior did not mediate weight change. Exploratory analyses suggest the possibility that changes in process variables were less associated with weight change in ABBI than in SBT after treatment was discontinued.

Conclusions: Both conditions produced significant changes in process variables, however there was little difference between groups. Thus, the results do not provide an adequate process account for the observed weight change differences between ABBI and SBT, leaving important questions that need to be addressed by future research.

1. Introduction

Behavioral weight loss programs consistently produce an average weight loss of approximately 7–10%; typically resulting in significant health improvements (Butryn, Webb, & Wadden, 2011; MacLean et al., 2015). However, most individuals achieve maximum weight loss between 6 and 9 months and gradually regain weight thereafter (Barte et al., 2010; Jeffery et al., 2000; Loveman et al., 2011; Perri, 1998). Participants who report problems with emotional overeating have been shown to fare worse in these programs (Butryn, Thomas, & Lowe, 2009; Niemeier, Phelan, Fava, & Wing, 2007).

Researchers have begun testing interventions that incorporate mindfulness and acceptance-based strategies found in Acceptance and Commitment Therapy (ACT; Hayes, Strosahl, & Wilson, 1999) within weight loss programs in an attempt to improve long-term outcomes. It is theorized that ACT strategies could lead to better weight loss by increasing acceptance of food cravings and problematic thoughts and emotions (thereby reducing their impact on behavior). In addition, ACT values clarification and commitment strategies could improve outcomes by increasing the degree to which individuals behave consistent with their self-identified values. Previously, changes in acceptance and values have been shown to mediate positive outcomes in ACT research across a broad range of mental and behavioral health intervention studies (Hayes, Luoma, Bond, Masuda, & Lillis, 2006), however researchers have just begun to apply ACT methods to weight control.

Pilot studies have demonstrated that ACT strategies could be helpful for both weight loss (Forman, Butryn, Hoffman, & Herbert, 2009; Goodwin, Forman, Herbert, Butryn, & Ledley, 2012; Tapper et al., 2009) and maintenance (Lillis, Hayes, Bunting, & Masuda, 2009). The first randomized trial comparing a standard behavioral treatment (SBT)

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to an acceptance based treatment (ABT) that incorporated mindfulness and acceptance strategies from ACT showed no significant between groups differences in weight loss at 12 months (Forman et al., 2013). A revised version of the ABT intervention, which built on, and expanded, successful strategies from the previous trial was later tested and showed significantly greater weight loss at 12 months as compared to SBT (13.3% vs 9.8%; Forman et al., 2016). The ABT effect was partially mediated by changes in acceptance of food-related cravings and autonomous motivation, a mechanism related to values clarification and attainment.

The authors of the current study recently published findings from a similar randomized controlled trial comparing a standard behavioral intervention to an acceptance-based behavioral intervention (ABBI) that combined ACT and traditional weight loss strategies for adults with overweight or obesity who self-identified as struggling with stress or emotional eating (Lillis et al., 2016). In contrast to the results of the Forman 2016 trial, there were no significant differences in mean weight loss between groups after 12 months of treatment. However, participants in the ABBI group regained significantly less weight during the post-treatment phase (12–24 months) compared to those in the SBT condition (4.6 kg vs 7.1 kg regain; Lillis et al., 2016). In addition, a higher proportion of ABBI participants achieved clinically meaningful weight losses of ≥5% at 24 months (38% vs 25%). These results suggest that the acceptance-based strategies may be helpful for maintenance of weight loss.

The current study examined the process measures from this recent trial that might explain between group differences in weight loss outcomes. We hypothesized that the ABBI condition would show larger changes in acceptance, values-consistent behavior, and flexible control of eating, and that these changes would be related to weight loss outcomes in the ABBI condition and would partially mediate observed differences in weight loss maintenance between ABBI and SBT.

2. Method

2.1. Design

The study was a randomized controlled trial of 162 participants who were allocated in a 1:1 ratio, stratified by gender, to one of two treatment conditions: (1) Acceptance-Based Behavioral Intervention (ABBI), or, (2) Standard Behavioral Treatment (SBT). The intervention was 32 sessions across one year in a faded contact design. Assessments occurred at baseline, 6, 12, 18, and 24 months. The full details of the study procedures and primary results can be found elsewhere (Lillis et al., 2015; Lillis et al., 2016), however relevant portions are reviewed here.

2.2. Participants

Included participants were 18–70 years of age, had a body mass index (BMIs) between 30 and 50 kg/m^2, and reported elevated levels of internal disinhibition (defined as a score of 5 or higher for women or 4 or higher for men on the Internal Disinhibition [ID] subscale of the Eating Inventory). A detailed description of the screening process and establishment of the ID cutoff can be found in the study protocol (Lillis et al., 2015)

2.3. Interventions

The intervention was delivered in group format with 15–16 participants per group. Participants arrived early to be weighed by one of the group leaders and were also given brief feedback on their food diary prior to the start of group. Each session lasted one hour.

The groups were run by co-leader pairs, which include a mix of Ph.D. psychologists, Ph.D. exercise physiologists, and master's level nutritionists. One of the leaders was an expert and the other was a novice (newly trained for the current study). Each leader pair was responsible for running both conditions in the cohort to which they were assigned in order to counterbalance leader effects. All the group leaders had training and experience running standard behavioral weight loss interventions. All group leaders received a 2-day training in acceptance-based interventions and met for weekly supervision with one of the study co-investigators. All sessions were audiotaped for treatment fidelity analysis (treatment fidelity was excellent and results have been presented elsewhere, see Lillis et al., 2016).

2.3.1. Shared components

Both intervention conditions shared core behavioral weight components. Participants were placed on a standard calorie and fat restricted diet, with goals of 1200–1800 kcal/day and 33–42 g of fat/day (25% calories from fat) depending on their baseline weight, and were encouraged to lose 1–2 pounds per week and to achieve and then maintain a weight loss of 10% of initial body weight; consistent with AHA and ADA guidelines (Look AHEAD Research Group, 2006). Participants were instructed to self-monitor their daily calorie and fat intake in their food diaries, which were reviewed each week by the interventionists. Participants were also encouraged to gradually increase their physical activity until they are exercising at least 250 min per week at moderate intensity (goal = 50–75% of maximal heart rate, not to exceed perceived exertion of 13 on a 6–20 scale) and were given basic information about safe and effective exercise strategies. Participants were taught behavioral strategies to assist in the modification of their eating and exercise habits including self-monitoring (Baker & Kirschenbaum, 1993; Boutelle & Kirschenbaum, 1998), stimulus control, problem-solving (Perri et al., 2001), assertiveness training, social support (R. Wing & Jeffery, 1999), goal setting (Bandura & Simon, 1977), and relapse prevention (Marlatt & Gordon, 1985). Later lessons included relapse prevention, dealing with motivation erosion, improving the quality of the diet through approaches such as volumetrics, and adding novelty to the physical activity regimen.

2.3.2. Components that differed in ABBI vs SBT

SBT utilized cognitive change strategies to addresses negative thoughts, emotions, and food cravings that may impede weight loss. For example, participants were taught how to recognize a negative thought, attempt to stop it, and replace it with a positive thought. Participants in the SBT condition were also taught how to reduce stress and avoid impulsive eating using relaxation and distraction techniques.

In contrast, the ABBI intervention taught acceptance, mindfulness, and values-based techniques to address negative thoughts, emotions, and food cravings (Hayes & Lillis, 2012; Lillis, Dahl, & Weineland, 2014). Acceptance strategies focus on illustrating the link between efforts to control or avoid internal experiences and unsuccessful weight control behaviors. For example, emotional eating was discussed as a way to reduce stress or sadness in the short-term, at the expense of more stress and sadness, reduced health, and possibly increased weight over the medium to long-term (referred to as “the cost of avoidance”). A variety of exercises were used to expose participants to unwanted physiological and emotional states (through guided imagery and the presentation of food cues) in order to practice “riding out” these experiences without engaging in unhealthy behavior. Participants were taught mindfulness strategies that included increasing awareness of problematic thoughts through thought labeling (e.g. “self-sabotaging” or “judgment”), guided imagery (e.g. imaging thoughts as leaves on a stream), thought exposure (repeating a problematic thought over and over), and metaphor (e.g. imagining your mind as a “bad motivational speaker”) in order to decouple problematic thoughts and unhealthy behavior. Finally, the ABBI condition utilized basic values clarification and commitment techniques, such as writing about core values related to health, relationships, and work, and setting values-based goals, for the purpose of helping participants identity how weight-related