The impact of the interventionist–participant relationship on treatment adherence and weight loss

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Abstract

Little is known about the impact of the relationship built between interventionists and their participants on weight loss. Our objective is to determine whether stronger early (i.e., 4 weeks) participant-interventionist bond is associated with significantly greater weight loss success and treatment adherence. Three hundred and ninety-eight participants received an online group behavioral weight control program over 18 months. Weight was measured objectively at baseline and at 6 and 18 months. At 4 weeks, participants completed the Working Alliance Inventory (WAI) bonding subscale, which measures the collaborative bond with the interventionist. Adherence (i.e., session attendance and online self-monitoring diary completion) was recorded by the interventionists. Participant-interventionist bond at 4 weeks was significantly associated with weight loss at 6 months ($t(322) = -2.14$, $p = .03$) but not at 18 months ($t(290) = 0.53$, $p = .60$). The model indicated that participant-interventionist bond at 4 weeks was a significant predictor of adherence at 6 months ($b = .063$, standard error [SE] = .30, $p = .04$), and 6 month adherence was a significant predictor of weight loss at 6 months ($b = -.594$, $SE = .049$, $p < .0001$). The indirect effect of the WAI-Bond subscale was significant ($b = -.037$, $p = .03$, 95% confidence interval: $-.074, -.002$) and accounted for 54% of the total effect of participant-interventionist bond on weight loss. However, the total weight loss explained by WAI-Bond subscale was small (0.04 kg). Participant-interventionist bond between participant and interventionist is an early predictor of treatment adherence and weight loss success at 6 months; however, the degree of weight loss explained by participant-interventionist bond is small and was not maintained at 18 months.

Keywords

Obesity, Weight loss, Interventionist, Alliance, Adherence

INTRODUCTION

While there has been extensive research on the strong facilitative role of social factors on weight loss outcomes [1–4], minimal attention has been paid to the participant-interventionist relationship in behavioral weight control programs. Several previous studies have examined potential differences in therapeutic alliance between participants and their interventionist in different treatment approaches [5–8]; however, we are not aware of any studies that examined the impact of this relationship on treatment

Implications

Practice: While the quality of the early participant-interventionist bond in an online obesity treatment program may predict short-term weight loss and treatment adherence, the effect of the relationship was small and was not maintained longer term.

Policy: It is unclear whether there would be substantive benefit to dedicating additional attention to enhancing the participant-interventionist bond in weight loss programs or instituting training of interventionists to adopt particular alliance-building behaviors unless further investigation into the participant-interventionist bond using alternative measurement approaches provides stronger support for continued consideration.

Research: Future research should explore whether measuring the interventionist-participant bond with alternative methods reveals strong associations with weight loss success or, alternately, focus on other potential early predictors of sustained weight management treatment success.

engagement during a behavioral weight loss program as well as weight loss success. Thus, our primary hypothesis was that a stronger early (i.e., four weeks) participant-interventionist bond would predict significantly greater weight loss success at 6 and 18 months. An additional aim was to explore whether the early participant-interventionist bond is associated with greater treatment adherence (i.e., group chat session attendance, dietary and exercise self-monitoring).

METHODS

A detailed description of the study design [9] and the primary study outcomes [10] have been published previously. The trial was registered at Clinical Trials.gov: NCT #01232699. In summary, 398 participants (24.1% African American; 89.7% women; mean age: 48.4 ± 10.1; mean baseline body mass index (BMI)

36.0 ± 6.0 kg/m^2, and 92.2% with at least some college education) were recruited at two clinical centers (Burlington, Vermont, and Little Rock, Arkansas). In brief, eligibility criteria included: being older than 18 years, having a BMI 25 to 50 kg/m^2, the ability to participate in moderate physical activity, having no major health conditions for which weight loss was contraindicated, taking no medications that might affect weight loss, reporting no recent substantial weight loss, having no history of weight loss surgery, and having access to the Internet and a computer. Participants also had to successfully complete 7 days of dietary and physical activity self-monitoring on the study website. The study was approved by the Committee on Human Research in the Behavioral Sciences at the University of Vermont and the Institutional Review Board at the University of Arkansas for Medical Sciences.

Participants were randomly allocated to either: (a) an 18-month online- and group-based behavioral weight loss program with 24 weekly synchronous chat sessions focused on weight loss and then 12 monthly synchronous chat sessions focused on weight maintenance or (b) the same online group program augmented with six individual online motivational interviewing (MI) synchronous chat sessions. The online chat sessions of 12 to 19 participants from both clinical sites were moderated by experienced behavioral weight control interventionists. Participants were instructed to record dietary intake, minutes of physical activity and weight daily in the online journal, and group interventionists provided tailored emailed feedback weekly and then monthly during the monthly weight maintenance sessions. The nine group interventionists were master's level dietitians, psychologists, exercise physiologists, or health educators, and all were female and Caucasian. Group interventionists were distinct individuals from the MI interventionists. Both participants and group interventionists had headshots that appeared at the top of the chat room when they were in attendance.

As previously reported, the addition of individual MI chat sessions was found to confer no weight loss advantage relative to the online group program alone and demonstrated no benefit in treatment engagement (i.e., group chat attendance or self-monitoring) [10]. Specifically, participants in the condition that received the online group intervention in addition to MI sessions lost 5.1 kg at 6 months, compared with 5.5 kg for participants in the online group intervention alone. In addition, follow-up data were obtained from 90% of randomized participants at 6 months with no difference between conditions in retention rates. A similar pattern was evident at 18-months (−3.5 kg for group intervention + MI vs. −3.3 kg for group intervention alone), with 81% retention for data collection at 18 months. In addition, there were no significant differences in the Working Alliance Inventory (WAI)-Bond subscale ratings of the group interventionist by treatment condition. Therefore, for the purposes of the current report, participants in the two conditions have been combined.

Measures

In-person data collection occurred at baseline, 6 months and 18 months. The 4-week assessment included only online questionnaires. Participants received nominal incentives for completing data collection (e.g., athletic socks, tote bags, cookbooks).

Anthropometrics

Weight was measured in street clothes, without shoes, on a calibrated digital scale at baseline and 6 and 18 months. Height was measured using a wall-mounted stadiometer. BMI was calculated as weight (kg)/height (m)^2.

Sociodemographic characteristics

Self-reported gender, age, race, and education level were collected at baseline by an online questionnaire.

WAI-Bond subscale

This 12-item measure of the collaborative bond between the participants and the group interventionist [11] was obtained by online questionnaire. Each participant reported on their participant-interventionist bond with their group interventionist, reflecting research indicating that the participant's assessment of participant-interventionist bond is most predictive of treatment outcomes [12], rather than the interventionist's perspective. Items on this subscale include: "I felt uncomfortable with my group counselor" (reverse scored), "My group counselor and I understand each other," and "I believe my group counselor likes me." Each item was scored on a 7-point scale (1 = "never" to 7 = always). Possible scores range from 12 to 84, with higher scores being indicative of a more positive alliance. The Bond subscale has an internal consistency estimate of 0.89 [13] and high test−retest reliability estimates of 0.85−0.92 [14]. The measure was administered at 4 weeks, consistent with the eating disorders literature that typically measures alliance in the first few weeks of intervention [15]. Working alliance is considered to be stable at this stage in other treatments [12]. However, since the stability of working alliance has not yet been examined in online group-based lifestyle interventions, we also assessed the WAI-Bond subscale at 6 months and 18 months. We found that WAI-Bond subscale scores remained relatively stable throughout the study (4 weeks = 73.01 ± 10.12; 6 months = 73.02 ± 11.62; 18 months: 73.27 ± 11.81). Due to the stability of the WAI-Bond subscale over the intervention and since the focus of the current analyses is on a potential early predictor of weight loss success, we did not use

the WAI-Bond subscale data from 6 and 18 months, focusing instead only on the 4 week administration.

Treatment adherence

Group interventionists recorded participant attendance at group chat sessions, as well as self-monitoring journal submissions, using an online adherence monitoring tool. We examined the number of sessions attended over 18 months (24 possible during weekly sessions, 12 possible during monthly sessions) as well as the number of self-monitoring diaries completed over the 18 months (24 possible during weekly sessions, 12 possible during monthly sessions). (Participants were asked to self-monitor for one week prior to each monthly session.) Consistent with previous studies [7, 16, 17], a completed self-monitoring diary was defined contributing at least one diet, exercise, or weight entry to the weekly diary. Self-monitoring and session attendance are highly correlated (r = .89), so it was not appropriate to add these variables separately to our models. Instead, overall treatment adherence was operationalized as the mean of the number of sessions attended and the number of self-monitoring diaries submitted.

Statistical analyses

The overall study was designed to detect a 1.72 kg group weight loss difference with a standard deviation of 5.2 kg, a 5% type I error rate, and 80% power [10]. Analyses related to the WAI-Bond subscale were intended to be secondary; thus, no power

calculation related to the WAI-Bond was conducted. Frequencies, means, and univariable comparisons by treatment group (chi-square and Wilcoxon Rank−Sum Tests) were generated. Path analysis was used to examine the impact of the participant-interventionist bond on treatment adherence and on weight loss outcomes, specifically determining the direct and indirect effects of both participant-interventionist bond and adherence on weight loss. The coefficients for the path model were derived from linear mixed models that included clusters nested within treatment as the random effect. Each of the three regressions adjusted for the following covariates: age at baseline, race (African American vs. others), and gender. The treatment engagement measure consisted of the means of the number of sessions attended and of the number of self-monitoring diaries submitted. The partial posterior method was used to calculate the p value of the indirect effect while the Hierarchical Bayesian approach was used for estimating the 95% confidence interval of the mediation effect [18]. Statistical significance was defined as $p < 0.05$ (two-tailed).

RESULTS

Participant demographic characteristics, mean WAI-Bond scores at 4 weeks, and treatment engagement parameters are summarized in Table 1. There were no significant gender differences in WAI-Bond scores (men = 74.00 ± 8.18; women = 72.90 ± 10.33), but there was a significant difference in WAI-Bond scores

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Table 1 | Sample characteristics and treatment adherence in an online behavioral weight loss intervention

	n = 398
Age at baseline (years) ($M \pm SD$)	48.4 ± 10.1
Female (N [%])	357 (89.7%)
African American (N [%])	96 (24.1%)
Clinical site (N [%])	
VT	201 (50.5%)
AR	197 (49.5%)
Weight (kg) ($M \pm SD$)	98.3 ± 18.6
BMI ($M \pm SD$)	36.0 ± 6.0
Obese (≥30 BMI) (N [%])	326 (81.9%)
Education (N [%])	
High school/vocational training	31 (7.8%)
Some college	73 (18.3%)
College degree	155 (38.9%)
Graduate/professional	139 (34.9%)
Attendance (number of weekly sessions, out of 24 possible) ($M \pm SD$)	15.47 ± 6.62
Attendance (number of monthly sessions, out of 12 possible) ($M \pm SD$)	3.50 ± 3.87
Self-Monitoring Diary Completion (number of weekly diaries, out of 24 possible) ($M \pm SD$)	16.87 ± 7.26
Self-Monitoring Diary Completion (number of monthly diaries, out of 12 possible) ($M \pm SD$)	3.32 ± 3.98
	n = 378
Working Alliance Inventory bonding subscale at 4 weeks (out of a maximum of 84)	73.01 ± 10.12

by race such that African American participants reported a stronger therapeutic bond than White participants (African American = 74.30 ± 10.45; White = 72.62 ± 10.01, p = .038). With age as a continuous variable, age was positively correlated with WAI-Bond score, such that older participants had significantly higher WAI-Bond scores (r = .11, p < .04). There were no significant differences in WAI-Bond score by interventionist ($F(6)$ = 1.25, p = .28).

For the following analyses, the 348 (87%) participants who completed the WAI-Bond subscale at 4 weeks and provided their weight at 6 months were included in the 6 month analyses, and the 316 (79%) who completed the WAI-Bond at 4 weeks and provided their weight at 18 months were included in the 18 month analyses. WAI-Bond at 4 weeks had a significant effect on weight loss at 6 months ($t(322)$ = −2.14, p = .03) but not at 18 months ($t(290)$ = 0.53, p = .60).

Mediation analyses, using path analysis, investigated the hypothesis that treatment adherence mediated the effect of 4-week participant-interventionist bond on 6 month weight loss. Models were examined only for 6-month weight loss since 4-week participant-interventionist bond was not associated with weight loss at 18 months. The model for change from baseline weight at 6 months indicated that participant-interventionist bond at 4 weeks was a significant predictor of adherence at 6 months (b = .063, standard error [SE] = .30, p = .04), and 6-month adherence was a significant predictor of weight loss at 6 months (b = −.594, SE = .049, p < .0001). The indirect effect of participant-interventionist bond was significant (b = −.037, p = .03, 95% confidence interval: −.074, −.002) and accounted for 54% of the total effect of participant-interventionist bond on weight loss. However, the total weight loss explained by participant-interventionist bond was small (0.04 kg).

DISCUSSION

This study demonstrated that early online participant-interventionist bond predicts weight loss and treatment adherence at 6 months. These results are consistent with other research indicating that social support is an important factor in behavioral weight loss programs [1−3]. While this previous research examined the impact of fellow participants or support persons external to the group on weight loss outcomes, the current study indicates that the group interventionist may also serve an important social support role. However, the total weight loss explained by the participant-interventionist bond was small and the effect was not maintained at 18 months; thus, the quality of the participant-interventionist bond may not dramatically impact weight losses.

The participants in the current program reported strong WAI-Bond scores (mean = 73 out of 84 possible); these scores are similar to scores in previous studies with different treatment goals [19, 20] and there were no significant differences in working alliance by interventionist. Thus, it is unclear whether there would be substantive benefit to dedicating additional attention to enhancing the participant-interventionist bond in weight loss programs or instituting training of interventionists to adopt particular alliance-building behaviors.

This study has several strengths and limitations. First, the racial diversity of the sample (24% African American) increases confidence in generalizing these findings to other samples. Conversely, our sample was predominately female (90%), so the generalizability to men is unknown and should be examined in future research. In addition, all interventionists were Caucasian and female, which could have negatively impacted bonding with participants who were dissimilar in race and gender. However, we did not find any significant differences in WAI-Bond by gender and a modest difference by race (indicating actually better reports of bonding among the African American participants with their Caucasian interventionists). These results are consistent with a previous study [21], which did not find significant differences in weight loss success or treatment engagement based on race-concordance between the participants and the group interventionist. We are also limited by our binary (yes/no) definition of weekly self-monitoring; it is possible that a finer-grained analysis of self-monitoring would have been more illuminating, although the small and short-term total weight loss explained by the participant-interventionist bond would be unchanged. Furthermore, we are limited in our generalization of this study's results to online group-based behavioral weight loss programs and cannot assume that the same findings would hold for face-to-face behavioral weight loss programs. However, the similarities in participant-interventionist Bond scores between online and face-to-face modalities in previous research [6] suggest that generalizations to face-to-face treatment may be reasonable. It is also likely that these findings would generalize to non−research-based weight management programs. A final limitation is the use of the WAI-Bond subscale as the sole indicator of working alliance. Although this measure has been used previously to assess the strength of the therapeutic relationship between interventionist and group members in weight loss [5−8], and between counselor and patient in other intervention settings [19, 20], it may not adequately or fully quantify important aspects of working alliance in online weight management treatment (e.g., aspects of communication style such as amount of information provided versus asking open-ended questions). In addition, we only used one of the three subscales of the WAI; since weight loss programs are more structured with clear and common tasks (e.g., self-monitoring,

session attendance) and goals (e.g., weight loss) compared to one-on-one psychotherapy, we did not feel that the other two subscales of the WAI (the Task subscale—agreement about the tasks of therapy and the Goal subscale—agreement about the goals of therapy) were as relevant as the Bond subscale with this study. However, it is possible that the other subscales of the WAI could provide insight into the working alliance in behavioral weight management.

In sum, early participant-interventionist bond was significantly associated with greater weight loss and treatment engagement in the short-term, but the total weight loss explained by participant-interventionist bond was small and the effect was not sustained throughout the 18 month program. Thus, participant-interventionist bond does not appear to be an early predictor of long-term treatment success, unlike research that has found long-ranging impact of self-monitoring [22] and early weight losses [23, 24]. Future research may wish to focus on other potential early predictors of weight management treatment success.

Compliance With Ethical Standards

Conflicts of Interest None of the authors have conflicts of interest.

Ethical Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the Committee on Human Research in the Behavioral Sciences at the University of Vermont and the Institutional Review Board at the University of Arkansas for Medical Sciences and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study. Welfare of Animals: this article does not contain any studies with animals performed by any of the authors.

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