Imagery rescripting and cognitive dissonance: A randomized controlled trial of two brief online interventions for women at risk of developing an eating disorder

Jamie-Lee Pennesi PhD | Tracey D. Wade PhD

School of Psychology, Flinders University, Adelaide, South Australia, Australia

Correspondence
Jamie-Lee Pennesi, School of Psychology, Flinders University, PO Box 2100, Adelaide, SA, 5001, Australia.
Email: Jamie-Lee.Pennesi@flinders.edu.au

Abstract

Objective: This pilot study compared two brief online interventions, imagery rescripting and cognitive dissonance, to an assessment-only control condition in a sample of body-dissatisfied young women at risk of developing an eating disorder. We examined the degree to which each intervention reduced disordered eating and modified risk and protective factors for eating disorders.

Method: Female university students (N = 107, 17–28 years of age) completed a screening questionnaire, followed by random allocation to one of the three conditions, followed by a baseline assessment, body dissatisfaction induction, and brief online intervention. Participants in the active conditions then completed online daily home practice and a postintervention questionnaire.

Results: Findings provide qualified support for the imagery rescripting intervention, with participants reporting higher body image acceptance (Cohen's d = 0.49) than the cognitive dissonance condition, and higher self-compassion (d = 0.59) and lower levels of disordered eating (d = 0.59) than the control condition, at postintervention. There was no significant impact of cognitive dissonance on any factors. Change in body image acceptance and self-compassion mediated the relationship between allocated condition and change in disordered eating at postintervention.

Discussion: These findings provide preliminary support for the use of online-adapted imagery-based techniques (e.g., imagery rescripting) to reduce risk for the development of an eating disorder by strengthening protective factors (i.e., body image acceptance and self-compassion) and reducing disordered eating. Further exploration of the use of imagery strategies in the prevention of disordered eating is required, including prospective tests of the mechanisms of action.

KEYWORDS
cognitive dissonance, disordered eating, eating disorders, imagery rescripting, intervention, online, prevention

1 | INTRODUCTION

Disordered eating and eating disorders are prevalent among young women (Wade, Wilksch, & Lee, 2012), and have the potential for serious consequences including increased mortality rates, emotional distress, physical morbidity, psychosocial impairment, and decreased quality of life (Fichter & Quadflieg, 2016; Winkler et al., 2014). Body dissatisfaction and negative affect are two of the most prominent risk factors associated with the development of disordered eating (Dakani-lis et al., 2017; Stice, 2016), and are the most common risk factors to be included across the eating disorder models that have been used to inform interventions (Pennesi & Wade, 2016), including prevention approaches.

In a prospective test of the dual-pathway model, Stice (2001) found that perceived pressure to be thin and internalization of the thin-ideal increases bulimic pathology, resulting in the development of a dissonance-based intervention (DBI) utilizing counter-attitudinal activities such as asking participants to argue against these ideals (Stice & Presnell, 2007). DBIs have been shown to be robustly effective prevention approaches, reducing risk for eating disorder onset (Becker &
A growing body of research suggests self-compassion may also act as a protective factor against poor body image and eating pathology (Braun, Park, & Gorin, 2016; Steindl, Buchanan, Goss, & Allan, 2017). In a cross-sectional study of adult women, Tylka, Russell, and Neal (2015) found that self-compassion was protective for disordered eating. Somerville and Cooper (2007) argue that using cognitive approaches to tackle negative core beliefs of relevance to eating disorders (such as self-criticism and shame) will be less effective than approaches that focus on emotional mechanisms, such as compassion-focused imagery (Gilbert & Irons, 2005). Recent experimental work has shown that imagery has a greater impact on emotions than verbalizing (Holmes & Mathews, 2005) and has led to an interest in the use of imagery rescripting which changes the negative meanings linked to autobiographical memories of early traumatic or distressing experiences by asking a patient to imagine or visualize a specific memory in the present and then to intervene (e.g., say or do something) so as to change its meaning (Stopa, 2011). Across a variety of psychological disorders there has been a growing use and evaluation of imagery rescripting as an adjunct to standard cognitive-behavioral treatments, with preliminary research showing that it can improve treatment outcomes, and can also be effective as a stand-alone treatment in some disorders, including when previous treatments have failed (Amptz, Tiesema, & Kindt, 2007; Grunert, Weis, Smucker, & Christianson, 2007; Wheatley et al., 2007).

To date, only two studies have investigated the use of imagery techniques to target core beliefs related to eating disorders (Tatham, 2011), in both cases bulimia nervosa. Ohanian (2002) presented a single case report investigation of the use of imagery rescripting in conjunction with cognitive behavior therapy (CBT), and found that while eight sessions of conventional CBT reduced symptom behaviors by 50%, one session of imagery rescripting led to an almost complete cessation of binge-purge behaviors. Cooper, Todd, and Turner (2007) compared a single session imagery intervention (imagery modification; i.e., restructuring of core beliefs through imagery) to a control (i.e., verbal restructuring with no imagery), and found the former was more effective in reducing emotionally held belief ratings, negative mood, and urges to binge. More recently, Riva (2011) has suggested the role of imagery rescripting methods for body image disturbance in obesity and binge-eating disorder, with early research showing that this approach improved weight loss and prevented weight regain among obese binge-eating disorder patients (Cesa et al., 2013). However, imagery rescripting has not previously been investigated for reducing body image disturbance in the prevention of an eating disorder, and further has yet to be investigated in an online format.

Thus, the aim of the present study was to compare three conditions with respect to reducing disordered eating in a sample of body-dissatisfied women, including imagery rescripting techniques, DBI techniques, and an assessment-only control condition, all conducted online. We also investigated the extent to which each intervention modified established risk and protective factors for eating disorders. It was hypothesized that imagery-based methods (i.e., imagery rescripting) may be more effective than cognitive-based approaches (i.e., DBI) in reducing disordered eating in young women at risk of developing an eating disorder.

2 | METHOD

2.1 | Participants

Females were recruited from a first year university student population and wider university sample. Inclusion criterion for the study included those women at risk of developing an eating disorder, as indicated by a score of \( \geq 47 \) on the Weight Concerns Scale (WCS; Killen et al., 1994, 1996), a cutoff that has good predictive validity for eating disorder cases (Jacobi, Abascal, & Taylor, 2004; Killen et al., 1994, 1996). The analytic sample for this study included 107 females ranging in age from 17 to 28 years (Mage = 20.27, SD = 2.02) with a mean body mass index (BMI) in the healthy range (i.e., BMI 18.5–24.99; World Health Organization [WHO], 2006; \( M = 24.57, SD = 5.08 \)). The majority of participants (70.1%) self-reported as Caucasian, with the next largest groups being Asian (21.5%), African (2.8%), Indian (2.8%), and Middle Eastern (1.9%).

2.2 | Procedures

The study was presented as an investigation of different strategies to improve body image and eating in women, and involved two phases of data collection over a period of 1 week, depicted in Figure 1. Participants first completed the WCS and height and weight were measured. Participants were then randomized, using the randomization function in Qualtrics, to one of the three conditions: imagery rescripting, cognitive dissonance, or control.

In phase 1 (baseline), participants completed self-report trait measures (Time 1; T1) in a research laboratory with the principal researcher available behind a screen to answer any questions. For 5 mins all participants were asked to imagine (or visualize), and then describe in the first person (as if it were happening to them) a situation from the past where you may have felt ashamed or embarrassed of your body or how your body looked. Examples were provided for example, trying on clothes in a change-room, getting ready with friends to go to a party, walking past a group of people who were looking at you, being teased about your body, looking at yourself in the mirror. This was used to equalize all groups given that the first stage of imagery rescripting requires recalling and visualizing traumatic memories (Wild & Clark, 2011). After the recall, participants received their allocated 5-min intervention (i.e., imagery rescripting, cognitive dissonance, or control).

After phase 1, participants not meeting criteria for risk (n = 94) were informed that they would not be required to participate in second phase of the research. These participants were provided with information about the aims of the study and relevant referral and support information. Also at this time, we excluded women considered to be likely to have an eating disorder that required urgent attention (n = 8),
This included (a) self-reporting ≥4 on the fear of weight gain item in the Eating Disorder Examination-Questionnaire (EDEQ; Fairburn & Beglin, 1994) and a BMI of <17.5 (i.e., the criteria for low weight; WHO, 2006), or (b) self-reporting ≥4 on the over-evaluation of weight or shape items in the EDEQ, and either a BMI of <17.5, or vomiting or laxatives as a means of controlling shape or weight at least four times over the past 28 days. We provided these women with information about appropriate treatment options.

Phase 2 (postintervention) was completed online. Participants in the experimental conditions completed home practice (i.e., a condensed form of the baseline intervention but participants were not given a time limit in which to respond) over five consecutive days, and then completed the trait measures again at the one-week postintervention (T2). Data were collected between October 2016 and April 2017. The mean time between assessments was 7.6 days (SD = 0.9 days). A choice of course credits, cash, or gift voucher were offered for research.
2.3.1 | Imagery rescripting

This procedure was designed for this study based on methods used previously with traumatic memories in social phobia (Wild & Clark, 2011). While imagery rescripting is traditionally delivered using face-to-face contact and therapist-led, the protocol used in the present study was adapted for online delivery. Participants were asked to close their eyes and imagine (or visualize), and then describe in writing, their first or earliest memory of a personal unpleasant body experience from the past where they may have felt ashamed or embarrassed of their body or how their body looked: (a) from an observers’ perspective, and (b) in the present with their wiser and more compassionate self in the room.

2.3.2 | Cognitive dissonance

This procedure was adapted from techniques described by Stice, Shaw, Burton, and Wade (2006), which have subsequently been used by Wade, George, and Atkinson (2009) as a brief intervention for body dissatisfaction. Participants were asked to read a definition of the thin-ideal stereotype for women and view accompanying images of what the thin-ideal looks like (provided at the baseline intervention only), before brainstorming about: (a) the costs and consequences of pursuing the thin-ideal looks like (provided at the baseline intervention only), before brainstorming about: (a) the costs and consequences of pursuing the thin-ideal, and (b) the positive attributes about themselves.

2.3.3 | Control

The control procedure was adapted from May et al. (2010). Participants did not receive any training but were asked to let their mind wander.

2.4 | Fidelity

A quality rating scheme was developed to assess intervention fidelity at home practice, based on that previously described by Allen et al. (2016). For complete scale, see Quality Rating Scheme in Supporting Information. Before the final ratings were completed, the first author and a blind rater scored a random sample of responses independently with subsequent discussion of ratings until an agreement was met; a third rater was consulted where the first author and blind rater were unable to come to an agreement. Individual mean item ratings were summed to give a total score, with higher scores indicating greater fidelity. Possible scores ranged from 0 to 12 for the imagery rescripting intervention, and from 0 to 6 for the cognitive dissonance intervention; scores for the cognitive dissonance intervention were multiplied by two in order to directly compare scores across interventions. The number of intervention exercises completed during the postintervention period was also recorded. The maximum number of intervention exercises offered to participants in each condition was five.

### Table 1: Measures included in the study, with internal consistency (Cronbach’s α) at T1 and T2 and intraclass correlation coefficients

<table>
<thead>
<tr>
<th>Measure (author)</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Screening measure</strong></td>
<td></td>
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<tr>
<td>Weight concern: Weight Concern Scale (WCS; Killen et al., 1994, 1996)</td>
<td>Five items scored on 4-point, 5-point, and 7-point scales. Scale adapted for Australian audience that is, 3 lb was replaced with 1.36 kg.</td>
</tr>
<tr>
<td><strong>Outcome measures</strong></td>
<td></td>
</tr>
<tr>
<td>Body image acceptance: Body Image-Acceptance and Action Questionnaire (BIAAQ; Sandoz et al., 2013)</td>
<td>12 items scored on 7-point scales; higher scores = higher acceptance. α = 0.91–0.92; ICC = 0.84.</td>
</tr>
<tr>
<td>Negative affect: Depression Anxiety and Stress Scale–Short form (DASS-21; Henry &amp; Crawford, 2005)</td>
<td>21 items assessing the past 7 days; scored on 4-point scales; higher scores = higher psychopathology. α = 0.94–0.95; ICC = 0.91.</td>
</tr>
<tr>
<td>Self-compassion: Self-Compassion Scale–Short form (SCS; Raes et al., 2011)</td>
<td>12 items scored on 5-point scales; higher scores = higher self-compassion. α = 0.78; ICC = 0.84.</td>
</tr>
<tr>
<td>Quality of life: Clinical Impairment Assessment–Questionnaire (CIA; Bohn et al., 2008; Bohn &amp; Fairburn, 2008)</td>
<td>16 items scored on 4-point scales assessing the past 28 days; higher scores = higher clinical impairment (lower quality of life). Scale at T2 adapted to reflect the past 7 days. α = 0.93–0.95; ICC = 0.83.</td>
</tr>
<tr>
<td>Disordered eating: global score of the Eating Disorder Examination–Questionnaire (EDE-Q; Fairburn &amp; Beglin, 1994)</td>
<td>22 items scored on 7-point scales assessing the past 28 days; higher scores = higher pathology. Scale at T2 adapted to reflect the past 7 days. Scores at T1 divided by four to account for shorter time frame at T2 and allow direct comparison between scores. α = 0.90–0.92; ICC = 0.74.</td>
</tr>
</tbody>
</table>

Note. T1 = time 1; T2 = time 2; α = Cronbach’s alpha; ICC = intraclass correlation coefficient.
TABLE 2  Descriptive statistics at baseline (T1)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Whole sample Mean (SD)</th>
<th>Imagery rescripting Mean (SD)</th>
<th>Cognitive dissonance Mean (SD)</th>
<th>Control Mean (SD)</th>
<th>ES (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline variables only</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight concern</td>
<td>62.96 (11.71)</td>
<td>64.19 (12.19)</td>
<td>61.76 (11.19)</td>
<td>62.86 (11.89)</td>
<td>−0.21 (−0.67 to 0.26)</td>
</tr>
<tr>
<td>Age</td>
<td>20.27 (2.02)</td>
<td>20.55 (2.43)</td>
<td>19.90 (1.84)</td>
<td>20.36 (1.68)</td>
<td>−0.32 (−0.79 to 0.14)</td>
</tr>
<tr>
<td>BMI</td>
<td>24.57 (5.08)</td>
<td>24.28 (4.80)</td>
<td>25.21 (4.62)</td>
<td>24.24 (5.83)</td>
<td>0.18 (−0.28 to 0.65)</td>
</tr>
<tr>
<td><strong>Dependent variables</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body image acceptance</td>
<td>3.61 (1.12)</td>
<td>3.64 (1.04)</td>
<td>3.59 (1.04)</td>
<td>3.61 (1.29)</td>
<td>−0.04 (−0.51 to 0.42)</td>
</tr>
<tr>
<td>Negative affect</td>
<td>1.09 (0.61)</td>
<td>0.99 (0.62)</td>
<td>1.10 (0.60)</td>
<td>1.19 (0.61)</td>
<td>0.18 (−0.28 to 0.65)</td>
</tr>
<tr>
<td>Self-compassion</td>
<td>2.56 (0.49)</td>
<td>2.65 (0.47)</td>
<td>2.54 (0.44)</td>
<td>2.47 (0.56)</td>
<td>−0.23 (−0.69 to 0.24)</td>
</tr>
<tr>
<td>Quality of life</td>
<td>2.28 (0.60)</td>
<td>2.36 (0.61)</td>
<td>2.24 (0.56)</td>
<td>2.23 (0.64)</td>
<td>−0.20 (−0.66 to 0.27)</td>
</tr>
<tr>
<td>Disordered eating</td>
<td>3.34 (0.94)</td>
<td>3.55 (0.84)</td>
<td>3.30 (0.83)</td>
<td>3.15 (1.11)</td>
<td>−0.27 (−0.73 to 0.19)</td>
</tr>
</tbody>
</table>

Note. T1 = time 1; SD = standard deviation; ES = between groups effect size (Cohen’s $d$); CI = confidence interval; BMI = body mass index. Sample $(N = 107)$; imagery rescripting $(n = 37)$; cognitive dissonance $(n = 35)$; control $(n = 35)$. Significant values are in **bold**.

2.5 Measures

The validated measures are described in Table 1. Outcome measures were selected to assess the following constructs: body image acceptance (Sandoz, Wilson, Mervin, & Kellum, 2013), negative affect (Henry & Crawford, 2005), self-compassion (Raes, Pommier, Neff, & Van Gucht, 2011), quality of life (Bohn et al., 2008; Bohn & Fairburn, 2008), and disordered eating (Fairburn & Beglin, 1994).

2.6 Statistical analyses

Of the 107 participants in the analytic sample, one (0.9%) declined to participate at phase 2 and a further six (5.6%) did not complete the postintervention (T2) questionnaire. Comparisons between those participants who provided data at T1 only and those who provided data at T1 and at T2 were investigated using Little’s (1988) Missing Completely At Random (MCAR) test: $\chi^2 = 14.073$ ($df = 9$; $p = .120$) with a $\chi^2/df$ ratio of 1.56, indicating that the data were missing at random. Given the small amount of missing data, we utilized an intent-to-treat analysis using the expectation maximization function in the *Statistical Package for the Social Sciences* (SPSS) version 23. Therefore data from all participants $(N = 107)$ were analyzed. Consistent with an open science approach to interpreting significance (Cumming & Calin-Jageman, 2016), all comparisons were investigated using a between- or within-group effect size (ES) with 95% confidence intervals (CIs). If the CI does not contain zero, the null hypothesis is rejected and the difference between groups is considered to be statistically significant. ES was calculated using Cohen’s $d$, where $0.2 = $ small, $0.5 = $ medium, and $0.8 = $ large (Cohen, 1988), unless otherwise stated. Baseline values across the three conditions were compared using one-way analyses of variance (ANOVAs).

2.6.1 Change in outcome over time

One-way analyses of covariance (ANCOVAs) were used to compare the effectiveness of the three conditions with respect to the outcome variables. The dependent variable was change at T2, and T1 was included as a covariate in order to minimize variation in the data and reduce the impact of measurement error.

2.6.2 Ratings of quality

Hierarchical multiple regressions were used to investigate whether fidelity or the number of intervention exercises completed predicted change in outcome at T2. T1 was included as a covariate in all analyses. Independent samples $t$ tests were used to compare between group differences.

TABLE 3  Estimated means (and standard errors) at postintervention (T2), controlling for baseline (T1) variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Imagery rescripting</th>
<th>Cognitive dissonance</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body image acceptance (T1 covariate mean = 3.61)</td>
<td>4.19 (0.14)</td>
<td>3.78 (0.14)</td>
<td>3.82 (0.14)</td>
</tr>
<tr>
<td>Negative affect (T1 covariate mean = 1.09)</td>
<td>0.85 (0.06)</td>
<td>0.95 (0.06)</td>
<td>0.86 (0.06)</td>
</tr>
<tr>
<td>Self-compassion (T1 covariate mean = 2.56)</td>
<td>2.70 (0.06)</td>
<td>2.64 (0.06)</td>
<td>2.49 (0.06)</td>
</tr>
<tr>
<td>Quality of life (T1 covariate mean = 2.30)</td>
<td>1.93 (0.08)</td>
<td>2.11 (0.08)</td>
<td>2.06 (0.08)</td>
</tr>
<tr>
<td>Disordered eating (T1 covariate mean = 3.34)</td>
<td>2.68 (0.15)</td>
<td>3.02 (0.15)</td>
<td>3.20 (0.15)</td>
</tr>
</tbody>
</table>

Note. T1 = time 1; T2 = time 2. Imagery rescripting $(n = 37)$; cognitive dissonance $(n = 35)$; control $(n = 35)$. LSD adjustments.
2.6.3 Mediational pathways
Mediation was tested using PROCESS macro (Hayes, 2013), which allows for path analysis-based mediation analysis and generates direct and indirect effects and bootstrap CIs in mediation models with single or multiple mediators operating in parallel or serial. In particular, we were interested in investigating whether any variables mediated the relationship between condition and change in disordered eating. As recommended by Hayes (2013) we did not test preconditions or interpret the present findings in terms of complete or partial mediation. Indirect effects were tested through corrected bootstrapping, which is recommended in mediation analysis with small to moderate sample sizes (MacKinnon, Lockwood, & Williams, 2004). Bootstrap analysis is less sensitive to violations of the statistical assumptions of normality and linearity, and has strongest statistical power in detecting indirect effects (MacKinnon et al., 2004). It also has the best Type-I error control and allows for improved accuracy of CIs. Bootstrapping with 10,000 resamples was used to generate 95% CIs to determine the significance of the indirect (or mediating) effect.

3 RESULTS

3.1 Descriptives
Means and standard deviations are shown in Table 2. Skewness for each variable was within the accepted range of $Z = \pm 2.575$ ($\alpha = 0.01$). Participants did not differ across the three conditions on any of the variables. The majority of participants (61.7%) were within the healthy BMI range (i.e., BMI 18.5–24.99; WHO, 2006); 2.8% were classified as underweight (i.e., BMI <18.5), and 35.5% were overweight or obese (i.e., BMI $\geq$25). The majority of participants (95.3%) reported engaging in some form of disordered eating behavior, specifically: driven exercise/fasting (85.0%); binge eating (77.6%); and self-induced vomiting/laxative misuse (19.6%). Over two thirds of participants (71.0%) reported eating disorder psychopathology (i.e., EDE-Q global) above the clinical cut-off (i.e., $\geq$2.77, norm for young adult women $= 1$ SD; Mond, Hay, Rodgers, & Owen, 2006). Mean WCS for this sample was well above the cutoff for high risk of developing an eating disorder (i.e., $\geq$47; Killen et al., 1994, 1996; $M = 62.96$, SD = 11.17).

3.2 Change in outcome over time
Table 3 shows the estimated means and standard errors for the outcome measures at T2, adjusting for T1 variables, and between-group effect sizes are reported in Table 4. Participants in the imagery rescripting condition reported significantly higher body image acceptance than those in the cognitive dissonance condition, as well as significantly higher self-compassion and lower levels of disordered eating than those in the control condition at T2.

3.3 Fidelity and outcome
Raters independently scored a random selection of responses from each of the intervention groups including: nine responses from the imagery rescripting condition (5.3%); and nine responses from the cognitive dissonance condition (5.5%). Inter-rater reliability was high: $r = 0.94$ and 0.84, respectively. Across all participants, the quality rating scheme showed high internal consistency for both the imagery rescripting ($\alpha = 0.90$) and the cognitive dissonance intervention ($\alpha = 0.91$).

There was no significant difference between groups for fidelity (imagery rescripting, $M = 9.08$, SD = 2.10; cognitive dissonance, $M = 8.32$, SD = 2.19; ES = 0.35, 95% CI = -0.11 to 0.82) or for the number of intervention exercises completed (imagery rescripting, $M = 4.54$, SD = 1.12; cognitive dissonance, $M = 4.66$, SD = 0.64; ES = -0.13, 95% CI = -0.59 to 0.33). Fidelity and the number of intervention exercises completed did not predict change in the outcome measures in either condition.

3.4 Mediational pathways
Given the findings showing imagery rescripting to be associated with significant change in body image acceptance, self-compassion, and disordered eating, a dichotomous variable was computed for condition, where participants were classified as belonging either to the imagery rescripting condition or to the cognitive dissonance/control conditions. Change in body image acceptance and self-compassion were investigated as mediators of the relationship between condition and changes in disordered eating, adjusting for T1 variables. Mediators were investigated separately (Model 1 and Model 2) and simultaneously (Model 3). Table 5 presents the model summary and indirect effect summaries.
TABLE 5  Testing mediational pathways at postintervention (T2), controlling for baseline (T1) variables

<table>
<thead>
<tr>
<th>Model: Mediation pathway for disordered eating as DV; condition (IR or CD/control) as IV</th>
<th>Model summary</th>
<th>Indirect effect</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$R^2$</td>
<td>$F$</td>
</tr>
<tr>
<td>Model 1 MV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 body image acceptance</td>
<td>0.560</td>
<td>32.46</td>
</tr>
<tr>
<td>Model 2 MV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 self-compassion</td>
<td>0.489</td>
<td>24.38</td>
</tr>
<tr>
<td>Model 3 MV (in parallel)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>T2 body image acceptance &amp; T2 self-compassion</td>
<td>0.590</td>
<td>23.99</td>
</tr>
</tbody>
</table>

Note. T1 = time 1; T2 = time 2; DV = dependent variable; IV = independent variable; MV = mediator variable; df = degrees of freedom; Boot SE = bootstrap standard error; Boot 95% CI = bootstrap 95% confidence interval; IR = imagery rescripting; CD = cognitive dissonance. Imagery rescripting (n = 37); cognitive dissonance/control (n = 70). Significant indirect effects are in bold.

The indirect effect (mediational pathway) was statistically significant for all models. Variance explained and effect size indicated that the model containing both body image acceptance and self-compassion (Model 3) was superior to the models containing body image acceptance (Model 1) or self-compassion (Model 2) alone, and accounted for 59% of the variance in disordered eating (see Figure 2).

4 | DISCUSSION

The aim of the present research was to investigate the effectiveness of two brief online interventions, imagery rescripting and cognitive dissonance, to a control condition in a sample of young women at risk of developing an eating disorder, with respect to reducing disordered eating. Findings provide some qualified support for the imagery rescripting techniques over the DBI techniques and control conditions. Imagery rescripting was associated with significant improvements in body image acceptance compared to the cognitive dissonance condition but not compared to the control condition. In addition, imagery rescripting was associated significant improvements in self-compassion and levels of disordered eating compared to the control condition but not compared to the cognitive dissonance condition.

This somewhat confusing pattern of results limited the strength of conclusions about the usefulness of imagery rescripting. This was addressed to some degree through further analysis indicating that change in body image acceptance and self-compassion mediated the relationship between condition (comparing imagery rescripting to a combined cognitive dissonance and control condition) and change in disordered eating. Here the imagery rescripting condition was associated with higher body image acceptance and higher self-compassion, which was associated with lower levels of disordered eating, compared to the combined condition. Model testing indicated that the model containing both body image acceptance and self-compassion was superior to the models containing either body image acceptance or self-compassion alone, suggesting that each of these variables play a role in influencing change in disordered eating.

This pilot study adds to the early literature suggesting that imagery-based techniques (e.g., imagery rescripting) may be useful adjuncts in interventions for eating disorders (Tatham, 2011). While imagery rescripting strategies have been shown to be effective in the treatment of bulimia nervosa (Cooper et al., 2007; Ohanian, 2002), the present findings are the first to provide preliminary evidence for the use of imagery rescripting in the context of reducing risk factors and increasing protective factors for disordered eating. While there is considerable support for the effectiveness of DBIs for reducing body dissatisfaction and body image problems in young women (Stice, Rohde, Gau, & Shaw, 2009), the current findings indicate that imagery-based approaches may be more effective (e.g., increasing body image acceptance).

We highlight a number of reasons why the DBI techniques in the current study were not as effective as previous research suggests. First, we utilized an individual online format, whereas DBIs are typically delivered, and have been most widely evaluated, in a group-based format. A recent evaluation of clinician-led, peer-led, and internet-delivered DBIs by Stice et al. (2017) found that the internet-based intervention was less effective. Second, while the length of the intervention was the same for imagery rescripting, the intervention was much briefer than usual (Stice et al., 2009). Third, participants were
exposed to the thin-ideal stereotype during the baseline intervention (but not during home practice), which may have diluted the impact of the exercise. Fourth, we only used one aspect of DBIs repeatedly, and not the full intervention; repetition may be better suited to imagery rescripting than cognitive dissonance. Finally, we included the use of a body dissatisfaction induction prior to delivering the intervention, however, this procedure was used in all conditions. Future prevention research would benefit from further exploration of the use of imagery in the prevention of eating disorders, especially as an adjunct to evidence-based interventions.

These findings contribute to the emerging research highlighting the potential advantages of using imagery-based approaches over more verbal-based approaches. Researchers have suggested that, compared to verbal representation, imagery has a stronger association with emotion and therefore can provide greater impact on psychological disorders (Holmes & Mathews, 2005). For example, Holmes, Mathews, Mackintosh, and Dalgleish (2008) demonstrated that use of a mental image compared to use of a verbal sentence consistently elicited greater emotional responses, despite the use of identical cues. Imagery-based strategies may be better able to evoke—and therefore modify—emotionally held core beliefs, compared to verbal-based strategies that are utilized in CBT. In line with this, research has demonstrated that core (self) beliefs are associated with greater emotional than rational bases (Somerville & Cooper, 2007), which may explain why core beliefs are more difficult to modify using cognitive therapies. Early work has indicated that rescripting of early memories (i.e., imagery rescripting) may help to modify core beliefs in eating disorders (Cooper, 2011; Somerville & Cooper, 2007). While the present findings provide support the use of imagery rescripting in the context of reducing disordered eating, yet to be explored are the mechanisms of action and relationship to maladaptive core beliefs. Our research suggests that imagery rescripting reduces risk for the development of an eating disorder by strengthening protective factors, but further exploration of the use of imagery strategies in the prevention of disordered eating is required, including prospective tests of the mechanisms of action.

These findings are also in line with a greater emphasis on resilience, and concur with the emerging literature on positive body image (Tylka, 2011), which suggests that appreciation for, acceptance of, and concord with the emerging literature on positive body image, enabling development of more effective future prevention approaches for eating disorders and related problems with body, weight, and shape. While this study provides preliminary support for the use of imagery rescripting in the prevention of disordered eating among a sample of women at risk of developing an eating disorder, further exploration is recommended, including longer follow-up. Second, while the present study investigated an online imagery rescripting intervention, it would be of interest to compare this to more traditional face-to-face or therapist-led imagery protocols (e.g., Wild & Clark, 2011). Third, it would be of interest to investigate a fuller version of an imagery rescripting intervention to the gold standard 4-session DBIs (Stice et al., 2009) in order to examine if these interventions differ. Further, combined approaches may enhance intervention effectiveness, enabling development of more effective future prevention approaches for disordered eating.

**ORCID**

Jamie-Lee Pennesi PhD [http://orcid.org/0000-0003-1461-7303](http://orcid.org/0000-0003-1461-7303)

Tracey D. Wade PhD [http://orcid.org/0000-0003-4402-770X](http://orcid.org/0000-0003-4402-770X)

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SUPPORTING INFORMATION

Additional Supporting Information may be found online in the supporting information tab for this article.

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