Body Mass Index, avoidance and psychosocial factors: What moderates the impact of brief mirror exposure and other interventions on the body image of women?

Elizabeth Trippett

Submitted for the award of
Doctorate in Clinical Psychology

Clinical Psychology Unit
Department of Psychology
The University of Sheffield

August 2017

This page is intentionally left blank

Declaration

This thesis has been submitted for the award of Doctorate in Clinical Psychology at The University of Sheffield. It has not been submitted for any other qualification or to any other academic institution.

Word Count

Literature review	7993
References	2513
References and appendices	3335
Research	9018
References	1539
References and appendices	5203
Appendices	4486
Total word count	25549
Excluding appendices and references	17011

Abstract

Literature Review This systematic review sought to determine whether interventions can reduce body dissatisfaction for adults, and whether body mass index (BMI) moderates the effectiveness of body dissatisfaction interventions. A search of two databases produced 14 studies, which generated 21 treatment groups. Where data were available, the relationships between effect size, quality score, publication date and treatment group mean BMI were calculated. A range of body dissatisfaction interventions were found to be effective, in particular those delivered in person, in groups, and using CBT components. There was a strong correlation between study quality and intervention effect size. Larger treatment effect sizes were found among participants with a heavier BMI.

Research Report This study used a non-randomized experimental design to determine the impact of brief mirror exposure on a non-clinical sample of women with a healthy body mass index (BMI) and women with an overweight/obese BMI. It examined the moderating effect of reassurance-seeking, social anxiety, and body avoidance. Forty-six women completed a battery of measures and undertook a 15-minute mirror exposure intervention. Analyses showed that mirror exposure was effective at improving the body perception and satisfaction of overweight/obese women. Reassurance-seeking, social anxiety, and body image avoidance did not affect the impact of mirror exposure.

Acknowledgements

Firstly, I would like to thank all the participants who gave their time and their effort to contribute to the findings of this study.

Secondly, I would like to thank Professor Glenn Waller for his ongoing support, scrutiny and guidance throughout the process of completing this research. He has made doing a thesis a fascinating and invaluable learning experience for me.

Finally, I would like to thank my friends and family for all the help they provided, both emotional and practical, so I could do this work. In particular, my gratitude goes to my husband Daniel, who has been with me every minute of the journey.

Table of Contents

Section One: Literature Review

Does body mass index moderate the effectiveness of interventions for body dissatisfaction? A systematic review

This page is intentionally left blank

Abstract

Objectives: Body dissatisfaction is highly prevalent among women, can be highly distressing to them and is associated with eating disorders. Following previous reviews, this systematic review aimed to ascertain whether body image interventions can reduce body dissatisfaction for adults, and to determine whether body mass index (BMI) moderates the effectiveness of interventions for body dissatisfaction (unexplored in earlier reviews).

Method: Two databases were systematically searched for relevant journal articles, producing 14 papers, from which 21 intervention groups were generated. Where data were available, the relationships between effect size, quality score and treatment group mean BMI were calculated.

Results: A range of body dissatisfaction interventions were effective, but the most consistently effective were those delivered in person, in group formats, and using CBT components. There was a strong correlation between study quality and intervention effect size. Larger treatment effect sizes were found among participants with a heavier BMI.

Conclusions: Further research is needed to understand why heavier individuals benefit more, and which particular interventions should be offered to underweight, healthy BMI, overweight and obese populations. Researchers should continue to strive for methodological quality in their studies. These findings suggest that services and clinicians should routinely offer interventions for body dissatisfaction to overweight and obese patients who present with body image distress, as the potential for positive change is substantial.

Introduction

The consequences of body dissatisfaction can be devastating. It is a predictor of a range of disordered eating and weight-related outcomes (Ghaderi & Scott, 2001), and a risk factor in the development of psychopathology such as depression and self-esteem (Bucchianeri, Arikian, Hannan, Eisenberg & Neumark-Sztainer, 2012). For the clinical population, improving body image can play a powerful role in the prevention and treatment of eating disorders, as body dissatisfaction increases the risk of onset, and reduces the likelihood of recovery (Stice & Shaw, 2002; Waller et al., 2007). Given that body dissatisfaction is such a problem, it is important to be clear about what body image and body dissatisfaction are.

Definitions

Body image is a multidimensional concept, which incorporates perception of the body, attitudes towards the body, and mood in relation to the body. Disturbance in body image perception involves a distorted view of one's appearance. Body dissatisfaction is a negative subjective evaluation of the body or body parts (Stice & Shaw, 2002). Body dissatisfaction can lead to distress and behaviours that maintain the problem and become harmful to the individual, particularly where there is overvaluation of appearance in defining one's sense of self (Striegel-Moore & Franko, 2002). State body image is how an individual feels towards their body at a particular point in time, and can change according to context, activity and interactions with others (Tiggemann, 2002; Wade, George & Atkinson, 2009). Trait body image is how an individual feels about their body generally, and most

assessment tools and research focus on this (Cash, 2002a). It is important to understand how widespread body dissatisfaction is.

Prevalence

Over thirty years ago, body dissatisfaction was considered so commonplace among women that it was described as a “normative discontent” (Rodin, Silberstein & Striegel-Moore, 1984). More recent research confirms that this is still true. Up to 70% of women and 63% of men report dissatisfaction with some aspect of their appearance (Garner, 1997). Among Caucasian populations, women have consistently been found to be significantly more dissatisfied with their body than men over their lifespan (Bulik et al., 2001). Body dissatisfaction can develop as early in life as 8 years old (Grogan, 2017). A survey of British girls found that 54% of 11-16-year-olds, and 66% of 17-21-year-olds often felt that they were “not pretty enough” (Girlguiding UK, 2016).

Surveys vary in how they define and measure body dissatisfaction, so prevalence data on body dissatisfaction need to be interpreted with caution. There is a difference between dissatisfaction with one or more aspects of appearance – such as the Garner (1997) data above - and a global negative evaluation of the whole body (Cash, 2002b). It is useful to explore how body dissatisfaction is measured.

Measurement

A range of tools has been developed to measure body dissatisfaction. Tools include measures of discrepancy between the body actual and the

body ideal, Likert scales requiring responses to body image statements, and visual analogue scales (VAS). Figural methods allow respondents to choose responses from silhouettes, selecting their perceived ideal and actual body shape (Thompson & van den Berg, 2002). Questionnaire measures enable evaluation of the psychometric properties of the measure.

Commonly-used and well validated measures of global satisfaction include: the Body Satisfaction Scale (BSS, Slade et al., 1990); the Body Shape Questionnaire (BSQ, Cooper et al. 1987); and the Multidimensional Body Self-Relations Questionnaire – Appearance Scales (MBSRQ, Cash, 2000). Tools that measure body dissatisfaction on a cognitive level do not always capture the personal distress their body evaluation causes individuals (Cash, 2002b). Measures that incorporate this affective assessment include the Physical Appearance State and Trait Anxiety Scale (PASTAS, Reed et al., 1990), and the Body Dysmorphic Disorder Examination (BDDE, Rosen & Reiter, 1996; Thompson & Van Den Berg, 2002; Phillips, 2002).

To summarise, body dissatisfaction is widespread among women and can be measured validly. However, in order to design effective interventions, it is first important to understand where body dissatisfaction comes from and how it is maintained.

Origins of body dissatisfaction

The origins of body dissatisfaction are poorly understood, due to a dependence on historical review, cross-sectional research and theoretical perspectives (Smolak, 2002). Sociocultural theory posits that early experiences are internalised as personal ideals, based on family, peer and

cultural messages about physical attractiveness. Where these ideals are significantly different from a person's self-evaluation, the result is body dissatisfaction (Jackson, 2002; Hargreaves & Tiggemann, 2009; Grogan, 2017).

Higgins' (1987) self-discrepancy theory proposes that an individual's vulnerabilities and motivations arise from a discrepancy between their actual self and their ideal self (how they would ideally like to be), or their actual self and their 'ought' self (how they ought to be, through obligation to other people). Body dissatisfaction can be a result of a discrepancy between the body actual and the body ideal/ought (Higgins, 1987). Studies have shown that greater actual-ideal discrepancies correlate with body dissatisfaction and eating disorder symptoms (Strauman, Vookle, Berenstein & Chaiken, 1991), and social comparison with media images (Bessenoff, 2006).

Experimental studies have shown that even brief exposure to idealized media images has a negative effect on women's body satisfaction and mood, but not everyone is equally affected (Tiggemann, 2002). Stice and Shaw (2002) found that higher levels of perceived pressure to be thin, thin-ideal internalization and body mass were all risk factors for greater body dissatisfaction.

Maintaining factors in body dissatisfaction

There is stronger evidence identifying how body dissatisfaction is maintained. Factors include: cognitive biases, such as selectively attending to appearance-related aspects of media images and upwards social comparison (Tiggemann, 2002); safety behaviours, such as body checking

and body avoidance (Shafran, Fairburn & Robinson, 2004); and self-objectification (women's internalisation of the observer's perspective towards their own bodies - Alleva, Martijn, Jansen & Nederkoorn, 2014). Cognitive bias can lead to selective attention towards disliked body parts and comparison with admired others, which increases body preoccupation and dissatisfaction (Shafran, Fairburn, Robinson & Lask, 2004). Cognitive bias in appearance and body self-consciousness can also relate to broader social threat, leading someone to attend to and negatively interpret ambiguous body image-related cues in their environment (Altabe, Wood, Herbozo & Thompson, 2004). For an individual with high dispositional body image anxiety, this interpretational bias can create and/or maintain social anxiety and avoidance of social or body image-related situations.

Avoidance of body image (e.g., through covering mirrors, refusing to be weighed) is a safety behaviour that, in the long term, prevents individuals from disconfirming their worst fears about their body (Salkovskis, 1991). Recognising maintaining factors such as these and how they vary between individuals allows interventions for body dissatisfaction to be targeted appropriately, whether for prevention or treatment purposes. A range of interventions have been developed to reduce body dissatisfaction.

Interventions for Body Dissatisfaction

When considering the interventions available for body dissatisfaction, it is worth outlining: the settings in which they are delivered; whether they are preventative or a treatment; whether the intervention is delivered on an individual or a group basis; and the nature of the population.

Types of intervention. A wide range of interventions has been developed to reduce body dissatisfaction for both clinical and non-clinical populations. Those interventions can be categorised as cognitive, educational, behavioural and physical. Most interventions target maintaining factors, such as cognitive processing, avoidance, checking and comparison. Cognitive behavioural therapy (CBT) has been the most commonly-used approach to date (Alleva, Sheeran, Webb, Martijn, & Miles, 2015), and the most successful in research with clinical populations (Nicolino, Martz & Curtin, 2001).

Cognitive techniques can address unhelpful thinking through monitoring thoughts about the body and restructuring them. Other approaches include self-esteem enhancement, acceptance and self-compassion techniques (e.g., Albertson, Neff & Dill-Shackleford, 2015), and describing the body in functional terms (Alleva et al., 2014). Behavioural techniques include exposure exercises (in order to reduce avoidance of the body image and related feelings), and response-prevention work to limit body checking/weighing (Alleva et al., 2015).

Educational approaches (such as media literacy) teach people to be critical of media messages about physical attractiveness, and to understand how the messages lead to negative body image. Educational interventions are designed to reduce vulnerability to media exposure and promote healthy lifestyles as an alternative to the thin-ideal (Alleva et al., 2015; Grogan, 2017). This approach is particularly used in large-scale prevention programmes in schools and colleges, and can include sociocultural and

feminist ideology (Tiggemann, 2002; Peterson, Tantleff-Dunn & Bedwell, 2006).

Physical interventions (such as fitness training) are designed to give people a different physical experience of their body, as a route to perceived physical improvement and self-efficacy (e.g., Campbell & Hausenblas, 2009).

Settings. Interventions can be delivered in person, or remotely through online programmes that reach large numbers of people. They may take place in an in-patient clinic, a community setting or educational institution. Research on the benefits of different settings can be affected by variables such as the characteristics of the target population, including their baseline level of body dissatisfaction. Adaptations of a CBT programme delivered through minimal telephone contact, individual face-to-face sessions, and group settings were found to be equally effective (Farrell, Shafran, & Lee, 2006).

Treatment vs. prevention. Prevention programmes such as those delivered in schools have shown a short-term improvement in body dissatisfaction for 12-17-year-olds. Preventative interventions are often targeted at at-risk populations, such as adolescents (Levine & Smolak, 2002). Treatment interventions are delivered when an individual has been identified as having high levels of body dissatisfaction, such as part of a treatment package for someone with an eating disorder (e.g., anorexia nervosa) or body dysmorphic disorder (Farrell et al., 2006; Waller et al., 2007).

Group vs. individual

Interventions can be delivered via group programmes or one-to-one. Group programmes can be resource-efficient as they often require less therapist contact (Farrell et al., 2006), and include peer support. Interventions delivered on an individual basis allow for greater privacy and can tailor the techniques to the person's particular needs. Group delivery has been found to be more effective than one-to-one delivery (Alleva et al., 2015).

Nature of the population

While existing reviews address the points raised above, there is less evidence about the characteristics of the individual being treated. The characteristics of particular groups (including their subcultural physical ideal norms, Grogan, 2017), might determine which interventions for body dissatisfaction are most appropriate. The majority of the research findings are based on physically healthy Caucasian female college student samples. However, people in need of interventions vary in their age, clinical status (e.g., mental health diagnosis), body weight, physical health conditions, gender, sexuality, and ethnic group. Body dissatisfaction interventions may not be relevant to all populations, or may carry a risk of being less effective, ineffective or even harmful to some individuals.

Age. Body image can be affected by factors such as the physical changes of puberty and aging, occurring at different life stages. Short-term benefits have been seen in programmes for adolescent girls but long-term effects were less reliable (Levine & Smolak, 2002). A sustained reduction in

body dissatisfaction was found for women in mid-life (Lewis-Smith et al., 2016). Alleva et al. (2015) found large treatment effects for adolescents and participants in mid-life, but unreliable effects with children and insufficient research to draw conclusions about body dissatisfaction interventions in later life.

Gender. Current research is often focused on body dissatisfaction in women. Body dissatisfaction and eating disorders in men can be harder to detect, especially as the male 'body ideal' focuses on muscularity not thinness. Gay men have been found to be particularly vulnerable to high levels of body dissatisfaction (Grogan, 2017). Men can benefit from body image interventions (e.g., Martin Ginis, Eng, Arbour, Hartman, & Philips, 2005). However, the lack of evidence-based treatments for men means that interventions might need to be adapted from those researched with women (Burlew & Shurts, 2013).

Clinical vs. non-clinical population. Body dissatisfaction in people with an eating disorder diagnosis may co-occur with distorted perception of the body, or it may not be present at all (Waller et al., 2007). Therefore, intervention planning for this population requires careful assessment. Body dissatisfaction in people without a clinical diagnosis can also cause significant distress, and predicts various levels of eating disturbance (Farrell et al., 2006). CBT-based treatments have been found to be effective for both non-clinical body-dissatisfied populations and populations with an eating disorder (Bhatnagar, Wisniewski, Solomon, & Heinberg, 2012; Grogan, 2017).

Body weight. Body mass index (BMI) is a commonly-used way to assess weight in relation to height, and to compare individuals (calculated as kg/m^2). Individuals with a BMI <18.5 are considered underweight, those with a BMI of 18.5-25 are within the healthy weight range, those with a BMI >25-30 are overweight, and those with a BMI >30 are considered obese. BMI does not take into account body composition (i.e., percentage of muscle and fat). However, it is the best measure currently available for comparing adult individuals and populations and widely used in research. As the UK average BMI is currently 27 (Health & Social Care Information Centre, 2016), the term 'healthy BMI' is used throughout this review for the 18.5-25 category, rather than 'normal BMI', with an acknowledgment that neither term is entirely appropriate. Recent reviews of body dissatisfaction interventions have concentrated on research with healthy BMI samples (Farrell et al., 2006), or have not considered BMI as a potential moderator (Alleva et al., 2015). Only one review (of exercise interventions) considered BMI, and found non-significant larger effect sizes for overweight/obese participants (Campbell & Hausenblas, 2009).

So, it is unclear whether body dissatisfaction interventions are equally effective for people in different BMI categories, and this represents a substantial gap in the literature and the guidance required by health professionals.

Aim of Present Review

This paper systematically reviewed the available literature in order to determine whether body mass index (BMI) moderates the effectiveness of

interventions for body dissatisfaction (unexplored in earlier reviews). As a pre-requisite to this, the review sought to ascertain whether body image interventions can improve body dissatisfaction for adults (as demonstrated in previous reviews).

Method

Design

This study used a systematic review design. A systematic review is a review of a clearly stated question which uses 'systematic and explicit methods to identify, select, and critically appraise relevant research, and to collect and analyse data from the studies that are included in the review' (Moher, Liberati, Tezlaff, & Altman, 2009). This review poses a question not previously addressed.

Moher et al. (2009) suggest that their PRISMA statement can be used to guide the reporting of systematic reviews that evaluate interventions. This review therefore includes the PRISMA preferred reporting items of: clear search terms and strategy; eligibility criteria; and quality assessment criteria (Moher et al., 2009). As this review did not involve human participants, ethical approval was not required.

Search strategy

The databases PubMed (from 1809) and PsychInfo (from 1806) were searched up to 22nd January 2017. The following search terms and Boolean operators were used:

(1) “body image” OR “body dissatisfaction”

AND

(2) “intervention” OR “treatment”

AND

(3) “weight” OR “body mass ind*” OR “BMI”

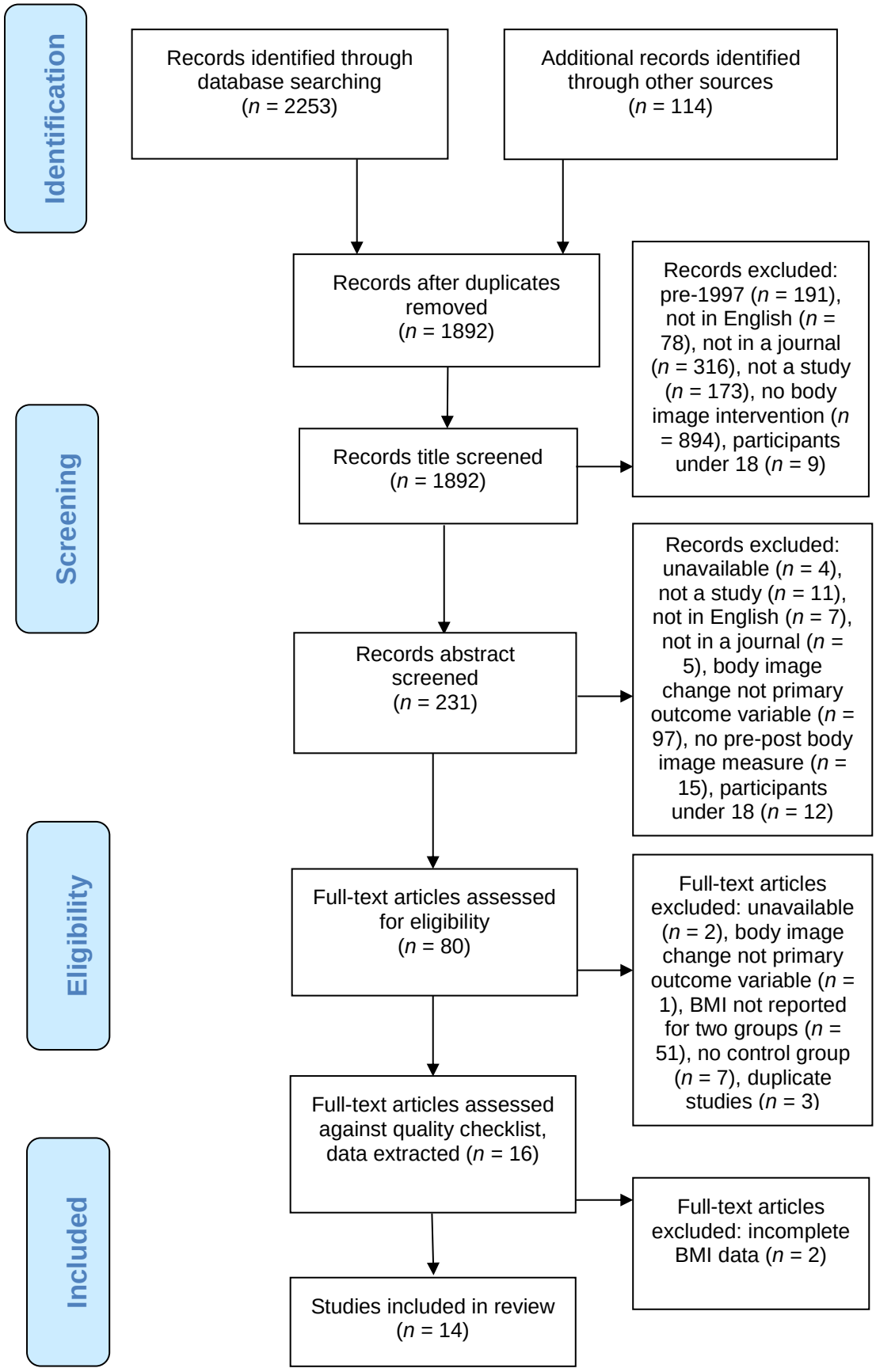
Database searches were conducted using these terms in all search categories, then using them in the ‘abstract’ search category. The former strategy generated approximately 19,000 papers. On initial screening, most of these papers were not relevant to the review aim that required pre- and post-intervention measurement, and body image change as a primary outcome (e.g., they were studies of physical illness or medical procedures which noted body image change as a secondary outcome, or qualitative exploratory studies). Using the search terms in the ‘abstract’ category did not appear to change the number of relevant studies identified. The final search is therefore based on search terms (1) and (2) appearing in the abstract of a paper. Additional potentially relevant papers were identified through hand searching previous reviews of body image interventions and the reference lists of included studies.

Inclusion and exclusion criteria

Papers were included if they were published in English in a peer-reviewed journal and used participants of 18 years and over. Papers were excluded if body image change was not the primary outcome variable of the

study. Papers published more than twenty years earlier were also excluded, as many of the commonly-used body image measures were not developed until the 1990s, making older studies difficult to compare with more recent research. Studies with no control group and no pre- or post-intervention body image measures were also excluded. The literature was restricted to controlled studies as this is an established criteria used in reviews of body image treatments (e.g. Alleva et al., 2015; Campbell & Hausenblas, 2009; Lewis-Smith et al., 2015), which excludes studies that are less likely to be such high quality. As specific data on participant BMI were required, papers with missing mean BMI data for each treatment group were excluded. Figure 1 shows a PRISMA diagram of the study selection process for this review.

Figure 1. PRISMA diagram of study selection process



Quality of studies

Fourteen papers were assessed for methodological quality. The Downs and Black (1998) 27-item checklist was used for this purpose, because it can assess both randomized controlled trials and non-randomized studies. It assesses studies on the basis of reporting, external validity, internal validity (including selection bias), and power (Downs & Black, 1998). For this review, item 27 was modified from the original checklist to enable transparent evaluation of the power of a study. All papers were scored by the author and three papers were randomly selected to be scored by an independent rater - a trainee clinical psychologist colleague. As there were no areas of disagreement in the quality scoring, no further second rating or discussion took place. No papers were excluded at any stage on the basis of poor quality scores (i.e. no cut-off was used), but paper quality was considered in the analysis of the study findings, to determine whether quality was related to effect sizes or year of publication.

Appendix A shows the scoring of each paper against the modified Downs and Black (1998) checklist, together with their total quality scores. Table 2 shows the total quality scores.

Effect sizes

Cohen's *d* was chosen as a measure of effect size because it allows standardized effect sizes to be compared across studies (Ellis, 2010). Within-group effect sizes were extracted from papers or converted or calculated by the author. As studies varied in their follow-up data, immediate post-intervention scores were used for all studies to calculate effect size.

Where a number of different measures were used in a study, scores were taken for the body image measure most closely related to body or appearance satisfaction (see Table 2 for which measure was used to calculate within-group effect size for each treatment group). Where papers included data for multiple intervention groups, these were included in the review. Where authors reported Cohen's *d* within-group effect sizes for the body image intervention groups in their paper, these were used (*N* = 12). Where authors reported an eta-squared effect size for the body image intervention groups in the paper, these were converted to a Cohen's *d* effect size using a formula taken from Cohen (1988; *N* = 3; see Appendix B). Where no effect size was reported, Cohen's *d* effect size was calculated by the author using pre- and post-intervention mean scores, standard deviations and correlations between the mean scores (*N* = 6; see Appendix B). None of these papers provided the necessary correlation between mean scores. Therefore, a conservative value of *r* =.7 was used for the calculation of treatment effect size (Rosenthal, 1993). Two studies did not provide sufficient information to calculate effect sizes. See Table 2 for intervention effect sizes and how these were calculated.

Association of effect sizes with study and sample characteristics

Using SPSS v.23, Pearson's correlations were calculated for: the association between effect sizes and study quality scores; the association between study quality scores and year of publication; and the association of treatment effect size and pre-intervention mean BMI (available for only 12 studies). An independent-samples *t*-test was used to compare effect sizes

across studies of patients with mean BMI in the low-healthy range vs those in the overweight/obese range.

Results

Table 1 shows the characteristics of the papers that were included in the review following this process.

Table 1
Study characteristics

Authors (date)	Aims	Design and sample	Intervention category	Measure
Dunigan, King & Morse (2011)	Examine whether massage influences state body image, and examine relationships between trait body image and attitudes towards massage	Randomised controlled pre-test post-test experimental design. Women psychology undergraduates (n = 49) in USA	Individual Physical	Body Image States Scale (Cash, 2002)
Hilbert & Tuschen-Caffier (2004)	Compare group cognitive behavioural therapy with exposure (CBT-E) to CBT with cognitive restructuring for BI disturbance (CBT-C)	Randomised controlled pre-test post-test experimental design. Community-based women (n = 28) with binge-eating disorder in Germany	Face-to-face Group	BSQ (Cooper, et al., 1987; Waadt, Laessle & Pirke, 1992)
McLean, Paxton & Wertheim (2011)	Examine impact of group intervention tailored to women in mid-life on body dissatisfaction, body image attitudes disordered eating symptoms and psychological distress	Randomised controlled pre-test post-test experimental design. Community-based women (n = 61) in mid-life in Australia	Face-to-face Group	BSQ

Table 1 (continued)
Study characteristics

Authors (date)	Aims	Design and sample	Intervention category	Measure
Mountford et al. (2014)	Evaluate effectiveness of BodyWise body image group in decreasing BI disturbance and the elements which maintain BI disturbance	Partial crossover waitlist design Adults (n = 62) with anorexia nervosa undergoing in-/out-patient treatment in UK	Face-to-face Group	Eating Disorders Examination – Questionnaire (EDE-Q, Fairburn & Beglin, 1994)
Paxton, McLean, Gollings, Faulkner & Wertheim (2007)	Compare body image, eating behaviour and psychological outcomes from face-to-face and internet group delivery of manualized CBT group intervention, Set Your Body Free	Randomised controlled pre-test post-test experimental design Community-based women (n = 116) with high body dissatisfaction in Australia	Face-to-face vs remote Group	BSQ
Perpina et al. (1999)	Compare effectiveness of virtual reality and conventional BI group treatment	Randomised pre-test post-test experimental design Adult outpatients (n = 13) with an eating disorder diagnosis	Individual	BSQ

Table 1 (continued)
Study characteristics

Authors (date)	Aims	Design and sample	Intervention category	Measure
Peterson, Tantleff-Dunn & Bedwell (2006)	Determine if exposure to feminist theory would increase women's feminist identity and improve BI disturbance, compared to psychoeducational and control groups	Randomised controlled pre-test post-test experimental design Women undergraduates (n = 154) in USA	Face-to-face Individual	VAS
Ramirez & Rosen (2001)	Compare behavioural lifestyle weight-control group programme with weight control with BI therapy on BI, mental health symptoms and self-esteem	Randomised controlled pre-test post-test experimental design Community-based obese adults (n = 65), in Canada	Face-to-face Group	BSQ
Riva, Bacchetta, Baruffi & Molinari (2001)	Evaluate virtual reality-based in-patient treatment for BI disturbance	Randomised controlled pre-test post-test experimental design Women (n = 28) seeking treatment at residential obesity clinic in Italy	Individual	Italian version of Body Satisfaction Scale (Slade et al., 1990)

Table 1 (continued)
Study characteristics

Authors (date)	Aims	Design and sample	Intervention category	Measure
Stewart et al. (2010)	Explore changes in BI as a function of weight loss in individuals in an intensive lifestyle intervention	Randomised controlled pre-test post-test experimental design Adults with Type 2 diabetes (n = 157) enrolled in the Look AHEAD trial in USA	Face-to-face Individual and group	Body morph assessment v.2 (BMA 2.0, Stewart, Allen, Han & Williamson, 2009), a self-administered computerised body assessment programme
Taylor & Fox (2005)	Investigate the impact of exercise referral scheme on physical self-perception and physical self-worth of middle-aged and elderly population	Randomised controlled pre-test post-test experimental design Community-based adults (n = 81) in middle-/old-age, with 1-3 coronary risk factors	Physical	Physical Self-Perception Profile (Fox, 1990; Fox & Corbin, 1989)
Wade, George & Atkinson (2009)	Compare acceptance, cognitive dissonance, and distraction conditions' ability to increase weight and appearance satisfaction	Randomised controlled pre-test post-test experimental design Women psychology undergraduates (n = 100) in Australia	Face-to-face Individual	VAS (based on Heinberg & Thompson, 1995)

Table 1 (continued)
Study characteristics

Authors (date)	Aims	Design and sample	Intervention category	Measure
Williams & Cash (2001)	Determine the effects of 6-week circuit weight training programme on facets of body image	Pre-test post-test quasi-experimental design College students (n = 78) in USA	Physical	MBSRQ
Zabinski et al. (2001)	Evaluate whether computerized Student Bodies programme can reduce body image dissatisfaction, disordered eating patterns and preoccupation with shape/ weight among women at high risk for developing an eating disorder	Randomised controlled pre-test post-test experimental design Women psychology undergraduates (n = 62) in USA	Remote Individual	BSQ

Table 2 shows the treatment quality score, effect size and pre-intervention mean BMI for each treatment group included in the review. The effect size for two studies could not be calculated due to missing information in those papers.

Table 2.

Treatment group effect sizes, methodological quality score of studies, and pre-intervention treatment group BMI (used as a moderator)

Study	Paper	Intervention (category)	Quality score[1]	*d* (measure used)	Pre-intervention BMI *M (SD)*
1	Dunigan et al. (2011)	Massage (individual/ physical)	16	0.67*** (BISS: State body image)	23.3 (5.83)
2	Hilbert & Tuschen-Caffier (2004)	CBT-exposure group programme (face-to-face/ group)	18	1.13** (BSQ)	34 (10.2)
3	Hilbert & Tuschen-Caffier (2004)	CBT-cognitive restructuring group programme (face-to-face/ group)	18	1.53** (BSQ)	36.4 (10.4)
4	McLean et al. (2011)	CBT body image group programme (face-to-face/ group)	21	2.22* (BSQ)	31.7 (7.8)

Note. BISS – Body Image States Scale, BSQ – Body Shape Questionnaire
*effect size reported in paper
**effect size calculated by author
***eta squared effect size reported in paper and converted to Cohen's *d* by the author
1 Maximum possible score = 29

Table 2 (continued)

Treatment group effect sizes, methodological quality score of studies, and pre-intervention treatment group BMI (used as a moderator)

Study	Paper	Intervention (category)	Quality score[1]	*d* (measure used)	Pre-intervention BMI *M (SD)*
5	Mountford et al. (2014)	Body Image group programme (face-to-face/ group)	19	0.38* (EDE-Q: Shape concern)	15.6 (1.7)
6	Paxton et al. (2007)	Body image/ eating problems group programme (face to face) (face-to-face/ group)	18	1.28* (BSQ)	25.7 (6.0)
7	Paxton et al. (2007)	Body image/ eating problems group programme (internet) (remote/group)	18	0.58* (BSQ)	25.8 (5.8)
8	Perpina et al. (1999)	Virtual reality body image treatment (individual)	12	No M, SD or *d* reported	21.5 (3.2)
9	Peterson et al. (2006)	Exposure to feminist ideology (face-to-face/ individual)	18	2.30*** (VAS: Satisfaction with appearance)	21.8 (3.3)
10	Peterson et al. (2006)	Psychoeducational material (face-to-face/ individual)	18	0.41*** (VAS: Satisfaction with appearance)	23.5 (5.9)

Note. BSQ – Body Shape Questionnaire, EDE-Q –Eating Disorders Examination - Questionnaire , VAS – visual analogue scale
*effect size reported in paper
**effect size calculated by author
***eta squared effect size reported in paper and converted to Cohen's *d* by the author
1 Maximum possible score = 29

Table 2 (continued)

Treatment group effect sizes, methodological quality score of studies, and pre-intervention treatment group BMI (used as a moderator)

Study	Paper	Intervention (category)	Quality score[1]	*d* (measure used)	Pre-intervention BMI M (SD)
11	Ramirez & Rosen (2001)	Weight control and CBT for body image group (face-to-face/ group)	21	2.24** (BSQ)	34.91 (no SD)
12	Ramirez & Rosen (2001)	Weight control group (face-to-face/group)	21	1.53** (BSQ)	32.14 (no SD)
13	Riva et al. (2001)	Virtual reality body image treatment (individual)	16	No SD reported	43.5 (5.97)
14	Stewart et al. (2010)	Intensive lifestyle intervention (weight control), men) (face-to-face/ individual and group)	16	0.53* (Discrepancy between current/ideal body size)	33.9 (5.1)
15	Stewart et al. (2010)	Intensive lifestyle intervention (weight control), women) (face-to-face/ individual and group)	16	0.46* (Discrepancy between current/ideal body size	36.4 (5.6)

Note. BSQ – Body Shape Questionnaire
*effect size reported in paper
**effect size calculated by author
***eta squared effect size reported in paper and converted to Cohen's *d* by the author
1 Maximum possible score = 29

Table 2 (continued)

Treatment group effect sizes, methodological quality score of studies, and pre-intervention treatment group BMI (used as a moderator)

Study	Paper	Intervention (category)	Quality score[1]	*d* (measure used)	Pre-intervention BMI M (SD)
16	Taylor & Fox (2005)	Exercise referral intervention (physical)	20	2.10** (PSPP: physical appearance subscale)	28.7 (0.5)
17	Wade et al. (2009)	Brief acceptance technique (face-to-face/ individual)	18	0.77* (VAS: Appearance satisfaction)	22.48 (4.07)
18	Wade et al. (2009)	Brief distraction technique (face-to-face/ individual)	18	0.60* (VAS: Appearance satisfaction)	23.63 (5.89)
19	Wade et al. (2009)	Brief cognitive dissonance technique (face-to-face/ individual)	18	0.28* (VAS: Appearance satisfaction)	24.32 (4.26)
20	Williams & Cash (2001)	Circuit weight training (physical)	12	0.39** (MBRSQ)	23.9 (4.4)
21	Zabinski et al. (2001)	Internet-based programme for body image and eating behaviours (remote/ individual)	16	0.39* (BSQ)	24.8 (4.0)

Note. BSQ – Body Shape Questionnaire, VAS – visual analogue scale, PSPP – Physical Self-Perception Profile, MBRSQ - Multidimensional Body Self-Relations Questionnaire
*effect size reported in paper
**effect size calculated by author
***eta squared effect size reported in paper and converted to Cohen's *d* by the author
[1] Maximum possible score = 29

Narrative review

The studies in this review represent a range of interventions for body dissatisfaction. The results in Table 2 show that different interventions can reduce body dissatisfaction, but the range of effect sizes indicates that there is great variation in the degree of improvement.

Overall, face-to-face interventions appear to be more effective than those delivered via the internet. For example, Paxton et al.'s (2007) comparison of the same group content delivered in person or online found the online version to be less effective, and Zabinski et al. (2001) found a similar small-to-medium reduction in body dissatisfaction for their internet-based programme. The two studies testing virtual reality interventions did not provide sufficient data for calculation and comparison of treatment effect size. Their authors report some body dissatisfaction reduction in their results, but Perpina et al. (1999) was of poor methodological quality, and Riva et al. (2001) was underpowered.

Group programmes also appear to be highly effective for reducing body dissatisfaction. Many of the largest body dissatisfaction reductions were found in high quality studies of group programmes (Hilbert & Tuschen-Caffier, 2004; McLean, Paxton & Wertheim, 2011; Paxton et al., 2007; Ramirez & Rosen, 2001). The exceptions to this large body dissatisfaction change were group studies in which the sample were diabetic (Stewart et al., 2010) or had anorexia nervosa (Mountford et al., 2004), though both showed some improvement. Where group programmes were based on CBT, these appeared to be particularly effective (Hilbert & Tuschen-Caffier, 2004; McLean et al., 2011; Ramirez & Rosen, 2001). However, group programmes

not explicitly based on CBT also found significant reduction in body dissatisfaction (Paxton et al., 2007; Ramirez & Rosen, 2001).

Individual interventions also appear to be effective, but usually with smaller treatment effects than in group settings. Of these interventions, reading feminist material (Peterson, Tantleff-Dunn & Bedwell, 2006) or using a brief acceptance technique (Wade, George & Atkinson, 2009) appear to be the most effective. However, small reductions in body dissatisfaction can also be achieved through brief distraction techniques, reading psychoeducational material about the media, and cognitive dissonance techniques (Wade et al., 2009; Peterson et al., 2006).

It is not possible to determine gender effects on the outcome of body dissatisfaction interventions, as most involved mixed samples or females only. Only one study of acceptable quality reported results by gender (for adults with Type 2 diabetes undergoing a year-long weight control lifestyle intervention - Stewart et al., 2010). In this case, men and women showed similar reduction in their body dissatisfaction, with a medium treatment effect size in each case.

Physical interventions vary in their effectiveness and study quality. Massage produced some body dissatisfaction reduction in participants in a study of acceptable quality (Dunigan, King & Morse, 2011). However, the findings of Williams and Cash's (2001) study of circuit weight training, which they report as effective, must be treated with caution due to the study's poor quality. By contrast, Taylor and Fox's (2005) high quality study found an exercise referral programme to be highly effective in improving the body

satisfaction of a sample with significant coronary risk factors. It is difficult to judge the overall effectiveness of physical interventions for body dissatisfaction based on the findings of these three studies.

Where the mean BMI of study participants was in the obese range, treatment effects tended to be large (Hilbert & Tuschen-Caffier, 2004; MacLean et al., 2011; Ramirez & Rosen, 2001). The exceptions to this pattern were Peterson et al.'s (2006) feminist ideology intervention with healthy BMI participants, and Stewart et al.'s (2010) study with obese diabetic participants, which found only moderate effects. Taylor and Fox's (2005) exercise study with an overweight sample also found very large intervention effects. In general, those studies using healthy weight participants tended to have small to moderate effect sizes (Dunigan et al., 2011; Wade et al., 2009; Williams & Cash, 2001; Zabinski et al., 2001).

Summary. Overall, interventions that are delivered in a face-to-face group format appear to be the most effective for reducing body dissatisfaction, particularly where they are CBT-based and where the sample has a higher BMI. Other interventions delivered on an individual basis (such as structured exercise referral programmes, exposure to feminist ideology, and acceptance-based techniques) can also be beneficial. Interventions delivered via the internet or virtual reality technology produce lower levels of body dissatisfaction reduction.

Quantitative analyses

These analyses consider three factors for their potential association with the effect sizes of body image interventions – study quality, year of publication and BMI status.

Study quality and intervention effect size. Fourteen papers generated data for twenty-one different body dissatisfaction intervention group studies. Of these, two studies were excluded as their intervention group data were incomplete (Perpina et al., 1999; Riva et al., 2001). A Pearson product-moment correlation coefficient was calculated to assess the relationship between the methodological quality score and the treatment effect size of the remaining nineteen interventions (see Table 2). This showed a strong positive correlation between paper quality and effect size, $r = 0.643$, $N = 19$, $p = 0.003$. In case of non-normal distribution of data, a Spearman's *Rho* was also calculated, showing a similar positive correlation, $r_s = .557$, $n = 19$, $p = 0.013$. This shows that the higher quality studies produced the largest treatment effect sizes, whilst poorer quality studies tended to find smaller effect sizes.

Study quality over time. There was no significant correlation between study quality and year of publication, $r = 0.41$, $N = 19$, $p = .867$. Therefore, it appears that methodological quality has not consistently improved or worsened with time over the past 20 years.

BMI and intervention effect size. There was no correlation between treatment effect and pre-intervention treatment group BMI, $r = .371$, $N = 19$, $p = .118$. However, an independent samples t-test was calculated to

compare the outcomes of studies with underweight or healthy BMI participants (BMI ≤25) vs studies with overweight and obese participants (BMI of >25). Studies using overweight/obese participants had larger intervention effect sizes (mean *d* = 1.36, *SD* = 0.69) than those using underweight or healthy BMI participants (mean *d* = 0.69, *SD* = 0.63). This difference was significant, *t* (17) = 2.215, *p* = 0.041, 95% *CI* [1.312, 0.032]. Therefore, while BMI is not dimensionally associated with whether body image interventions work, it is categorically linked.

Discussion

The aim of this systematic review was to determine whether body mass index (BMI) moderates the effectiveness of interventions for body dissatisfaction (unexplored in earlier reviews). As a pre-requisite to this, it sought to ascertain whether body image interventions can improve body dissatisfaction for adults (as demonstrated in previous reviews).

This aim was achieved through a process of including only studies that reported separate mean BMI data for the treatment and control groups. The findings of the review are summarised below, as well as a critique of the methodology used, a commentary on the clinical implications of the review, and suggestions for further research.

Summary of Findings

First, a range of body image interventions reduce body dissatisfaction, but those delivered face-to-face in groups (Paxton et al., 2007; Ramirez &

Rosen, 2001), particularly groups using CBT components (Hilbert & Tuschen-Caffier, 2004; McLean et al., 2011; Ramirez & Rosen, 2001), appear to be most effective.

Second, research of higher methodological quality found larger treatment effect sizes (e.g., McLean et al., 2011; Ramirez & Rosen, 2001; Taylor & Fox, 2005). This is an important finding, which is an endorsement of striving for methodological rigour in research in this area.

Finally, body dissatisfaction interventions are more effective when the sample has a higher BMI. In general, studies using samples which had a mean BMI>25 (e.g., Hilbert & Tuschen-Caffier, 2004; McLean et al., 2011; Ramirez & Rosen, 2001), achieved significantly larger effect sizes than those with healthy BMI or underweight samples (e.g., Dunigan et al., 2011; Mountford et al., 2014; Wade et al., 2009).

Relationship to existing reviews

Alleva et al. (2015) and Lewis-Smith et al. (2016) also found that group programmes delivered in person reported larger treatment effects than those offered individually or remotely, and that CBT approaches were effective. However, Lewis-Smith et al. (2016) found a group programme based on Acceptance and Commitment Therapy (ACT) led to body image improvement - a finding that cannot be tested here as none of the studies in the present review used ACT. This review found that the effectiveness of exercise interventions varied, and study quality made conclusions difficult (e.g., Taylor & Fox, 2005; Williams & Cash, 2001). Similarly, Campbell and

Hausenblas (2009) found that exercise interventions produce a small effect size, possibly due to the type and frequency of the exercise.

In contrast to the findings of the present review, Alleva et al. (2015) found that studies with a high risk of bias (i.e., poorer or unclear methodological quality) produced larger intervention effect sizes. Campbell and Hausenblas (2009) did not find any link between publication bias and effect sizes. However, Lewis-Smith et al. (2016) found a low risk of bias in the three studies demonstrating the most effective interventions, supporting the findings of this review.

Only one review - of exercise interventions - considered BMI as a moderator of intervention effectiveness. Campbell and Hausenblas (2009) found larger effect sizes for overweight/obese participants than for healthy BMI participants, but this result was non-significant. The current review suggests that such effects are more widespread than those for exercise interventions alone.

Relationship to theory

It is worth considering theoretical explanations for why heavier individuals experience more benefit from body dissatisfaction interventions.

First, research has found higher levels of body dissatisfaction within the overweight non-clinical population, possibly due to the greater deviation of those individuals' bodies from the thin-ideal (Stice & Shaw, 2002). It is possible that higher baseline levels of dissatisfaction enable interventions to produce a larger reduction in body dissatisfaction than in healthy BMI

populations (with lower levels of baseline body dissatisfaction), resulting in larger treatment effect sizes.

Second, individuals who are overweight/obese could be less likely to engage in regular exercise than those of healthy BMI. Embarking on an exercise programme (e.g. Taylor & Fox, 2005), could help participants experience their bodies in a more positive way, increasing physical self-efficacy and valuing functionality as part of their body self-evaluation, rather than just appearance.

Finally, there could be cognitive or behavioural variables that are more common in overweight and obese individuals, and it is these variables that are successfully addressed by body image interventions. For example, someone who is heavier might be more likely to habitually avoid their own image, leading to overestimation of their body size, which would be addressed during exposure interventions. Factors such as reassurance-seeking and social anxiety might be higher in someone who is heavier (either as a cause or a consequence of weight gain), and these could be addressed through cognitive-behavioural interventions for body dissatisfaction, particularly where they are delivered in a group format that provides peer support.

Methodological critique of review

Two key limitations of this review include aspects of the initial literature search process. The two databases PubMed and PsychInfo were searched in order to include literature from both medical and psychological professional groups. However, using a third database, such as CINAHL,

could have included literature from a broader professional range of nursing and allied health professionals. In addition, the use of more search terms (e.g., therap*, psychotherap*) could have resulted in a greater number of relevant papers being included in the review, strengthening the findings. Both of these aspects of the search methodology therefore represent significant limitations of the review, which should be rectified if it were repeated.

The current review excluded studies that had not been published in a peer-reviewed journal, and that did not report a treatment group mean BMI. The first exclusion decision carries a risk of publication bias influencing the review findings (i.e., treatment effects are higher in published papers). The second exclusion decision was necessary to achieve the aims of the review, but has potentially excluded many effective interventions from analysis because the authors did not publish participant BMI data. Contacting authors for their participants' BMI data and including unpublished studies could have broadened the scope of this review. It is also important to acknowledge the limitations of BMI. It is a measure based on height and weight only, and does not reflect the health, body fat or body shape of an individual. BMI was used in this review as it is the most common way body image researchers report participants' weight-based physical characteristics. However, if the review were repeated, using data such as waist-to-height ratio to categorise a sample could offer an alternative, more nuanced measure of body size and shape as it relates to health (Ashwell, Gunn & Gibson, 2012).

Based on previous meta-analyses of interventions (e.g., Alleva et al., 2015), only studies which used a control group were included (thus

enhancing quality). However, the effect size and BMI data of the control group were not included in the final analysis. Therefore, it is possible that including all experimental studies would have increased the number of studies analysed.

In order to compare treatment group effect sizes, within-group effect sizes were obtained in three ways: extracted from the study; converted from eta squared to Cohen's *d*; and calculated by the author using pre- and post-treatment within-group means, standard deviations and correlation between the means. Converting and comparing effect sizes to Cohen's *d* carries a risk of loss of some information and means there is no upper limit to the effect size. Contacting the authors directly for missing data (e.g., correlation between the mean scores) could have improved the accuracy of the effect sizes reported in the review (Ellis, 2010).

The body image measurement tools used by the included studies vary from study-specific VAS to questionnaires with established validity and reliability. This diversity reflects the range of approaches to measuring body dissatisfaction and body image concerns. Cash (2002a) argues that most assessment tools focus mainly on trait body image, and do not capture the interplay of stable traits and contextual events that influence an individual's body image and body dissatisfaction. It is therefore possible that comparing intervention effect sizes measured by this variety of tools is not sufficiently precise to be confident about the review findings. However, the alternative – only including studies using the same or equivalent assessment tools – would have substantially limited the scope of the review.

Clinical implications

The body dissatisfaction of overweight/obese individuals is even more responsive to interventions than that of underweight/healthy BMI individuals, with very large effect sizes for the former group and moderate-large effect sizes for the latter. This distinction should inform health professionals and their clients when working to reduce body dissatisfaction within this population.

Unfortunately, clinicians tend to have ‘anti-fat’ attitudes, leading them to consider overweight and obese patients to be beyond help or undeserving of such help (e.g., Latner & Wilson, 2012; Murray, 2016; Tomiyama et al., 2015). The risk is that those attitudes will mean that clinicians miss the opportunity to help people who could benefit greatly from body dissatisfaction interventions. Such clinicians should be educated more widely about the results of research findings such as those of this review, in an effort to change their attitudes and practice, in order to treat patients with a higher BMI fairly with the best interventions.

This review indicates that the best interventions for body dissatisfaction will be group-based, should be delivered in person, and should use elements of CBT. This approach can benefit all, but should be of greatest benefit to body-dissatisfied people who are overweight or obese. Services such as obesity clinics might routinely offer interventions for body dissatisfaction as part of their treatment packages, to improve outcomes even when weight reduction is limited. Clinicians can expect to see improvements in body satisfaction in such clients, and should monitor

outcomes so that interventions can be adjusted if positive change is not occurring.

Future research

This review's finding that higher quality studies produced larger treatment effect sizes should encourage body image researchers to strive for methodological rigour throughout the design, conduct, and reporting of their studies. By working to the highest possible standards and clearly reporting all relevant details in their write-up, studies can generate important findings about treatment effectiveness, which have far-reaching implications for clinical practice and future research.

It is important to understand whether overweight/obese individuals' greater responsiveness to body dissatisfaction interventions is culturally invariant. Are men and women equally affected, and does age or ethnic background make a difference? Furture systematic reviews could examine large numbers of intervention studies and how effect size is moderated by gender, age, or ethnic group. This would produce a more detailed understanding of how treatment effectiveness varies within the overweight/obese population.

Once this variation is understood, then further studies are needed to determine why overweight/ obese individuals are even more responsive to body dissatisfaction interventions than individuals with a healthy BMI. Detailed exploration of the causes and maintaining factors in this population can lead to better interventions. Are there particular comorbid variables which are higher in an overweight/obese population? For example, it is

possible that the greater effect for individuals with higher BMIs is a product of their body dissatisfaction reflecting greater health concerns than for other groups, and that such health concerns are more amenable to this approach to treatment. This hypothesis could be addressed by comparing those overweight/obese individuals with more or less physical comorbidity (e.g., different classes of obesity), and exploring how perceived change in body functionality (e.g., fitness, strength), relates to changes in body dissatisfaction.

Another possibility could be that it is intra-individual cognitive and behavioural factors, such as habitual image-avoidance or social anxiety, which are responsible for maintaining body dissatisfaction. These factors may occur at higher levels in a population with a higher BMI. Research is needed that tests interventions within a sample with different BMI categories, and examines the role of variables such as image-avoidance and social anxiety with each BMI group. Findings from studies such as these could improve understanding about the mechanisms for change, and lead to interventions that can be targeted effectively for body-dissatisfied individuals and populations.

Conclusions

This systematic review found that the most effective body dissatisfaction interventions were delivered in person, in group formats, and using CBT components. It also showed that individuals with a higher BMI benefit more than those of lower BMI, and higher quality research found

greater improvements in body dissatisfaction. Further research is needed to understand why heavier individuals benefit more, and which particular interventions should be offered to different populations. Services and clinicians should routinely offer interventions for body dissatisfaction to adults of any BMI who present with body image distress.

References

Note: *studies included in review

**reviews used for hand searching of studies

Albertson, E. R., Neff, K. D., & Dill-Shackleford, K. E. (2015). Self-compassion and body dissatisfaction in women: A randomized controlled trial of a brief meditation intervention. *Mindfulness*, *6*, 444-454. doi: 10.1007/s12671-014-0277-3

Alleva, J. M., Martijn, C., Jansen, A., & Nederkoorn, C. (2014). Body language: Affecting body satisfaction by describing the body in functionality terms. *Psychology of Women Quarterly, 38*, 181-196. doi: 10.1177/0361684313507897

**Alleva, J. M., Sheeran, P., Webb, T. L., Martijn, C., & Miles, E. (2015). A meta-analytic review of stand-alone interventions to improve body image. *PLOS One, 10*, 1-32. doi:10.1371/journal.pone.0139177

Altabe, M., Wood, K., Herbozo, S., Thompson, J. K. (2004). The Physical Appearance Ambiguous Feedback Scale (PAAFS): A measure for indexing body image related cognitive bias. *Body Image, 1*, 299-304, doi: 10.1016/j.bodyim.2004.05.004

Ashwell, M., Gunn, P., & Gibson, S. (2012). Waist-to-height ratio is a better screening tool than waist circumference and BMI for adult cardiometabolic risk factors: Systematic review and meta-analysis. *Obesity*, *13*, 275-286, doi: 10.1111/j.1467-789X.2011.00952.x

Bessenoff, G. (2006) Can the media affect us? Social comparison, self-discrepancy, and the thin ideal. *Psychology of Women Quarterly*, *30*, 239-51, doi: 10.1111/j.1471-6402.2006.00292.x

Bhatnagar, K. A. C., Wisniewski, L., Solomon, M., & Heinberg, L. (2012). Effectiveness and feasibility of a cognitive-behavioural group intervention for body image disturbance in women with eating disorders. *Journal of Clinical Psychology*, *69*, 1-13. doi: 10.1002/jclp.21909

Boyatzis, C. J., Kline, S. & Backof, S. (2007). Experimental evidence that theistic-religious body affirmations improve women's body image. *Journal for the Scientific Study of Religion, 46*, 553-564. doi: 143.167.2.135

Bucchianeri, M. M., Arikian, A. J., Hannan, P. J., Eisenberg, M. E., & Neumark-Sztainer, D. (2012). Body dissatisfaction from adolescence to young adulthood: Findings from a 10-year longitudinal study. *Body Image, 10*, 1-7. doi: 10.1016/j.bodyim.2012.09.001

Bulik,. C. M., Wade, T. D., Heath, A. C., Martin, A. G., Stunkard, A. J., & Eaves, L. J. (2001). Relating body mass index to figural stimuli: Population-based normative data for Caucasians. *International Journal of Obesity and Related Metabolic Disorders*, *25*, 1517-1524. doi: 10.1038/sj.ijo.0801742

Burley, L. D., & Shurts, W. M. (2013). Men and body image: Current issues and counselling implications. *Journal of Counseling and Development*, *91*, 428-435. doi: 10.1002/j.1556-6676.2013.00114.x

**Campbell, A. & Hausenblas, H. A., (2009). Effects of exercise interventions on body image. *Journal of Health Psychology, 14*, 780-793. doi: 10.1177/1359105309338977

Cash, T. F. (2000). *The Multidimensional Body-Self Relations Questionnaire users' manual.* Available from the author at. www.body-images.com

Cash, T. F., Fleming, E. C., Alindogan, J., Steadman, L., & Whitehead, A. (2002). Beyond body image as a trait: The development and validation of the Body Image States Scale. *Eating Disorders*, *10*, 103-113. doi: 10.1080/10640260290081678

Cash, T. F. (2002a). Assessing body image states. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp. 163-170). New York, NY: Guilford Press.

Cash, T. F. (2002b). A "negative body image": Evaluating epidemiological evidence. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp. 269-276). New York, NY: Guilford Press.

Cash, T. F., & Labarge, A. S. (1996). Development of the Appearance Schemas Inventory: A new cognitive body-image assessment. *Cognitive Therapy and Research*, *20*, 37-50. doi: 10.1007/BF02229242

Cohen, J. (1988). *Statistical power analysis for the behavioural sciences*. (2nd ed.). Hillsdale, NJ: Erlbaum.

Cooper, P. J., Taylor, M. J., Cooper, Z., & Fairburn, C. G. (1987). The development and validation of the Body Shape Questionnaire. *International Journal of Eating Disorders, 6*, 485-494. doi: 10.1002/1098-108X

DeCoster, J. (2012). Spreadsheet for converting effect size measures. Available from: http://www.stat-help.com/spreadsheets/Converting%20effect%20sizes%202012-06-19.xls (accessed 04.03.2017)

Downs, S. H., & Black, N. (1998). The feasibility of creating a checklist for the assessment of the methodological quality both of randomised and non-randomised studies of health care interventions. *Journal of Epidemiology and Community Health, 52*, 377-384. doi: 10.1136/jech.52.6.377

*Dunigan, B. J., King, T. K., & Morse, B. J. (2011). A preliminary examination of the effect of massage on state body image. *Body Image, 8*, 411-414. doi: 1016/j.bodyim.2011.06.004

Ellis, P. D. (2010). *The essential guide to effect sizes*. Cambridge, UK: Cambridge University Press.

Fairburn C. G., & Cooper, Z. (1993). The Eating Disorder Examination (twelfth edition). In C. G. Fairburn & G. T. Wilson (eds.). *Binge Eating:*

Nature, Assessment and Treatment. (pp. 317-360). New York, NY: Guilford Press.

***Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: Interview or self-report questionnaire? *International Journal of Eating Disorders*, *16*, 363-370.

Farrell, C., Shafran, R., & Lee, M. (2006). Empirically evaluated treatments for body image disturbance. A review. *European Eating Disorders Review*, *14*, 289-300. doi: 10.1002/erv.693

Fox, K. R. (1990). *The physical self-perception profile manual*. DeKalb, IL: Office of Health Promotion, Northern Illinois University Physical Self-Perception Profile.

Fox, K. R. & Corbin, C. B. (1989). The physical self-perception profile: Development and preliminary validation. *Journal of Sport & Exercise Psychology*, *11*, 408-430. doi: 10.1123/jsep.11.4.408

Garner, D. M. (1997). The 1997 body image survey results. *Psychology Today*. 1997, *30*, pp.30-44. Retrieved from: https://www.psychologytoday.com/articles/199702/survey-says-body-image-poll-results

Garner, D., Olmstead, M., & Polivy, J. (1983). Development and validation of a multidimensional eating disorder inventory for anorexia nervosa and bulimia. *International Journal of Eating Disorders*, *2*, 15-35. doi: 10.1002/1098-108X

Ghaderi, A., & Scott, B. (2001). Prevalence, incidence and prospective risk factors for eating disorders. *Acta Psychiatrica Scandinavica*, *104*, 122-130. doi: 10.1034/j.1600-0447.2001.00298.x

Girlguiding UK (2016). Girls' attitudes. Retrieved on 9th April 2017 from https://www.girlguiding.org.uk/globalassets/docs-and-resources/research-and-campaigns/girls-attitudes-survey-2016.pdf

Grogan, S. (2017). *Body image* (3rd ed.). Abingdon, UK: Routledge.

Hargreaves, D. A., & Tiggeman, M. (2009). Muscular ideal media images and men's body image: Social comparison processing and individual vulnerability. *Psychology of Men and Women*, *10*, 109-119. doi: 10.1037/a0014691

Hart, E. A., Leary, M. R., & Rejeski, W. J. (1989). The measurement of social physique anxiety. *Journal of Sport and Exercise Psychology*, *11*, 94-104. doi: 10.1123/jsep.11.1.94

Health and Social Care Information Centre (2016). Statistics on obesity, physical activity and diet. Retrieved from: http://content.digital.nhs.uk/catalogue/PUB20562/obes-phys-acti-diet-eng-2016-rep.pdf

Heinberg, L. J., & Thompson, J. K. (1995). Body image and televised images of thinness and attractiveness: A controlled laboratory investigation. *Journal of Social and Clinical Psychology*, *14*, 324-338. doi: 10.1521/jscp.1995.14.4.325

Higgins, E. T. (1987). Self-discrepancy: A theory relating self and affect. *Psychological Review, 94*, 319-40, doi: 10.1037/0033-295X.94.3.319

Hilbert, A., Tuschen-Caffier, B., & Vogele, C. (2002). Effects of prolonged and repeated body image exposure in binge-eating disorder. *Journal of Psychosomatic Research*, *52*, 137-144. doi: 10.1016/S0022-3999(01)00314-2

*Hilbert, A., & Tuschen-Caffier, B. (2004). Body image interventions in cognitive-behavioural therapy of binge-eating disorder: a component analysis. *Behaviour Research and Therapy, 42*, 1325-1339. doi: 10.1016/j.brat.2003.09.001

Jackson, L. (2002). Physical attractiveness: A sociocultural perspective. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp.13-21). New York, NY: Guilford Press.

Latner, J. D., & Wilson, R. E. (2012). Obesity and body image in adulthood. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice and prevention* (2nd ed.). (pp.189-197). New York, NY: Guilford Press.

Levine, M. P., & Smolak, L. (2002). In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp.74-82). New York, NY: Guilford Press.

Martin Ginish, K. A., Eng., J.J., Arbour, K. P., Hartman, J. W., & Philips, S. M. (2005). Mind over muscle? Sex differences in the relationship

between body image change and subjective and objective physical changes following a 12-week strength-training programme. *Body Image*, *2*, 363-372. doi: 10.1016/j.bodyim.2005.08.003

McKinley, N. M. (2002). Feminist perspectives and objectified body consciousness. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp.55-62). New York, NY: Guilford Press.

*McLean, S. A., Paxton, S. J., & Wertheim, E. H. (2011). A body image and disordered eating intervention for women in midlife: A randomized controlled trial. *Journal of Consulting and Clinical Psychology, 79*, 751-758. doi: 10.1037/a0026094

Moher, D., Liberati, A., Tetzlaff, J., Altman, D.G., & the PRISMA Group (2009). Preferred reporting items for systematic reviews and meta-analysis: The PRISMA statement. *Annals of Internal Medicine*, *151*, 264-270. doi:10.1371/journal.pmed.1000097

Morris, S. B., & DeShon, S. P. (2002). Combining effect size estimates in meta-analysis with repeated measures and independent groups designs. *Psychological Methods*, *7*, 105-125, doi: 10.1037//1082-989X.7.1.105

*Mountford, V. A., Brown, A., Bamford, B., Saeidi, S., Morgan, J. F., & Lacey, H. (2014). BodyWise: Evaluating a pilot body image group for patients with anorexia nervosa. *European Eating Disorders Review, 23*, 62-67. doi: 10.1002/erv.2332

Murray, S. (2016). *The 'fat' female body*. London, UK: Palgrave.

Nicolino, J. C., Martz, D. M., & Curtin, L. (2001). Evaluation of a cognitive-behavioral therapy intervention to improve body image and decrease dieting in college women. *Eating Behaviors, 2*, 353-362. doi: 10.1016/S1471-0153(01)00043-5

*Paxton, S. J., McLean, S. A., Gollings, E. K., Faulkner, C., & Wertheim, E. H. (2007). Comparison of face-to-face and internet interventions for body image and eating problems in adult women: An RCT. *International Journal of Eating Disorders, 40*, 692-704. doi: 10.1002/eat

*Perpina, C., Botella, C., Banos, R., Marco, H., Alcaniz, M., & Quero, S. (1999). Body image and virtual reality in eating disorders: Is exposure to virtual reality more effective than the classical body image treatment? *CyberPsychology and Behaviour, 2*, 149-155. doi: 10.1089/cpb.1999.2.149

*Peterson, R. D., Tantleff-Dunn, S., & Bedwell, J. S. (2006). The effects of exposure to feminist ideology on women's body image. *Body Image, 3*, 237-246. doi: 10.1016/j.bodyim.2006.05.004

Phillips, K. A. (2002). Body image and body dysmorphic disorder. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp.312-321). New York, NY: Guilford Press.

*Ramirez, E. M., & Rosen, J. C. (2001). A comparison of weight control and weight control plus body image therapy for obese men and women. *Journal of Consulting and Clinical Psychology, 69*, 440-446. doi: 10.1037/0022-006X.69.3.440

Reed, J. C., Thompson, J., Brannick, M. T., & Sacco, W. P. (1991). Development and validation of the Physical Appearance State and Trait Anxiety Scale (PASTAS). *Journal of Anxiety Disorders*, *5*, 323-333. doi: 10.1016/0887-6185(91)90032-O

Reiter, J. T., & Rosen, J. C. (2000). *The development of a self-administration version of the Body Dysmorphic Disorder Examination*. Unpublished manuscript, Department of Psychology, University of Vermont at Burlington.

*Riva, G., Bacchetta, M., Baruffi, M., & Molinari, E. (2001). Virtual reality-based multidimensional therapy for the treatment of body image disturbances in obesity: A controlled study. *CyberPsychology and Behaviour, 4*, 511-526. doi: 10.1089/109493101750527079

Rodin, J., Silberstein, L.R. & Striegel-Moore, R.H. (1984). Women and weight: A normative discontent. In T. B. Sondereger (Ed.) *Nebraska symposium on motivation; Psychology and gender*, *32*, (pp.267-307), Lincoln, NE: University of Nebraska Press.

Rosen, J. C., Srebnik, D., Saltzberg, E., & Wendt, S. (1991). Development of a Body Image Avoidance Questionnaire. *Psychological Assessment:*

A Journal of Consulting and Clinical Psychology, 3, 32-37. doi:10.1037//1040-3590.3.1.32

Rosenberg, M. (1979). *Conceiving the self*. New York, NY: Basic Books.

Rosenthal, R. (1993). *Meta-analytic procedures for social research*. Newbury Park, CA: Sage.

Ryckman, R. M., Robbins, M. A., Thornton, B., & Cantrell, P. (1982). Development and validation of a Physical Self-Efficacy Scale. *Journal of Personality and Social Psychology, 42*, 891-900. doi: 10.1037/0022-3514.42.5.891

Salkovskis, P. M. (1991). The importance of behavior in the maintenance of anxiety and panic: A cognitive account. *Behavioural Psychotherapy*, *19*, 6–19. doi: 10.1017/S0141347300011472

Shafran, R., Fairburn, C.G., Robinson, P., & Lask, B. (2004). Body checking and its avoidance in eating disorders. *International Journal of Eating Disorders, 35,* 93-101. doi:10.1002/eat.10228

Shafran, R., Lee, M., Payne, E., & Fairburn, C. G. (2007). An experimental analysis of body checking. *Behaviour Research and Therapy*, *45*, 113-121. doi: 10.1016/j.brat.2006.01.015

Slade, P., Dewey, M., Newton, T., Brodie, D., & Kiemle, G. (1990). Development and preliminary validation of the Body Satisfaction Scale (BSS). *Psychology and Health, 4,* 213-220. doi:10.1080/08870449008400391

Smolak, L. (2002). Body image development in children. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp.65-73). New York, NY: Guilford Press.

Shafran, R., Fairburn, C. G., Robinson, P., & Lask, B. (2004). Body checking and its avoidance in eating disorders. *International Journal of Eating Disorders*, *35*, pp. 93-101. doi: 10.1002/eat.10228

Stewart, T. M., Allen, H. R., Han, H., & Williamson, D. A. (2009). The development of the Body Morph Assessment version 2.0 (BMA 2.0): tests of reliability and validity. *Body Image*, *6*, 67–74. doi: 10.1016/j.bodyim.2009.01.006

*Stewart, T. M. Bachand, A. R., Han, H., Ryan, D. H., Bray, G. A., & Williamson, D. A. (2010). Body image changes associated with participation in an intensive lifestyle weight loss intervention. *Obesity, 19*, 1290-1295. doi: 10.1038/oby.2010.276

Stice, E., & Shaw, H. E. (2002). Role of body dissatisfaction in the onset and maintenance of eating pathology: A synthesis of research findings. *Journal of Psychosomatic Research*, *53*, 985-993. doi: 10.1016/S0022-3999(02)00488-9

Strauman, T. J., Vookle, J., Berenstein, V., & Chaiken, S. (1991) Self-discrepancies and vulnerability to body dissatisfaction and disordered eating. *Journal of Personality and Social Psychology 61*, 946-56, doi: 10.1037/0022-3514.61.6.946

Streigel-Moore, R. H., & Franko, D. L. (2002). Body image issues among girls and women. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp. 183-191). New York, NY: Guilford Press.

*Taylor, A. H., & Fox, K. R. (2005). Effectiveness of a primary care exercise referral intervention for changing physical self-perceptions over 9 months. *Health Psychology, 24*, 11-21. doi: 1037/0278-6133.24.1.11

Thompson, J. K., Heinberg, L. J., Altabe, M. & Tantleff-Dunn, S. (1991). The Physical Appearance Comparison Scale (PACS). *The Behavior Therapist*, *14*, 174. Retrieved from: http://jkthompson.myweb.usf.edu/pacsweb.html

Thompson, J. K., & Altabe, M. N. (1991). Psychometric qualities of the Figure Rating Scale. *International Journal of Eating Disorders*, *10*, 615-619. doi: 10.1002/1098-108X

Thompson, J. K., & van den Berg, P. (2002). Measuring body image attitudes among adolescents and adults. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp. 142-154). New York, NY: Guilford Press.

Tiggemann, M. (2002). Media influences on body image development. In T. F. Cash & T. Pruzinsky (Eds.), *Body image: A handbook of theory, research and clinical practice* (pp. 91-97). New York, NY: Guilford Press.

Tomiyama, A. J., Finch, L. E., Incollingo Belsky, A. C., Buss, J., Finley, C., Schwartz, M. B., & Daubonmier, J. (2015). Weight bias in 2001 versus 2013: Contradictory attitudes among obesity researchers and health professionals. *Obesity*, *23*, 46-53. doi: 1002/oby.20910

Waadt, S., Laessle, R. G., & Pirke, K. M. (1992). *Bulimie: Ursachen und therapie*. Heidelberg, Germany: Springer.

*Wade, T., George, W. M., & Atkinson, M. (2009). A randomized controlled trial of brief interventions for body dissatisfaction. *Journal of Consulting and Clinical Psychology, 77*, 845-854. doi: 1037/a0016879

Waller, G., Cordery, H., Corstorphine, E., Hinrichsen, H., Lawson, R., Mountford, V., & Russell K. (2007). *Cognitive behavioral therapy for eating disorders: A comprehensive treatment guide*. Cambridge, UK: Cambridge University Press.

*Williams, P. A., & Cash, T. F. (2001). Effects of a circuit weight training program on the body images of college students. *International Journal of Eating Disorders, 30*, 75-82. doi: 10.1002/eat.1056

*Zabinski, M. F., Pung, M. A., Wilfley, D. E., Eppstein, D., L., Winzelberg, A., J., Celio, A., & Barr Taylor, C. (2001). Reducing risk factors for eating disorders: Targeting at-risk women with a computerized psychoeducational program. *International Journal of Eating Disorders, 29*, 401-408. doi: 10.1002/eat.1036

Section Two: Research Report

What factors moderate the impact of brief mirror exposure on the body image of women of different body mass indices?

This page is intentionally left blank

Abstract

Objective: Mirror exposure is an effective treatment for body image disturbance, but its impact can be reduced for individuals with high levels of social anxiety or reassurance-seeking. This study replicated and extended a previous pilot study, to determine the impact of brief mirror exposure on a non-clinical sample of women of different body mass indices (BMIs). The moderating effect of reassurance-seeking, social anxiety, and body avoidance was examined.

Design: Non-randomized experimental design, examining the impact of mirror exposure on women of healthy BMI and overweight/obese BMI.

Method: Forty-six women completed measures of reassurance-seeking, social anxiety, and body image avoidance, and undertook a 15-minute mirror exposure intervention. Pre- and post-intervention body perception and body satisfaction scores were obtained.

Results: Analyses showed that overweight/obese women experienced improved body satisfaction and body perception immediately following mirror exposure. Reassurance-seeking, social anxiety and body image avoidance did not affect the impact of mirror exposure.

Conclusions: Brief mirror exposure is most effective at improving body image for women who are overweight/obese, but further research is required to establish the moderators of exposure effectiveness.

Practitioner points

- Brief mirror exposure is an effective intervention for body image disturbance for non-clinical women who are overweight/obese.
- Mirror exposure should be routinely offered to body-dissatisfied women who are overweight/obese, despite the short-term anxiety it can induce in individuals and clinicians
- Single-session mirror exposure ('flooding') may be more resource-efficient and effective than a multi-session graded mirror exposure approach to address body image disturbance

Research points:

- Further research with a larger sample is needed to determine why body-disturbed women of healthy BMI do not experience improvement in their body image
- Future studies should use a larger sample to determine the moderators of mirror exposure effectiveness
- Future research could include measures to determine the role of body image investment and social appearance anxiety in maintaining body image disturbance

Introduction

Body Image

Body image is the mental picture an individual forms of their body. Its key elements are body percept (the perceived size and shape of the body) and body concept (the individual's subjective psychological and behavioural attitudes toward their body; Jarry & Ip, 2005). In Western societies, body image issues are pervasive, and are more severe for women who have an eating disorder or weight problem (Coker & Abraham, 2014; Grogan, 2017; Latner & Wilson, 2012; Waller et al., 2007).

A range of measures assess these perceptual and attitudinal aspects of body image, usually focusing on trait rather than state body image (Cash, 2012a). In a non-clinical population, high levels of body image disturbance are associated with low self-esteem, social anxiety, depression, and disordered eating (Farrell, Shafran & Lee, 2006; Ghaderi & Scott, 2001; Tantleff-Dunn & Lindner, 2012). Body image disturbance is a core feature of eating disorders, and reducing it has been shown to reduce the risk of relapse (Delinsky, 2012; Keel, Dorer, Franko, Jackson & Herzog, 2005).

Cognitive Behavioural Approach to Body Image Concerns

The cognitive behavioural approach is the dominant paradigm in body image research and treatment (Cash, 2012b). Cognitive behavioural therapy (CBT) has been shown to be an effective treatment for body image disturbance in clinical and non-clinical populations (Alleva et al., 2015; Jarry & Cash, 2012; Jarry & Ip, 2005). Body image CBT focuses on the maintaining factors in body image problems, though historical factors such as dysfunctional body image schemas are sometimes addressed (Cash,

2012b).

Body image concerns can be maintained by a number of processes, including unhelpful cognitions, emotions and safety behaviours. Body image-related cognitions include distortion, thin-idealisation, attentional biases and social comparison. These activate negative emotions such as anxiety and low mood, creating a negative feedback loop. Habitual behaviours then serve to (temporarily) reduce the negative thoughts and feelings about the body. These safety behaviours include body checking/weighing, appearance-fixing, disordered eating, reassurance-seeking and image avoidance (Shafran, Fairburn, Robinson & Lask, 2004). However, there is strong evidence that using these behaviours results in a longer-term worsening of eating pathology (Bailey & Waller, in press).

Body image avoidance is one of the key maintenance safety behaviours. An individual initially reduces their anxiety by avoiding their body (e.g., avoiding mirrors, wearing baggy clothes), but eventually becomes increasingly anxious and develops even poorer body image due to the lack of any feedback that could address the anxiety. It is important to outline how body image avoidance can be addressed.

Exposure Interventions for Body Image Disturbance

Effective treatments for body image avoidance are exposure-based (Key et al., 2002; Norris, 1984; Waller et al., 2007). This approach allows the individual's anxiety to reduce, so that they can develop more accurate body perception and cognitions. The individual is encouraged to undertake exposure to their own body image through mirror exposure with response prevention (i.e., individuals need to keep looking at themselves in the mirror,

without looking away, until their anxiety reduces). This in vivo method of exposure involves flooding rather than graded exposure. It has an impact on body perception and bodily self-esteem, and is more effective than cognitive and educational approaches (e.g., Hildebrandt, Loeb, Troupe & Delinsky, 2012; Key et al., 2002). Whilst looking in the mirror, individuals are often asked to describe their body in neutral terms in order to de-emphasize any negative evaluations (Jansen et al., 2008). Mirror exposure can be mindfulness-based (Wilson, 1999), pure or guided (i.e., spontaneous description or answering therapist questions - Moreno-Dominguez, Rodriguez-Ruiz, Fernandez-Santaella, Jansen & Tuschen-Caffier, 2012), and it can vary in the duration and number of exposure sessions. Mirror exposure has been shown to be effective in reducing body image distortion for the eating disorders (Tuschen-Caffier, Pook & Frank, 2001), for non-eating-disordered women (Delinsky & Wilson, 2006; Moreno-Dominguez et al., 2012), and for obese individuals (e.g., Jansen et al., 2008).

However, while mirror exposure is the most effective method for reducing body image distortion overall, the variance in study findings show that it is not effective for everyone. Not all individuals show improvements in body image following the intervention, but the reasons for this pattern of variation are not understood. It is worth exploring why mirror exposure works differently for different people.

The Role of Individual Factors in Exposure Effectiveness

Social anxiety and reassurance-seeking. It can be hypothesised that the reason that some people do not respond to the direct feedback that mirror exposure provides is that they tend to rely on external opinions rather

than their own judgements. If that is the case, then the key psychological characteristics that moderate the impact of body image exposure are likely to be social anxiety and reassurance-seeking. Social anxiety is clearly established as a comorbid state in the eating disorders and eating, weight and shape concerns among non-clinical individuals (Hinrichsen, Wright, Waller & Meyer, 2003). However, reassurance-seeking is an almost totally unknown factor in the empirical literature on eating pathology, though it is more widely researched in anxiety disorders (Cougle et al., 2012; Rector, Kamkar, Cassin, Ayearst & Laposa, 2011).

A pilot study (Waller & Robinson, under consideration) tested the role of reassurance-seeking and social anxiety in moderating the impact of relatively brief (nine-minute) mirror exposure for women with healthy body mass indices (BMIs) and no eating disorder diagnosis. The whole sample had improved body perception as a result of mirror exposure. However, those who habitually sought reassurance from other people (rather than trusting their own views) benefitted less from mirror exposure in terms of improved body satisfaction (Waller & Robinson, under consideration). This sample only included women of a healthy BMI. It is worth considering whether reassurance-seeking as a moderator of mirror exposure effectiveness might be different for women who are heavier.

Body Mass Index (BMI). BMI is calculated as (weight[kg]/ height[m^2]). It is used to assess weight in relation to height, and to compare individuals. BMI categories are: underweight (BMI <18.5), healthy weight (BMI 18.5-25), overweight (BMI >25-30), and obese (BMI >30). BMI is widely used clinically and in research, but can only be considered a loose proxy for

body shape or health, due to its failure to account for body composition or racial and sex differences. The mean BMI in the UK is 27.2 (Health & Social Care Information Centre, 2016). Therefore the BMI category 18.5-25 is referred to as ‘healthy BMI’ rather than ‘normal BMI’ throughout this paper, with the recognition that neither term is entirely accurate for this category. There is very little research that directly compares the effectiveness of body image interventions in samples with different BMI (e.g., Alleva et al., 2015). Studies such as Waller and Robinson (under consideration) require replication and extension to determine the role of BMI in the effectiveness of mirror exposure.

In the Western world, research has shown that overweight or obese individuals are more likely than those of healthy BMI to be body-dissatisfied, and to report social difficulties related to their body image and weight (Tantleff-Dunn & Lindner, 2012). People who are obese also tend to overestimate their size to a greater degree than non-overweight people (Latner & Wilson, 2012). It is not clear whether social anxiety and reassurance-seeking would have similar levels of moderating effects for overweight/obese individuals, where weight stigma might increase the effects of such moderators. For example, individuals who are overweight might seek more reassurance to set against stigmatizing experiences, or have more fear of negative evaluation as a result of their physical status (Latner & Wilson, 2012; Murray, 2016).

This study

This study replicated and extended the research conducted by Waller and Robinson (under consideration). The two areas of extension were: using

a sample that included women of healthy BMI and women with an overweight/obese BMI, and taking pre-intervention measurement of participants' trait body image avoidance. As the latter is a key safety behaviour in body image disturbance, identifying the role of participants' body image avoidance was important. Therefore, this study investigated the moderating effects of reassurance-seeking, social anxiety and trait body image avoidance on brief mirror exposure treatment for body image disturbance in non-eating-disordered women. It compared those moderating effects in women with a healthy BMI, and those with an overweight/obese BMI, to determine whether the same effects are found for mirror exposure.

Aims of the Research

The main aims of the study were:

1. To determine levels of body image disturbance for women with healthy vs overweight/obese BMIs (hypothesis 1)
2. To determine the impact of brief mirror exposure on body image for all women (within-group), and for women in different BMI groups (between-groups, using planned comparisons, hypotheses 2-3)
3. To determine the moderators of the impact of mirror exposure on body image, by determining whether pre-treatment variables impact on the outcome of treatment. This will be tested separately for each group (hypotheses 4-6)

Hypotheses

1. There will be a difference between the body size overestimation of women of healthy weight and women who are overweight/ obese

2. Anxiety levels will rise then fall during the intervention for the whole sample, and for either group
3. Body image will improve overall (body perception and body satisfaction) for the whole sample and for both groups
4. Reassurance-seeking will reduce the impact of mirror exposure on body image for both groups
5. Social anxiety will reduce the impact of mirror exposure on body image for both groups
6. Higher levels of trait body image avoidance will increase the impact of mirror exposure on body image for both groups

Method

Design

This research used a non-randomized experimental design. It examined the impact of a brief exposure-based treatment for body image among women grouped into two BMI categories (healthy BMI vs overweight/obese), and considered the impact of psychological and behavioural moderators in both groups. It used a mixed within-subject (pre- and post-intervention) and between-subject (BMI group) approach.

Sample size calculation

G*Power 3.1.5 was used to calculate sample size, as there were pre-existing effect sizes to work from. Two core outcomes were used – change in body image, and association of body image change with moderator variables:

(1) To determine the sample size needed to demonstrate change in

body image within each group, using Waller and Robinson's (under consideration) findings (effect size 0.63), a sample size of 17 per group would be sufficient to ensure a power of 0.80, with a p value of 0.05. If 23 participants were recruited per group, the power would be 0.90. Therefore, the target N was 34-46 (see Appendix H for power calculation workings).

(2) To determine the sample size needed to establish the reliability of the correlation between the potential moderators of body image change, the effect sizes yielded by Waller and Robinson (Waller & Robinson, under consideration), were used (0.32). Assuming a power of 0.80 and a *p* value of 0.05, a total of 56 participants were needed per BMI group (see Appendix H for power calculation workings).

In order to ensure adequate N for both of these purposes, a total sample of 112 was sought.

Ethical considerations

This research was approved by the University of Sheffield, Department of Psychology Research Ethics Committee. See Appendix C for supporting documentation. The project was registered as a clinical trial with the University Research Management System (project code 143409).The only incentive for participating was course credits available to first year psychology undergraduates for taking part in university research. Three women were eligible for and received these credits. All other participants received no compensation.

The research took place in a university room which maintained participants' privacy. As the intervention involved participants doing something which they might habitually avoid, it was anticipated that it could be uncomfortable for them to take part. Participants were briefed by the researcher, informed of their right to withdraw, and gave their written consent (see Appendix D and E). The researcher had details of the University Health Service to give participants who became distressed, to arrange further support for themselves if they wished. Four participants became distressed during the intervention and were asked if they wished to stop and/or leave. All chose to complete the process of participating.

Participants' data was recorded and stored anonymously on a password-protected file. If participants provided an email address, this was also stored confidentially. All participant paper data were used only for the purposes of this research and were destroyed once they were no longer required.

Participants

Recruitment. Recruitment targeted adult women living in the community and willing to participate in research about body image. In order to ensure a wide range of BMIs, participants were recruited from two sources - a university volunteer email system and local community slimming club meetings. The first stage of university recruitment took place in July-August 2015. The second stage of recruitment took place in September-October 2016 through approaching local community slimming clubs and the university list again. This second recruitment stage was designed to enhance the recruitment of women with above-normal BMI (i.e., overweight or obese (BMI

>25); see Appendices F and G for recruitment literature). Most appointments were booked through an online appointment booking system or by email correspondence with the researcher. Three appointments were made in person with the researcher by women attending community slimming club meetings.

Inclusion and exclusion criteria. Through purposive sampling, the aim was to recruit equal numbers of women with a healthy BMI (BMI = 18.5-25), and women who were overweight or obese (BMI >25).

Inclusion criteria:

- Women who responded to recruitment literature
- Aged over 18

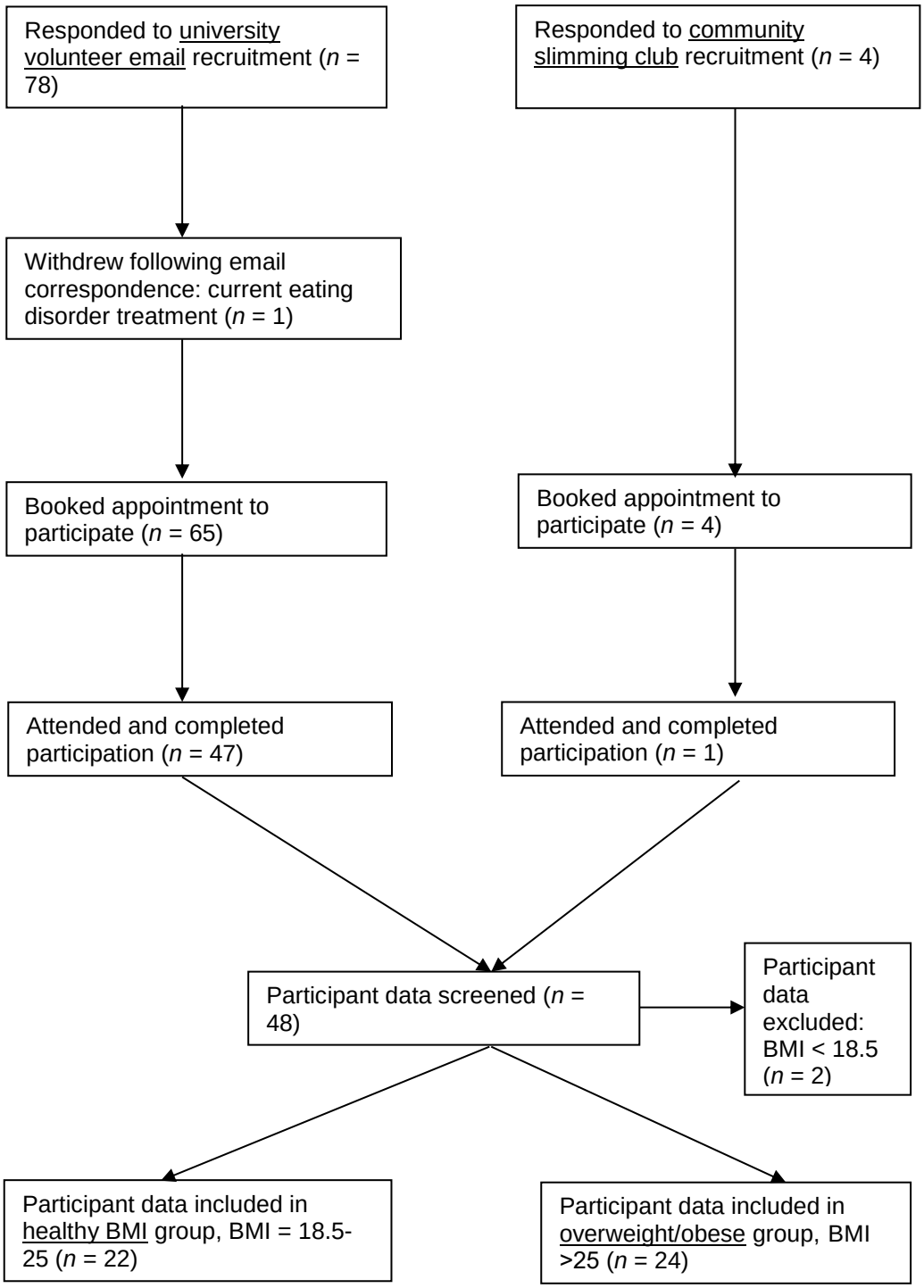
Exclusion criteria:

- BMI <18.5
- Current treatment for an eating disorder or body image problems
- Previous treatment for an eating disorder or body image problems
- Unable to complete the measures in a meaningful way (e.g. not fluent in English, learning disability).

Before undertaking the intervention, each participant answered a screening question about whether they had received any treatment, or were currently receiving treatment, for an eating disorder. No participants met these exclusion criteria.

Flow of participants into final sample. Figure 1 shows the flow of participants into the final sample (*N* = 46).

Figure 1. Participant flow chart



Measures

Height and weight. Height and weight were measured by the researcher using a portable stadiometer and portable digital scales. From these data, BMI was calculated for each participant [37](weight[kg]/height[m^2]).

The three trait measures completed pre-intervention were:

(1) **Reassurance-seeking**. Depressive and Obsessive Reassurance Seeking Scale (DORSS, Radomsky, Parrish & Dugas, 2009). This 30-item self-rated scale was used to measure reassurance-seeking. It has three 10-item subscales, Overt/Active Obsessive-Compulsive Reassurance-Seeking (OC-A), Covert/Passive Obsessive-Compulsive Reassurance-Seeking (OC-P), and Depressive Reassurance-Seeking (D-AP). A higher score shows higher levels of reassurance-seeking (see Appendix I). The measure has excellent internal consistency (α = 93) and convergent validity (strong correlation with the Vancouver Obsessional-Compulsive Inventory, *r* = .67, Radomsky et al., 2009). The internal consistency of the DORSS for this study was good (α = .89).

(2) **Fear of negative evaluation**. Fear of Negative Evaluation Scale, brief version (FNE, Leary, 1983). This 12-item, self-rated scale is used to measure social anxiety. A higher score shows higher levels of social anxiety (see Appendix J). The brief FNE has good internal consistency (α = .80) and convergent validity (moderate correlation in the expected direction with the Beck Depression Inventory, *r* = .30, Duke, Krishnan, Faith & Storch, 2006). For this study, internal consistency of the FNE was questionable (α = .65).

(3) **Body image avoidance**. Body Image Avoidance Questionnaire

(BIAQ, Rosen, Srebnik, Saltzberg & Wendt, 1991). This is a 19-item self-rated measure of avoidant behavioural tendencies that frequently accompany body image disturbance. A higher score shows higher levels of body image avoidance (see Appendix K). It has good internal consistency (α =.89) and test-retest reliability (*r* (23) = .87, *p* < .0001, Rosen et al., 1991). The internal consistency of the BIAQ for this study was acceptable (α = .79).

The two measures of body image taken pre- and post-intervention were:

(1) **Body Satisfaction**. Body Satisfaction Scale (BSS, Slade, Dewey, Newton, Brodie & Kiemle, 1990). This 16-item, self-report questionnaire measures body satisfaction. A higher score shows higher levels of body dissatisfaction (see Appendix L). It has good internal consistency (α = .87-.89 for non-clinical samples), and good convergent validity (moderate correlation with the Body Shape Questionnaire, *r* =.44, Slade et al., 1990). For this study, the internal consistency of the BSS was excellent (α = .90).

(2) **Body Perception**. Body Perception Index (BPI = [estimated size/actual size] x100). Participants' estimates of their size were taken at three points (chest, waist, hips) before and after the mirror exposure. Their actual measurements were taken using the same callipers at the end of the procedure. This method has been used widely in previous research. A BPI of 100 indicates accurate/healthy perception. A BPI >100 shows overestimation of body size - the higher the number, the greater the overestimation.

Anxiety during intervention. During the intervention, anxiety ratings (subjective units of distress from lowest to highest anxiety, 1-10) were taken

by the researcher every three minutes, to determine the pattern of anxiety across the intervention for each participant.

Procedure

Women participated on an individual basis with the same female researcher, and wearing their own clothes. Participants were asked to take off their shoes and any baggy outer layers. All participants followed the same procedure, shown in Figure 2. During the mirror exposure, participants were asked to stand two metres in front of a full-length mirror, to keep looking at themselves, and to describe themselves in neutral terms for 15 minutes, as though to a blind person (i.e., as objectively as possible, rather than using emotive terms). They were prompted to describe all body parts, from their hair and face, down to their toes, to ensure the whole body was described during the exposure period (see Table 1 for the researcher script). The researcher stood at a right angle to the participant in order to check their eye gaze remained on the mirror. The researcher was not visible to the participant in the mirror. If participants struggled to describe themselves in neutral terms, the researcher asked prompt questions emphasising neutral description in order to prevent participants making negative or positive self-evaluative comments. For the participant to complete all components and to be debriefed took approximately 45 minutes. See Appendices D, E and M for participant information sheet, consent form and debriefing sheet.

Table 1

Researcher script for mirror exposure

Spoken to participant:
I'm going to ask you to stand in front of the mirror and describe your body head-to-toe in neutral terms, being careful to avoid biased or emotionally charged language about specific body parts. Imagine describing yourself to a blind person: They cannot see you, and can't imagine what words like 'disgusting' or 'too big' objectively look like, so you will need to say things that give them an accurate portrayal of yourself. You can talk about colour, shape, proportion, texture and symmetry of your body. This will begin with your head and facial features, going down to your shoulders, arms, hands stomach, legs, and feet. For example, instead of describing your fingers as "short and too fat" you might describe them as smooth, 1cm wide and about 5cm in length, with blue nail polish on your nails. You don't have to rush, take your time describing your body parts and keep focusing on using neutral language throughout. I will ask you at regular intervals to rate your anxiety levels on a scale of 1-10 (10 being most anxious). If you have any questions then please feel free to ask. You also have a right to withdraw from the experiment at any point. *Let's start with your hair.* *Now your eyes…* *Your nose…*

Ears…

Mouth…

Face shape…

Arms…

Hands…

Chest…

Waist…

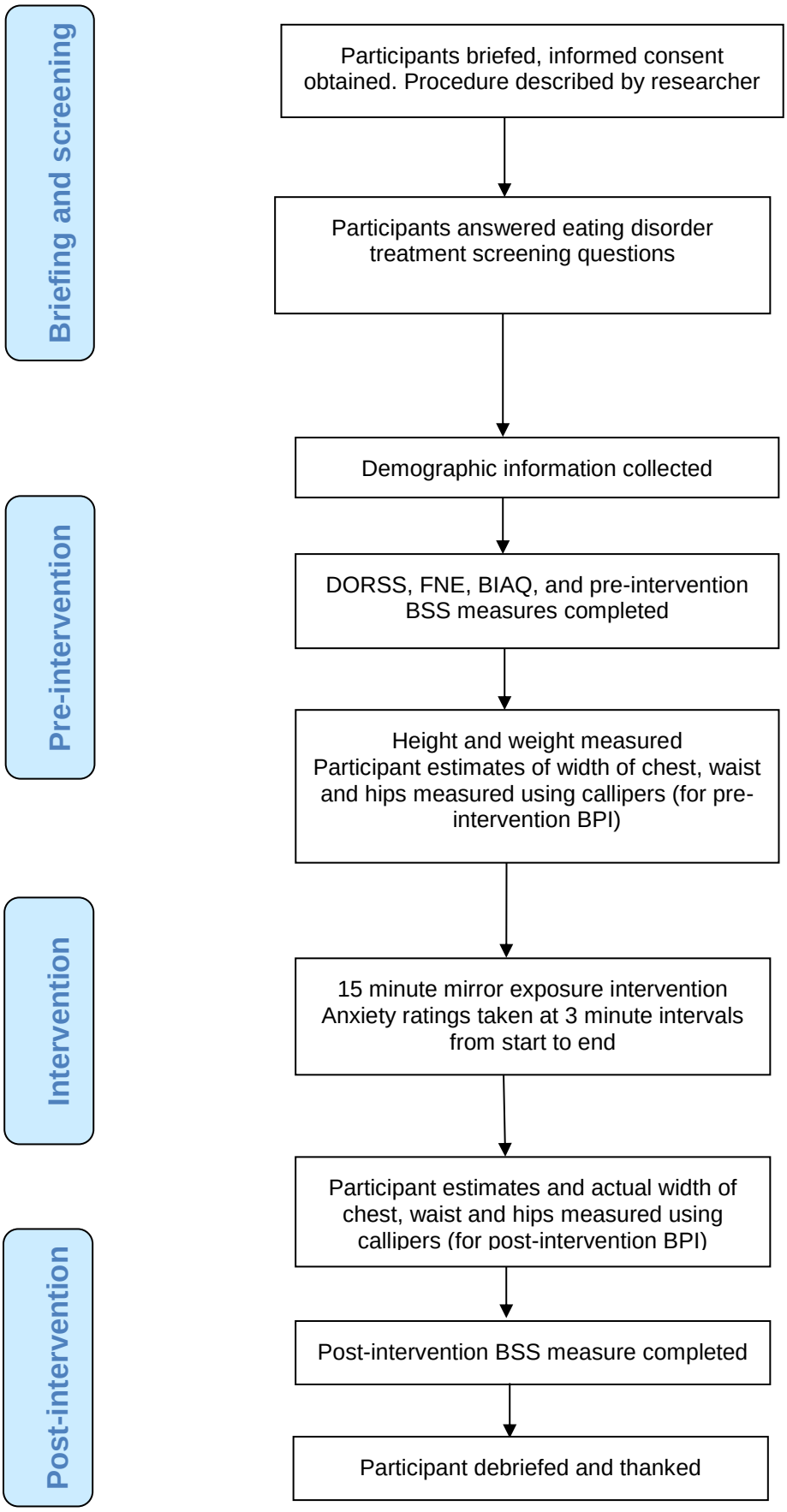
Hips…

Stomach…

Thighs…

Legs & Feet…

Figure 2. Experimental procedure



Data analysis

Data screening and preparation. Two participants failed to complete all items on one double-sided pre-intervention trait measure. These data were collected by subsequently contacting the individuals and asking them to complete the relevant measure. There were no other missing data.

Raw data were transferred to a Microsoft Excel file to calculate questionnaire totals. BMI totals and BMI category were calculated for each participant. The questionnaire results for reassurance-seeking (DORSS) social anxiety (FNE), body image avoidance (BIAQ) and pre- and post-intervention body satisfaction (BSS) were calculated. These figures were then transferred to the SPSS data file.

Figures were calculated for post-mirror exposure change in body perception and body satisfaction for each participant. Change in body perception was calculated using the equation (pre-BPI – post-BPI), so that a positive change score showed improved body perception. Change in body satisfaction was calculated using the equation (pre-BSS score – post-BSS score), so that a positive BSS change score indicated improved body satisfaction.

Descriptive statistics. Means and standard deviations were calculated for participant age, BMI, the DORSS, FNE, BIAQ, pre-intervention BSS, post-intervention BSS, anxiety levels at six time points, pre-intervention BPI and post-intervention BPI, using SPSS version 23 (IBM Corp, 2015). These were calculated for the whole sample, and for both BMI groups. Shapiro-Wilk's W tests were used to determine whether the data were

normally distributed. This test was used as it is more sensitive and appropriate for the sample size of this study. Of twenty-four key variables, only three were non-normally distributed. Following Kirk (2013), and in the light of the sample obtained, the data were considered well-enough distributed, and parametric tests were used.

Inferential statistics. For hypothesis 1, independent samples t-tests were used to compare the pre-intervention BPI and BSS scores of women of healthy BMI and overweight/obese BMI women.

For hypothesis 2, within-subject, repeated measures ANOVA was used to determine how all participants' anxiety levels varied across six time points during mirror exposure, then a mixed design group x time ANOVA was conducted to compare any differences in anxiety scores between the two BMI groups.

For hypothesis 3, between-subject, repeated measures ANOVA was used to determine change in BPI and body satisfaction for all participants, then planned comparison paired samples t-tests determined any change for healthy BMI women and overweight/ obese BMI women.

For hypotheses 4-6, Pearson's correlations were used to assess the association between any change in body satisfaction and BPI, and scores on the DORSS, FNE and BIAQ, age and BMI number for both BMI groups.

Bonferroni corrections were applied where necessary to adjust the significance level required where multiple analyses were conducted per hypothesis. Magnitude of effect sizes was interpreted following Cohen's

(1988) guidelines for comparing independent means (Cohen's *d*), for ANOVA (η^2), and for correlation (*r*, see Table 2).

Table 2.

Effect size magnitude interpretation, following Cohen (1988)

		Effect size classes		
Test	Effect size	Small	Medium	Large
T test	*d*	.20	.50	.80
ANOVA	η^2	.01	.06	.14
Correlation	*r*	.10	.30	.50

Results

Demographic data

All participants were female. Only one participant (2.2% of sample) was recruited through community slimming clubs, all other participants were university students or staff. The mean age of participants with healthy BMI was 32.36 years (standard deviation [SD] = 10.67), ranging from 18-64. The mean age of participants with overweight/ obese BMI was 33.36 years (SD 12.24), with a range of 19-57. Participants with healthy BMI had a mean BMI of 21.96 (SD = 1.61), ranging from 18.54-24.9. Participants in the overweight/obese BMI group had a mean BMI of 28.82 (SD = 2.9), ranging from 25.66-37.23.

White British participants made up 78.3% of the sample (18 women in each group), and white Europeans made up a further 13% (three women in each group). In the healthy BMI group, one woman was Sri Lankan (2.2% of

sample). In the overweight/obese BMI group, one woman was Iraqi (2.2% of sample) and one was Chinese (2.2% of sample).

Pre-intervention levels of body image disturbance

Table 3 shows body perception and body satisfaction levels, pre- and post-intervention for both groups.

Hypothesis 1 predicted that there would be a difference between the body size overestimation of women of healthy BMI and women who are overweight/obese. An independent-samples t-test was conducted to compare the body perception indices (BPIs) for women of healthy BMI and women of overweight/obese BMI. There was no significant difference in BPI between women of healthy BMI and women of overweight/obese BMI, t (44) = 1.15, p = .26, two-tailed.

An independent-sample t-test was conducted to compare the Body Satisfaction Scale (BSS) scores for women of healthy BMI and women of overweight/obese BMI. Women of healthy BMI had statistically significant lower levels of body dissatisfaction than women of overweight/obese BMI, t (44) = 2.04, p = .047, two-tailed.

Table 3.

Descriptive statistics for pre-intervention Body Perception Index and Body Satisfaction scores

	Healthy BMI (*n* = 22)		Overweight/obese BMI (*n* = 24)	
	Mean	SD	Mean	SD
Pre-intervention BPI	109.42	10.83	113.17	11.23
Pre-intervention BSS	48.36	14.68	57.96	17.01

Note. SD = standard deviation, BMI = Body mass index, BPI = Body perception index, BSS = Body Satisfaction Scale. Accurate BPI is 100. Higher BPI numbers indicate greater overestimation of body size. BSS lower score indicates greater body satisfaction (maximum score is 112)

Anxiety levels during mirror exposure

Hypothesis 2 predicted that participants' anxiety levels would rise then fall during the intervention. Data were first analysed for changes in anxiety during the intervention for all participants. A repeated measures ANOVA was conducted to compare anxiety scores at six time points, including the start, during and the end of mirror exposure. The means and standard deviations are presented in Table 4. The results show that overall participant anxiety levels changed significantly over time, F (5, 41) = 3.39, p = .012, multivariate partial eta squared = .29 (large effect size).

Table 4

Descriptive statistics for participants' anxiety levels during mirror exposure

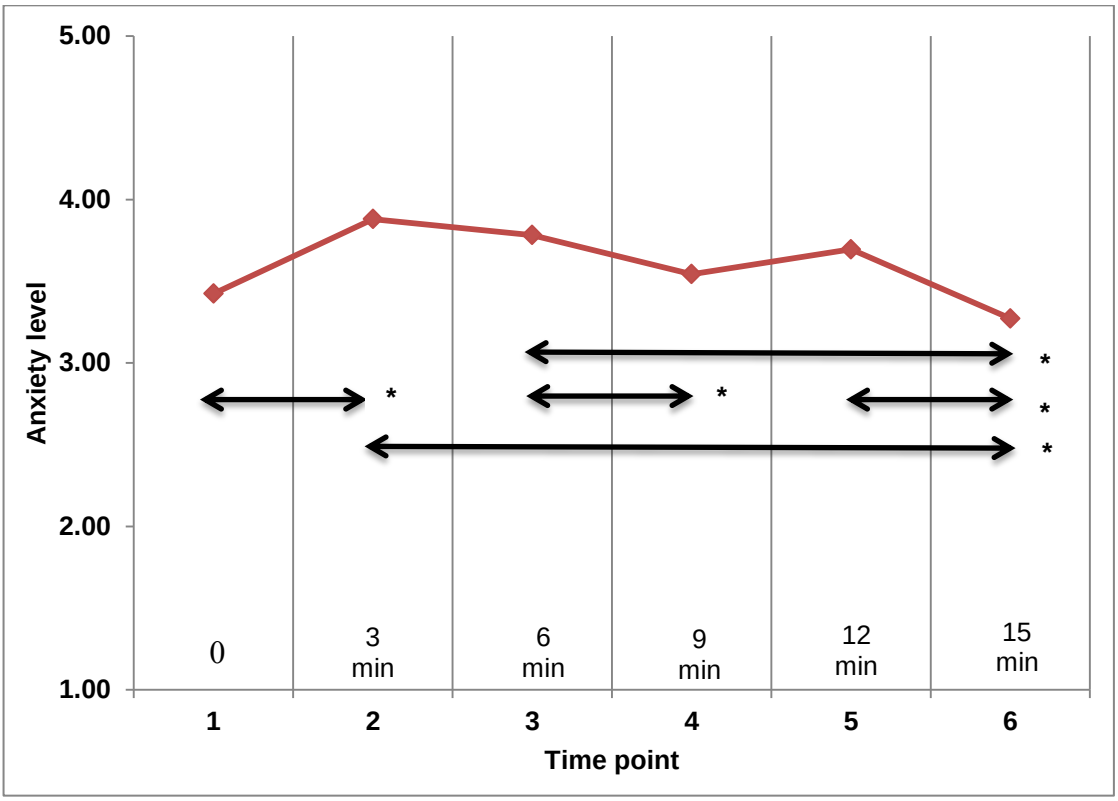
	Whole sample (*n* = 46)		Healthy BMI (*n* = 22)		Overweight/obese BMI (*n* = 24)	
Time point	Mean anxiety	SD	Mean anxiety	SD	Mean anxiety	SD
1	3.42	2.29	2.89	1.94	3.92	2.52
2	3.88	2.24	3.36	2.11	4.35	2.30
3	3.78	2.10	3.27	2.01	4.25	2.11
4	3.54	2.01	3.32	2.06	3.75	1.98
5	3.70	2.28	3.32	2.14	4.04	2.40
6	3.27	2.09	3.05	1.99	3.48	2.21

Note. SD = standard deviation, BMI = Body mass index. Time points are three-minute intervals (1 = start of intervention, 2-5 = mid-intervention, 6 = end of intervention). Anxiety possible range 1-10 (1 = lowest, 10 = highest)

Figure 3 shows participant mean anxiety levels for the whole sample during mirror exposure and which time point anxiety changes were significant (pairwise comparisons, indicated by asterisked arrows). Participants' anxiety rose significantly between time points 1 and 2, then fell back to the start level over the remaining time points.

Figure 3.

Line graph showing mean anxiety levels during 15-minute mirror exposure



Note. Time points are 3-minute intervals (1 = start of intervention, 2-5 = mid-intervention, 6 = end of intervention). Anxiety possible range 1-10 (1 = lowest, 10 = highest)
* Arrow denotes significant anxiety change between time points

Data were also analysed to determine whether anxiety levels during the intervention changed differently for women of healthy BMI and women of overweight/obese BMI. The means and standard deviations are presented in Table 4. A mixed design group x time ANOVA (with repeated measures on the time variable) was conducted to compare anxiety scores at six time points for the two BMI groups. As Maunchly's test of sphericity was significant, the Greenhouse-Geiser corrected degrees of freedom were used. There were no main effects of time, F (2.1, 90.3) = 2.13, p = .12, or of group, F (1,44) = 1.80, p = .19. There was no group x time interaction, F (5, 40) =

1.29, *p* = .29. Thus, the previously demonstrated overall effect of time was not found in the individual groups.

Body image after mirror exposure

Body Perception. Hypothesis 3 predicted that for the whole sample, and for both groups, body image would improve overall (body perception and body satisfaction). Table 5 shows the mean scores for the whole sample, and for each group at each time point (beginning and end of intervention). A mixed group x time ANOVA was conducted to compare women's body perception indices (BPI) before and after mirror exposure. There was a significant effect for time, *F* (1, 44) = 14.1, *p* = .001, multivariate partial eta squared = .24 (strong effect), but no effect for BMI group, *F* (1,44) = 495, *p* = .486. There was no interaction between time and BMI group, *F* (1,44) = 2.86, *p* = .098.

Table 5

Descriptive statistics for pre- and post-intervention Body Perception Index and Body Satisfaction scores, for whole sample and by BMI group

	Whole sample (*n* = 46)		Healthy BMI (n = 22)		Overweight/obese BMI (n = 24)	
	Mean	SD	Mean	SD	Mean	SD
Pre-intervention BPI	111.38	11.08	109.42	10.83	113.17	11.23
Post-intervention BPI	107.30	8.84	107.23	9.2	107.37	8.71
Pre-intervention BSS	53.37	16.49	48.36	14.68	57.96	17.01
Post-intervention BSS	51.35	16.16	48.82	16.14	53.67	16.16

Note. SD = standard deviation, BPI = Body Perception Index, BSS = Body Satisfaction Scale, BMI = Body mass index. Healthy/ accurate BPI is 100. Higher BPI numbers indicate greater overestimation of body size. BSS lower score indicates improved body satisfaction (maximum score is 112).

The main effect of time demonstrates that body perception became more accurate over the course of the intervention. Planned comparisons were then carried out to interpret what this effect might indicate. A Bonferroni correction was applied to this analysis, requiring a $p < .025$ for the data to be statistically significant. Paired samples t-tests were conducted to evaluate the impact of mirror exposure on each BMI groups separately. For healthy BMI women, there was no significant difference in their pre- and post-intervention BPI, t (21) = 1.51, p = .15 (95% CI [-.82, 5.21]. In contrast, for overweight/obese women, there was a significant improvement in their BPI

post-intervention, *t* (23) = 3.76, *p* = .001, 95% CI [2.60, 8.99], which represents a large effect, *d* = .81. This shows that exposure tends to be more effective at improving body perception in women who are overweight/obese, though this effect did not reach significance in the interaction.

Body satisfaction. A mixed group X time ANOVA was conducted to compare women's body satisfaction scores before and after mirror exposure (see Table 5 for means and standard deviations). There was no effect of time, *F* (1,44) = 3.46, *p* = .069, or of BMI group, *F* (1,44) = 2.44, *p* = .125. However, there was a significant interaction between time and BMI group, *F* (1,44) = 5.30, *p* = .026, multivariate partial eta squared = .108 (moderate effect).

Planned comparison paired samples t-tests were conducted to evaluate the impact of mirror exposure on each group separately. Using a Bonferroni correction for these analyses, $p < .025$ was required for statistical significance. For healthy BMI women, there was no significant difference in their pre- and post-intervention body satisfaction scores, *t* (21) = -.31, *p* = .76, 95% CI [-3.49, 2.59]. For overweight/obese women, there was a significant improvement in their body satisfaction scores post-intervention, *t* (23) = 2.96, *p* = .007, 95% CI [1.29, 7.29]. This represents a medium effect, *d* = 0.61. Therefore, mirror exposure is reliably more effective at improving body satisfaction in women who are overweight/obese.

Factors associated with the impact of mirror exposure on body image

Pearson's correlations were used to assess the influence of reassurance-seeking, social anxiety and body image avoidance on body

image change for both groups of women. BMI and age were also tested for any correlation with body image change. A Bonferroni correction was applied to these analyses for the number of correlations (20), and required a *p* <.0025 to reach statistical significance. Table 6 shows the correlations between change in body satisfaction and body perception and these five variables for both groups.

Reassurance-seeking (hypothesis 4), social anxiety (hypothesis 5) and trait body image avoidance (hypothesis 6) were predicted to reduce the impact of mirror exposure on body image. None of these factors, nor BMI or age, were shown to influence the impact of the intervention for either group of women (see Table 6). The influence of the DORSS subscales were also analysed, but were not relevant.

Table 6

Correlations between change in body satisfaction and body perception and measures of reassurance-seeking, social anxiety and body image avoidance, BMI and age, by BMI group

	Change in BPI		Change in BSS score	
	Healthy BMI women (*n* = 22)	Overweight/ obese women (*n* = 24)	Healthy BMI women (*n* = 22)	Overweight/ obese women (*n* = 24)
DORSS	-.131	.179	-.210	.299
FNE	-.210	.262	-.148	.231
BIAQ	.001	.499	-.189	.468
BMI	.436	.023	.081	-.130
Age	.034	-.015	.066	.017

Note. BSS = Body Satisfaction Scale; BPI = Body Perception Index; DORSS = Depressive and Reassurance-seeking Scale; FNE = Fear of Negative Evaluation; BIAQ = Body Image Avoidance Questionnaire; BMI = Body Mass Index.

Discussion

This study had three aims. The first was to determine the levels of body image disturbance for women with healthy BMIs and overweight/obese BMIs. The second was to determine the impact of brief mirror exposure on the body image of the whole sample, and on these two groups of women. The final aim was to determine whether psychological characteristics (reassurance-seeking, social anxiety, trait body image avoidance) act as moderators of the impact of mirror exposure on body image for the two groups of women.

This discussion summarises the main findings of the study in relation to the hypotheses, considers them in relation to existing research and theory, and outlines the methodological limitations of the study. It goes on to suggest recommendations for future research, and to outline the clinical implications of the study findings.

Summary of Main Findings

Pre-intervention, all women overestimated their body size to the same degree, regardless of their BMI category. This does not support hypothesis 1, which predicted different levels of overestimation. However, women of healthy BMI had higher levels of body satisfaction than overweight/obese women.

During mirror exposure, participants' anxiety levels rose then fell, supporting hypothesis 2. The mirror exposure produced significant improvements in the body perception and satisfaction of overweight/obese women, but made no difference to the body image of women of healthy BMI.

This finding only supports hypothesis 3 partially, as it predicted that body image would improve for the whole sample, and for both groups.

Reassurance-seeking, social anxiety and body image avoidance had no impact on the effectiveness of mirror exposure for either group, which does not support hypotheses 4, 5 or 6.

Main Findings in relation to the Existing Literature

Change in body perception/satisfaction. This study's finding that mirror exposure treatment improves body perception and body dissatisfaction for overweight/obese individuals partially supports existing research. Exposure exercises, particularly the size-estimate element, have been found to be an effective technique to improve body image (Alleva et al., 2015; Jarry & Ipp, 2005; Key et al., 2002; Norris, 1984). This is true for both clinical populations (Hildebrandt et al., 2012; Trentowska et al., 2014) and non-clinical populations (Delinsky & Wilson, 2006; Moreno-Dominguez et al., 2012). This study's findings that mirror exposure is effective for overweight/obese individuals supports the work of Jansen et al. (2008), who did not measure body perception change, but found that mirror exposure successfully improved body satisfaction and anxiety for obese adolescents.

There are contrasting findings in the literature regarding the effectiveness of particular types of mirror exposure. The present study successfully used neutral/descriptive mirror exposure with minimal guidance prompts to body parts from the researcher. This does not support the findings of Luethcke, McDaniel & Becker (2011), who found that only participants making positive comments about body appearance/functionality (cognitive-dissonance guided exposure) showed improvements in body

satisfaction. However, the present study is consistent with the findings of other researchers (e.g., Delinsky & Wilson, 2006; Moreno-Dominguez et al.,2012; Waller & Robinson, under consideration), who all found that pure mirror exposure (where the participant describes their body head to toe in neutral terms) is an effective approach. It would appear that positive commentary by participants during mirror exposure is not necessary to achieve body image improvements for individuals who are body-dissatisfied.

Reassurance-seeking, social anxiety, and body image avoidance as moderators. The present study was intended to replicate and extend the pilot study of Waller and Robinson (under consideration). That pilot study found that individuals with higher levels of reassurance-seeking experienced less improvement in their body satisfaction after mirror exposure. The present study does not support this finding, as reassurance-seeking levels had no impact on mirror exposure effectiveness. However, this study did support Waller and Robinson's (under consideration) finding that social anxiety had no impact on mirror exposure effectiveness. There are no studies that examine body image avoidance as a moderator of mirror exposure effectiveness, so it is not possible to compare the findings of the present study with those of other studies.

BMI as a moderator. There is also only a limited research literature that investigates BMI in relation to the effectiveness of body image interventions, and directly compares treatment effects with different BMI categories. Campbell and Hausenblas' (2009) review found a non-significant larger treatment effect for overweight/obese participants, compared to participants with a healthy BMI. However, this was for exercise interventions,

not mirror exposure. Other research has found mirror exposure to be highly effective at reducing body dissatisfaction in obese adolescents (Jansen et al., 2008) and overweight adults (Hilbert et al., 2002), but neither study compared this finding with exposure effects on a healthy BMI sample.

More research is required to draw firm conclusions, but it would appear from the existing literature and the findings of the present study that mirror exposure can improve body image disturbance for women with an overweight/obese BMI.

Main findings in relation to theory

The findings of this study are mixed in terms of their support for the value of the cognitive-behavioural approach to addressing body image. Mirror exposure was found to be an effective approach for improving body perception and body satisfaction, but only for overweight/ obese women. Body image avoidance was not shown to moderate the effectiveness of mirror intervention, for either group of women. This finding could be due to the small sample size, but it also raises questions about the cognitive behavioural model's application to body image.

First, is avoidance the key body image disturbance-maintaining safety behaviour for some people? Body avoidance is theorised to maintain negative body image by enabling a person to escape the distress they associate with their body image. Through repeated avoidance, the person never encounters evidence to disconfirm their negative perceptions, or experiences their anxiety reducing. Exposure provides information about the person's body, whilst simultaneously allowing their anxiety to reduce. However, avoidance is only one, non-universal mechanism within the

cognitive behavioural model which can results in body image disturbance. Other mechanisms include comparison, checking, mind-reading and schema-elaboration. Exposure as a technique to address avoidance/body image disturbance might not affect all individuals equally, if other moderating cognitive, behavioural or physical factors are present that maintain the problem.

This study has shown that one moderator could be BMI category. Both healthy BMI and overweight/obese participants overestimated their body size initially, but only overweight/obese participants had improved body perception after the intervention. The cognitive behavioural model would predict that exposure would improve body perception for all women who avoid their own image, and this was not supported by this study's findings with women of healthy BMI. It is therefore possible that a high level of avoidance is not always the key maintaining factor in body image disturbance, and the cognitive behavioural model must reflect the role of other moderating factors.

Second, if avoidance is not always a moderator of exposure effectiveness, can Objectification theory (Frederickson & Roberts, 1997) help to explain why the women with healthy BMI did not have improved body perception or body satisfaction in the present study? Objectification theory suggests that women exist in a sexually objectifying culture which can create state self-objectification and chronic trait self-objectification in women, leading them to experience body shame and anxiety and engage in habitual body monitoring (Grogan, 2017). It is possible that some participants might have a favourable body image and/or generally emphasise the functionality

of their body and their embodied physical experience in their everyday life (Alleva et al., 2014). The appearance-focused mirror exposure could have been disappointing if participants found their appearance reality less positive than their mental self-image, or their self-objectification increased. Mirror exposure might be predicted to make body image worse among women who had positive body image. This could be the case in the healthy BMI group of the present study, where pre- and post-intervention, change in body image might not have been captured by the overall body perception and dissatisfaction means. Pre- and post-mirror exposure self-objectification requires further research, but Objectification theory could suggest alternative explanations for the impact of mirror exposure, beyond those offered by the cognitive behavioural model.

Finally, is graded exposure viable for body image disturbance? The cognitive behavioural model proposes graded exposure as an approach that introduces an individual to their feared stimulus incrementally, at a pace which they can tolerate without escaping the exposure situation. In the case of body image disturbance, this might mean introducing an individual to their reflection using smaller mirrors, for short periods of time, and working up to the use of a full-length mirror over a number of sessions. This study has shown that brief single-session mirror exposure flooding is an effective technique for a non-clinical population of overweight/obese women. Can graded exposure get the same effects on body image disturbance as flooding? This would be a test of cognitive behavioural theory. Mirror exposure may be more resource-efficient and more effective, as a single-

session approach eliminates any anticipatory anxiety or avoidance attempts induced by slowly working up to full-length mirror body image exposure.

Methodological Limitations

There are a number of limitations to this study which must be acknowledged.

First, in this study, BMI was selected as a widely-used method to categorise and compare people by weight relative to their height. However, it is important to acknowledge the limitations of BMI as a tool. As a calculation of only height and weight, BMI does not account for overall body composition (e.g. muscle mass is heavier than fat, bone density can vary), or racial or sex differences. It is not a measure of fatness or of health. Flegal, Kit, Orbana and Grauberg's (2013) meta-analysis found that people of overweight BMI had significantly lower mortality rates than those of normal/ healthy BMI. Findings such as these underline how the description 'healthy' BMI can be misleading, when an athlete could have the same BMI as a sedentary person of the same height and weight. However, 'normal BMI' is not accurate, given that the average BMI within the UK is 27 (Health and Social Care Information Centre, 2016). Ashwell, Gunn and Gibson (2012) found that waist-to-height ratio was better at identifying cardio-metabolic risk factors such as Type 2 diabetes and heart disease for both sexes, than was BMI or waist circumference. Waist-to-height ratio is an indicator of abdominal fat, and therefore body fat percentage and body shape, in a way in which BMI is not. Therefore, although widely-used, BMI is an imperfect tool, and alternative measurement options must be considered for any future research into body image.

This study used a narrow sample of mainly white, female, young adult women, which makes the findings difficult to generalise to other groups. This research was intended to extend the Waller and Robinson (under consideration) pilot study by broadening recruitment beyond undergraduate psychology students to include women who attended community slimming clubs. Unfortunately, this aspect of recruitment failed. Four individuals initially opted to participate from this recruitment source, but only one attended to complete participation (see Figure 1). As the final sample included a broad range of women, including locally-based university staff, post-graduate students, and undergraduate students from a range of disciplines, the participant recruited via the slimming club was not felt to be an anomaly in age or professional status. Her data were therefore included for analysis alongside those of the other participants. If this study was repeated, alternative methods of community recruitment should be piloted, to reach more women unconnected to the university and deliver participants from more equally balanced recruitment sources. More broadly, and in the interests of generalisability, it would be desirable to recruit a sample that is more representative of the wider population by including men and women of different ages from a range of ethnic backgrounds.

The study was underpowered for the correlational analyses of the moderators of the impact of mirror exposure (hypotheses 4-6). This means that firm conclusions cannot be drawn about the non-significance of the moderating role of reassurance-seeking, social anxiety and body image avoidance in both groups, as it is possible that Type II errors occurred.

The researcher script used to give participants their instructions prior to the mirror exposure intervention contains elements which could have primed participants to think negatively about their body. For example, ‘disgusting’, and ‘too big’ were given as examples of how someone might describe themselves in non-neutral terms. This was not balanced with more positive examples of non-neutral description, such as ‘imposing’ or ‘elegant’. The script was used in this form in order to replicate exactly the intervention conditions of the Waller and Robinson (under consideration) pilot study. However, it must be acknowledged as a study limitation that the instructions did not include equal numbers of negative and positive examples of non-neutral description.

This study was not designed to collect participant data to measure the impact of mirror exposure over a longer period of time. Therefore, it is not clear whether the improvements in body image that occurred were sustained beyond the immediate post-intervention period.

Participants were not matched for baseline body dissatisfaction. Doing this could have showed whether mirror exposure benefitted body-dissatisfied women of healthy BMI as much as body-dissatisfied overweight/obese women. However, matching participant BMI groups would have carried a risk of the sample being unrepresentative. For example, overweight/obese women with similar levels of body satisfaction to women with a healthy BMI are unlikely to be representative of the general population of overweight/obese women.

This study used an opportunity sample, and therefore there is a risk of self-selection bias. A large number of women initially expressed an interest

in the study but 41% of these did not attend to participate, for mostly unknown reasons. Speculating about participant characteristics, it is possible that the women who attended had some body dissatisfaction, and/or some interest in body image research. However, they also had sufficient confidence to anticipate and complete a potentially uncomfortable, exposing experience with a researcher they did not know. This self-selection process could have made the sample unrepresentative of the overall non-clinical population of women.

Recommendations for Future Research

Recommendations for future research include those which extend the present study, and recommendations which broaden the scope of this area of research. First, ways to extend the present study are considered.

This study should be replicated with larger sample to establish whether the same differences in mirror exposure impact are found for different groups, and what moderating factors influence these. Future research could recruit a sample which is more representative of the wider population by including men and a broader age range of people from different ethnic backgrounds from a non-student population. If different recruitment sources are used, studies should first pilot any new community recruitment methods, and should strive for equal numbers of participants from the different sources. A broader sample could establish whether reassurance-seeking, social anxiety, body image avoidance, BMI or age moderate exposure effectiveness within different populations.

In light of the limitations of using BMI as a tool, any replication or extension of this study should consider using waist-to-height ratio as an

alternative to BMI, to explore how this relates to body image disturbance, and how it could predict intervention effectiveness.

This study could also be extended by including a follow-up period of data collection from participants. Participant follow-up would show whether the effects of mirror exposure are sustained over a period of time, enhanced, or lost. By varying the exposure duration and number of sessions, or including participant between-session mirror exposure 'homework' tasks, further research could establish the minimum effective dose of mirror exposure that produces sustained improvements in the body image of people of different BMI categories.

Second, ways to broaden the scope of this research are considered. Context is important in body image evaluation, as body image has a fluidity that means it can vary according to situations and interactions (Cash 2012a). It is possible that the study measured participants' state body image in a research context which asked them to focus on their appearance in front of a researcher. This could be particularly relevant if the script negatively primed participants to think critically about their bodies, whilst trying to use neutral descriptive terms aloud. Further research could explore this by changing the researcher script and using a measure of state body image (e.g., the Body Image States Scale - Cash, Fleming, Alindogan, Steadman & Whitehead, 2002).

To explore the reasons why participants with a healthy BMI did not benefit from mirror exposure, future research could explore whether the research participation process changes participants' levels of self-objectification. A measure such as the Self-Objectification Questionnaire

(Noll & Fredrickson, 1998) could be used to measure increased or reduced self-objectification. Research has found that emphasising body functionality can reduce self-objectification (e.g., Alleva et al., 2014). A future study could alter the research script for mirror exposure process to invite participants to describe their body in terms of functionality as well as appearance, whilst looking in the mirror.

Another area for further research is broader exploration of the factors that moderate the effectiveness of mirror exposure for body-dissatisfied women of healthy BMI. Are there factors maintaining the body dissatisfaction of this group which are not addressed during mirror exposure? For example, this study did not measure appearance (over)investment, an element of body image disturbance which has not been found to significantly improve with CBT treatment (Jarry & Ip, 2005). A measure such as the Appearance Schemas Inventory – Revised (Cash, Melnyk & Hrabosky, 2004) can be used to measure body image investment. Another possibility is that social anxiety as a construct may be too broad and the FNE does not capture the particular social concerns of body-dissatisfied women of varying BMIs. Both social appearance anxiety and social comparison have been found to relate to body dissatisfaction and mirror exposure effectiveness (Hildebrandt et al., 2012; Titchener & Wong, 2015). Therefore, future research into exposure interventions could use measures of body image investment and/or social appearance anxiety to explore whether these factors influence the impact of mirror exposure.

Clinical Implications

The findings of this study have shown that mirror exposure should be offered as an intervention for body-dissatisfied women in distress who are overweight/obese. Mirror exposure should be routinely offered in obesity clinics and as part of healthy lifestyle interventions for overweight/obese individuals. NHS clinics would need to have appropriate full-length mirrors available for treatment purposes. Where mirrors have not been installed due to safety concerns about deliberate self-harm or the effects of exposure, this decision should be revisited and unbreakable mirrors obtained.

Body image disturbance sometimes self-corrects during a course of treatment for an eating disorder due to other therapeutic components. As suggested in existing protocols (e.g., Fairburn, 2008; Waller et al., 2007), mirror exposure should be considered towards the end of therapy for overweight/obese women if there has been no improvement in body image, following mid-treatment measurement of body image perception and satisfaction.

Exposure treatment generally is anxiety-provoking for individuals and for clinicians, causing clinicians to avoid delivering behavioural components of CBT (Meyer et al., 2014; Waller, 2009). Mirror exposure is a flooding technique, which might be particularly challenging for both clinician and their client compared to a graded exposure exercise. Clinicians may also hold internalised weight bias or ‘anti-fat’ attitudes towards their overweight/obese clients (Murray, 2016), which make them less likely to use any intervention to treat body image. However, this study has shown that addressing body image disturbance and body image avoidance through a flooding exercise

such as mirror exposure can be effective for improving the body image of women who are overweight/obese. Disseminating results such as these should encourage clinicians to use mirror exposure as part of their regular practice with body-dissatisfied clients.

Conclusions

Brief mirror exposure is an effective intervention for body image disturbance for non-clinical women who are overweight/obese. Understanding why body-dissatisfied women of healthy BMI do not experience similar improvements in their body image requires further research. Further research is also needed to establish what factors moderate the effectiveness of mirror exposure. Mirror exposure should be routinely offered to body-dissatisfied women who are overweight/obese and present to services in distress, despite the anxiety it can induce in individuals and clinicians.

References

Alleva, J. M., Martijn, C., Jansen, A., & Nederkoorn, C. (2014). Body language: Affecting body satisfaction by describing the body in functionality terms. *Psychology of Women Quarterly, 38*, 181-196. doi: 10.1177/0361684313507897

Alleva, J. M., Sheeran, P., Webb, T. L., Martijn, C., & Miles, E. (2015). A meta-analytic review of stand-alone interventions to improve body image. *PLOS One, 10*, 1-32. doi:10.1371/journal.pone.0139177

Ashwell, M., Gunn, P., & Gibson, S. (2012). Waist-to-height ratio is a better screening tool than waist circumference and BMI for adult cardiometabolic risk factors: Systematic review and meta-analysis. *Obesity*, *13*, 275-286, doi: 10.1111/j.1467-789X.2011.00952.x

Bailey, N., & Waller, G. (in press). Body checking in non-clinical women: Experimental evidence of a specific impact on fear of uncontrollable weight gain. *International Journal of Eating Disorders*. Advance online publication. doi: 10.1002/eat.22676

Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*, 1173-1182. doi: 10.1037/0022-3514.51.6.1173

Bauer, S., Winn, S., Schmidt, U., & Kordy, H. (2005). Construction, Scoring and Validation of the Short Evaluation of Eating Disorders (SEED). *European Eating Disorders Review*, *13*, 191-200. doi: 10.1002/erv.637

Campbell, A. & Hausenblas, H. A., (2009). Effects of exercise interventions

on body image. *Journal of Health Psychology, 14*, 780-793. doi: 10.1177/1359105309338977

Cash, T. F. (2012a). Crucial considerations in the assessment of body image. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice and prevention* (2nd ed.). (pp.129-137). New York, NY: Guilford Press.

Cash. T. F. (2012b). Cognitive-behavioural perspectives on body image. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice and prevention* (2nd ed.). (pp.39-47). New York, NY: Guilford Press.

Cash, T. F., Fleming, E. C., Alindogan, J., Steadman, L., & Whitehead, A. (2002). Beyond body image as a trait: Development and validation of the Body Image States Scale. *Eating Disorders*, *10*, 103-113. doi: 10.1080/10640260290081678

Cash, T. F., Melnyk, S. E., & Hrabosky, J. I. (2004). The assessment of body image investment: An extensive revision of the Appearance Schemas Inventory. *International Journal of Eating Disorders*, *35*, 305-316. doi: 10.1002/eat.10264

Cohen, J. (1988). *Statistical power analysis for the behavioural sciences*. (2nd ed.). Hillsdale, NJ: Erlbaum.

Coker, E., & Abraham, S. (2014). Body weight dissatisfaction: A comparison of women with and without eating disorders. *Eating Behaviors*, *15*, 453-459. doi: 10.1016/j.eatbeh.2014.06.014

Cougle, J. R., Fitcha, K. E., Finchamb, F. D., Riccardia, C. J., Keough, M. E., & Timpanod, K. R. (2012). Excessive reassurance seeking and

anxiety pathology: Tests of incremental associations and directionality. *Journal of Anxiety Disorders, 26*, 117-125. doi:10.1016/j.janxdis.2011.10.001

Delinsky, S. S., & Wilson, G. T. (2006). Mirror exposure for the treatment of body image disturbance. *International Journal of Eating Disorders, 39*, 108–116. doi:10.1002/eat.20207

Delinsky, S. S. (2012). Body image and anorexia nervosa. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice and prevention* (2nd ed.). (pp.279-287). New York, NY: Guilford Press.

Duke, D., Krishnan, M., Faith, M., Storch, E.A. (2006). The psychometric properties of the Brief Fear of Negative Evaluation Scale. *Journal of Anxiety Disorders, 20,* 807-817. doi:10.1016/j.janxdis.2005.11.002

Fairburn, C. G. (2008). *Cognitive behavior therapy and eating disorders.* New York, NY: Guilford Press.

Farrell, C., Shafran, R., & Lee, M. (2006). Empirically evaluated treatments for body image disturbance. A review. *European Eating Disorders Review*, *14*, 289-300. doi: 10.1002/erv.693

Flegal, K. M., Kit, B. K., Orbana, H., & Grauberg, B.I. (2013). Association of all-cause mortality with overweight and obesity using standard body mass index categories. *Journal of the American Medical Association, 309*, 71-82, doi: 10.1001/jama.2012.113905

Frederickson, B. L., & Roberts, T. (1997). Objectification theory: Towards understanding women's lived experience and mental health risks. *Psychology of Women Quarterly*, *21,* 173-206. doi: 10.1111/j.1471-6402.1997.tb00108.x

Ghaderi, A., & Scott, B. (2001). Prevalence, incidence and prospective risk factors for eating disorders. *Acta Psychiatrica Scandinavica*, *104*, 122-130. doi: 10.1034/j.1600-0447.2001.00298.x

Grogan, S. (2017). *Body image: Understanding body dissatisfaction in men, women and children* (3rd ed.). Abingdon, UK: Routledge.

Health and Social Care Information Centre (2016). Statistics on obesity, physical activity and diet. Retrieved from: http://content.digital.nhs.uk/catalogue/PUB20562/obes-phys-acti-diet-eng-2016-rep.pdf

Hildebrandt, T., Loeb, K., Troupe, S., & Delinsky, S. (2012). Adjunctive mirror exposure for eating disorders: A randomized controlled pilot study. *Behaviour Research and Therapy, 50, 797-804.* doi:10.1016/j.brat.2012.09.004

Himes, J. H., Hannan, P., Wall, M., & Neumark-Sztainer, D. (2005). Factors associated with errors in self-reports of stature, weight, and body mass index in Minnesota adolescents. *Annals of Epidemiology*, *15*, 272–278. doi: 10.1016/j.annepidem.2004.08.010

Hinrichsen, H., Wright, F., Waller, G., & Meyer, C. (2003). Social anxiety and coping strategies in the eating disorders. *Eating Behaviors, 4*, 117-126. doi:10.1016/s1471-0153(03)00016-3

Jansen, A., Bollen, D., Tuschen-Caffier, B., Roefs, A., Tanghe, A., & Braet, C. (2008). Mirror exposure reduces body dissatisfaction and anxiety in obese adolescents: A pilot study. *Appetite, 51,* 214-217. doi:10.1016/j.appet.2008.01.011

Jansen, A., Voorwinde, V., Hoebink, Y., Rekkers, M., Martijn, C., & Mulkens,

S. (2016). Mirror exposure to increase body satisfaction: Should we guide the focus of attentions towards positively or negatively evaluated body parts? *Journal of Behavior Therapy and Experimental Psychiatry*, *50*, 90-96. doi: 10.1016/j.jbtep.2015.06.002

Jarry, J. L., & Cash, T. F. (2012). Cognitive behavioural approaches to body image change. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice and prevention* (2nd ed.). (pp.415-423). New York, NY: Guilford Press.

Jarry, J. L., & Ip, K. (2005). The effectiveness of stand-alone cognitive-behavioural therapy for body image: A meta-analysis. *Body Image*, *2*, pp.317-331. doi: 10.1016/j.bodyim.2005.10.001

Key, A., George, C. L., Beattie, D., Stammers, K., Lacey, H., & Waller, G. (2002). Body image treatment within an inpatient program for anorexia nervosa: The role of mirror exposure in the desensitization process. *International Journal of Eating Disorders, 31*, 185-190. doi:10.1002/eat.10027

Keel, P. K., Dorer, D. J., Franko, D. L., Jackson, S. C., & Herzog, D. B. (2005). Postremission predictors of relapse in women with eating disorders. *American Journal of Psychiatry, 162,* 2263-2268. doi: org/10.1176/appi.ajp.162.12.2263

Kirk, R. (2013). *Experimental design: Procedures for the behavioral sciences* (4th ed.). Retrieved from http://dx.doi.org.sheffield.idm.oclc.org/10.4135/9781483384733

Latner, J. D., & Wilson, R. E. (2012). Obesity and body image in adulthood. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of*

science, practice and prevention (2nd ed.). (pp.189-197). New York, NY: Guilford Press.

Leary, M. R. (1983). A brief version of the Fear of Negative Evaluation Scale. *Personality and Social Psychological Bulletin, 9*, 371-376. doi:10.1177/0146167283093007

Luethcke, C. A., McDaniel, L., & Becker, C. B. (2011). A comparison of mindfulness, non-judgemental, and cognitive dissonance-based approaches to mirror exposure. *Body Image*, *8*, 251-258. doi: 10.1016/j.bodyim.2011.03.006

Meyer, J. M., Farrell, N. R., Kemp, J. J., Blakey, S. M., & Deacon, B. J. (2014). Why do clinicians exclude anxious clients from exposure therapy? *Behaviour Research and Therapy*, *54*, 49-53. doi: 10.1016/j.brat.2014.01.004

Moreno-Dominguez, S., Rodriguez-Ruiz, S., Fernandez-Santaella, M. C., Jansen, A., & Tuschen-Caffier, B. (2012). Pure versus guided mirror exposure to reduce body dissatisfaction: A preliminary study with university women. *Body Image, 9,* 285-288. doi:10.1016/j.bodyim.2011.12.001

Murray, S. (2016). *The 'fat' female body*. London, UK: Palgrave.

Noll, S. M., & Frederickson, B. L. (1998). A meditational model linking self-objectification, body shame, and disordered eating. *Psychology of Women Quarterly*, *22*, 623-636. doi: 10.1111/j.1471-6402.1998.tb00181.x

Norris, D. L. (1984). The effects of mirror confrontation on self-estimation of body dimensions in anorexia nervosa, bulimia and two control groups.

Psychological Medicine, 14, 835-842. doi:10.1017/S0033291700019802

Radomsky, A. S., Parrish, C., & Dugas, M. J. (2009). *The Depressive and Obsessive Reassurance Seeking Scale (DORSS)*. Montreal (Canada): Fear and Anxiety Disorders Laboratory, Concordia University.

Rector, N. A., Kamkar, K., Cassin, S. E., Ayearst, L. E., & Laposa, J. M. (2011). Assessing excessive reassurance seeking in the anxiety disorders. *Journal of Anxiety Disorders, 25,* 911-917. doi:10.1016/j.janxdis.2011.05.003

Rosen, J. C., Srebnik, D., Saltzberg, E., & Wendt, S. (1991). Development of a Body Image Avoidance Questionnaire. *Psychological Assessment: A Journal of Consulting and Clinical Psychology, 3*, 32-37. doi:10.1037//1040-3590.3.1.32

Shafran, R., Fairburn, C.G., Robinson, P., & Lask, B. (2004). Body checking and its avoidance in eating disorders. *International Journal of Eating Disorders, 35,* 93-101. doi:10.1002/eat.10228

Slade, P., Dewey, M., Newton, T., Brodie, D., & Kiemle, G. (1990). Development and preliminary validation of the Body Satisfaction Scale (BSS). *Psychology and Health, 4,* 213-220. doi:10.1080/08870449008400391

Tantleff-Dunn, S. & Lindner, D. M. (2012). Body image and social functioning. In T. F. Cash & L. Smolak (Eds.), *Body image: A handbook of science, practice and prevention* (2nd ed.). (pp.263-270). New York, NY: Guilford Press.

Thordarson, D. S., Radomsky, A. S., Rachman, S., Shafran, R., Sawchuk, C. N., & Ralph Hakstian, A, (2004). Vancouver Obsessional-Compulsive Inventory (VOCI). *Behaviour Research and Therapy, 42,* 1289-1314, doi: 10.1016/j.brat.2003.08.007

Tuschen-Caffier, B., Pook, M., & Frank, M. (2001). Evaluation of manual-based cognitive-behavioural therapy for bulimia nervosa in a service setting. *Behaviour Research and Therapy, 39*, 299-308. doi:10.1016/s0005-7967(00)00004-8

Waller, G. (2009). Evidence-based treatment and therapist drift. *Behaviour research and therapy*, *47*, 119-127. doi: 10.1016/j.brat.2008.10.018

Waller, G., Cordery, H., Corstorphine, E., Hinrichsen, H., Lawson, R., Mountford, V., & Russell, K. (2007). *Cognitive behavioral therapy for eating disorders*: *a comprehensive treatment guide.* Cambridge, UK: Cambridge University Press.

Waller, G., & Robinson, J. (under consideration). Social psychological characteristics moderate the impact of mirror exposure on body image among young non-clinical women.

Wilson, G. T. (1999). Cognitive behaviour therapy for eating disorders: progress and problems. *Behaviour Research and Therapy*, *37*, 79-95. doi: 10.1016/S0005-7967(99)00051-0

Appendix A

Table showing assessment of studies against modified Downs and Black (1998) checklist

Appendix A.

Assessment of studies against modified Downs and Black (1998) checklist

Study	Checklist items																											
	Reporting										External validity			Internal validity							Internal validity – confounding (selection bias)							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27[1]	Total
Dunigan et al. (2011)	Y[1]	Y	Y	Y	P	Y	Y	U	Y	N	U	U	U	N	U	U	Y	Y	Y	Y	Y	U	Y	N	Y	Y	N	16
Hilbert & Tuschen-Caffier (2004)	Y	Y	Y	Y	N	Y	Y	N	Y	Y	U	U	Y	Y	U	Y	Y	Y	Y	Y	U	U	Y	Y	N	Y	N	18
McLean et al. (2011)	Y	Y	Y	Y	N	Y	Y	U	Y	Y	U	U	U	Y	U	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	Y	Y	21
Mountford et al. (2014)	Y	Y	Y	Y	P	Y	Y	N	Y	N	U	U	Y	Y	U	Y	Y	Y	Y	Y	Y	U	N	N	U	Y	Y	19
Paxton et al. (2007)	Y	Y	N	Y	N	Y	Y	N	Y	Y	U	U	U	Y	U	Y	Y	Y	Y	Y	U	U	Y	U	Y	Y	Y	18

[1] Power modified from original checklist: Yes: power calculation reported/ sample sufficient (2), Partial: power calculation reported but sample insufficient (1), No: no power calculation reported (0)

[1] Y = yes, N = no, U = unable to determine, P = partial. Total possible score = (29)

Appendix A (continued)

Assessment of studies against modified Downs and Black (1998) checklist

Study	Checklist items																										
	Reporting										External validity				Internal validity						Internal validity – confounding (selection bias)						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27[1]	Total
Perpina et al. (1999)	Y	Y	N	Y	N	Y	Y	N	N	N	U	U	U	U	Y	Y	Y	U	U	Y	Y	U	Y	Y	N	N	N	12
Peterson et al. (2006)	Y	Y	Y	Y	P	Y	Y	N	Y	Y	U	U	Y	Y	U	Y	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	P	18
Ramirez & Rosen (2001)	Y	Y	Y	Y	P	Y	Y	N	Y	Y	U	U	U	U	U	Y	Y	Y	Y	Y	Y	U	Y	U	Y	U	N	21
Riva et al. (2001)	Y	N	Y	Y	P	Y	N	N	N	Y	Y	U	Y	U	U	Y	Y	Y	U	Y	Y	U	Y	U	Y	U	P	16
Stewart et al. (2010)	Y	Y	Y	N	P	Y	Y	N	Y	Y	U	U	U	U	N	Y	Y	Y	U	Y	Y	U	Y	U	Y	Y	N	16

[1] Power modified from original checklist: Yes: power calculation reported/ sample sufficient (2), Partial: power calculation reported but sample insufficient (1), No: no power calculation reported (0)

Appendix A (continued)

Assessment of studies against modified Downs and Black (1998) checklist

Study	Checklist items																											
	Reporting										External validity			Internal validity							Internal validity – confounding (selection bias)								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27[1]	Total
Taylor & Fox (2005)	Y	Y	Y	Y	P	Y	Y	N	Y	N	Y	N	Y	U	U	Y	Y	Y	Y	Y	Y	U	Y	Y	Y	Y	N	20
Wade et al. (2009)	Y	Y	Y	Y	N	Y	Y	N	Y	Y	U	U	Y	N	N	Y	Y	Y	U	Y	Y	U	Y	Y	U	Y	P	18
Williams & Cash (2001)	Y	Y	Y	N	P	Y	Y	N	N	N	U	U	U	N	U	Y	Y	Y	U	Y	Y	U	N	N	Y	N	N	12
Zabinski et al. (2001)	Y	Y	Y	N	P	N	Y	N	N	N	Y	U	Y	U	U	Y	Y	Y	Y	Y	Y	U	Y	U	Y	Y	N	16

[1] Power modified from original checklist: Yes: power calculation reported/ sample sufficient (2), Partial: power calculation reported but sample insufficient (1), No: no power calculation reported (0)

Appendix B: Formulae for calculation of effect sizes

(1) Formula used to convert eta squared within-group effect size to Cohen's *d* effect size (taken from DeCoster, 2012, following Cohen, 1988). Effect sizes were calculated from two treatment group mean scores (pre- and post-intervention).

d = 2 x (sqr(eta^2 / (1 - eta^2)))

(2) Formula used to calculate Cohen's *d* within-group effect size using pre- and post-intervention mean scores, standard deviations and correlation between mean scores

If the correlation between groups is known, then Cohen (e.g., 1988) suggests calculating the effect size using the formula for *d* but correcting it by *r* (that correlation coefficient).

1) Regular d = $(M_1 - M_2) / SD$

2) Corrected d = d / $\sqrt{}$(1 - r)

Appendix C

University of Sheffield Department of Psychology Ethics Committee approval email

From: Psychology Research Ethics Application Management System <no_reply@psychologyresearchethicsapplicationmanagementsystem>
Date: 12 May 2015 at 22:13
Subject: Approval of your research proposal
To: G.Waller@sheffield.ac.uk

Your submission to the Department of Psychology Ethics Sub-Committee (DESC) entitled "What affects the impact of mirror exposure on women's body image?" has now been reviewed. The committee believed that your methods and procedures conformed to University and BPS Guidelines.

I am therefore pleased to inform you that the ethics of your research are approved. You may now commence the empirical work.

Yours sincerely,

Paul Norman
Acting Chair, DESC

Appendix D: Participant Information Sheet

Liz Trippett
Trainee Clinical Psychologist
Department of Psychology
University of Sheffield
Western Bank
Sheffield S10 2TP UK

Telephone: 0114 222 6650
Email:
etrippett1@sheffield.ac.uk

Project title: What affects the impact of mirror exposure on women's body image?

You are being invited to take part in a research project. Before you decide, it is important to understand why the research is being done and what it will involve. Please read the following information carefully, and ask me any questions you have.

Many women experience difficulties with their body image. Some studies have found that looking in a mirror for a few minutes ('mirror exposure'), can help. However, this effect could be different for different people. This project is investigating which factors influence the effectiveness of mirror exposure. It will finish by May 2017.

Why have I been chosen?
You have been chosen to take part because you are a woman who responded to our recruitment notice, and you have not had previous treatment for body image difficulties or an eating disorder. Around 60-80 participants are being recruited.

Do I have to take part?
It is up to you. If you decide to take part you can keep this information sheet and will be asked to sign a consent form. You can withdraw *at any time* without giving a reason.

What will happen to me if I take part?
You will spend around 30-40 minutes with the (female) researcher in a room at the university. You will have your height, weight, chest, waist and hips measured. You will complete some questionnaires before and after looking in the mirror (e.g., about your eating, seeking reassurance, your view of yourself/your body). For 15 minutes, you will then look

directly at yourself in a full-length mirror (fully dressed). Every 3 minutes you will rate your anxiety level. Unfortunately, this research is not able to reimburse travel expenses. All the questionnaire results will be analysed using a statistical programme.

Are there possible disadvantages of taking part?
For individuals who are not comfortable with their own image, looking in a mirror for 15 minutes may not be easy. If you feel this could be too difficult for you, please discuss this with the researcher before you take part. If you do find the process unexpectedly distressing, you can withdraw at any point, and the researcher will be able to discuss with you what further support might be of help.

What are the possible benefits of taking part?
Some participants in studies such as this experience an improvement in their body image, at least temporarily. However, this is not true for everyone. By gathering information about what improves body image, it is hoped that this study will improve clinical treatments for women experiencing difficulties with their body image.

What if something goes wrong?
In the unlikely event of something going wrong, you can raise any concerns with the lead researcher. If you wish to take any concerns further, please contact Professor Glenn Waller (via the telephone number at the top of this letter). If this is not adequate, then you should contact the Office of the Registrar and Secretary at the University of Sheffield (0114-222-1101).

Will my taking part be kept confidential?
All the information we collect about you will be kept strictly confidential. You will not be identifiable in any reports or publications.

What will happen to the results of the research project?
The results will be submitted as part of the researcher's doctoral thesis in May 2017, then prepared for publication in 2017. You can obtain a copy of the results when they have been analysed, by contacting the researcher on etrippett1@sheffield.ac.uk or by giving her your contact details for this now.

The University of Sheffield is organising and funding this research. This project has been ethically approved via the University of Sheffield Psychology Department Research Ethics Committee, using the University of Sheffield's Ethics Review Procedure.

Contacts for further information:

- Liz Trippett (etrippett1@sheffield.ac.uk)
- Professor Glenn Waller (g.waller@sheffield.ac.uk)

Appendix E: Participant Consent Form

The University Of Sheffield.

Department Of Psychology.
Clinical Psychology Unit.

Liz Trippett
Trainee Clinical Psychologist
Department of Psychology
University of Sheffield
Western Bank
Sheffield S10 2TP UK

Telephone: 0114 222 6650
Email: etrippett1@sheffield.ac.uk

Title of Research Project: What factors moderate the impact of brief mirror exposure on the body image of women of different weights?

Name of Researcher: Liz Trippett

Participant Identification Number for this project: **Please initial box**

1. I confirm that I have read and understand the information sheet explaining the above research project and I have had the chance to ask questions. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason and without there being any negative consequences. In addition, should I not wish to answer any particular question or questions, I am free to decline. ☐

3. I understand that my responses will be kept confidential. I understand that I will not be identified or identifiable in the report or reports that result from the research. ☐

4. I agree for the data collected from me to be stored anonymously and potentially used in future research. ☐

5. I agree to take part in the above research project. ☐

_____	_____	_____
Name of Participant	Date	Signature
_____	_____	_____
Lead Researcher	Date	Signature

To be signed and dated in presence of the participant

Copies:

Once this has been signed by all parties the participant should receive a copy of the signed and dated participant consent form and the information sheet. A copy of the signed and dated consent form should be placed in the project's main record (e.g. a site file), which must be kept in a secure location.

Appendix F: University volunteer system participant recruitment emails

Phase 1 recruitment July 2015

Subject line: Are you a female interested in taking part in a study about body image?

Main text: This study is looking for women of all sizes to give 30-40 minutes to take part in a study about the impact of a brief method to examine and improve body image. You would complete some questionnaires and undertake a well-established, simple body image intervention (lasting about 15 minutes). We hope to add to existing knowledge about what helps women improve their perception of their own bodies, and who benefits the most. You would participate individually, wearing your own clothes, with a female researcher in a university building. If you'd like to know more or take part, please contact Liz Trippett on etrippett1@sheffield.ac.uk, indicating your availability on weekdays over the summer.

Phase 2 recruitment September 2016

Subject line: Are you a female interested in taking part in a study about body image?

Main text: We are looking for women of above-average Body Mass Index (BMI) to give 30-40 minutes to take part in a study about a brief method to examine and improve body image. We hope to add to existing knowledge about what helps women improve their perception of their own bodies, and who benefits the most.

- You would complete some questionnaires and undertake a well-established, simple body image intervention
- You would participate individually, wearing your own clothes, with a female researcher in a university building
- You can check your BMI here: http://www.nhs.uk/Tools/Pages/Healthyweightcalculator.aspx

7 participation dates are available between 3-31st October. Please book here:
http://bodyimageresearch.simplybook.it/sheduler/manage/event/1/unit/1

For further details, please contact Liz Trippett on etrippett1@sheffield.ac.uk

Appendix G: Slimming club participant recruitment leaflet

Liz Trippett
Trainee Clinical Psychologist
Department of Psychology
University of Sheffield
Western Bank
Sheffield S10 2TP UK

Telephone: 0114 222 6650
Email:
etrippett1@sheffield.ac.uk

Would you like to take part in a study about body image?

We are looking for women of all sizes to give 30-40 minutes to take part in a study about the impact of a brief method to understand and improve body image.

Many women experience difficulties with their body image. Some studies have found that looking in a mirror for a few minutes ('mirror exposure'), can help. However, this effect could be different for different people, so this project is trying to find out why. Taking part involves doing some questionnaires, having some measurements taken and doing 'mirror exposure' for 15 minutes.

You would participate individually, wearing your own clothes, with a female researcher. The study takes places in a room in the Clinical Psychology Unit on Western Bank (opposite Starbucks, near Weston Park museum). Dates for participating include: 3rd October, 4th October, 19th October, 26th October, 28th October.

If you'd like to know more or take part, please contact Liz Trippett on etrippett1@sheffield.ac.uk, or 0114 222 6650.

Appendix H: Power calculations for sample size

(1) Power calculations for sample size required to demonstrate body image change within each group

Power = 0.8

F-tests	ANOVA: Repeated measures, within-between interaction			
Analysis	A priori: Compute required sample size			
Input	Effect size f	=	0.25	
	α err prob	=	0.05	
	Power (1-β err prob)	=	0.8	
	Number of groups	=	2	
	Number of measurements	=	2	
	Corr among rep measures	=	0.5	
	Nonsphericity correction ε	=	1	
Output	Noncentrality parameter λ	=	8.5000000	
	Critical F	=	4.1490974	
	Numerator df	=	1.0000000	
	Denominator df	=	32.0000000	
	Total sample size	=	34	
	Actual power	=	0.8070367	

Power = 0.9

F-tests	ANOVA: Repeated measures, within-between interaction		
Analysis	A priori: Compute required sample size		
Input	Effect size f	=	0.25
	α err prob	=	0.05

	Power (1-β err prob)	=	0.9
	Number of groups	=	2
	Number of measurements	=	2
	Corr among rep measures	=	0.5
	Nonsphericity correction ε	=	1
Output	Noncentrality parameter λ	=	11.5000000
	Critical F	=	4.0617065
	Numerator df	=	1.0000000
	Denominator df	=	44.0000000
	Total sample size	=	46
	Actual power	=	0.9124984

(2) Power calculation for sample size needed to establish the reliability of the correlation between the potential moderators of body image change

T tests	Correlation: Point biserial model		
Analysis	A priori: Compute required sample size		
Input	Tail(s)	=	One
	Effect size |ρ|	=	0.32
	α err prob	=	0.05
	Power (1-β err prob)	=	0.8
Output	Noncentrality parameter δ	=	2.5275664
	Critical t	=	1.6735649
	Df	=	54
	Total sample size	=	56
	Actual power	=	0.8025704

Appendix I: THE DEPRESSIVE AND OBSESSIVE REASSURANCE SEEKING SCALE (DORSS, Radomsky, Parrish, & Dugas, 2009)

Please rate each statement by putting a circle around the number that best describes how much the statement is true of you. Please answer every item, without spending too much time on any particular item.

How much is each of the following statements true of you?	**Not at all**	**A little**	**Some**	**Much**	**Very Much**
1. I often try to find out if others care about me without asking them directly	0	1	2	3	4
2. I often make a statement about something that I've done to get information from others about how well I've done it	0	1	2	3	4
3. I often ask my partner / family members / roommate to reassure me that I remembered to lock the door, turn off the stove, unplug the clothes iron, etc.	0	1	2	3	4
4. I have trouble accepting responsibility for something important without asking for reassurance that everything will be OK	0	1	2	3	4
5. I sometimes make self-derogatory statements with the hope that someone will object to them	0	1	2	3	4
6. If I am unable to check something I am anxious about, I will ask others to reassure me that it is OK	0	1	2	3	4
7. I spend an excessive amount of time looking for signs of approval from others	0	1	2	3	4
8. If I am uncertain about the cleanliness of an object, I will wait until somebody else touches it before I do	0	1	2	3	4
9. In order to feel worthwhile, I need other people to continually show me that I am valued through their actions and gestures towards me	0	1	2	3	4
10. I always 'test the waters' before engaging in any activity that makes me anxious	0	1	2	3	4
11. I often ask others to tell me if I have made the 'wrong' decision	0	1	2	3	4
12. I become so anxious when I am uncertain about something that I need to ask my friends or family for reassurance over and over again	0	1	2	3	4
13. I am always 'testing' my friends and family to see if they really care about me	0	1	2	3	4
14. I sometimes check the safety of an object or situation by looking to see how other people react to it	0	1	2	3	4
15. I sometimes ask others to reassure me again and again that I have done all that I can to make things safe	0	1	2	3	4
16. I look to other people's moods when they are around me to determine whether they like me	0	1	2	3	4
17. If I am really worried about something, it rarely seems good enough to have others reassure me about it only once	0	1	2	3	4

How much is each of the following statements true of you?	Not at all	A little	Some	Much	Very Much
18. I spend far more time than most people looking to others for signs that things will be OK	0	1	2	3	4
19. I sometimes threaten to end a friendship in order to see if my friends really care about me	0	1	2	3	4
20. If I am unsure about the safety of my food, I will wait until someone else has tried some before I do	0	1	2	3	4
21. When faced with an important decision, I need to ask others for reassurance before I can make my final choice	0	1	2	3	4
22. I would rather risk annoying other people with repeated requests for reassurance than to continue to feel anxious about something	0	1	2	3	4
23. I annoy people with repeated requests for reassurance about their feelings for me and this causes problems in my relationships	0	1	2	3	4
24. If other people do not tell me otherwise, I can assume that I've got things under control	0	1	2	3	4
25. If I have checked something repeatedly and still feel unsure, I ask others to reassure me that things are safe	0	1	2	3	4
26. When I am anxious about doing something, I often start and if nobody around me warns me to stop, I assume it is OK to continue	0	1	2	3	4
27. I have often been told that I seem "insecure" because I constantly seek affirmation or approval from others	0	1	2	3	4
28. In social situations, I try to 'read' other people's body language to determine whether they like me	0	1	2	3	4
29. If others do not object to my engaging in an activity, then it must be 'safe'	0	1	2	3	4
30. I often try to find out if an object or situation is "safe" without asking anybody directly	0	1	2	3	4

Appendix J: BRIEF FEAR OF NEGATIVE EVALUATION SCALE (SHORT FNE, Leary (1983)

Please read each of the following statements carefully and indicate how characteristic it is of you, by circling the appropriate number on the scale:

	Not at all	Slightly	Moderately	Very	Extremely
I worry about what other people will think of me even when I know it doesn't make any difference.	0	1	2	3	4
I am unconcerned even if I know people are forming an unfavourable impression of me.	0	1	2	3	4
I am frequently afraid of other people noticing my shortcomings.	0	1	2	3	4
I rarely worry about what kind of impression I am making on someone.	0	1	2	3	4
I am afraid that others will not approve of me.	0	1	2	3	4
I am afraid that other people will find fault with me.	0	1	2	3	4
Other people's opinions of me do not bother me.	0	1	2	3	4
When I am talking to someone, I worry about what they may be thinking about me.	0	1	2	3	4
I am usually worried about what kind of impression I make.	0	1	2	3	4
If I know someone is judging me, it has little effect on me.	0	1	2	3	4
Sometimes I think I am too concerned with what other people think of me.	0	1	2	3	4
I often worry that I will say or do the wrong things.	0	1	2	3	4

Appendix K: BODY IMAGE AVOIDANCE QUESTIONNAIRE (BIAQ, Rosen, Srebnik, Saltzberg, & Wendt, 1991)

Circle the number which best describes how often you engage in these behaviours at the present time.

	Always	*Usually*	*Often*	*Some-times*	*Rarely*	*Never*
1. I always wear baggy clothes	5	4	3	2	1	0
2. I wear clothes I do not like	5	4	3	2	1	0
3. I wear darker color clothing	5	4	3	2	1	0
4. I wear a special set of clothing, e.g. my “fat clothes”	5	4	3	2	1	0
5. I restrict the amount of food I eat	5	4	3	2	1	0
6. I only eat fruits, vegetables and other low calorie foods	5	4	3	2	1	0
7. I fast for a day or longer	5	4	3	2	1	0
8. I do not go out socially if I will be “checked out”	5	4	3	2	1	0
9. I do not go out socially if the people I am with will discuss weight	5	4	3	2	1	0
10. I do not go out socially if the people I am with are thinner than me	5	4	3	2	1	0

11. I do not go out socially if it involves eating	5	4	3	2	1	0
12. I weigh myself	5	4	3	2	1	0
13. I am inactive	5	4	3	2	1	0
14. I look at myself in the mirror	5	4	3	2	1	0
15. I avoid physical intimacy	5	4	3	2	1	0
16. I wear clothes that will divert attention from my weight	5	4	3	2	1	0
17. I avoid going clothes shopping	5	4	3	2	1	0
18. I don’t wear “revealing” clothes (e.g., bathing suits, tank tops, or shorts	5	4	3	2	1	0
19. I get dressed up or made up	5	4	3	2	1	0

Appendix L: THE BODY SATISFACTION SCALE (Slade, Dewey, Newton, Brodie, & Kiemle, 1990)

Please note how satisfied you are with each of the following parts of your body, by circling the appropriate number.

		Very Satisfied	Moderately Satisfied	Slightly Satisfied	Undecided	Slightly Unsatisfied	Moderately Unsatisfied	Very Unsatisfied
1.	Head	1	2	3	4	5	6	7
2.	Face	1	2	3	4	5	6	7
3.	Jaw	1	2	3	4	5	6	7
4.	Teeth	1	2	3	4	5	6	7
5.	Nose	1	2	3	4	5	6	7
6.	Mouth	1	2	3	4	5	6	7
7.	Eyes	1	2	3	4	5	6	7
8.	Ears	1	2	3	4	5	6	7
9.	Shoulders	1	2	3	4	5	6	7
10.	Neck	1	2	3	4	5	6	7
11.	Chest	1	2	3	4	5	6	7
12.	Tummy	1	2	3	4	5	6	7
13.	Arms	1	2	3	4	5	6	7
14.	Hands	1	2	3	4	5	6	7
15.	Legs	1	2	3	4	5	6	7
16.	Feet	1	2	3	4	5	6	7

Appendix M: Participant debriefing sheet

Participant debriefing

As you know, this study has been examining your body image, and whether viewing it has an impact on how you see your body and how you feel about it. Some people are not that keen on their body, but that usually fades a bit or a lot after a while of looking at yourself in that way. Describing your body parts in neutral ways can help people be more objective about what their body looks like, so that is why you were asked to do this. For some people, certain things might influence whether this 'mirror exposure' helps their body image, such as whether they usually avoid looking in mirrors, or ask other people about how they look – that's why you were asked to do all the different questionnaires.

If taking part in this study has raised any issues for you that you would like to talk about further, then I would advise you to contact your GP/the University Health Service, where you can discuss whether there is any assistance that would help you.

As before, if you would like a summary of the findings of this study, I will make sure that you receive it as soon as possible once we have finished collecting the data. Please indicate on your consent form and include your contact email, if you would like this summary.

Many thanks for taking part.