



A randomized controlled trial of a peer co-led dissonance-based eating disorder prevention program for gay men



Tiffany A. Brown^{*}, Pamela K. Keel^{**}

Florida State University, Department of Psychology, 1107 W. Call St., Tallahassee, FL 32304, USA

ARTICLE INFO

Article history:

Received 30 March 2015
Received in revised form
20 August 2015
Accepted 24 August 2015
Available online xxx

Keywords:

Eating disorder
Gay men
Dissonance
Peer-led
Prevention

ABSTRACT

Objective: Gay males have increased risk for eating disorders compared to heterosexual males, establishing a need to develop and empirically evaluate programs to reduce risk for this population. The present study investigated the acceptability and efficacy of a cognitive dissonance-based (DB) intervention (The PRIDE Body Project[®]) in reducing eating disorder risk factors among gay males in a university-based setting.

Method: Eighty-seven gay males were randomized to either a 2-session DB intervention ($n = 47$) or a waitlist control condition ($n = 40$). Participants completed eating disorder risk factor assessments pre-intervention, post-intervention, and at 4-week follow-up, and those receiving the intervention completed post-treatment acceptability measures.

Results: Acceptability ratings were highly favorable. Regarding efficacy, the DB condition was associated with significantly greater decreases in body dissatisfaction, drive for muscularity, self-objectification, partner-objectification, body-ideal internalization, dietary restraint, and bulimic symptoms compared to waitlist control from pre- to post-intervention. Improvements in the DB group were maintained at 4-week follow-up, with the exception of body-ideal internalization. Body-ideal internalization mediated treatment effects on bulimic symptoms.

Conclusion: Results support the acceptability and efficacy of The PRIDE Body Project[®] and provide support for theoretical models of eating pathology in gay men.

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1. Introduction

Eating disorders among men have been on the rise in recent decades, with males representing up to 33% of all eating disorder cases (Hudson, Hiripi, Pope, & Kessler, 2007). One subgroup of men who are at particularly high-risk is gay men, who have been shown to have higher prevalence of diagnosed eating disorders (Carlat, Camargo, & Herzog, 1997; Feldman & Meyer, 2007; Olivardia, Pope, Mangweth, & Hudson, 1995) and higher levels of eating disorder risk factors compared to heterosexual men (Brown & Keel, 2012; Brown & Keel, 2015; Carper, Negy, & Tantleff-Dunn, 2010; Laska et al., 2015; Martins, Tiggemann, & Kirkbride, 2007). Eating disorders within this group are associated with increased functional impairment, medical complications, impaired social

relationships, and higher incidence of substance use disorders, anxiety, depression, personality disorders, and suicide attempts (Bramon-Bosch, Troop, & Treasure, 2000; Carlat et al., 1997; Feldman & Meyer, 2010). Despite the strong body of research demonstrating that gay men represent a high-risk group, to our knowledge, no studies have developed interventions aimed at reducing eating disorder risk in this population.

In order to develop such an intervention, models of risk must be examined to identify factors that explain why gay men are more likely to develop eating disorders. One sociocultural explanation for gay males' high-risk status stems from applications of objectification theory (Fredrickson & Roberts, 1997). Because men emphasize physical appearance when looking for a romantic partner (Silberstein, Mishkind, Striegel-Moore, Timko, & Rodin, 1989; Tiggemann, Martins, & Kirkbride, 2007), individuals who are trying to attract male partners, including heterosexual women and homosexual men, are socialized to view their physical appearance from an observer's perspective, as a sexual object. Increasing the complexity of this objectification, gay men are both the subject and

^{*} Corresponding author.

^{**} Corresponding author.

E-mail addresses: brown@psy.fsu.edu (T.A. Brown), keel@psy.fsu.edu (P.K. Keel).

the executors of objectification of other males (termed the “gay male gaze”; Wood, 2004). This internalized objectification (self-objectification) may lead gay men to engage in regular body comparison with other gay males and media images (Duggan & McCreary, 2004; Wood, 2004). These processes are theorized to lead to the internalization of a lean, muscular body ideal (Siever, 1994; Tylka & Andorka, 2012). Importantly, these media images depict an unrealistic body-ideal (Tiggemann et al., 2007; Wood, 2004) that can rarely be achieved without extreme diet, exercise, or steroid use (Cafri et al., 2005). Body-ideal internalization has been associated with increased body dissatisfaction in gay males, which, in turn, increases risk for eating disorders (Tylka & Andorka, 2012). Thus, application of objectification theory to gay men (Brown & Keel, 2015) implicates body-ideal internalization as playing a central role in their elevated risk for eating disorders (Tylka & Andorka, 2012).

The role body-ideal internalization plays in eating pathology among gay males may be similar to the role that thin-ideal internalization plays among women, as described by the dual-pathway model of bulimic symptoms (Stice, Ziemba, Margolis, & Flick, 1996; Stice, 2001). This model hypothesizes that thin-ideal internalization, pressures to be thin, and increased body mass promote increased body dissatisfaction. Theoretically, increased body dissatisfaction promotes dual pathways to increased dieting and increased negative affect, both of which subsequently lead to increased bulimic symptoms. Thus, according to the dual-pathway model, thin-ideal internalization plays a central role in promoting body dissatisfaction, dietary restraint, negative affect, and bulimic symptoms. Indeed, previous research has found that thin-ideal internalization is a potent causal risk factor for eating pathology among females (Thompson & Stice, 2001). As such, body-ideal internalization may be a potent target for reducing eating disorder risk in gay men.

Although no prevention programs have targeted body-ideal internalization among gay men, DB programs were developed from the dual-pathway model to target thin-ideal internalization for young women (Stice et al., 1996; Stice, 2001) and have become one of the more innovative and promising classes of eating disorder prevention programs (Stice & Shaw, 2004). Cognitive dissonance theory asserts that when people behave in a way that contradicts their beliefs, they will experience psychological discomfort, which will lead them to alter their beliefs to be more compatible with their actions to restore consistency (Festinger, 1957). Recent interventions have used DB principles to target high-risk groups of females by having participants actively critique and speak out against the thin ideal.

DB interventions in young women have consistently produced significant reductions in dietary restraint, body dissatisfaction, thin-ideal internalization, negative affect, psychosocial impairment, and eating pathology symptoms post-intervention (Becker, Smith, & Ciao, 2005; Becker et al., 2010; Stice, Shaw, Burton, & Wade, 2006; Stice, Marti, Spoor, Presnell, & Shaw, 2008; Stice, Rohde, Gau, & Shaw, 2009), with many effects persisting through 2–3 year follow-up (Stice, Marti, et al., 2008; Stice, Rohde, et al., 2008). Importantly, these programs have also reduced risk of eating disorder onset by 60% through 3-year follow-up (Stice, Marti, et al., 2008; Stice, Rohde, et al., 2008). Consistent with the dual-pathway model of bulimic symptoms, mediation analyses have demonstrated that thin-ideal internalization partially mediates treatment effects among women (Seidel, Presnell, & Rosenfield, 2009; Stice, Presnell, Gau, & Shaw, 2007; Stice, Marti, Rohde, & Shaw, 2011). Given the central role that body-ideal internalization plays in explaining why gay men are at increased risk for eating pathology, and that targeting thin-ideal internalization within DB interventions has successfully reduced a variety of eating disorder

risk factors in women, DB interventions represent a promising framework for reducing risk in gay men.

An important aspect of these more recent DB interventions has been the use of peer co-leaders (Becker et al., 2005), based on principles of community participatory research (Becker, Stice, Shaw, & Woda, 2009). The addition of peer co-leaders may be particularly relevant given the importance of peer influences on eating behaviors among gay males (Tylka & Andorka, 2012). Thus, positive modeling from peer co-leaders, as opposed to non-peer leaders, may contribute to the salience and relevance of the program and enhance the credibility of the intervention. Finally, the use of peer co-leaders provides further opportunities for dissemination of interventions once efficacy has been established because of the greater availability of peers compared to trained professionals.

Thus, the aim of the present study was to determine the acceptability and efficacy of adapting a peer co-led cognitive DB intervention for use among gay college-aged males. Regarding acceptability, we hypothesized that: (1) a minimum of 75% would complete the intervention and that acceptability ratings would be favorable for all items. Regarding efficacy, we hypothesized that: (2a) men in the DB group would show significantly greater reductions in all eating disorder-related outcome measures (body dissatisfaction, drive for muscularity, body-ideal internalization, dietary restraint, bulimic symptoms, and self- and partner-objectification) over time compared to men in the waitlist control (WL) group; and (2b) differences between groups would be maintained at 4-week follow-up. Finally, consistent with the theoretical premise of DB interventions, we hypothesized that: (3) the DB program's impact on bulimic symptoms would be mediated by reductions in body-ideal internalization.

2. Methods

2.1. Sample, study design, and procedures

Participants ($N = 87$) were recruited through advertisements around the campus of a large, public southern university and local community for participation in a positive body image program for gay men, through introductory psychology classes at the university, and through an e-mail distributed to men enrolled at the university. Given that gay males are at increased risk for eating pathology, our design represented a selected prevention in which participants met the following inclusion criteria: (a) male, (b) 18–30 years old, (c) were more attracted to men than women, (d) did not meet criteria for a DSM-5 eating disorder, and (e) agreed to participate in the body image program. All study procedures were approved by the Florida State University Institutional Review Board (IRB). The majority of participants were currently in school pursuing an undergraduate (72.5%) or graduate degree (19.2%).

2.1.1. Eligibility phone screen

Interested participants completed an eligibility phone screen. The phone screen obtained information regarding sexual identity, sexual behaviors, and sexual attractions over the past year, and included the eating disorders module of the Structured Clinical Interview for Axis-I Disorders (SCID-I; First, Spitzer, Gibbon, & Williams, 1995). Criteria from the SCID-I eating disorders module were amended to be consistent with DSM-5. Phone screens confirmed that participants met the sexual orientation criteria and did not have a current DSM-5 eating disorder (anorexia nervosa, bulimia nervosa, or binge eating disorder); however, participants could have eating disorder symptoms, consistent with methods used in prior selective prevention trials (Becker, Bull, Schaumberg, Cauble, & Franco, 2008). Eligible and interested participants were

sent a link to an online consent form. Ineligible participants were thanked for their time and offered a list of community resources.

2.1.2. Overview and study flow

After completing consent online, participants were randomly assigned to either the DB group intervention ($n = 47$) or a WL condition ($n = 40$) (see Fig. 1). Timing of assessments in the WL condition were matched to the timing of assessments for participants in the DB intervention, with the exception that WL completed all of their assessments online and could start at any time after completing informed consent, whereas DB participants completed assessments in person before and after completing the intervention. Participants in the DB condition completed the follow-up assessment online, comparable to control group.

Participants completed baseline measures assessing demographics, lesbian, gay, bisexual, transgender (LGBT) community involvement, and eating disorder risk factors. The two 2-h intervention sessions were separated by one week. Intervention groups

included between 4 and 7 members each and were led by the investigator, who was a masters level clinician with previous experience leading treatment groups for clinical populations, and one peer co-leader, who was an undergraduate gay male. Previous research using the community participatory research approach emphasizes the importance of having peer co-leaders with whom participants in the intervention can identify in order to maximize and facilitate behavior and attitudinal change (Becker et al., 2009). Four different peer co-leaders led groups throughout the course of the study, and outcomes did not differ across group leaders (all p -values > 0.11).

Baseline measures were repeated for both conditions immediately post-intervention (DB condition)/after a one-week interval (WL control) and 4-weeks post-intervention (DB condition)/after a 5-week interval (WL control), to assess immediate and longer-term effects (see Fig. 1). Participants had the option of receiving monetary compensation for completing assessments (\$20 total; DB condition $n = 33$; 91.67%; Control condition $n = 35$; 97.22%) or

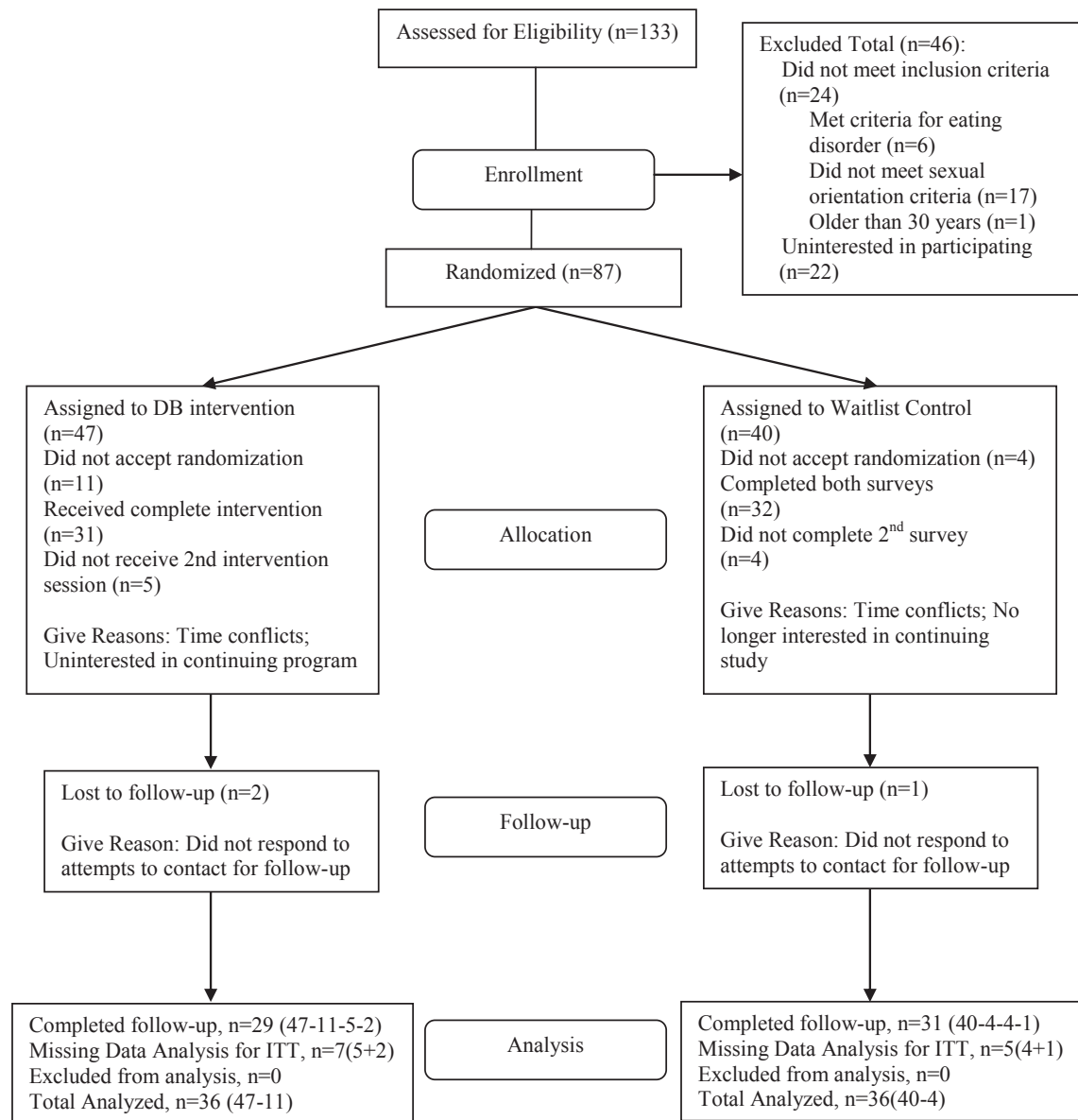


Fig. 1. CONSORT chart detailing participant flow through the study.

receiving course credit for participation (DB condition $n = 3$; 8.33%; Control condition $n = 1$; 2.78%). There was no significant difference between conditions on form of compensation ($\chi^2(1) = 1.16$, $p = .28$).

2.1.3. Dissonance-based intervention

The intervention for the present study, *The PRIDE Body Project*[®] (Brown & Keel, 2012), was adapted from the two-session, peer-led DB intervention used by Becker et al. (2005) to address risk factors specific to gay males. Consistent with the community participatory research approach, drafts of the adapted program were submitted to members of the gay male community ($n = 6$) for feedback.

In Session 1, participants: (a) defined the “ideal” body type within the gay community, (b) discussed the origin and perpetuation of the “ideal,” (c) brainstormed the costs of pursuing the “ideal,” (d) participated in a verbal challenge during which they countered the thin, muscular-ideal message, and (e) were asked to complete three homework assignments (a letter to an adolescent boy, a behavioral challenge, and a mirror exposure assignment). In Session 2, participants: (a) reviewed homework, (b) engaged in role plays to counter/discourage pursuit of the “ideal,” (c) discussed ways to challenge and avoid negative “body talk” statements, (d) listed ways to resist the pressure to pursue this “ideal” both individually and as a group within the gay community (termed “body activism”), (e) discussed barriers to body activism and how to overcome those barriers, and (f) individually selected an exit exercise to continue actively challenging the body-ideal.

2.1.4. Investigator and peer co-leader training

The authors and two peer co-leaders completed an 8-h training session that was led by Dr. Carolyn Becker, the developer of the peer-led, 2-session DB intervention from which *The PRIDE Body Project*[®] was adapted. In addition to providing training to become peer co-leaders, the workshop provided training to provide supervision for peer leaders – a “train the trainer” session for the authors. Peer co-leaders received additional training on the adapted intervention for gay men by the first author. Subsequent peer co-leaders underwent a three-fold training process. First, they listened to audiotaped sessions of at least two previous groups. Second, they participated in a group and completed all associated exercises. And finally, they underwent two 3-h training sessions on the DB-intervention, including active practice running a mock group with other peer-facilitators and the graduate student clinician.

2.2. Measures

2.2.1. Intervention adherence and leader competence

All intervention sessions were audiotaped, and four of the nine group tapes were randomly selected for treatment adherence and facilitator competence ratings (one group randomly selected for each co-leader). Facilitator competence and adherence ratings were determined by rating forms used within previous DB intervention studies (Becker, Smith, & Ciao, 2006; Stice et al., 2009; Stice, Rohde, Seeley, & Gau, 2008) and provided on the Body Project Collaborative website (formed by Drs. Eric Stice and Carolyn Becker; <http://www.bodyprojectsupport.org/resources/materials>). The facilitator competence rating form was composed of 12 items assessing various characteristics of a competent facilitator on a 10-point scale (e.g., leader expressed ideas clearly and at an appropriate pace, leader is organized, etc.). All co-leaders were rated for competence independently. Competence ratings were completed by the second author and two masters-level clinicians (including the first author), all of whom attended the training led by Dr. Becker. The first author provided ratings for two of her co-leaders, but did not provide

ratings for herself, to avoid inherent biases.

2.2.2. Sexual orientation

Sexual orientation was assessed through items adapted from the *Sell Assessment* (1996) assessing sexual identity, behaviors, and attractions. All items were assessed dimensionally on an 8-point scale from exclusively homosexual (or “exclusively attracted to men”) to exclusively heterosexual (or “exclusively attracted to women”). Given that objectification theory posits that interest in obtaining a male partner drives increased risk for eating pathology for gay men, we used the attraction item to determine eligibility. To properly capture variability among gay men in their sexual attractions, eligible participants could endorse being attracted to men across a spectrum, as long as they endorsed being more attracted to men (than women). This is consistent with the theoretical models of increased risk in eating disorders among gay males (Siever, 1994).

2.2.3. Treatment acceptability

Treatment acceptability was assessed using four self-report items assessing: (1) helpfulness in promoting a positive body image (2) helpfulness in improving the participant's own body image (3) overall program satisfaction, and (4) likelihood of recommending the program to a friend. Responses were rated on a 7-point Likert-type scale (1 = very unsatisfied/unhelpful/unlikely and 7 = very satisfied/helpful/likely).

2.2.4. Body dissatisfaction

Overall body dissatisfaction was assessed through the Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987). The BSQ assesses the degree of unhappiness with body appearance on a 6-point Likert-type scale. The BSQ has demonstrated good concurrent and discriminant validity (Cooper et al., 1987). Because the BSQ was developed for females, some items were adapted in accordance with previous studies, which have established high internal consistency ($\alpha = .96$) and validity in gay men (Russell & Keel, 2002). Internal consistency for the BSQ in the present study ranged from $\alpha = 0.97$ – 0.98 across assessments, and test-retest reliability for controls from baseline to follow-up was $r = 0.75$.

2.2.5. Drive for muscularity

Drive for muscularity was assessed through the Drive for Muscularity Scale (DMS; McCreary & Sasse, 2000). The DMS is a 15-item measure with higher scores indicating a desire to be more muscular. The DMS has demonstrated good construct validity, convergent validity, and discriminant validity in gay males (Duggan & McCreary, 2004). Internal consistency for the DMS in the present study ranged from $\alpha = 0.91$ – 0.93 , and stability for the control group was $r = 0.57$.

2.2.6. Body-ideal internalization

Body-ideal internalization was measured through the Internalization General subscale of the Sociocultural Attitudes Towards Appearance Questionnaire-3 for males (SATAQ-3; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004), which measures the extent to which participants endorse and accept unrealistic body-ideal images from the media. The SATAQ-3 has demonstrated strong internal consistency, concurrent validity, and discriminant validity among males (Karazsia & Crowther, 2008), and internal consistency within the present study ranged from $\alpha = 0.95$ – 0.96 . Stability for the control group was $r = 0.61$.

2.2.7. Dietary restraint

Dietary restraint was measured through the Restraint subscale

of the Eating Disorder Examination-Questionnaire (EDE-Q; Fairburn & Cooper, 1993). The EDE-Q assesses pathological eating behaviors and attitudes over the previous 28 days and has demonstrated convergent validity with the EDE interview it was adapted from (Berg, Peterson, Frazier, & Crow, 2011). Items were reframed to the past 7 days, reflecting the time course in the present study. The EDE-Q has been used in previous DB intervention studies (Becker et al., 2008; Becker et al., 2010), which facilitates comparison of effect sizes for the application of the adapted DB intervention in a new population. Internal consistency for the EDE-Q Restraint subscale in the present study ranged from $\alpha = 0.80$ – 0.87 and the stability within the control group was $r = 0.67$.

2.2.8. Bulimic symptoms

Bulimic symptoms were assessed through summing the diagnostic items from the EDE-Q over the past seven days (e.g., binge eating, compensatory behaviors, and overvaluation of weight and shape). This self-reported bulimic composite has been used in previous DB intervention studies by Becker et al. (2006; 2008) and is comparable to the EDE bulimic composite used by Stice et al. (2006). The original EDE bulimic symptom composite has demonstrated strong internal consistency ($\alpha = .92$), 1-week test-retest reliability ($r = 0.81$), and sensitivity to detect intervention effects (Stice et al., 2006). Internal consistency for the EDE-Q bulimic composite in the present study ranged from $\alpha = 0.72$ – 0.86 and stability within the control group was strong ($r = 0.94$).

2.2.9. Self- and partner-objectification

Self-objectification and potential partner-objectification were measured through the Self-Objectification Questionnaire (SOQ; Fredrickson, Roberts, Noll, Quinn, & Twenge, 1998), with items adapted to assess objectification of potential partners (Strelan & Hargreaves, 2005). The SOQ assesses the degree to which participants view their body in an objectified, appearance-based manner versus a non-objectified, competence-based manner. Positive scores indicate a greater emphasis on appearance and higher objectification, while negative scores reflect a greater emphasis on competence-based attributes. The SOQ has demonstrated convergent validity with related measures (Noll & Fredrickson, 1998). Stability for the control group was good for both the SOQ - Self ($r = 0.73$) and SOQ - Partner subscales ($r = 0.72$).

2.3. Analyses

2.3.1. Model overview

A two-level hierarchical linear model was used to examine intervention effects on eating disorder risk factors. Analyses were run using the Mixed Models module of the Statistical Package for the Social Sciences (SPSS, Version 19). Repeated measurements of the dependent variable nested within participants were modeled at Level 1, and intervention condition (DB intervention or WL control) and the interaction between condition and time were included at Level 2. To control for non-independence of observations for men who participated in the same group, group was initially included in all models as a Level 2 covariate. Group was removed from models if it was not a significant predictor of outcome, as recommended by Singer and Willett (2003). Separate models were run for each dependent variable. Full information maximum likelihood estimation (FIML) was used to impute data missing at follow-up, as FIML offers the recommended approach to data that are missing at random (MAR) (Schafer & Graham, 2002).

2.3.2. Model fitting

Model fitting was approached in several steps. First, a random

intercept, random slopes model was fit to the data, in which the intercept for each person and his rate of change over time were allowed to vary. This provided the least restrictive approach. However, models required respecification due to non-convergence. We examined two possible alternative models: (1) a fixed intercept, random slope model and (2) a random intercept, fixed slope model (Seltman, 2014). Inspection of variance estimates of the two models determined that the variance estimate for intercept was significant while the variance estimate for slope was not significant, indicating that slope should not be included as a random effect (Seltman, 2014). The random intercept, fixed slope model also provided a better fit to the data and thus was used for all analyses (e.g., BSQ: BIC [fixed intercept, random slope] = 1957.53; BIC [random intercept, fixed slope] = 1843.45). Based on initial inspection of the trajectory of group means across time points, a nonlinear (squared) effect of time was included in the model to determine whether this parameter provided a better fit over a model that included only a linear effect of time. Across all models, fit indices (AIC, BIC) supported inclusion of a squared effect of time in models (e.g., BSQ: BIC [Time] = 1871.59; BIC [Time and Time²] = 1843.45).

2.3.3. Mediation analyses

Mediation models were conducted using bias-corrected bootstrapped confidence intervals (CIs) for indirect effects (Preacher & Hayes, 2008). Specifically, we used 1000 bootstrap resamples to test the indirect effects of condition via the posited mediating variable (i.e., change in body-ideal internalization from baseline to post-intervention) on eating pathology (i.e., change in bulimic symptoms from baseline to 4-week follow-up). Bootstrapping has the advantage of increased statistical power over traditional tests of indirect effects (MacKinnon, Lockwood, Hoffman, West, & Sheets, 2002). Our approach reflects the short duration of intervention (two sessions) and desire to minimize participant burden by only collecting assessments at three time points. This approach is also in line with recommendations for examining mediation of treatment effects (Kraemer, Wilson, Fairburn, & Agras, 2002; Kaufman, Rohde, Seeley, Clarke, & Stice, 2005) although it does not fully meet the fifth condition proposed by Stice, Presnell, et al. (2007) and Stice, Shaw, et al. (2007) rigorous 5-condition test of mediation for randomized trials.

3. Results

3.1. Baseline characteristics

The DB and WL conditions did not differ on age ($F(1, 71) = 0.15$, $p = .70$) or ethnicity ($\chi^2(4) = 2.14$, $p = .71$). Participants were approximately 21 years old ($M(SD) = 21.48(2.53)$, range = 18–30). The racial and ethnic breakdown was as follows: Caucasian (56.9%), Hispanic/Latino (22.2%), African American (16.7%), Native American (2.8%), and Other (1.4%). Groups did not differ on likelihood of current treatment for emotional or psychiatric problems ($\chi^2(1) = 2.22$, $p = .14$), with 10.9% of participants currently receiving treatment.

3.2. Intervention adherence and leader competence

All adherence ratings were above 94%, demonstrating excellent adherence to the manual. Regarding leader competence, ratings fell in the above average/excellent range (graduate student clinician rating: 9.10/10; co-leaders $M = 7.62/10$). Importantly, there was considerable heterogeneity in the competence ratings of the peer co-leaders (range = 5.50–8.91), with some of the peer co-leaders demonstrating analogous competence ratings to the graduate student clinician.

3.3. Acceptability and homework completion

Regarding participant flow, 133 men completed the eligibility phone screen for the study (see Fig. 1). Of the 133 men who completed the phone screen, 82% were eligible ($n = 109$). Of the eligible participants, 80% ($n = 87$) consented and were randomized. Seventy-seven percent of participants in the DB condition ($n = 36$) attended the first session and completed baseline assessments, while 90% ($n = 36$) of WL participants completed baseline assessments. To account for greater attrition in the DB group and the need to form groups with a minimum of 4 participants with minimal delays between recruitment and session 1, we over-recruited for participants in the DB condition.

Regarding acceptability, the retention rate in the DB intervention was 86% ($n = 31$) and did not differ from retention over assessments in the WL (89%, $n = 32$) ($\chi^2(1) = 0.13, p = .72$). Compared to individuals who dropped out of the intervention ($n = 5/36$), treatment completers ($n = 31/36$) did not differ significantly on any baseline demographic variables (all p -values > 0.19), with the exception of sexual identity. Completers were more likely to identify as “exclusively gay” than those who dropped out of intervention (completers: 73%, non-completers: 20%), who were more likely to identify as “mostly gay” or “more gay” (completers: 27%, non-completers: 80%; $\chi^2(2) = 6.06, p = .048$). Within the control group, completers did not differ from non-completers on sexual identity ($\chi^2(4) = 7.19, p = .13$). The acceptability ratings for the program were highly favorable for all items (overall $M = 6.18$ on a 7-point scale): (1) “How helpful did you find this program in promoting a positive body image?” ($M(SD) = 6.16(1.00)$, on a 7-point scale); (2) “How helpful did you find this program in improving your own body image?” ($M(SD) = 5.77(1.09)$); (3) “How satisfied were you with the overall program?” ($M(SD) = 6.32(0.98)$); and (4) “How likely would you be to recommend this program to a friend?” ($M(SD) = 6.45(1.00)$).

Regarding homework completion, all participants (100%) completed at least some of the assigned homework between the first and second session. The majority of participants completed all of the between-session activities/homework (83.9%). Of those who did not complete the assignments fully, three individuals (9.7%) completed their behavioral challenge once during the week (instead of twice) and two individuals (6.5%) completed two of the three assignments. Thus, there was high compliance with homework.

3.4. Intervention effects

Table 1 presents estimated marginal means for each outcome variable across time by condition. Table 2 presents HLM estimates for fixed effects and variance components for primary outcome variables.

3.4.1. Body dissatisfaction

Results from the random intercept, fixed slopes model for the BSQ demonstrated a significant effect for time ($b = -6.08, t = -7.28, p < .001$), reflecting an overall reduction in body dissatisfaction for all participants. As predicted, there was a significant Condition \times Time interaction ($b = 5.03, t = 4.35, p < .001$), indicating that the trajectory of BSQ scores from pre-intervention to 4-week follow-up differed by condition, with a steeper decline in scores over time for the DB group (see Table 2). Comparison of group means revealed that while conditions did not differ at baseline ($p = .99$), the DB group demonstrated significantly lower BSQ scores compared to WL, post-intervention ($p = .002$, Cohen's $d = 0.82$; see Table 1). Further, these treatment gains were maintained at 4-week follow-up, with the DB group demonstrating

significantly lower BSQ scores than WL ($p = .002, d = 0.78$). Demonstrating a clinically meaningful change in symptoms, at baseline, the mean values for the DB and WL condition were 93.94 and 93.97, respectively, which fell within the “mild concern with weight and shape” range. Post-intervention, the DB group dropped below the cutoff for “no clinical concern with weight and shape” ($M = 64.46$) and maintained this level at 4-week follow-up (cutoff = 80; www.pytc.org/tools/bsq/).

3.4.2. Drive for muscularity

Results for the DMS demonstrated a significant effect for time ($b = -0.13, t = -4.61, p < .001$) and group ($b = 0.09, t = 1.97, p = .05$), indicating that the DB groups in which men participated differed on baseline DMS scores. As hypothesized, a significant Condition \times Time interaction was found ($b = 0.13, t = 3.38, p = .001$; see Table 2). Mean comparisons revealed that while conditions did not differ on DMS scores at baseline ($p = .12$), the DB group demonstrated significantly lower DMS scores compared to WL post-intervention ($p = .001, d = 1.01$; see Table 1). These effects were maintained 4-weeks later, with the DB group reporting significantly lower drive for muscularity compared to WL ($p = .003, d = 0.86$).

3.4.3. Body-ideal internalization

Results for the SATAQ - Internalization General subscale demonstrated a significant effect for time ($b = -1.48, t = -5.24, p < .001$) and a significant Condition \times Time interaction ($b = 1.30, t = 3.28, p = .001$; see Table 2). While conditions did not differ at baseline ($p = .54$), the DB group demonstrated significantly lower SATAQ scores compared to WL post-intervention ($p = .02, d = 0.61$; see Table 1). However, unlike results for other variables tested, these treatment gains were not maintained, as there were no significant differences in body-ideal internalization observed between the DB group and WL at 4-week follow-up ($p = .39, d = 0.23$). While both groups demonstrated lower mean body-ideal internalization at 4-week follow-up compared to baseline (DB group: $t(28) = 15,011.24, p < .001$; WL group: $t(30) = 12,877.42, p < .001$), there was an improvement in the WL group from post-intervention to follow-up ($t(30) = 27,442.55, p < .001$) and a worsening in the DB group ($t(28) = 7093.98, p < .001$). Notably, the reduction in body-ideal internalization within the DB group from baseline to follow-up was still of a medium effect size ($d = 0.68$), while the reduction was small for the WL controls ($d = 0.30$). Supporting the high-risk nature of the sample, baseline scores for the DB group were approximately 1 SD above the mean demonstrated in a previous study of men ($M(SD) = 21.99(7.89)$; Karazsia & Crowther, 2008). Post-intervention, the DB group's scores were reduced from 28.77 to the community mean from one study (Karazsia & Crowther, 2008), signifying a clinically meaningful reduction in symptoms post-intervention.

3.4.4. Dietary restraint

Results for the EDE-Q Restraint subscale revealed a significant reduction over time for all participants ($b = -0.25, t = -5.37, p < .001$). As predicted, the Condition \times Time interaction was significant ($b = 0.17, t = 2.49, p = .01$; see Table 2). While conditions did not differ at baseline ($p = .49$), the DB group demonstrated significantly lower EDE-Q Restraint scores compared to WL post-intervention ($p = .003, d = 0.76$; see Table 1), and these gains were maintained at 4-week follow-up ($p = .04, d = 0.51$). Further, these results represent a clinically meaningful reduction in restraint, as the DB group's scores were reduced from the 75th - 80th percentile for undergraduate males at baseline ($M = 1.82$) to the 45th percentile post-intervention and the 55th percentile at follow-up (Lavender, De Young, & Anderson, 2010).

Table 1
Estimated marginal means for outcome variables at each time point by condition.

Measure	Baseline M (SE)		Post-intervention M (SE)		4-week Follow-up M (SE)		Cohen's <i>d</i> post		Cohen's <i>d</i> follow-up	
	DB	WL	DB	WL	DB	WL	DB	WL	DB	WL
BSQ	93.94 (5.20)	93.97 (5.20)	64.46** (5.38)	88.91 (5.26)	65.03** (5.45)	88.84 (5.36)	1.00	0.17	0.82	0.17
DMS	3.15 (0.19)	3.63 (0.19)	2.53** (0.20)	3.64 (0.19)	2.61** (0.20)	3.57 (0.20)	0.57	0.01	0.50	0.05
SATAQ-General	28.77 (1.40)	27.56 (1.40)	21.64* (1.47)	26.63 (1.45)	23.22 (1.51)	25.04 (1.48)	0.89	0.12	0.68	0.31
EDE-Q Restraint	1.82 (0.23)	2.04 (0.23)	0.58** (0.24)	1.61 (0.24)	0.80* (0.25)	1.50 (0.24)	0.95	0.32	0.76	0.41
EDE-Q Bulimic sxs	7.85 (1.06)	9.96 (1.06)	3.22** (1.10)	8.88 (1.09)	2.98*** (1.11)	8.17 (1.10)	0.76	0.18	0.81	0.29
SOQ-Self	2.08 (1.83)	2.75 (1.83)	-5.25** (1.93)	2.34 (1.91)	-3.51* (2.00)	3.49 (1.93)	0.70	0.04	0.52	0.07
SOQ-Partner	0.81 (1.71)	1.44 (1.71)	-4.09* (1.81)	2.51 (1.79)	-3.67* (1.87)	1.76 (1.81)	0.50	0.11	0.45	0.03

Note. BSQ = Body Shape Questionnaire; DMS = Drive for Muscularity; EDE-Q Bulimic sxs = Eating Disorder Examination Questionnaire - Bulimic Composite; SATAQ-General = Sociocultural Attitudes Towards Appearance Questionnaire - Internalization General subscale; SOQ - Partner = Self Objectification Questionnaire - Partner subscale; SOQ - Self = Self Objectification Questionnaire - Self subscale. * $p < .05$, ** $p < .01$, *** $p < .001$.

Table 2
HLM estimates for fixed effects and variance components for primary outcome variables.

Parameter	Fixed effects							Variance	
	Intercept	Time	Condition	Group	Time*Condition	Time*Time	Time*Time*Condition	Within Person	Intercept
	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)	γ (SE)
BSQ	99.87*** (5.52)	-6.07*** (0.83)	-4.89 (7.80)	-	5.03*** (1.16)	0.15*** (0.02)	-0.12*** (0.03)	248.21*** (31.27)	724.04*** (136.68)
DMS	2.98*** (0.31)	-0.13*** (0.03)	0.36 (0.32)	0.09† (0.04)	0.13** (0.04)	0.00*** (0.00)	-0.00** (0.00)	0.27*** (0.03)	0.63*** (0.12)
SATAQ-General	30.21*** (1.53)	-1.48*** (0.28)	-2.48 (2.17)	-	1.30** (0.40)	0.04*** (0.01)	-0.03** (0.01)	28.80*** (3.68)	41.40*** (8.87)
EDE-Q Restraint	2.07*** (0.25)	-0.26*** (0.05)	0.06 (0.36)	-	0.17* (0.07)	0.01*** (0.00)	-0.00* (0.00)	0.83*** (0.11)	1.04*** (0.23)
EDE-Q Bulimic sxs	8.78*** (1.13)	-0.95*** (0.18)	1.39 (1.59)	-	0.73** (0.25)	0.02*** (0.00)	-0.02** (0.01)	11.14*** (1.41)	29.09*** (5.56)
SOQ-Self	3.57 (2.03)	-1.52*** (0.40)	-0.73 (2.87)	-	1.42* (0.56)	0.04*** (0.01)	-0.03* (0.01)	56.58*** (7.15)	63.39*** (14.25)
SOQ-Partner	1.79 (1.90)	-1.01** (0.37)	-0.57 (2.69)	-	1.24* (0.52)	0.02* (0.01)	-0.03* (0.01)	49.75*** (6.31)	55.87*** (12.65)

Note. BSQ = Body Shape Questionnaire; DMS = Drive for Muscularity; EDE-Q Bulimic sxs = Eating Disorder Examination Questionnaire - Bulimic Composite; SATAQ-General = Sociocultural Attitudes Towards Appearance Questionnaire - Internalization General subscale; SOQ - Partner = Self Objectification Questionnaire - Partner subscale; SOQ - Self = Self Objectification Questionnaire - Self subscale. † $p = .05$, * $p < .05$, ** $p < .01$, *** $p < .001$.

3.4.5. Bulimic symptoms

Results for the EDE-Q bulimic symptoms composite revealed a significant effect of time ($b = -0.95$, $t = -5.38$, $p < .001$) and a significant Condition \times Time interaction ($b = 0.73$, $t = 2.96$, $p = .004$; see Table 2).¹ Bulimic symptoms at baseline did not differ between conditions ($p = .16$); however, the DB group demonstrated significantly lower EDE-Q bulimic symptoms compared to WL post-intervention ($p < .001$, $d = 0.92$; see Table 1) and at 4-week follow-up ($p = .001$, $d = 0.84$). Signifying clinically meaningful change, there was a nearly 60% reduction in the DB group's bulimic symptom score from baseline to post-intervention and follow-up ($M = 7.85$ at baseline; $M = 3.22$ at post-intervention; $M = 2.98$ at 4-week follow-up).

3.4.6. Self- and partner-objectification

Results for SOQ-Self scores revealed a significant effect of time ($b = -1.52$, $t = -3.86$, $p < .001$) and, as hypothesized, a significant Condition \times Time interaction ($b = 1.43$, $t = 2.57$, $p = .01$), indicating that the DB group demonstrated a steeper decline in self-objectification across time compared to WL (see Table 2). Conditions did not differ at baseline ($p = .80$), and the DB group demonstrated significantly lower SOQ-Self scores compared to WL post-intervention ($p = .01$, Cohen's $d = 0.70$; see Table 1) and at follow-up ($p = .01$, $d = 0.63$). Reflecting a clinically significant change, the DB program was associated with a shift from a self-evaluation based on appearance (or self-objectification) to a self-evaluation based on competence; this shift was not observed in the control group. Results for SOQ-Partner scores mirrored the

pattern found for SOQ-Self scores (see Tables 1 and 2).

3.5. Mediation analyses

The total indirect effect of body-ideal internalization on bulimic symptoms was estimated to lie between -0.36 and -0.02 (see Fig. 2). Because zero was not contained in the 95% confidence interval, we can conclude that the total indirect effect of the model was significantly different from zero at $p < .05$ and that body-ideal internalization mediated the effect of condition on bulimic symptoms. The direct effect of condition on bulimic symptoms, controlling for body-ideal internalization, was no longer significant ($r = -0.24$, $p = .20$), indicating that reductions in body-ideal internalization fully mediated the relationship between condition and bulimic symptoms.

4. Discussion

The purpose of the present study was to examine the acceptability and efficacy of *The PRIDE Body Project*[®], an adapted DB eating disorder prevention program for gay men, utilizing a randomized controlled trial. A total of 32 gay men completed the DB program, and the program was well-accepted and demonstrated a high retention rate. Consistent with our study hypotheses, the DB program decreased body dissatisfaction, drive for muscularity, dietary restraint, bulimic symptoms, self-objectification, and partner-objectification, and effects were maintained at 4-week follow-up. Further, body-ideal internalization mediated the intervention's effects on bulimic symptoms. However, no group differences were found in body ideal internalization at follow-up, raising questions of whether intervention effects will be maintained over longer durations of follow-up.

¹ We also ran analyses using a bulimic symptom composite including only behavioral symptoms (i.e., no weight/shape concerns) and the pattern of results remained unchanged.

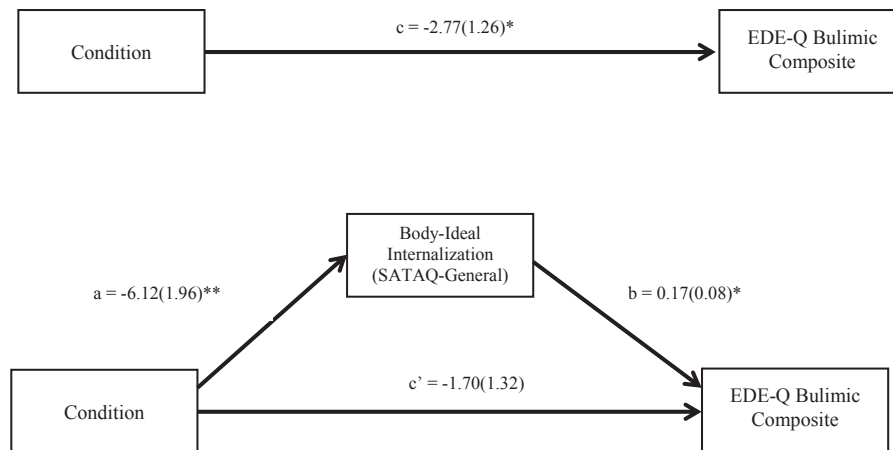


Fig. 2. Mediation analysis of the relationship between condition and bulimic symptoms. The top figure represents the total effect of condition on bulimic symptoms. The bottom figure represents the direct effect of condition and the indirect effect of body-ideal internalization. * $p < .05$, ** $p < .01$.

Results from the present study support a model for gay men in which altering body-ideal internalization reduces eating disorder risk factors and bulimic symptoms, which is consistent with risk models emerging from objectification theory, as well as the dual-pathway model. The DB program directly targeted body-ideal internalization by having participants challenge sociocultural pressures to conform to the body ideal and compared outcomes to a group in which body-ideal internalization was not altered. We successfully reduced body-ideal internalization and eating pathology post-intervention and found preliminary support that reductions in body-ideal internalization from baseline to post-intervention mediated reductions in eating pathology through 4-week follow-up. Thus, as predicted, targeting body-ideal internalization in gay men not only results in reductions in body-ideal internalization post-intervention, but appears to contribute to reductions in bulimic symptoms. Our results support the inclusion of body-ideal internalization in models of eating pathology in gay men and are consistent with the theoretical premise of DB interventions (Stice et al., 1996). Our results suggest future studies would benefit from empirically testing the dual-pathway model in gay men.

Results extend previous DB eating disorder prevention research by demonstrating that a peer co-led DB program is both acceptable and efficacious for gay men. Importantly, the retention rate across the program (86%) was comparable to retention rates across other DB studies (range: 88%–91%; Becker et al., 2005; Stice et al., 2006). Similarly, the within-condition effect sizes for the DB group pre-to post-intervention were comparable to those from previous studies in women using both peer-led (Becker et al., 2008, 2006, 2010) and professional-led formats (Stice et al., 2006). Impressively, effect sizes for dietary restraint (current study $d = 0.95$; other studies $d = 0.24$ – 0.64) and bulimic symptoms (current study $d = 0.76$; other studies $d = 0.32$ – 0.56) were larger than those found in previous research. For body dissatisfaction, effects within the present study were equivalent to or better than reported in previous research (current study $d = 0.63$ – 1.0 ; other studies $d = 0.23$ – 0.74). Finally, effect sizes for SATAQ body-ideal internalization (current study $d = 0.89$; other studies $d = 0.54$ – 1.09) were comparable to findings for thin-ideal internalization in the literature. Notably, measures for dietary restraint, body dissatisfaction, and body-ideal internalization in the present study differed from some of those used in previous DB research, which impacts the ability to directly compare effect sizes across studies. Examining within-condition

effect sizes for the novel constructs of drive for muscularity and self- and partner-objectification revealed medium effect sizes (DMS: d range = 0.50 – 0.70 ; SOQ-Self & SOQ-Partner: d range = 0.45 – 0.70). Our preliminary mediation results are consistent with those from Stice, Shaw, and Marti (2007; 2011) and extend these results to gay men. Overall, results mirror those found in DB intervention studies in females. More importantly, we observed clinically meaningful changes in eating disorder risk factors and bulimic symptoms, which is highly encouraging given the adaption to a new population and the use of novel constructs relevant to gay men.

Despite the strong retention rate, high acceptability ratings, and program efficacy, some men discontinued the program. The men who dropped out were less likely to be “exclusively homosexual,” indicating that ability to identify with others in the group may have contributed to treatment relevance and acceptability. Consistent with this, sexual orientation was not a predictor of dropout in the control group. Research supports that individuals who do not identify as “exclusively gay” feel less included within the gay community (Dodge et al., 2012). Thus, individuals within the present study who self-identified as “mostly gay” or “more gay” might have felt that the group did not fulfill their specific needs. Indeed, little research has been conducted on specific risk factors for eating pathology across the spectrum of gay men due to sample size constraints, highlighting an area for future research. Such research may contribute to the development of more specific and acceptable intervention efforts for men across a broader spectrum of sexual orientation.

The lack of difference between groups at 4-week follow-up on body-ideal internalization was contrary to study hypotheses, and there are several possible explanations for these null findings. First, it is possible that the post-intervention scores in the DB group may have been artificially reduced, given that assessments were completed immediately post-intervention, when the program exercises were most salient. Thus, it is possible that the delay between intervention and follow-up may contribute to reduced impact. However, this is unlikely given that all measures were administered immediately post-intervention and significant effects were found at 4-week follow-up for almost all other variables. Second, the two sessions may not supply a strong enough dose of intervention to produce long-lasting effects on body-ideal internalization. However, the within-group effect size comparing baseline to 4-week follow-up in the DB group was still in the

medium-large range ($d = 0.68$), while the effect for the WL was small ($d = 0.30$), suggesting that the program did have an impact on body-ideal internalization four weeks later. Additionally, the within-group effect size in the WL group was higher than in other DB studies ($d = 0.14$; Becker et al., 2005); however, it is important to note that the present study used a different measure of body-ideal internalization than the study by Becker et al. (2005). Third, the lack of significant difference between the DB and WL conditions on body-ideal internalization may be driven by the significant reduction on this outcome observed in the WL group between the second and third assessments. This significant reduction in body-ideal internalization for controls over a one-month period is a pattern that has also been observed in a DB prevention study in adolescent girls (Stice et al., 2006). Such changes may reflect the temporal course of body-ideal internalization in those seeking an intervention or they may have been a random occurrence specific to the men in the WL condition of the current study. Replication with a larger sample as well as a longer duration of follow-up may help elucidate whether differences between the DB and WL conditions are maintained over time.

The current study has several strengths including the randomized controlled design, the inclusion of a 4-week follow-up to evaluate the short-term maintenance of intervention gains, the use of psychometrically sound measures, and the high retention rate over the intervention and follow-up period. Further, the ethnically diverse sample increases generalizability to gay men of varying ethnic backgrounds. Finally, the use of HLM and FIML to handle missing data also represented methodological strengths. With these strengths in mind, there were also some limitations worth noting. First, the present study did not include an active treatment control; however, given that this was the first randomized controlled trial of a DB program for gay men, it was essential to determine the initial efficacy of the intervention before investing in a more resource-intensive comparison to alternative treatment. Thus, future studies should examine alternative treatment controls to rule out placebo effects. Second, conclusions about the potential efficacy of the intervention past one month cannot be made. Given that DB intervention studies have found effects lasting up to 2–3 years post-intervention (Stice, Marti, et al., 2008; Stice, Rohde, et al., 2008), it would be valuable for future studies to determine whether this effect holds for the application of our intervention in gay men as well. Third, regarding mediation analyses, given that we only had 3 time points, we were only partially able to meet Stice, Shaw, et al. (2007) fifth condition for mediation: that changes in the mediator proceeded changes in the outcome variable. Future studies should examine changes in body-ideal internalization between baseline and post-intervention (over the course of the intervention), to establish a more sensitive and rigorous test of mediation. Finally, given that men were only included if they were more attracted to men than to women, results may not be applicable across the spectrum of sexual minority men.

An important future direction for this field of research lies within maximizing the effectiveness and use of peer co-leaders. Within the present study, the competency ratings were good for the peer co-leaders, albeit not as strong on average as that of the graduate student clinician. Future research should conduct effectiveness trials to determine the feasibility, acceptability, and efficacy of a fully peer-led version of the DB program to extend the potential disseminability of *The PRIDE Body Project*®.

In summary, results from the current study provide support for the efficacy of *The PRIDE Body Project*® in reducing eating disorder risk factors among gay men. Results add to the extensive literature on the efficacy of DB eating disorder preventions and extend these results to gay males, who represent a high-risk, but underserved population. Findings also highlight the malleability of body-ideal

internalization and support the importance of this variable in models of risk for eating pathology among gay men. Given our promising results and research supporting that all men, regardless of orientation, are experiencing increasing pressures to conform to the body-ideal (Leit, Gray, & Pope, 2002), another future direction would be to adapt and evaluate DB interventions to men with body image concerns, regardless of their sexual orientation. Given that males are less likely to receive treatment despite the clinical and public health significance of eating disorders among men (Bramon-Bosch et al., 2000; Carlat et al., 1997), ignoring this group within prevention research is potentially dangerous. Results from the present study and proposed future areas of research will help fill a critical gap in the care provided to a growing demographic among those at risk for the development of eating disorders.

Acknowledgments

Data collection and manuscript preparation were supported by the Global Foundation for Eating Disorders Scholar Award, the Academy for Eating Disorders Student Research Grant, and the FSU Dissertation Award. We are incredibly grateful to Jared Hiers, Kevin Isserman, Christian Kon, Alejandro Pulido, and Ilyssa Rosenzweig for their assistance on the project, and the FSU PRIDE Student Union. We would also like to thank everyone involved with The Body Project, and especially Carolyn B. Becker for her support in our adaptation of this program.

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