Body matters : interventions and change techniques designed to improve body image

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BODY MATTERS

Interventions and Change Techniques
Designed to Improve
Body Image

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Interventions and Change Techniques Designed to Improve Body Image

DISSERTATION

to obtain the degree of Doctor at Maastricht University,
on the authority of the Rector Magnificus, Prof. L. L. G. Soete,
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by

Jessica Marie Alleva

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CHAPTER I
Introduction

"The experience of embodiment is central to the quality of human life."

Cash & Pruzinsky, 2002a, p. 516

The term *body image* was first defined by Paul Schilder in 1935, as "the subjective picture of our own body which we form in our mind; that is to say, the way in which the body appears to ourselves." Body image can be further conceptualised as a multi-dimensional construct, comprising a cognitive component (i.e., the thoughts about one's own body), an affective component (i.e., the feelings about one's own body), a perceptual component (i.e., the perception of one's own body), and a behavioural component (i.e., the behaviours carried out with regard to one's own body; Cash & Pruzinsky, 1990). When speaking of *negative body image*, it is generally meant that each of these components is negatively affected. That is, individuals with a negative body image tend to have negative thoughts (e.g., "I'm extremely unattractive"), feelings (e.g., weight dissatisfaction), and perceptions (e.g., magnification of perceived 'flaws') about their own body, and engage in behaviours such as excessive mirror-checking, pinching of the skin, or avoidance of public situations (Menzel, Krawczyk, & Thompson, 2011).

It is difficult to pinpoint precisely how many women and men have a negative body image, given that – in contrast to clinical disorders – there are no concrete or agreed upon criteria for what is or is not considered a "negative body image." However, studies tend to estimate that as many as 50-60% of women and 30-40% of men have a negative body image, with the majority of these estimates based on measures of the cognitive and affective components of body image (see Tiggemann, 2004, for a review). Williams, Cash, and Santos (2004) have made a further distinction between women with a "very negative body image" (24%) and women with a "moderately negative body image," or "normative body image discontent" (23%). Using cluster analysis, Williams et al. (2004) argued that although both groups of women may be equally dissatisfied with their body, women with a very negative body image differ in the extent that their body causes them substantial distress and affects their quality of life, as well as in the degree that they are 'invested' in their physical appearance. To our knowledge, similar estimates are not yet available for men.

Regardless of the exact estimates, these numbers are alarming considering the aversive consequences that have been associated with negative body image. For example, negative body image has been identified as a risk factor for a range of unhealthy behaviours, such as crash dieting, self-induced vomiting, laxative misuse, and excessive exercise, as well as the use of steroids, muscle-bulking products, and excessive weightlifting in men (Cafri et al., 2005; Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006). In addition, negative body image predicts low self-esteem, depression, and obesity, and it is considered the key risk factor for the development and maintenance of an eating disorder and body dysmorphic disorder (Cooley & Toray, 2001; Fairburn & Garner, 1986; Grabe, Hyde, & Lindberg, 2007; Johnson & Wardle, 2005; Neumark-

Sztianer et al., 2006; Paxton, Neumark-Sztianer, & Hannan, & Eisenberg, 2006; Phillips, 2011; Tiggemann, 2005). For these reasons, it has been said that body image is a "core aspect" of physical and psychological health – especially in women, for whom negative body image is more common (Grabe, Ward, & Hyde, 2008).

Both the prevalence and potential consequences of negative body image motivated the overarching aim of this thesis. That aim is, to answer the question: How can body image be improved? This question was divided into three sub-questions that guided the research conducted during the PhD project: (1) how is negative body image currently treated – and are existing interventions effective?; (2) how can we improve the way that individuals relate to their own body?; and (3) how can we improve the way that individuals relate to their own body with regard to the social environment? In the following, each sub-question is introduced, along with a specification of how it was addressed in the PhD project. At the end of the chapter, an outline of the remainder of the thesis is presented.

1. How Is Negative Body Image Currently Treated – and Are Existing Interventions Effective?

In order to investigate how body image can be improved, it is necessary to evaluate how body image is currently treated and whether existing interventions are effective at improving body image. Extant interventions designed to improve body image can broadly be divided into five categories: (a) cognitive-behavioural therapy (CBT), (b) media literacy, (c) fitness training, (d) self-esteem enhancement, and (e) psychoeducation.

CBT-based interventions stem from the *cognitive-behavioural perspective* on body image (Cash, 2011). In brief, the cognitive-behavioural perspective posits that a range of historical (e.g., culture, family upbringing, personality traits) and proximal (e.g., current situations, emotional states, peer group) factors can shape and affect an individual's body image. In addition, an individual's thoughts, feelings, and behaviours interact with these factors. CBT-based interventions assume that negative body image is maintained by dysfunctional or irrational thoughts, feelings, and behaviours with regard to one's own body. Thus, the aim of CBT is to modify these thoughts, feelings, and behaviours, and to help individuals to adopt healthier ones. To do so, a variety of techniques are used such as teaching monitoring and restructuring of cognitions and conducting exposure exercises (see Jarry & Cash, 2011, for more details).

Media literacy interventions are derived from the *sociocultural perspective* on body image. According to this perspective, "(1) there exist societal ideals of beauty (within a particular culture) that are (2) transmitted via a variety of sociocultural channels. These ideals are then (3) internalized by individuals, so that (4) satisfaction (or dissatisfaction) with appearance will be a function of the extent to which individuals do (or do not)

meet the ideal prescription" (Tiggemann, 2011, p. 13). Unfortunately, the current beauty ideal for women and men is more unrealistic than it ever has been in history, with the 'ideal woman' being extremely thin and the 'ideal man' being extremely muscular (Diedrichs & Lee, 2010; Grabe et al., 2008). Consequently, most individuals cannot possibly achieve the ideal prescription. The aim of media literacy interventions is therefore to teach individuals to critically evaluate and challenge the messages (e.g., that extremely muscular men are most attractive) and images (e.g., of extremely thin women) disseminated by the media, in order to discredit media and thus reduce their influence on body image (Irving & Berel, 2001). Techniques used in media literacy interventions include teaching individuals about the unrealistic nature of the beauty ideal and the technology used by media to create the 'perfect' image.

Fitness training interventions include aerobic (e.g., running) and/or anaerobic (e.g., weight lifting) exercises with the aim of improving physical capacities (e.g., stamina), and have been postulated to affect body image in various ways (Martin Ginis & Bassett, 2011). For example, fitness training might help individuals to focus less on the appearance of their body and more on the physical functioning of their body (Campbell & Hausenblas, 2009; Martin & Lichtenberger, 2002). Another possibility is that fitness interventions might improve body image via objective changes in physical appearance, such as weight loss. However, objective changes in body composition have been shown to account for less than 15% of changes in body image (Martin Ginis & Bassett, 2011). Instead, it appears that *perceived* changes in physical fitness and physical self-efficacy (i.e., beliefs about one's physical capabilities), play a more important role (Martin Ginis & Bassett, 2011).

The rationale behind self-esteem enhancement interventions is that low self-esteem is associated with negative body image, so improving an individual's overall self-worth should improve body image as well (O'Dea, 2004). These interventions may also improve body image by helping people to base their self-worth on factors other than appearance and by facilitating resiliency (e.g., in the face of criticism or anxiety; O'Dea, 2004). Self-esteem enhancement interventions incorporate techniques that help individuals to define themselves in nonappearance-related terms (e.g., academic achievement) and to broaden their notion of what defines a 'good' person (i.e., qualities other than appearance). Techniques related to healthy development and functional coping skills are also frequently deployed.

Lastly, psychoeducation-based interventions aim to teach individuals about the concept of body image, as well as the causes and consequences of negative body image, in order to provide them with a framework that they can use to better understand negative body image (O'Dea & Yager, 2011). In addition, factors related to the key features of a healthy lifestyle are also often discussed, such as nutrition, healthy eating behaviour, and physical activity. Psychoeducation may be administered as a stand-alone intervention, but is frequently combined with other types of interventions, such as fitness training or media literacy.

It is important to note that there are other types of interventions that do not easily fit into these categories. For instance, Martijn, Vanderlinden, Roefs, Huijding, and Jansen (2010) developed an evaluative conditioning task to improve body image, wherein pictures of participants' own body were systematically paired with positive social feedback (see also Aspen et al., 2015). Other studies have deployed self-affirmation techniques, such as having participants contemplate situations when they have acted with kindness (e.g., Armitage, 2012). Mindfulness-based interventions have also been developed for body image, and include techniques such as loving-kindness meditation (e.g., Albertson, Neff, & Dill-Shackleford, 2014). These interventions have shown promise in improving body image, but are comparatively new and have there-fore not yet received as much empirical attention.

How Was This Question Addressed in This Thesis?

To address the question of how body image is currently treated, and whether these interventions are effective, we conducted a meta-analytic review of existing stand-alone interventions to improve body image. In addition to assessing the overall effectiveness of interventions, we also evaluated interventions at the level of specific change tech-niques. That is, rather than looking at broad categories of interventions (e.g., self-esteem enhancement, psychoeducation), we evaluated the *specific change techniques* (or "active ingredients;" Abraham & Michie, 2008) used within each intervention (e.g., teaching interpersonal skills, discussing the causes of negative body image). To do so, we created a taxonomy of 48 change techniques used in stand-alone interventions to improve body image, and coded each intervention included in the meta-analytic review according to the presence versus absence of each technique. So doing allowed us to move beyond the question of whether and to what extent interventions are effective, to address deeper questions such as "what change techniques best improve body image and warrant use in future interventions?"

2. How Can We Improve the Way That Individuals Relate to Their Own Body?

All theoretical perspectives of body image, such as the cognitive-behavioural perspective and the sociocultural perspective, acknowledge the complex interplay between individual and interpersonal factors in shaping body image. Similarly, in this PhD project, we focused on improving body image both with regard to how individuals feel about *their own body*, as well as with regard to how they feel about their own body *in relation to the social environment* (i.e., to other people). In the following line of research, we focused in particular on improving body image with regard to how individuals relate to their

own body. The specific theory that motivated this line of studies is the objectification theory.

The *objectification theory* (Fredrickson & Roberts, 1997) posits that, in western society, women are routinely sexually objectified: Their body (or body parts) and sexual functions are seen as separate from their person, are seen as reflecting who they really are, or are "reduced to the status of mere instruments" (Fredrickson & Roberts, 1997, p. 175) for the pleasure of others (Bartky, 1990). Sexual objectification of women can occur in interpersonal interactions (e.g., via the sexualised male gaze) and is ubiquitous in mass media, where women are portrayed with an emphasis on their body or body parts, or in sexually submissive poses (Fredrickson & Roberts, 1997). The objectification theory further posits that living in a cultural milieu of sexual objectification may, to some degree, socialise women to internalise this view of their body. This has been termed *self-objectification,* whereby women value and evaluate both their own body and themselves as a person based predominantly on physical appearance, rather than the physical functioning of their body or other, internal qualities of themselves. Self-objectification, in turn, has been proposed to have a variety of potential consequences, such as negative body image, disordered eating, and psychological distress (see Fredrickson & Roberts, 1997, for details).

To date, a systematic review of research on objectification theory has confirmed these propositions (Moradi & Huang, 2008). For example, a number of experimental studies have shown that heightening self-objectification causes women to experience body shame and anxiety, and even impairs their performance on cognitive tasks (e.g., Fredrickson et al., 1998; Quinn, Kallen, Twenge, & Fredrickson, 2006). Longitudinal studies have also shown that self-objectification predicts negative body image over the long term (e.g., McKinley, 2006a, 2006b). It is important to note, however, that although women may be subject to similar societal contexts, not *all* women will respond to sexual objectification in the same way, or engage in self-objectification to the same extent. As predicted by Fredrickson and Roberts (1997), a variety of factors – such as ethnicity or the extent to which the beauty ideal is internalised – may influence women's tendency to engage in self-objectification (see Moradi & Huang, 2008, for details).

Drawing from the objectification theory, we questioned: If focusing predominantly on the *appearance* of one's own body is related to negative body image, what if we trained individuals to focus on the *functionality* of their body, instead? *Body functionality* can be defined as everything the body is able to *do*, rather than how it *looks* (Abbott & Barber, 2010), or as the "body-as-process" rather than the "body-as-object" (Franzoi, 1995). Functions of the body can be grouped into six possible categories: (a) physical capacities (e.g., muscular strength, walking), (b) health and internal processes (e.g., digestion, absorbing vitamins), (c) senses (e.g., sight, smell), (d) creative endeavours (e.g., dancing, playing an instrument), (e) communication with others (e.g., body language, eye contact), and (f) self-care (e.g., showering; Abbott & Barber, 2010; Avalos & Tylka, 2006; Franzoi, 1995; Franzoi & Shields, 1984; Fredrickson & Roberts,

1997). When conceptualising body functionality, it is important to bear in mind that it is not limited to physical capacities – which would position body functionality as a construct that is restricted to able-bodied people (cf. Webb, Wood-Barcalow, & Tylka, 2015) – but also encompasses many functions that fall under the other categories listed above.

Traditionally, research on body image has focused on individuals' thoughts, feelings, perception, and behaviour with regard to their physical appearance. In contrast, research on body functionality is scarce, and this has been identified as a major limitation to the current field of body image research (Smolak & Cash, 2011). Nevertheless, the few studies that have incorporated body functionality have demonstrated correlational relationships between focusing on the functionality of the body and a more positive body image (e.g., Avalos & Tylka, 2006; Frisén & Holmqvist, 2010; Wood-Barcalow, Tylka, & Augustus-Horvath, 2010) and lower levels of self-objectification (e.g., Prichard & Tiggemann, 2008; Roberts & Waters, 2004; Tiggemann, Coutts, & Clark, 2014). However, prior to the studies described in this thesis, no studies had experimentally tested whether focusing on body functionality actually *causes* improvements in body image and reductions in self-objectification.

How Was This Question Addressed in This Thesis?

To address the question of how can we improve the way that individuals relate to their own body – specifically, whether focusing on body functionality can improve body image – we conducted a series of randomised controlled experiments. In two initial studies, a group of female and male undergraduates, as well as a group of 30 to 50-year-old women, completed a brief writing assignment wherein they either wrote about their body functionality, physical appearance, or the route that they take to the university or shopping centre (as an active control). This study served primarily as a first test of whether focusing on body functionality can cause improvements in body image. In a third study, we created a more elaborate, one-week intervention programme (*Expand Your Horizon*) wherein women with a negative body image completed three structured writing assignments. The writing assignments were designed to teach women to focus on the functionality of their body and why it is meaningful and important to them. This intervention programme was compared to an active control programme. In all three studies, measures of body image (and, in the third study, measures of self-objectification) were administered at pretest, posttest, and one week follow-up.

3. How Can We Improve the Way That Individuals Relate to Their Own Body With Regard to the Social Environment?

As aforementioned, body image is shaped by a combination of individual and interpersonal factors, and both of these factors were addressed in the PhD project. The following line of research focused on improving the way that individuals relate to their own body with regard to the social environment, and was derived from the cognitive-behavioural perspective on body image (Cash, 2011). This perspective proposes that individuals' thoughts about their own body can be irrational – they may in fact display distortions in cognitive processing, or 'cognitive biases.' Jakatdar, Cash, and Engle (2006) described several distortions in cognitive processing that women with a negative body image tend to display, such as making biased social comparisons, magnification of perceived flaws in appearance, and dichotomous thinking (e.g., in terms of fat vs. thin). Distortions in cognitive processing have been related to greater psychological investment in one's appearance, preoccupation with being or becoming overweight, and pathological eating attitudes and behaviours (Jakatdar et al., 2006). Moreover, distortions in cognitive processing serve to create a 'vicious circle,' whereby cognitive biases and negative body image are reinforced and maintained (Williamson, White, York-Crowe, & Stewart, 2004).

In our research, we focused specifically on covariation bias. *Covariation bias* is defined as a distortion in cognitive processing whereby individuals overestimate the relationship between a particular stimulus and an aversive outcome – even when, in reality, the relationship is absent or is correlated in the opposite direction (Chapman & Chapman, 1967). Traditionally, research on covariation bias has been conducted in samples of individuals with an anxiety disorder or with high levels of anxiety symptomatology (e.g., De Jong, Merckelbach, Arntz, & Nijman, 1992; Hermann, Ofer, & Flor, 2004; Tomarken, Sutton, & Mineka, 1995). In the classic paradigm that has been used to investigate covariation bias (Tomarken, Mineka, & Cook, 1989), individuals are presented with a series of images that fall into one of three categories: (a) fear-relevant stimuli – specific for the pathology under investigation; (b) fear-relevant stimuli – nonspecific for the pathology under investigation; and (c) fear-irrelevant stimuli. In studies of spider phobia, for example, fear-relevant stimuli could be images of spiders (specific) and snakes (nonspecific), whereas fear-irrelevant stimuli could be images of mushrooms. Each image is followed either by an aversive outcome (an electric shock), a nonaversive outcome (a tone), or nothing. Importantly, the contingencies between each category of stimuli and each outcome are random.

At the very end of the task, participants estimate the percentage of trials of each stimulus category that were followed by each type of outcome. In studies of spider phobia, participants with a spider phobia markedly overestimate the relationship between spiders and the aversive outcome, but not the relationship between other fear-relevant (nonspecific) or fear-irrelevant stimuli and the aversive outcome, or the rela-

tionship between any category of stimuli and the other types of outcomes. Regardless of the context in which covariation bias occurs (e.g., spider phobia, panic disorder), it is proposed to have a direct and powerful influence on confirming danger expectations, enhancing fear, and maintaining psychological distress (e.g., De Jong, van den Hout, & Merckelbach, 1995; Hirsch & Clark, 2004; Tomarken et al., 1989).

We proposed that covariation bias might play a role in negative body image as well. In particular, we reasoned that women with a negative body image might display a covariation bias with regard to their own body (the stimulus) and negative social feedback (the aversive outcome). In practical terms, this would mean that women with a negative body image perceive that their own body is frequently associated with negative feedback from others in their social environment – even though this is not the case, or even though others view their body positively. For example, walking into a party, a woman with a negative body image might perceive that most people are staring at her body disapprovingly, as if she is unattractive. Theoretically, such a covariation bias would create body image distress, as well as reinforce and maintain negative body image in the long run (Williamson et al., 2004). In addition, the covariation bias might actually serve to *elicit* negative social feedback (e.g., if a woman avoids eye contact or talking with others), creating a 'self-fulfilling prophecy' and thus further exacerbating the impact of covariation bias on body image (Cash & Fleming, 2002a; Tantleff-Dunn & Lindner, 2011). Furthermore, if covariation bias does play a role in reinforcing and maintaining negative body image, then diminishing covariation bias might be a beneficial technique for improving body image.

How Was This Question Addressed in This Thesis?

To address the question of how can we improve the way that individuals relate to their own body with regard to the social environment – specifically, whether women with a negative body image display a covariation bias for their own body and negative social feedback, and whether it can be diminished in order to improve body image – we conducted the following two experiments. In a first study, female undergraduates completed a computer task wherein three categories of stimuli – pictures of their own body, a control woman's body, and a neutral object – were followed by 'facial crowds' consisting of equal amounts of negative, positive, and neutral social feedback. At the end of the task, participants were asked to estimate the percentage of negative, positive, and neutral social feedback that followed their own body, the control woman's body, and the neutral object. So doing allowed us to investigate the presence of covariation bias for the relation between one's own body and negative social feedback, for women with a more vs. less negative body image.

In a second study, female undergraduates completed a similar computer task, except that this time each category of stimuli was followed only by negative social feedback vs. nothing (to allow for a closer replication of the computer task that served as a

basis for this study; Pauli, Montoya, & Martz, 2001). Further, this computer task comprised three blocks. In Block 1 and Block 3, contingencies between each category of stimuli and negative social feedback were random. In Block 2, however, contingencies were manipulated so that women's own body and the control woman's body were only rarely followed by negative social feedback, whereas the neutral object was almost always followed by negative social feedback. The purpose of Block 1 was to investigate the presence of covariation bias, and the purpose of Block 2 was to diminish the covariation bias. Block 3 was used to investigate if any changes in covariation bias (as a consequence of the manipulation in Block 2) would persist when contingencies returned to random. In addition, participants estimated the relationship between each category of stimuli and the negative social feedback at various moments throughout the computer task, in order to allow us to develop a more fine-grained understanding of covariation bias (e.g., how it changes over multiple trials). State body evaluation (i.e., satisfaction or dissatisfaction with one's body) was also assessed to test whether any changes in covariation bias would coincide with improvements in body image.

Outline of the Remainder of the Thesis

To reiterate, negative body image is prevalent and can have serious consequences for psychological and physical health. Therefore, it is important to answer the question: How can body image be improved? The present PhD project addressed this central question according to three sub-questions, each with its own study or series of studies:

1. **How is negative body image currently treated – and are existing interventions effective?**
To answer this question, we conducted a meta-analytic review and investigated both the overall effectiveness of extant interventions, as well as the specific change techniques that improve body image. The meta-analytic review is described in **Chapter 2** of this thesis.

2. **How can we improve the way that individuals relate to their own body?**
To answer this question, we specifically focused on training individuals to shift their focus on their body from one predominantly based on appearance, to one that emphasises body functionality. The three studies resulting from this sub-question are described in **Chapter 3** and **Chapter 4** of this thesis.

3. **How can we improve the way that individuals relate to their own body with regard to the social environment?**
To answer this question, we investigated whether women with a negative body image display a covariation bias for the relation between their own body and negative social

feedback, and, if so, whether this covariation bias can be diminished. The two studies are described in **Chapter 5** and **Chapter 6** of this thesis.

The thesis concludes with the Discussion (**Chapter 7**) in which the findings of these studies are discussed, along with the key limitations and directions for future research. Lastly, a summary of the thesis is provided (**Summary**) and opportunities for valorisation are presented (**Valorisation**).

PART I

How Is Negative Body Image
Currently Treated – and
Are Existing Interventions Effective?

CHAPTER 2

A Meta-Analytic Review of Stand-Alone Interventions to Improve Body Image

Abstract

Objectives: Numerous stand-alone interventions to improve body image have been developed. The present review used meta-analysis to estimate the effectiveness of such interventions, and to identify the *specific change techniques* that lead to improvement in body image. **Methods:** The inclusion criteria were that (a) the intervention was stand-alone (i.e., solely focused on improving body image), (b) a control group was used, (c) participants were randomly assigned to conditions, and (d) at least one pretest and one posttest measure of body image was taken. Effect sizes were meta-analysed and moderator analyses were conducted. A taxonomy of 48 change techniques used in interventions targeted at body image was developed; all interventions were coded using this taxonomy. **Results:** The literature search identified 62 tests of interventions (N = 3,846). Interventions produced a small-to-medium improvement in body image (d_+ = .38), a small-to-medium reduction in beauty ideal internalisation (d_+ = -.37), and a large reduction in social comparison tendencies (d_+ = -.72). However, the effect size for body image was inflated by bias both within and across studies, and was reliable but of small magnitude once corrections for bias were applied. Effect sizes for the other outcomes were no longer reliable once corrections for bias were applied. Several features of the sample, intervention, and methodology moderated intervention effects. Twelve change techniques were associated with improvements in body image, and three techniques were contra-indicated. **Conclusions:** The findings show that interventions engender only small improvements in body image, and underline the need for large-scale, high-quality trials in this area. The review identifies effective techniques that could be deployed in future interventions.

Introduction

Body image is the subjective "picture" that people have of their own body (Schilder, 1935), regardless of how their body actually looks. Body image is a multifaceted construct, consisting of cognitive and affective components (i.e., how people think and feel about their body), perceptual components (i.e., how people perceive the size and shape of their body and body parts), and behavioural components (i.e., the actions that people perform for the purpose of checking on, tending to, altering, or concealing their body; Cash & Pruzinsky, 1990). *Negative body image* is expressed in one or more of the components of body image and is often characterised by a dissatisfaction with appearance and engaging in behaviours such as frequent self-weighing or mirror checking, or avoidance of public situations (Menzel, Krawczyk, & Thompson, 2011).

Studies have shown that negative body image can emerge in childhood. Approximately 50% of preadolescent girls and 30% of preadolescent boys dislike their body (Smolak, 2011; Wood, Becker, & Thompson, 1996; see Smolak & Levine, 2001, for a discussion). In adults, approximately 60% of women and 40% of men have a negative body image, and these rates remain stable across the lifespan (Garner, 1997; see Tiggemann, 2004, for a review). Negative body image contributes to the development and maintenance of body dysmorphic disorder and eating disorders (Cooley & Toray, 2001; Fairburn & Garner, 1986), and is associated with social anxiety (Cash & Fleming, 2002a), low self-esteem (Cash & Fleming, 2002b), depression (Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006), and impaired sexual functioning (Weaver & Byers, 2006). In addition, negative body image has serious consequences for health behaviours. For instance, negative body image predicts physical inactivity (Grogan, Evans, Wright, & Hunter, 2004; see Grogan, 2006, for a review), unhealthy eating (Cooley & Toray, 2001; Levine & Piran, 2004), and weight gain (van den Berg & Neumark-Sztainer, 2007), and is associated with unsafe sex (Littleton et al., 2005; Schooler, 2013), smoking (Wiseman, Turco, Sunday, & Halmi, 1998), and skin cancer risk behaviours (Blashill, Williams, Grogan, & Clark-Carter, 2015).

Interventions Designed to Improve Body Image

Given the associations between negative body image, psychological problems, and unhealthy behaviours, a large number of interventions have been designed to improve body image. The most prominent of these interventions is cognitive-behavioural therapy (CBT; Farrell, Shafran, & Lee, 2006). Broadly speaking, CBT aims to help individuals to modify dysfunctional thoughts, feelings, and behaviours that contribute to negative body image. To achieve these improvements, a variety of cognitive and behavioural change techniques are used such as self-monitoring, cognitive restructuring, and exposure exercises (see Jarry & Cash, 2011, for a detailed discussion).

Other interventions for improving body image can broadly be divided into four categories: fitness training, media literacy, self-esteem enhancement, and psychoeducation. Fitness training interventions include aerobic or anaerobic activities geared at improving physical capacities (e.g., muscular strength). Interestingly, objective improvements in fitness obtained by such interventions are inconsistently related to changes in body image. Instead, it appears that *perceived* improvements in physical capacities may play a more important role (Martin Ginis & Bassett, 2011). Fitness training interventions may also improve body image by encouraging individuals to focus more on the functionality of their body and less on their appearance, or by increasing their sense of self-efficacy (Martin Ginis & Bassett, 2011; Martin & Lichtenberger, 2002).

The aim of media literacy interventions is to teach individuals to critically evaluate and challenge the images (e.g., of underweight women) and messages (e.g., that thin is beautiful) disseminated by the media that can cause negative body image (Grabe, Ward, & Hyde, 2008; Groesz, Levine, & Murnin, 2002; Irving & Berel, 2001). In doing so, these images and messages are discredited and consequently their influence on body image should be reduced (Irving & Berel, 2001). Examples of techniques used in media literacy interventions include educating individuals about the biased notion of beauty ideals that is perpetuated by the media and teaching strategies to reduce exposure to appearance-focused media.

Another set of interventions is designed to enhance self-esteem. The rationale for these interventions is that low self-esteem has been shown to predict negative body image, and thus, by improving how individuals feel about their overall worth, body image should improve as well (O'Dea, 2004). Techniques used in such interventions focus on identifying and appreciating individual differences (e.g., in body shape, ethnicity), strengths (e.g., sense of humour, intelligence), and talents (e.g., singing, mathematics), and building skills that are necessary for healthy coping and development (e.g., interpersonal skills).

Finally, psychoeducation aims to teach individuals about issues related to negative body image including its causes and consequences (O'Dea & Yager, 2011). Psychoeducation often includes information about the key features of a healthy lifestyle (e.g., physical activity), and is frequently combined with other types of interventions, such as self-esteem enhancement (e.g., Dohnt & Tiggemann, 2008) or fitness training interventions (e.g., Lindwall & Lindgren, 2005). It is important to note that there are additional approaches to improving body image that do not easily fit into these categories (CBT, fitness training, media literacy, self-esteem enhancement, or psychoeducation), such as evaluative conditioning (e.g., Aspen et al., 2015; Martijn, Vanderlinden, Roefs, Huijding, & Jansen, 2010; Martijn et al., 2012) or mindfulness-based interventions (e.g., Albertson, Neff, & Dill-Shackleford, 2014; Delinsky & Wilson, 2006). However, these approaches are comparatively new and have not yet received as much empirical attention.

How Effective Are Interventions Targeted at Body Image?

Two narrative reviews have supported the efficacy of CBT (Jarry & Berardi, 2004; Farrell, Shafran, & Lee, 2006), and Jarry and Ip's (2005) meta-analysis of 19 CBT interventions found a large, positive effect on body image (d_+ = 1.00). In addition, Campbell and Hausenblas (2009) found that fitness training interventions had a small effect on body image at posttest (d_+ = .29), whereas Yager, Diedrichs, Ricciardelli, and Halliwell's (2013) review of classroom interventions (that used various intervention approaches) observed effect sizes in the small to medium range (d_+ = .23 to .48). Based on these reviews, it seems that interventions designed to improve body image are effective, with effect sizes ranging from small (d_+ = .23) to large (d_+ = 1.00).

Three important issues concerning these reviews must be addressed, however. First, reviews to date have focused on the broad approach taken (e.g., CBT or fitness training) rather than the *specific change techniques* deployed in interventions. This may be problematic because interventions based on any single approach may use a variety of different change techniques related to that approach, and may also draw upon techniques from alternative approaches. For instance, CBT-based interventions may deploy any number of CBT-based techniques such as guided imagery or exposure exercises, discussion of the role of cognitions in body image, or teaching monitoring and restructuring of cognitions. One or more of these techniques could be responsible for the effectiveness of the CBT approach. Further, these CBT interventions might also involve techniques such as those related to media literacy or self-esteem enhancement. Analysing the specific change techniques or "active ingredients" (Abraham & Michie, 2008) used in interventions targeted at body image is valuable because it helps to move research beyond the basic question of whether or to what extent interventions are effective, to address deeper questions about "*why* are interventions effective?" and "*what change techniques* best improve body image and warrant use in future interventions?"

Although the identification of change techniques in behavioural interventions is well established (e.g., Abraham & Michie, 2008; Michie et al., 2013), to our knowledge, there is no taxonomy that can be used to characterise the techniques used in interventions targeted at body image. Therefore, as part of the present review, we developed a taxonomy of change techniques used in stand-alone interventions designed to improve body image. To generate the taxonomy, we drew upon both theoretical accounts of cognitive and behavioural change (e.g., Karasu, 1986; Klar, Fisher, Chinsky, & Nadler, 1992; Tschacher, Junghan, & Pfammatter, 2014), Abraham and Michie's (2008) taxonomy of behavioural change techniques, and a careful analysis of the content of stand-alone interventions that targeted body image. The goal in developing the taxonomy was to combine top-down (theoretical) and bottom-up (empirical) approaches (for discussion, see Koole, 2009; Skinner, Edge, Altman, & Sherwood, 2003) in order to best characterise the specific change techniques used in intervention studies. The final taxonomy comprised 48 change techniques in six broad categories (see Table 1).

Table 1 Change Techniques Used in Stand-Alone Interventions to Improve Body Image

Nr.	Label	Definition
	General cognitive-behavioural techniques for improving body image	
1	Discuss cognitions and their role in body image	Discuss cognitions and the role that they play in feelings, emotions, and behaviour that are related to body image. Attention should be paid to concepts such as irrational beliefs, automatic thoughts, cognitive errors, etc.
2	Teach self-monitoring and restructuring of cognitions	Teach participants techniques to monitor and restructure their cognitions. Monitoring and restructuring is often recorded in writing, for example, using a diary or log. Techniques that may be used include keeping thought records, using the A-B-C model, or the triple column technique.
3	Teach self-monitoring of behaviour	Teach participants to monitor and record their behaviour(s) as part of a behavioural change strategy. For example, participants may be asked to record the number of times they check their appearance in the mirror. Or, participants may be asked to record, using a diary, the number of pedometer-determined steps that they walk per day.
4	Change negative body language	Teach participants to improve the language they use to describe their body (e.g., to avoid negative, evaluative terms and instead use terminology that is nonjudgemental and fact-based).
5	Change the biased focus toward the body	Teach participants to focus their attention less on body parts they dislike and to focus more attention on other body parts and on seeing one's body as a whole.
6	Conduct guided imagery exercises	Focus and direct participants' imagination, for example, by having participants relive an important event that influenced their body image or use their "mind's eye" to look at parts of their body.
7	Conduct exposure exercises	Expose participants to their own body, or to a distressing body-image related situation, with the goal of gradually extinguishing negative reactions to these situations. For example, mirror exposure may be conducted to expose participants to their own body, or participants may be asked to exercise in public wearing form-fitting clothing.
8	Write about the body	Prompt participants to write about their body image. For example, participants may describe, in writing, their most distressing body parts or particular life events that influenced their body image.
9	Provide size-estimate exercises	Prompt participants to estimate the size of various body parts, for example using movable markers to indicate the width of their hips. Provide participants with feedback on the accuracy of their estimates and have them repeat their estimates until they are accurate.
10	Prompt action-planning	Prompt detailed planning of the performance of a specific action (including context, frequency, duration, and intensity). The action may relate to behaviour (e.g., exercising), or cognition (e.g., engaging in positive self-talk). The context may be external (physical or social) or internal (physical, emotional, or cognitive experiences).
11	Teach time management skills	Teach participants skills to manage their time effectively, for example, by helping participants to schedule time to complete homework despite a busy schedule or to limit time spent engaging in undesired activities (e.g., watching too much television) and increase time spent engaging in desired activities (e.g., spending time with family).

Nr.	Label	Definition
12	Agree on a contract	Create and agree on a verbal or written contract specifying a specific response to be performed (and possibly, actions to overcome barriers) so that there is a record of participants' resolution that is witnessed by another person (e.g., by a therapist or group member). The response may be behavioural (e.g., physical activity) or cognitive (e.g., engaging in positive self-talk).
13	Barrier identification	Identify barriers to performing a specific behaviour and plan ways of overcoming them. For example, participants may arrange a baby sitter so that they have alone-time to perform physical activity exercises. Or, participants may arrange weekly visits to a friend to counteract loneliness.
14	Provide performance feedback	Provide feedback about behaviour or performance on a task, for example, by giving participants feedback regarding their homework assignments or regarding the completion of mirror exposure.
15	Provide encouragement	Encourage participants regarding the (continued) performance of particular (cognitive or behavioural) responses, for instance, by encouraging participants to complete homework assignments or to continue progressing through the intervention.
16	Prompt identification as a role model	Indicate how participants may set a positive example for others and how they may positively influence others' thoughts and behaviour. This technique may also include indicating how participants can share the knowledge they learned in the intervention with others and how they can use it to help others who are experiencing body image difficulties.
17	Provide relapse-prevention strategies	Provide strategies for when participants are confronted with perceived failures to cope with negative body image thoughts, feelings, or behaviours. Identify the situations likely to result in participants readopting maladaptive cognitions and behaviours or failing to maintain adaptive cognitions and behaviours, and help them plan to avoid or manage these situations.
18	Provide stress-management training	Teach participants stress management techniques that do not target body image cognition and behaviour but that seek to reduce anxiety and stress. These techniques include progressive muscle relaxation, deep breathing, etc.
19	Provide alternative help resources	Provide participants with alternative help resources, such as self-help books, DVDs, or websites, or information about a psychologist or support group.

Techniques for enhancing physical fitness

Nr.	Label	Definition
20	Provide physical activity exercises	Offer or lead physical activity exercises that participants can engage in (e.g., walking, aerobic dance, swimming, Pilates, etc.).

Techniques providing media-literacy and promoting media resistance

Nr.	Label	Definition
21	Provide media literacy training	Provide media literacy training with the aim of helping participants to decipher media messages and to be critical of them. Key concepts may include: (1) media images are constructed by experts (e.g., clothing and lighting experts); (2) media images present only one version of reality; (3) the media influence how people feel about themselves; and (4) the purpose of media is to sell products, values, and ideas.
22	Discuss the beauty ideal	Discuss the concept of the beauty ideal, including topics such as the variation in the beauty ideal over time and across cultures, the unrealistic nature of the beauty ideal, the (false) assumptions made about the beauty ideal (e.g., if one is thin, one will be happy), etc.

Nr.	Label	Definition
23	Teach strategies for resisting the effect of the media	Teach participants strategies they can use to resist the impact of the media. For example, participants may be trained to focus on nonappearance aspects of models in advertisements, or they may decide to stop reading fashion magazines that feature extremely thin (female) or extremely muscular (male) models.
24	Provide media-critique exercises	Provide exercises that involve critiquing media images and the messages presented through them. For example, participants may be asked to generate arguments to counter the 'thin is beautiful' message presented in many advertisements, or they may be asked to examine stereotypes portrayed in music videos.
25	Provide alternative images of women and/or men	Provide images of women's and/or men's bodies that are empowering and that go against the current beauty ideal. For example, provide participants with advertisements that promote positive body image or show participants images that portray historical beauty ideals (e.g., Degas' painting *The Bather*).

Techniques designed to enhance self-esteem

Nr.	Label	Definition
26	Discuss self-esteem	Discuss the concept of self-esteem, how self-esteem is formed, what factors influence self-esteem, how it relates to well-being, etc.
27	Provide self-esteem enhancement exercises	Provide exercises that aim to enhance the participants' positive self-regard. For example, participants may write a list of their talents and positive personality traits or participants may practice giving each other compliments.
28	Discuss individual differences	Discuss the concept of individual differences regarding inner (e.g., personality) and outer (e.g., appearance) facets. Topics may include how individuals develop different traits, characteristics, and talents that make them unique, how individuals differ in appearance, body size, body shape, skin colour, etc.
29	Discuss alternatives to focusing on appearance	Discuss nonappearance-related aspects of the self and others. For example, discuss how the body can be viewed in terms of its functionality (e.g., fitness, sensory experience, health) or capacity to express internal qualities (e.g., kindness, intelligence, sense of humour) rather than in terms of appearance, or how mastery and pleasure can be achieved through the body.
30	Discuss stereotypes	Discuss stereotypes, prejudice and discrimination related to gender or appearance. Topics may include female and male stereotypes, stereotypes about thin or overweight people, the impact of prejudice and discrimination, etc.
31	Discuss age-related issues and challenges	Discuss age-related issues and challenges, as well as their impact on well-being. Topics may include the changes the body goes through during puberty or menopause, different maturity rates, difficulties of navigating puberty and adolescence, etc.
32	Discuss interpersonal relations	Discuss interpersonal relations, for example, peer pressure, social rejection, the unacceptability and impact of appearance-based teasing, the effects of fat talk, how others may learn from one's behaviour (e.g., social learning), etc.
33	Teach interpersonal skills	Teach participants interpersonal skills, such as how to communicate with others effectively, how to express one's opinion, how to resolve interpersonal conflicts, etc.
34	Discuss social comparisons	Discuss topics such as social comparison theory, the consequences of comparing one's body with others' bodies (e.g., friends, peers), the consequences of comparing one's body with the beauty ideal, etc.
35	Provide social comparison exercises	Provide social comparison exercises with the primary aim to alter social comparison processes (either explicitly or implicitly). For example, participants may be asked to make nonappearance-based or downward social comparisons with models.

Nr.	Label	Definition
36	Provide a positive role-model	Provide participants with a role model, either real (e.g., another person who has experienced and conquered body image difficulties) or imaginary (e.g., a fictional character who demonstrates positive body image).

Techniques providing psychoeducation related to body image and healthy lifestyle

Nr.	Label	Definition
37	Discuss the concept of body image	Discuss the concept of body image, what body image is, and what are the different components of body image (e.g., evaluative, behavioural, perceptual).
38	Discuss the causes of negative body image	Discuss the causes and risk factors for negative body image (e.g., the beauty ideal, the tendency to make social comparisons, developmental events). These causes may be general (e.g., media influence) or specific (e.g., receiving a negative remark about one's weight), internal (e.g., perfectionism) or external (e.g., teasing).
39	Discuss the consequences of negative body image	Discuss the psychological consequences of negative body image, such as the development of an eating disorder, depression, low self-esteem, social anxiety, etc.
40	Discuss the behavioural expression of negative body image	Discuss how negative body image is expressed in various behaviours such as body checking (e.g., weighing, measuring, pinching, mirror checking), body avoidance (e.g., avoiding mirrors, wearing baggy clothing) or appearance preoccupation (e.g., time consuming efforts to groom, manage, or alter appearance). This may also include discussing how these behaviours can be negative reinforcers (i.e., they may relieve distress in the short term, but maintain the problem in the long term).
41	Discuss healthy eating	Discuss healthy eating and nutrition, including topics such as guidelines for a balanced and healthy diet, how to read food labels and choose the right foods, physiological cues (e.g., hunger, satiety), calories, fat, nutrients, vitamins, etc.
42	Discuss physical activity	Discuss physical activity, such as various physical activities that can be engaged in, how to select the right physical activities that participants enjoy, and the benefits of physical activity for health and well-being.
43	Discuss eating pathology	Discuss eating disorders and related behaviours and cognitions, including topics such as risk factors for developing an eating disorder, unhealthy eating patterns (e.g., bingeing, fasting), dietary restraint, excessive exercising, etc.
44	Discuss stress	Discuss the concept of stress, what stress is (e.g., healthy vs. unhealthy forms), what causes stress, and what are the consequences of stress for well-being.

Additional techniques for improving body image

Nr.	Label	Definition
45	Use evaluative conditioning	Use evaluative conditioning to alter implicit associations concerning the body. For example, pictures of the participants' own body may be paired with positive social feedback, or pictures of extremely thin models may be paired with words like "fake" and "unnatural."
46	Discuss feminism	Discuss topics regarding feminism, such as what it means to be feminist, misconceptions about feminism, feminist theories of body image and eating disturbance (e.g., the self-objectification theory), sex role conflicts, etc.
47	Discuss mindfulness	Discuss the concept of mindfulness, including aspects such as awareness, cognitive defusion, willingness to experience, accepting without judgement, and releasing the need for control. Discussions related to Acceptance and Commitment (e.g., pain as an unavoidable aspect of life) also fall under this category.

Nr.	Label	Definition
48	Provide mindfulness exercises	Provide mindfulness exercises, such as deep breathing, body scan, meditation, mindful eating, etc. Exercises related to Acceptance and Commitment (e.g., identification of values) or practicing gratitude also fall under this category.

Note. Coders are encouraged to make note of any change techniques that do not fall into any of the above categories.

Second, the present review also considers the issue of risk of bias both within individual studies and across studies. Risk of bias *within studies* refers to methodological features that could exaggerate the estimate of an intervention's effectiveness (Liberati et al., 2009). The Cochrane Handbook of Systematic Reviews (Higgins & Green, 2011) has published a tool for assessing risk of bias within individual studies, which comprises seven domains such as random sequence allocation (to assess selection bias) and incomplete outcome data (to assess attrition bias). Risk of bias *across studies* refers to factors that may affect the cumulative evidence obtained via meta-analysis. In particular, publication bias refers to the phenomenon that studies with significant results are more likely to be submitted and published (and, therefore, are more likely to be included in systematic reviews). In contrast, studies with nonsignificant findings may reside in the "file drawers" of the respective researchers (Rosenthal, 1979) and not be available for meta-analysis. The strategy for assessing publication bias recommended by the Cochrane Handbook of Systematic Reviews (Higgins & Green, 2011) is to generate a funnel plot and test for asymmetry using Egger's regression (Egger, Smith, Schneider, & Minder, 1997); if the regression coefficient is significant, the *trim and fill* procedure (Duval & Tweedie, 2000; Taylor & Tweedie, 1998) can be used to correct for asymmetry in the funnel plot arising from publication bias.

Related to publication bias is the phenomenon of *small sample bias*: the tendency for estimates of the intervention effect to be more favourable in smaller studies. Coyne, Thombs, and Hagedoorn (2010) recently critiqued interventions in the field of behavioural medicine for over-relying on small, underpowered trials (see also Howard et al., 2009; Ioannidis, 2008). Coyne et al. (2010) recommended that meta-analysts correct for small sample bias by estimating intervention effects separately for studies that contain at least 35 participants per cell, and thus have ≥ 55% power to detect an effect of medium magnitude. Only Campbell and Hausenblas (2009) reported a funnel plot, Egger's regression, and trim and fill analysis (as well as the Fail Safe *N*; Rosenthal, 1979), and none of the previous meta-analyses have tested or corrected for small sample bias or assessed risk of bias within individual studies. Consequently, the results of prior reviews could exhibit biases that overestimate the effect of interventions on body image (Liberati et al., 2009).

Third, although previous reviews excluded studies without a control condition, many of the included studies did not randomly assign participants to conditions (Campbell & Hausenblas, 2009; Farrell et al., 2006; Yager et al., 2013) or did not

include a pretest measure of body image (Farrell et al., 2006). According to the Cochrane Handbook of Systematic Reviews (Higgins & Green, 2011), randomisation is "the only way to prevent systematic differences between baseline characteristics of participants in different intervention groups in terms of both known and unknown (or unmeasured) confounders" (O'Connor, Green, & Higgins, 2011, p. 90). Pretest-posttest designs are important because they increase the power and precision of statistical tests (as each participant serves as his or her own control) and offer the best estimate of *improvement* (i.e., positive change) due to the intervention (Campbell, 1957; Hunter & Schmidt, 2004; Morris, 2008).

The Present Meta-Analysis

The aims of this meta-analysis were to (a) quantify the effectiveness of stand-alone interventions on body image taking account of the risk of bias both within and across studies, and (b) identify the specific change techniques that are associated with improvements in body image. There were four inclusion criteria for the review. First, the intervention to improve body image had to be stand-alone. We followed Jarry and colleagues' (Jarry & Berardi, 2004; Jarry & Ip, 2005) precedent in reviewing stand-alone body image interventions and used their definition of treatment: "A stand-alone body image treatment was defined as one where the body image intervention was not combined with another extensive psychological therapy. Therefore, studies where body image therapy was part of a comprehensive eating disorder treatment were excluded" (Jarry & Berardi, 2004, p. 320). Jarry and Ip (2005) pointed out that "Interventions for BI [body image] disturbance are often imbedded in larger eating disorder treatment programs (Rosen, 1996a), which complicates the assessment of their effectiveness" (p. 317). Thus, to meet this criterion, interventions had to have body image improvement as their primary and ultimate goal. This focus on stand-alone interventions should serve to reduce heterogeneity of effect sizes and enhance the interpretability of findings (O'Connor et al., 2011).

The second criterion was that studies had to include a control group. Third, participants had to be randomly assigned to either the intervention or control group. Finally, at least one pretest and one posttest measure of body image had to be taken. Body image was the primary outcome variable, but the effects of interventions on two secondary variables related to vulnerability for developing negative body image – internalisation of the beauty ideal and the tendency to make social comparisons – were also included as outcomes (see, for example, Cafri, Yamamiya, Brannick, & Thompson, 2005; Myers & Crowther, 2009). Features related to the sample, intervention, and methodology were assessed as potential moderators of intervention effects.

Method

Literature Search and Study Selection

Five strategies were used to generate the sample of studies: (a) we conducted computerised searches of the databases PsychINFO (1935 – Present), PubMed (1952 – Present), and Web of Science (1988 – Present) using the terms *body anxiety* or *body attitudes* or *body checking* or *body concern* or *body esteem* or *body evaluation* or *body dissatisfaction* or *body image* or *body image disturbance* or *body satisfaction* or *body shame* or *body surveillance* AND *campaign* or *experiment* or *initiative* or *intervention* or *prevention* or *technique* or *treatment* or *trial* or *strategy*; (b) we reviewed the reference lists of previous reviews; (c) we looked at the reference lists of all included papers (i.e., an ancestry approach, Johnson & Eagly, 2002); (d) we sent requests for relevant studies to the mailing lists of nine major societies (Association for Behavioral and Cognitive Therapies, European Association for Behavioural and Cognitive Therapies, European Association of Social Psychology, Eating Disorders Research Society, European Health Psychology Society, Obesity Society, Society of Experimental Social Psychology, Social Personality and Health Network, and Society for Personality and Social Psychology); and (e) we e-mailed established researchers working in the field to request studies.[1,2] The last search was conducted on March 2nd, 2015. No date or publication status restrictions were imposed, but only English-language studies were eligible (to allow independent assessment of the details of all interventions and change techniques included in the meta-analysis). The first author screened the records (i.e., title and abstract) obtained from the literature search twice; if the record indicated that the research involved an intervention and body image was measured, then the full-text article was consulted. If the full-text article did not provide sufficient information to determine eligibility (according to the inclusion criteria) or to calculate effect sizes, then all authors of the respective studies were e-mailed (authors' up-to-date contact information was obtained via online searches). If the authors did not respond after three attempts, then the study was excluded.

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[1] We e-mailed Thomas Cash, Rachel Calogero, Alex Clarke, Catherine Cook-Cottone, Alexandra Corning, Janis Crowther, Sigrun Danielsdottir, Nova Deighton-Smith, Helga Dittmar, Barbara Fredrickson, Ann Frisen, Shelly Grabe, Sarah Grogan, Heather Hausenblas, Kristina Holmqvist-Gattario, Michael Levine, Kristine Luce, Traci Mann, Kathleen Martin Ginis, Marita McCabe, Taryn Myers, Dianne Neumark-Sztainer, Jennifer O'Dea, Susan Paxton, Adria Pearson, Thomas Pruzinsky, Lina Ricciardelli, Danielle Ridolfi, Giuseppe Riva, James Rosen, Marlene Schwartz, Roz Shafran, Linda Smolak, Eric Stice, Viren Swami, Kevin Thompson, Marika Tiggemann, Tracy Tylka, David Veale, Tracey Wade, Zali Yager, and Patricia van den Berg.

[2] Michael Levine forwarded our request for unpublished research to his personal mailing list of approximately 115 researchers who are actively involved in body image research.

Effect Size Estimation

The primary outcome was body image and the secondary outcomes were beauty ideal internalisation and the tendency to make social comparisons. We calculated Cohen's effect size *d* for each outcome using Morris' (2008) recommended method for computing effect sizes in pretest-posttest control group designs: The mean pre-posttest change of the control group was subtracted from the mean pre-posttest change of the experimental group, and was then divided by the pooled pretest standard deviation; a bias adjustment for sample size was also applied (see Morris, 2008, for details and discussion). The first author and a research assistant independently calculated the effect sizes and sample sizes using separate data extraction sheets. The mean difference between the two sets of effect sizes was .001; sample size calculations were identical.

The following factors were taken into account when calculating the effect sizes. Where measures of an outcome were taken at two or more time points following the intervention, we used the longest-term follow-up measurement to calculate the effect sizes to permit a strict test of intervention effects (Webb & Sheeran, 2006). When both intention-to-treat and completer-only analyses were conducted, we calculated effect sizes using the intention-to-treat data to reduce the impact of attrition bias. When multiple measures of an outcome were available, we computed the average effect size within each study to ensure independence. For the same reason, we divided the sample size for the control group by the number of intervention groups when studies included more than one intervention (cf. Higgins, Deeks, & Altman, 2011). When studies employed a crossover design, participants who first received the intervention were considered the intervention group, whereas participants who first received the control intervention were considered the control group, and we excluded the data from the second phase of such studies (i.e., when participants switched conditions). Effect sizes were interpreted using Cohen's (1992) guidelines where d_+ = .20, .50, and .80 constitute small, medium, and large effects, respectively.

Recorded Variables

Change techniques. Descriptions of the interventions provided in the original reports were analysed, and generated a taxonomy that comprised 48 change techniques (see Table 1). Techniques could be classified in six broad categories: (a) general cognitive-behavioural techniques for improving body image (e.g., discuss cognitions and their role in body image); (b) techniques for enhancing physical fitness (e.g., provide physical activity exercises); (c) techniques providing media literacy and promoting media resistance (e.g., provide media critique exercises); (d) techniques designed to enhance self-esteem (e.g., discuss individual differences); (e) techniques providing psychoeducation related to body image and healthy lifestyle (e.g., discuss the causes of negative body image); and (f) additional techniques for improving body image (e.g., use evalua-

tive conditioning). For all intervention conditions, the presence versus absence of each technique was coded (0 = *absent*, 1 = *present*) so that the association between deployment of particular change techniques and effects on body image could be assessed via meta-regression.

Risk of bias within individual studies. Risk of bias within individual studies was assessed using The Cochrane Collaboration's Tool for Assessing Risk of Bias (Higgins & Green, 2011), which involves rating each study in seven domains: random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, selective reporting of outcomes, and "other sources of bias" (i.e., any remaining concerns about potential sources of bias that are not covered by the prior categories). Each intervention was coded as high, low, or unclear risk of bias with regard to each domain. A code of unclear risk of bias is used when insufficient information is provided to confer a judgement of either high or low risk. A summary assessment was also made for each intervention based on Higgins and Green's (2011) guidelines. It is important to note that we coded blinding of participants, not personnel, because it would be impossible for all personnel to be blinded to the participants' condition (e.g., when administering an intervention). Blinding of outcome assessment also concerned participants because the present outcomes are all self-reported outcomes (Patrick, Guyatt, & Acquadro, 2011).

Moderator variables. The moderator variables related to characteristics of the sample, intervention, and methodology. Studies that screened participants for having a negative body image were considered selected. Studies that delivered interventions in classroom settings or where participants were not screened for having a negative body image were considered non-selected. Interventions were divided into those that targeted participants at childhood (12 years and younger), adolescence (13 to 17 years), as well as early (18 to 29 years), middle (30 to 64 years), and late (65 years and older) adulthood (cf. Grogan, 2011; Hefner et al., 2014; Smolak, 2011; Tiggemann, 2004). Gender was coded as the percentage of female participants in the sample.

Intervention format was coded as individual (self-administered or delivered to one person) or group. We coded the presence versus absence of a facilitator, and whether the intervention comprised a single session or multiple sessions. The nature of the control group was coded as either active (i.e., where participants received a placebo intervention) or passive (i.e., where participants received no intervention or were placed on a waiting list). Time to follow-up was categorised into three levels (cf. Jarry & Ip, 2005): posttest only, short-term follow-up (3 months or less), or longer-term follow-up (longer than 3 months).

Reliability of codings. The first and fourth author independently coded each intervention. Reliability was assessed using kappa adjusted for prevalence and bias (Byrt, Bishop, & Carlin, 1993) because values were generally unbalanced across the two code options (i.e., technique present vs. absent). Kappas ranged from .68 to 1.00 (*Mdn* = .90); discrepancies were resolved by discussion.

Meta-Analytic Strategy

All of the analyses were pre-specified and conducted using STATA (Release 11).[3] We used a random effects model to calculate the sample-weighted average effect sizes because studies were likely to be "different from one another in ways too complex to capture by a few simple study characteristics" (Cooper, 1986, p. 526), and because random effects models enhance the generalisability of meta-analytic findings (Field & Gillet, 2010).

The impact of risk of bias within individual studies was tested by estimating the effect sizes for interventions deemed high risk, low risk, and unclear risk, and by comparing these effect sizes using the Q statistic. Publication bias was assessed using several procedures, as recommended by Field and Gillet (2010). First, the data were Winsorised using both the 90th and the 80th percentiles to determine how studies with the smallest and largest effect sizes influenced the overall effect size. Second, to facilitate comparability with prior reviews, we calculated the Fail Safe N (FSN; Rosenthal, 1979), which is the number of additional 'negative' studies (studies in which the intervention effect was zero) that would be needed to increase the p-value for the sample-weighted average effect to above .05. We used Rosenthal's (1979) recommended tolerance level of $5k + 10$ (where k is the number of independent tests): If the FSN exceeds the tolerance level, the findings are considered resistant to publication bias. Third, we compared the effect sizes for published vs. unpublished studies to assess the impact of publication status. Fourth, we created a funnel plot (a scatterplot of each effect size against its standard error; Light & Pillemer, 1984); visual inspection of the plot indicates where studies are 'missing' (usually studies with negative or null effects). To formally test funnel plot asymmetry, we used Egger's regression (Egger et al., 1997), which regresses the intervention effect estimate on its standard error, weighted by the inverse of the variance of the intervention effect estimate.

Fifth, if Egger's regression proved significant, the *trim and fill* procedure (Duval & Tweedie, 2000; Taylor & Tweedie, 1998) was used. The basis of the procedure is to (1) 'trim' (remove) the smaller studies causing funnel plot asymmetry, (2) use the trimmed funnel plot to estimate the true 'centre' of the funnel, then (3) replace the omitted studies and their missing 'counterparts' around the centre ('filling'). As well as providing an estimate of the number of missing studies, the trim and fill procedure provides an adjusted intervention effect by performing a meta-analysis including the filled studies. We corrected for small sample bias using the procedure recommended by Coyne et al. (2010): We computed the average effect size in studies with at least 35 participants per condition.

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[3] Although we followed a pre-specified plan for conducting the present meta-analysis, the protocol was not registered as we were not aware that this was feasible when the review started.

Variability in the effect sizes for body image and the secondary outcomes was calculated using the Q and I^2 statistics. We used meta-regression to test the association between change techniques and effect sizes whenever $k \geq 4$ (the criterion proposed by Michie, Abraham, Whittington, McAteer, & Gupta, 2009). Meta-regression was also used to test the association between gender and the effect of the interventions on body image. The other potential moderators of intervention effects involved mutually exclusive categories. We therefore estimated an effect size for each level of the moderator whenever $k \geq 4$, using the Q statistic to test the difference between the effect sizes.

Results

Study Selection and Characteristics

Figure 1 presents the flow of studies through the review. The literature search returned 12,731 English language records (after duplicates were removed). In total, 166 full-text articles were assessed for eligibility. Forty-three studies were included in the meta-analysis, providing 62 tests of stand-alone interventions to improve body image, with a total sample size of $N = 3,846$. The studies were published between 1987 and 2015, and were conducted in the United States ($n = 28$), Australia ($n = 10$), the Netherlands ($n = 8$), Turkey ($n = 8$), the United Kingdom ($n = 5$), Canada ($n = 1$), Portugal ($n = 1$), and Sweden ($n = 1$). Table 2 presents the 62 interventions, their effect sizes, and the measures used to calculate respective effect sizes.
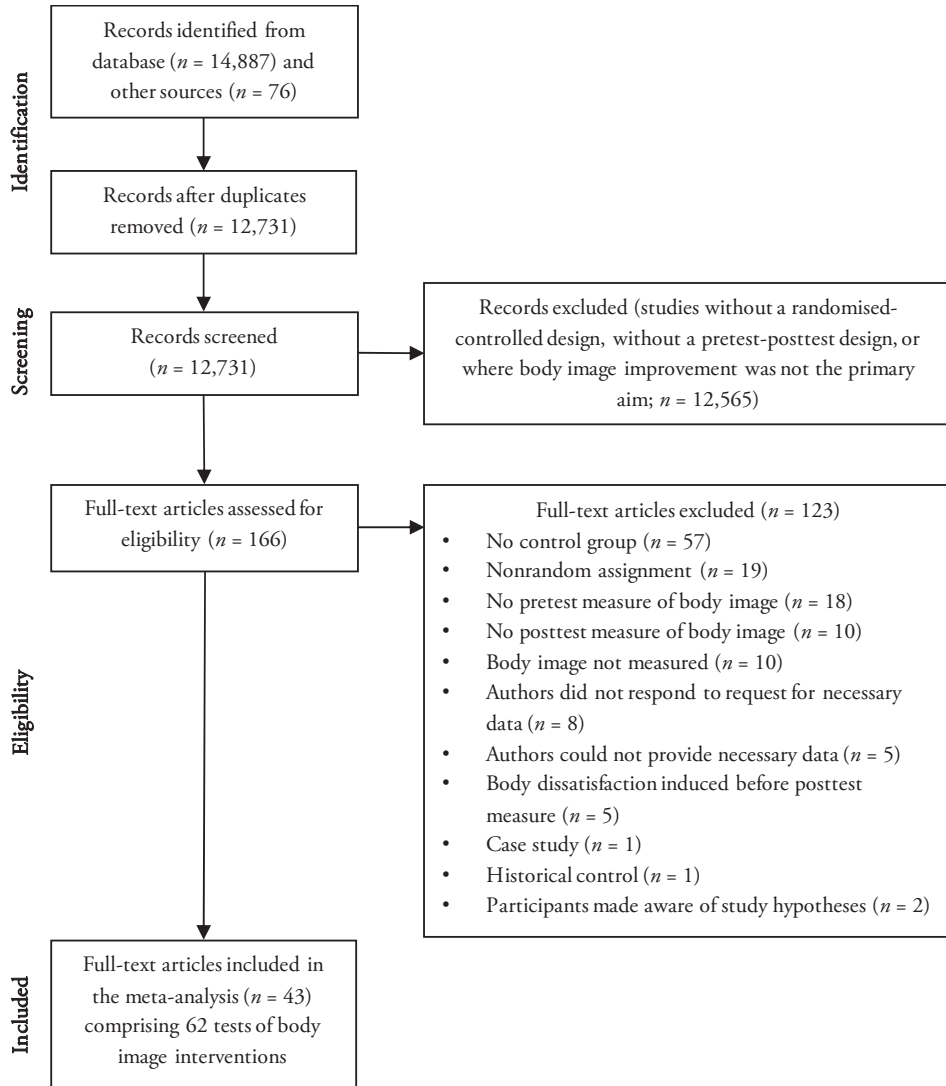
Figure 1. Flow of studies through the current meta-analysis (Moher, Liberati, Tetzlaff, Altman, & the PRISMA Group, 2009).

Table 2 Effect Sizes for Studies Included in the Meta-Analysis

Authors	N_c	N_e	Body image d_+ (95% CI)	Meas.	Beauty ideal internalisation d_+ (95% CI)	Meas.	Social comparison tendencies d_+ (95% CI)	Meas.
			Effect size categories					
Albertson et al. (2014)	130	98	.37 (.10 to .63)	3, 18				
Alleva et al. (2014) – Study 1[a]	20	18	.08 (-.56 to .71)	12				
Alleva et al. (2014) – Study 1[b]	22	19	.58 (-0.05 to 1.21)	12				
Alleva et al. (2014) – Study 2	39	41	-.05 (-.49 to .39)	12				
Alleva et al. (2015)	40	41	.33 (-.11 to .77)	3, 26, 27				
Arbour & Ginis (2008)	17	25	.64 (.01 to 1.27)	1				
Asci (2002)[a]	36	37	.33 (-.14 to .79)	32				
Asci (2002)[b]	32	33	.41 (-.09 to .90)	32				
Asci (2003)	20	20	.22 (-.40 to .84)	31				
Asci et al. (1998)[c]	7.5[y]	15	.46 (-.42 to 1.35)	21, 32				
Asci et al. (1998)[d]	7.5[y]	15	.37 (-.51 to 1.26)	21, 32				
Bhatnagar (2013)	19	19	.78 (.12 to 1.44)	10, 22, 26, 27				
Burgess et al. (2006)	25	25	2.06 (1.38 to 2.75)	2, 23				
Butters & Cash (1987)	16	15	1.42 (.63 to 2.20)	15, 16, 20			-1.38 (-2.16 to -.59)	2
Corning et al. (2010)	16	15	.51 (-.20 to 1.23)	13, 14, 24				
Cousineau et al. (2010)	98	92	-.19 (-.48 to .10)	7, 8, 40				
Cruz-Ferreira et al. (2011)	24	38	.19 (-.32 to .70)	33, 34				
Delinsky & Wilson (2006)	20	21	.25 (-.36 to .87)	4, 10, 35				
Divsalar (2006)[e]	11[y]	22	.21 (-.52 to .94)	22, 26, 27	-.32 (-1.05 to .41)	2		

			Effect size categories					
			Body image		Beauty ideal internalisation		Social comparison tendencies	
Authors	N_c	N_e	d_+ (95% CI)	Meas.	d_+ (95% CI)	Meas.	d_+ (95% CI)	Meas.
Divsalar (2006)[f]	11[y]	22	.002 (-.72 to .73)	22, 26, 27	-.12 (-.84 to .61)	2		
Dohnt & Tiggemann (2008)	42	42	-.33 (-.76 to .10)	42	-.25 (-.68 to .18)	1		
Duncan et al. (2009)[b]	17	17	.09 (-.59 to .76)	9				
Duncan et al. (2009)[a]	18	16	.48 (-.20 to 1.16)	9				
Dunigan et al. (2011)	26	23	.36 (-.20 to .93)	12				
Earnhardt et al. (2002)	25	23	-.13 (-.70 to .44)	5				
Emerson (1995)	20	20	.33 (-.30 to .95)	6				
Fisher & Thompson (1994)[g]	8[y]	16	.46 (-.40 to 1.32)	10, 24, 29, 30				
Fisher & Thompson (1994)[h]	8[y]	14	.70 (-.19 to 1.60)	10, 24, 29, 30				
Gehrman et al. (2006)[a]	19	33	0 (-.56 to .56)	24				
Gehrman et al. (2006)[b]	16	16	.07 (-.63 to .76)	24				
Geraghty et al. (2010)[i]	115.5[y]	130	.24 (-.01 to .49)	26, 27				
Geraghty et al. (2010)[j]	115.5[y]	118	.14 (-.11 to .40)	26, 27				
Grasso (2007)	98	83	-.06 (-.36 to .23)	11, 26, 38				
Heinicke et al. (2007)	37	36	.62 (.15 to 1.09)	19	-.38 (-.84 to .09)	2	-.47 (-.94 to -.01)	1
Jansen et al. (2008)	8	8	.69 (-.32 to 1.70)	43				
Lew et al. (2007)	45	50	.27 (-.13 to .68)	25, 28, 29, 37				
Lindwall & Lindgren (2005)	35	27	.18 (-.19 to .56)	32, 39				
Martijn et al. (2012) - Study 2	19	17	.40 (-.26 to 1.07)	12				
Martijn et al. (2010)[k]	14	14	.46 (-.29 to 1.21)	41, 42				

			Effect size categories					
			Body image		Beauty ideal internalisation		Social comparison tendencies	
Authors	Nc	Ne	d_+ (95% CI)	Meas.	d_+ (95% CI)	Meas.	d_+ (95% CI)	Meas.
Martijn et al. (2010)[l]	14	12	.07 (-.71 to .84)	41, 42				
McCabe et al. (2006)[a, m]	33	41	-.37 (-.84 to .09)	44, 45				
McCabe et al. (2006)[a, n]	48	51	-.09 (-.48 to .31)	44, 45				
McCabe et al. (2006)[b, m]	36	44	.20 (-.25 to .64)	44, 45				
McCabe et al. (2006)[b, n]	51	64	.01 (-.36 to .38)	44, 45				
McLean et al. (2011)	29	32	1.51 (.94 to 2.08)	10, 18	-1.07 (-1.61 to -.53)	3	-.90 (-1.43 to -.38)	3
Murphy (1994)[k]	6	7	.62 (-.50 to 1.74)	10, 18, 24				
Murphy (1994)[l]	7	8	.36 (-.66 to 1.39)	10, 18, 24				
Özdemir et al. (2010)[o]	4[y]	11	.92 (-.28 to 2.11)	32				
Özdemir et al. (2010)[p]	4[y]	12	.46 (-.68 to 1.60)	32				
Özdemir et al. (2010)[q]	4[y]	11	.88 (-.31 to 2.07)	32				
Paxton et al. (2007)[r]	18.5[y]	42	.95 (.38 to 1.52)	10, 18	-.55 (-1.11 to .002)	3	-.74 (-1.31 to -.18)	3
Paxton et al. (2007)[s]	18.5[y]	37	.40 (-.16 to .97)	10, 18	-.29 (-.86 to .27)	3	-.41 (-.98 to .15)	3
Pearson et al. (2012)	39	34	.57 (.10 to 1.04)	28, 29				
Peterson et al. (2006)[t]	23.5[y]	51	.30 (-.19 to .80)	42				
Peterson et al. (2006)[u]	23.5[y]	49	.03 (-.46 to .53)	42				
Ridolfi & Vander Wal (2008)	39	42	.21 (-.22 to .65)	19	-.03 (-.47 to .40)	3		
Rosen et al. (1995)[v]	23	25	1.67 (1.02 to 2.33)	18				
Rosen et al. (1995)[w]	27	27	2.38 (1.69 to 3.08)	18				
Rosen et al. (1989)	10	13	1.40 (.49 to 2.32)	18, 24, 36				

			Effect size categories					
			Body image		Beauty ideal internalisation		Social comparison tendencies	
Authors	Nc	Ne	d_+ (95% CI)	Meas.	d_+ (95% CI)	Meas.	d_+ (95% CI)	Meas.
Stanford & McCabe (2005)	69	52	.22 (-.14 to .58)	17				
Waggoner (1999)[g]	3.5[y]	8	.55 (-.73 to 1.83)	10, 24				
Waggoner (1999)[x]	3.5[y]	8	.46 (-.81 to 1.73)	10, 24				

Note. N_c = Number of participants in the control condition; N_e= Number of participants in the experimental condition; d_+ = sample-weighted average effect size; *95% CI* = 95% confidence interval; Meas. = Measures.

[a] Females. [b] Males. [c] Dance aerobics. [d] Step aerobics. [e] Video Intervention 1. [f] Video Intervention 2. [g] Cognitive-behavioural therapy (CBT). [h] Fitness training intervention. [i] Gratitude diaries. [j] Monitoring and restructuring. [k] High-risk women. [l] Low-risk women. [m] 3rd and 4th grade students. [n] 5th and 6th grade students. [o] Cycling. [p] Running. [q] Swimming. [r] Face-to-face intervention. [s] Internet intervention. [t] Feminist intervention. [u] Psychoeducation intervention. [v] Rosen, Orosan, & Reiter (1995). [w] Rosen, Reiter, & Orosan (1995). [x] Cognitive therapy. [y] To accommodate testing for two experimental conditions, the sample size of the control group has been divided by two.

Measures of body image are coded as follows: 1 = Adult Body Satisfaction Questionnaire (ABSQ; Reboussin et al., 2000): Satisfaction with Physical Appearance Subscale; 2 = Body Attitudes Questionnaire (BAQ; Ben-Tovim & Walker, 1991); 3 = Body Appreciation Scale (Avalos, Tylka, & Wood-Barcalow, 2005); 4 = Body Checking Questionnaire (BCQ; Reas, Whisenhunt, Netemeyer, & Williamson, 2002); 5 = Body Esteem Scale (BES; Franzoi & Shields, 1984); 6 = BES (Franzoi & Shields, 1984): Sexual Attractiveness Subscale; 7 = Body Esteem Scale for Adolescents and Adults (BES; Mendelson, Mendelson, & White, 2001): Appearance Body Esteem Subscale; 8 = BES (Mendelson et al., 2001): Weight Body Esteem Subscale; 9 = Body Esteem Scale for Children (Mendelson & White, 1982); 10 = Body Image Avoidance Questionnaire (BIAQ; Rosen, Srebnik, Saltzberg, & Wendt, 1991); 11 = Body Image Disturbance Questionnaire (BIDQ; Cash, Phillips, Santos, & Hrabosky, 2004); 12 = Body Image States Scale (BISS; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002); 13 = Body Parts Dissatisfaction Scale (BPDS; Corning, Gondoli, Bucchianeri, & Blodgett Salafia, 2010): Number of Body Parts Wished Smaller; 14 = BPDS (Corning et al., 2010): Number of Body Parts with Which Content; 15 = Body Parts Satisfaction Scale (BPSS; Bencheid, Walster, & Bohrnsted, 1973): Body Parts Satisfaction Subscale; 16 = BPSS (Bencheid et al., 1973): Overall Appearance Satisfaction Subscale; 17 = Body Satisfaction and Body Change Inventory (BSBCI; Ricciardelli & McCabe, 2002): Body Satisfaction Subscale; 18 = Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987); 19 = Body Shape Questionnaire- Short Form (BSQ-SF; Evans & Dolan, 1993); 20 = Body-Self Relations Questionnaire (BSRQ; Winstead & Cash, 1984): Appearance Evaluation Subscale; 21 = Berscheid, Walster, & Bohrnstedt Body Image Questionnaire (BWB; Berscheid, Walster, & Bohrnstedt, 1988); 22 = Contour Drawing Rating Scale (CDRS; Thompson & Gray, 1995); 23 = Child and Youth Physical Self-Perception Profile (CY-PSPP; Whitehead, 1995): Body Attractiveness Subscale; 24 = Eating Disorders Inventory – II (EDI-II; Garner, 1991): Body Dissatisfaction Subscale; 25 = Figure Rating Scale (FRS; Furnham & Alibhai, 1983); 26 = Multidimensional Body-Self Relations Questionnaire (MBSRQ; Brown, Cash, & Mikulka, 1990): Appearance Evaluation Subscale; 27 = MBSRQ (Brown et al., 1990): Body Areas Satisfaction Subscale; 28 = Physical Appearance State and Trait Anxiety Scale (PASTAS; Reed, Thompson, Brannick, & Sacco, 1991): State Nonweight Subscale; 29

= PASTAS (Reed et al., 1991): State Weight Subscale; 30 = PASTAS (Reed et al., 1991): Trait Weight Subscale; 31 = Marsh Physical Self-Description Questionnaire (PSDQ; Marsh, Richards, Johnson, Roche, & Tremayne, 1994); 32 = Physical Self-Perceptions-Inventory (PSPP; Fox & Corbin, 1989): Bodily Attractiveness Subscale; 33 = Physical Self-Concept Scale (PSS; Pais-Ribeiro & Ribeiro, 2003): Perception of Appreciation of Physical Appearance Subscale; 34 = PSS (Pais-Ribeiro & Ribeiro, 2003): Perception of Physical Appearance Subscale; 35 = Satisfaction with Body Parts Scale (SBPS; Bencheid et al., 1973); 36 = Self-Report Behavioral Avoidance Questionnaire (Rosen, Saltzberg, & Srebnik, 1989); 37 = Self-reported current weight = self-reported ideal weight; 38 = Situational Inventory of Body Image Dysphoria – Short Form (SIBID-S; Cash, 2002); 39 = Social Physique Anxiety Scale (SPAS; Hart, Leary, & Rejeski, 1989); 40 = Self-Perception Profile for Adolescents (Harter, 1985): Physical Appearance Subscale; 41 = State Self-Esteem Scale (SSES; Heatherton & Polivy, 1991): Appearance Subscale; 42 = Visual Analogue Scales (VAS) to assess body satisfaction; 43 = VAS to assess feelings of beauty; 44 = VAS to assess muscle dissatisfaction (McCabe & Ricciardelli, 2003); 45 = VAS to assess weight dissatisfaction (McCabe & Ricciardelli, 2003).

Measures of beauty ideal internalisation are coded as follows: 1 = Questions about desire to look like TV and pop stars; 2 = Sociocultural Attitudes Toward Appearance Questionnaire (SATAQ; Heinberg, Thompson, & Stormer, 1995): Internalization of the Thin Ideal Subscale; 3 = Sociocultural Attitudes Toward Appearance Questionnaire-III (SATAQ-III; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004): General Internalization Subscale.

Measures of social comparison tendencies are coded as follows: 1 = Body Comparisons Scale (BCS; Fisher, Dunn, & Thompson, 2002); 2 = Physical Appearance Beliefs Test (PABT; Butters & Cash, 1987): Social Comparisons Subscale; 3 = Physical Appearance Comparison Scale (PACS; Thompson, Heinberg, & Tantleff, 1991).

Overall Intervention Effect Sizes

Table 3 shows the overall effect of the interventions on the primary and secondary outcomes. The sample-weighted improvement in body image was of small-to-medium magnitude (d_+ = .38) and was reliable (i.e., the confidence interval did not contain zero). The sample-weighted effect sizes for internalisation of the beauty ideal (d_+ = -.37) and the tendency to make social comparisons (d_+ = -.72) were of small-to-medium and large magnitude, respectively, and were both reliable. Thus, the interventions appear to be effective in improving body image and reducing internalisation of the beauty ideal and the tendency to make social comparisons.

Table 3 Overall Effect of Interventions on Outcomes

Outcome	N	k	d_+ (95% CI)	Q	I^2
Body image	3,846	62	.38 (.27 to .50)	176.26***	65.4
Beauty ideal internalisation	481	8	-.37 (-.60 to -.15)	10.12	30.8
Social comparison tendencies	281	5	-.72 (-1.01 to -.43)	5.38	25.7

Note. k = number of effect sizes; d_+ = sample-weighted average effect size; *95% CI* = 95% confidence interval; Q = homogeneity Q statistic; I^2 = homogeneity I^2 statistic.
*** p < .001.

Risk of Bias Within Individual Studies

Table 4 shows the risk of bias for each intervention. The majority of studies did not specify how participants were randomly allocated to condition ($k = 43$), and whether this allocation was adequately concealed ($k = 47$). Studies were similarly divided according to those where participants were not blinded ($k = 30$) vs. blinded ($k = 29$) to the knowledge of their allocated condition, and in the majority of studies outcome assessment was not blinded ($k = 35$). Risk of attrition bias was low in most studies ($k = 42$), as were "other sources of bias" ($k = 48$). The other sources of bias concerned differences between groups at baseline (e.g., in body dissatisfaction) that were either statistically significant (high risk; $k = 2$) or not statistically checked (unclear risk; $k = 12$). All of the interventions were coded as having unclear risk of bias with regard to selective reporting of outcomes – a finding that is common in systematic reviews (Higgins & Green, 2011). To facilitate comparisons between studies, we therefore did not incorporate this domain when calculating the summary assessment.

The summary assessments indicated that 40 studies exhibited high risk of bias whereas the remaining 22 studies had unclear risk of bias. Studies that had high risk of bias produced significantly larger improvements in body image ($d_+ = .44$; *95% CI = .29 to .59*) compared to studies that had unclear risk of bias ($d_+ = .29$; *95% CI = .10 to .48*), $Q(1) = 4.29$, $p = .03$. Only one study that assessed internalisation of the beauty ideal, and no studies that assessed social comparison tendencies, had unclear risk of bias, so comparisons could not be conducted for these outcomes.

Table 4 Risk of Bias Within Individual Studies

Study	Summary assessment	Random sequence generation	Allocation concealment	Blinding of participants	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other bias
Albertson et al. (2014)	High	Unclear	Unclear	High	High	High	Unclear	Low
Alleva et al. (2014) – Study 1[a]	Unclear	Low	Unclear	Low	Low	Low	Unclear	Low
Alleva et al. (2014) – Study 1[b]	Unclear	Low	Unclear	Low	Low	Low	Unclear	Low
Alleva et al. (2014) – Study 2	Unclear	Low	Unclear	Low	Low	Low	Unclear	Low
Alleva et al. (2015)	Unclear	Low	Unclear	Low	Low	Low	Unclear	Low
Arbour & Ginis (2008)	High	Unclear	Unclear	Low	Low	High	Unclear	Unclear
Asci (2002)[a]	Unclear	Unclear	Unclear	Low	Low	Low	Unclear	Low
Asci (2002)[b]	High	Unclear	Unclear	Low	Low	High	Unclear	Low
Asci (2003)	Unclear	Unclear	Unclear	Low	Low	Low	Unclear	Low
Asci et al. (1998)[c]	High	Unclear	Unclear	Low	High	Low	Unclear	Low

Study	Summary assessment	Random sequence generation	Allocation concealment	Blinding of participants	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other bias
Asci et al. (1998)[d]	High	Unclear	Unclear	Low	High	Low	Unclear	Low
Bhatnagar (2013)	High	Unclear	Unclear	High	High	High	Unclear	Low
Burgess et al. (2006)	Unclear	Unclear	Unclear	Low	Low	Low	Unclear	Low
Butters & Cash (1987)	High	Low	Low	High	High	Low	Unclear	Low
Corning et al. (2010)	High	Low	Low	High	High	Low	Unclear	Unclear
Cousineau et al. (2010)	Unclear	Low	Unclear	Low	Low	Low	Unclear	Low
Cruz-Ferreira et al. (2011)	High	Low	Low	High	High	High	Unclear	Low
Delinsky & Wilson (2006)	Unclear	Unclear	Unclear	Low	Low	Low	Unclear	Low
Divsalar (2006)[e]	High	Low	Low	High	High	Low	Unclear	Low
Divsalar (2006)[f]	High	Low	Low	High	High	Low	Unclear	Low
Dohnt & Tiggemann (2008)	Unclear	Unclear	Unclear	Low	Low	Low	Unclear	Low
Duncan et al. (2009)[b]	High	Unclear	Unclear	Low	High	Low	Unclear	Low
Duncan et al. (2009)[a]	High	Unclear	Unclear	Low	High	Low	Unclear	Low
Dunigan et al. (2011)	Unclear	Unclear	Low	Low	Low	Low	Unclear	Low
Earnhardt et al. (2002)	High	High	High	Low	Low	High	Unclear	Low
Emerson (1995)	High	Unclear	Unclear	High	High	High	Unclear	Low
Fisher & Thompson (1994)[g]	High	Unclear	Unclear	High	High	Low	Unclear	Low
Fisher & Thompson (1994)[h]	High	Unclear	Unclear	High	High	Low	Unclear	Low
Gehrman et al. (2006)[a]	Unclear	Unclear	Unclear	Low	Low	Low	Unclear	Low
Gehrman et al. (2006)[b]	High	Unclear	Unclear	Low	Low	Low	Unclear	High
Geraghty et al. (2010)[i]	High	Low	Low	High	High	High	Unclear	Low
Geraghty et al. (2010)[j]	High	Low	Low	High	High	High	Unclear	Low
Grasso (2007)	High	High	High	Low	Low	High	Unclear	High

Study	Summary assessment	Random sequence generation	Allocation concealment	Blinding of participants	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other bias
Heinicke et al. (2007)	High	Low	Low	High	High	High	Unclear	Low
Jansen et al. (2008)	High	Unclear	Unclear	High	High	Low	Unclear	Unclear
Lew et al. (2007)	Unclear	Unclear	Unclear	Low	Low	Unclear	Unclear	Low
Lindwall & Lindgren (2005)	High	Low	Low	High	High	High	Unclear	Low
Martijn et al. (2012) - Study 2	Unclear	Unclear	Unclear	Low	Low	Low	Unclear	Low
Martijn et al. (2010)[k]	Unclear	Unclear	Unclear	Low	Low	Unclear	Unclear	Low
Martijn et al. (2010)[l]	Unclear	Unclear	Unclear	Low	Low	Unclear	Unclear	Low
McCabe et al. (2006)[a, m]	High	Unclear	Unclear	High	High	Low	Unclear	Unclear
McCabe et al. (2006)[a, n]	High	Unclear	Unclear	High	High	Low	Unclear	Unclear
McCabe et al. (2006)[b, m]	High	Unclear	Unclear	High	High	Low	Unclear	Unclear
McCabe et al. (2006)[b, n]	High	Unclear	Unclear	High	High	Low	Unclear	Unclear
McLean et al. (2011)	High	Unclear	Unclear	High	High	High	Unclear	Low
Murphy (1994)[k]	High	Unclear	Unclear	High	High	Low	Unclear	Low
Murphy (1994)[l]	High	Unclear	Unclear	High	High	Low	Unclear	Low
Özdemir et al. (2010)[o]	High	Unclear	Unclear	High	High	Low	Unclear	Low
Özdemir et al. (2010)[p]	High	Unclear	Unclear	High	High	Low	Unclear	Low
Özdemir et al. (2010)[q]	High	Unclear	Unclear	High	High	Low	Unclear	Low
Paxton et al. (2007)[r]	High	Low	Low	High	High	High	Unclear	Low
Paxton et al. (2007)[s]	High	Low	Low	High	High	High	Unclear	Low
Pearson et al. (2012)	High	Low	Low	High	High	High	Unclear	Low
Peterson et al. (2006)[t]	Unclear	Unclear	Unclear	Low	Low	Low	Unclear	Low
Peterson et al. (2006)[u]	Unclear	Unclear	Unclear	Low	Low	Low	Unclear	Low

Study	Summary assessment	Random sequence generation	Allocation concealment	Blinding of participants	Blinding of outcome assessment	Incomplete outcome data	Selective reporting	Other bias
Ridolfi & Vander Wal (2008)	High	Unclear	Unclear	High	High	Low	Unclear	Unclear
Rosen et al. (1995)[v]	High	Unclear	Unclear	High	High	Low	Unclear	Low
Rosen et al. (1995)[w]	High	Unclear	Unclear	High	High	Low	Unclear	Low
Rosen et al. (1989)	Unclear	Unclear	Unclear	Low	Low	Low	Unclear	Unclear
Stanford & McCabe (2005)	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear	Unclear
Waggoner (1999)[g]	Unclear	Unclear	Unclear	Unclear	Unclear	Low	Unclear	Unclear
Waggoner (1999)[x]	Unclear	Unclear	Unclear	Unclear	Unclear	Low	Unclear	Unclear

Note. [a] Females. [b] Males. [c] Dance aerobics. [d] Step aerobics. [e] Video Intervention 1. [f] Video Intervention 2. [g] Cognitive-behavioural therapy (CBT). [h] Fitness training intervention. [i] Gratitude diaries. [j] Monitoring and restructuring. [k] High-risk women. [l] Low-risk women. [m] 3rd and 4th grade students. [n] 5th and 6th grade students. [o] Cycling. [p] Running. [q] Swimming. [r] Face-to-face intervention. [s] Internet intervention. [t] Feminist intervention. [u] Psychoeducation intervention. [v] Rosen, Orosan, & Reiter (1995). [w] Rosen, Reiter, & Orosan (1995). [x] Cognitive therapy. Risk of bias within individual studies was assessed using the Cochrane Collaboration's Tool for Assessing Risk of Bias (Higgins & Green, 2011).

Risk of Bias Across Studies

Next, we undertook tests of, and corrections for, publication bias and small sample bias (Table 5). Using 90th and 80th percentile Winsorisation, the effects of the interventions on body image were, respectively, $d_+ = .37$ (*95% CI* = .26 to .47) and $d_+ = .34$ (*95% CI* = .25 to .43). These values are similar to the overall effect size ($d_+ = .38$), suggesting that the largest and smallest effects did not bias the results. The FSN indicated that 2,282 unpublished studies with zero effect sizes would need to exist in order to invalidate the finding that the interventions improved body image. This value exceeds the tolerance value of 320 studies and suggests that the findings are resistant to publication bias.

However, more stringent tests of publication bias (Higgins & Green, 2011) offered a different conclusion. Sixteen percent of the studies included in the review ($k = 10$) were unpublished. The effect size from these studies ($d_+ = .19$, *95% CI* = .004 to .38) was significantly smaller than the effect size derived from published studies ($d_+ = .40$, *95% CI* = .27 to .54. $k = 52$), $Q(1) = 4.45$, $p = .035$. Furthermore, the funnel plot for body image effect sizes was asymmetrical, with studies reporting negative or zero effect sizes being absent (Figure 2). Egger's regression was significant ($p < .001$) and indicative of publication bias in the distribution of effect sizes. Trim and fill analysis imputed 21 additional effect sizes, resulting in an overall effect size of $d_+ = .15$ (*95% CI* = .02 to .28). Only 16 out of the 62 studies (26%) had 55% power to detect a medium effect. Correction for small sample bias showed that the effect size for interventions with at least 35 participants per condition was $d_+ = .13$ (*95% CI* = .02 to .24). In sum, the overall effect size estimate of $d_+ = .38$ for improved body image appears to be inflated

by publication bias and small sample bias. Findings from unpublished studies, adequately powered studies, and trim and fill analyses all converge on the conclusion that the overall effect of interventions on body image is of small magnitude (d_+ = .13 to .19), yet still reliable.

With regard to the secondary outcomes, FSN suggested the presence of publication bias in tests of internalisation of the beauty ideal, and effects were not reliable in the two unpublished studies (d_+ = -.22, *95% CI* = -.73 to .29) and the three adequately powered studies (d_+ = -.21, *95% CI* = -.47 to .04) of this outcome. The intervention effect on the tendency to make social comparisons appeared resistant to publication and small sample bias, but many of the analyses were not possible due to the small number of tests (k = 5).

Table 5 Tests for Publication Bias and Small Sample Bias

Procedure	Outcome		
	Body image	Beauty ideal internalisation	Social comparison tendencies
Winsorisation			
80% percentile			
d_+ *(95% CI)*	.34 (.25 to .43)	NA	NA
90% percentile			
d_+ *(95% CI)*	.37 (.26 to .47)	NA	NA
Fail Safe *N* (tolerance value)	2,282 (320)	36 (50)	56 (35)
Publication status			
Published			
k	52	6	5
d_+ *(95% CI)*	.40 (.27 to .54)	-.41 (-.69 to -.13)	-.72 (-1.01 to -.43)
Unpublished			
k	10	2	NA
d_+ *(95% CI)*	.19 (.004 to .38)	-.22 (-.73 to .29)	NA
Q	4.45*	.44	NA
Egger's regression			
β *(SE)*	1.91 (.51)***	-1.06 (2.47)	-5.02 (2.45)
Trim and fill analyses			
Imputed (k)	21	NA	NA
d_+ *(95% CI)*	.15 (.02 to .28)	NA	NA
Adequately powered studies			
k	16	3	1
d_+ *(95% CI)*	.13 (.02 to .24)	-.21 (-.47 to .04)	-.47 (-.94 to -.01)

Note. d_+ = sample-weighted average effect size; *95% CI* = 95% confidence interval; k = number of effect sizes; Q = homogeneity Q statistic; β = beta from Egger's regression; *SE* = standard error; NA = not applicable (because Egger's regression was not significant or because there were too few tests to permit computation of average effect size).
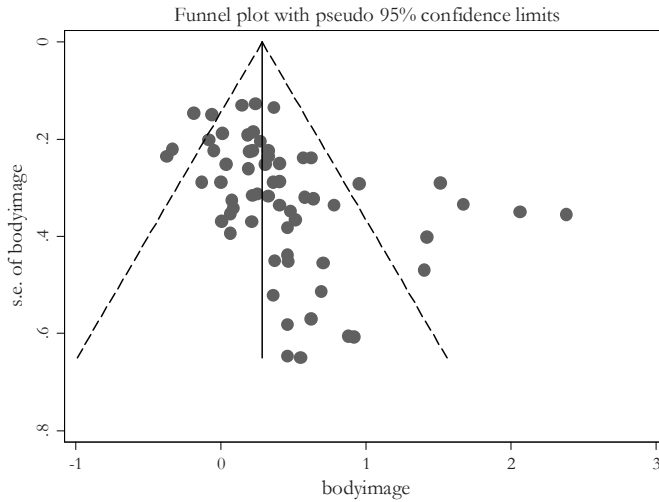* $p < .05$, *** $p < .001$.

Figure 2. Funnel plot of effect sizes (d+) for body image. s.e. = standard error.

Change Techniques and Improvement in Body Image

There was significant heterogeneity in the effects of the interventions on body image, $Q(1) = 176.26$, $p < .001$, of a moderate-to-high level (Higgins, Thompson, Deeks, & Altman, 2003). This heterogeneity encourages tests to establish whether particular change techniques were associated with improvements in body image. Table 6 presents the change techniques used in each intervention. Of the 48 intervention techniques identified in our taxonomy, 31 techniques were used in at least four interventions and thus could be included in the analyses. The most commonly used techniques were: discuss the causes of negative body image ($k = 23$), provide physical activity exercises ($k = 22$), discuss cognitions and their role in body image ($k = 19$), teach self-monitoring and restructuring of cognitions ($k = 17$), discuss the consequences of negative body image ($k = 17$), and teach self-monitoring of behaviour ($k = 17$).

Table 6 Change Techniques Deployed and Moderator Features for Each Intervention Separately

Study	Change techniques	Sample	Age	Gender	Intervention format	Facilitator present	Nr. of sessions	Type of control	Follow-up
Albertson et al. (2014)	48	Selected	Middle adulthood	100	Individual	No	Multiple	Passive	Short-term
Alleva et al. (2014) – Study 1[a]	5, 8	Non-selected	Early adulthood	100	Individual	No	Single	Active	Short-term
Alleva et al. (2014) – Study 1[b]	5, 8	Non-selected	Early adulthood	0	Individual	No	Single	Active	Short-term
Alleva et al. (2014) – Study 2	5, 8	Non-selected	Middle adulthood	100	Individual	No	Single	Active	Short-term
Alleva et al. (2015)	5, 8, 29	Selected	Early adulthood	100	Individual	No	Multiple	Active	Short-term
Arbour & Ginis (2008)	3, 10, 11, 13, 20	Non-selected	Middle adulthood	100	Group	No	Multiple	Active	Posttest only
Asci (2002)[a]	20	Non-selected	Early adulthood	100	Group	Yes	Multiple	Active	Posttest only
Asci (2002)[b]	20	Non-selected	Early adulthood	0	Group	Yes	Multiple	Active	Posttest only
Asci (2003)	20	Non-selected	Early adulthood	100	Group	Yes	Multiple	Active	Posttest only
Asci et al. (1998)[c]	20	Non-selected	Early adulthood	100	Group	Yes	Multiple	Active	Posttest only
Asci et al. (1998)[d]	20	Non-selected	Early adulthood	100	Group	Yes	Multiple	Active	Posttest only
Bhatnagar (2013)	1, 2, 4, 6, 7, 10, 17, 18, 37, 38, 39, 40, 43	Selected	Early adulthood	100	Group	Yes	Multiple	Passive	Posttest only
Burgess et al. (2006)	20	Selected	Adolescence	100	Group	Yes	Multiple	Active	Posttest only
Butters & Cash (1987)	1, 2, 3, 6, 7, 17, 18, 29, 38, 39	Selected	Early adulthood	100	Individual	Yes	Multiple	Passive	Posttest only
Corning et al. (2010)	2, 3, 4, 7, 10, 14, 15, 16, 21, 22, 23, 29, 32, 33, 38, 41	Non-selected	Adolescence	100	Individual	Yes	Multiple	Passive	Short-term
Cousineau et al. (2010)	26, 28, 31, 32, 34, 41, 42	Non-selected	Childhood	57	Individual	No	Multiple	Active	Short-term
Cruz-Ferreira et al. (2011)	20	Non-selected	Middle adulthood	100	Individual	Yes	Multiple	Passive	Posttest only
Delinsky & Wilson (2006)	1, 3, 4, 7, 12, 14, 15, 38, 47	Selected	Early adulthood	100	Individual	Yes	Multiple	Active	Short-term
Divsalar (2006)[e]	21, 22, 23, 30, 34, 36	Selected	Early adulthood	100	Group	No	Single	Passive	Posttest only
Divsalar (2006)[f]	1, 21, 22, 34, 36, 38, 39	Selected	Early adulthood	100	Group	No	Single	Passive	Posttest only

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Study	Change techniques	Sample	Age	Gender	Intervention format	Facilitator present	Nr. of sessions	Type of control	Follow-up
Dohnt & Tiggemann (2008)	22, 26, 28, 30, 32, 37, 41, 42	Non-selected	Childhood	100	Group	Yes	Single	Active	Short-term
Duncan et al. (2009)[b]	20	Non-selected	Childhood	0	Group	Yes	Multiple	Passive	Short-term
Duncan et al. (2009)[a]	20	Non-selected	Childhood	100	Group	Yes	Multiple	Passive	Short-term
Dunigan et al. (2011)	49 (Massage)	Non-selected	Early adulthood	100	Individual	Yes	Single	Active	Posttest only
Earnhardt et al. (2002)	6, 8, 38	Non-selected	Early adulthood	100	Individual	Yes	Multiple	Active	Short-term
Emerson (1995)	1, 2, 3, 6, 7, 17, 18, 29, 33, 38, 39,40	Selected	Early adulthood	100	Individual	No	Multiple	Passive	Posttest only
Fisher & Thompson (1994)[g]	1, 2, 3, 6, 7, 17, 18, 29, 38, 39	Selected	Early adulthood	100	Group	Yes	Multiple	Passive	Posttest only
Fisher & Thompson (1994)[h]	20, 37, 42	Selected	Early adulthood	100	Group	Yes	Multiple	Passive	Posttest only
Gehrman et al. (2006)[a]	3, 20, 41, 42	Non-selected	Childhood	100	Group	Yes	Multiple	Active	Posttest only
Gehrman et al. (2006)[b]	3, 20, 41, 42	Non-selected	Childhood	0	Group	Yes	Multiple	Active	Posttest only
Geraghty et al. (2010)[i]	37, 38, 48	Non-selected	Middle adulthood	95.62	Individual	No	Multiple	Passive	Posttest only
Geraghty et al. (2010)[j]	1, 2, 37, 38	Non-selected	Middle adulthood	95.62	Individual	No	Multiple	Passive	Posttest only
Grasso (2007)	7, 8, 38	Non-selected	Early adulthood	89.50	Individual	No	Multiple	Active	Short-term
Heinicke et al. (2007)	1, 2, 3, 4, 17, 18, 19, 22, 26, 32, 34, 37, 38, 43, 44	Non-selected	Adolescence	100	Group	Yes	Multiple	Passive	Posttest only
Jansen et al. (2008)	4, 7	Selected	Adolescence	50	Individual	Yes	Multiple	Passive	Posttest only
Lew et al. (2007)	21, 23, 29, 35	Selected	Early adulthood	100	Individual	Yes	Multiple	Active	Posttest only
Lindwall & Lindgren (2005)	15, 20, 41, 42	Non-selected	Adolescence	100	Group	Yes	Multiple	Passive	Posttest only
Martijn et al. (2012) - Study 2	35, 45	Non-selected	Early adulthood	100	Individual	No	Single	Active	Posttest only
Martijn et al. (2010)[k]	45	Selected	Early adulthood	100	Individual	No	Single	Active	Posttest only
Martijn et al. (2010)[l]	45	Non-selected	Early adulthood	100	Individual	No	Single	Active	Posttest only

Study	Change techniques	Sample	Age	Gender	Intervention format	Facilitator present	Nr. of sessions	Type of control	Follow-up
McCabe et al. (2006)[a, m]	3, 20, 27, 28, 29, 32, 33, 35, 42	Non-selected	Childhood	100	Group	Yes	Multiple	Passive	Posttest only
McCabe et al. (2006)[a, n]	3, 20, 27, 28, 29, 32, 33, 35, 42	Non-selected	Childhood	100	Group	Yes	Multiple	Passive	Posttest only
McCabe et al. (2006)[b, m]	3, 20, 27, 28, 29, 32, 33, 35, 42	Non-selected	Childhood	0	Group	Yes	Multiple	Passive	Posttest only
McCabe et al. (2006)[b, n]	3, 20, 27, 28, 29, 32, 33, 35, 42	Non-selected	Childhood	0	Group	Yes	Multiple	Passive	Posttest only
McLean et al. (2011)	1, 2, 4, 7, 8, 11, 13, 17, 20, 21, 22, 24, 26, 31, 34, 35, 38, 39, 41, 42, 43, 48	Selected	Middle adulthood	100	Group	Yes	Multiple	Passive	Posttest only
Murphy (1994)[k]	1, 2, 4, 6, 7, 9, 17, 18, 22, 29, 37, 38, 39, 40, 43, 46	Selected	Early adulthood	100	Group	Yes	Multiple	Passive	Short-term
Murphy (1994)[l]	1, 2, 4, 6, 7, 9, 17, 18, 22, 29, 37, 38, 39, 40, 43, 46	Non-selected	Early adulthood	100	Group	Yes	Multiple	Passive	Short-term
Özdemir et al. (2010)[o]	20	Non-selected	Early adulthood	0	Group	Yes	Multiple	Passive	Posttest only
Özdemir et al. (2010)[p]	20	Non-selected	Early adulthood	0	Group	Yes	Multiple	Passive	Posttest only
Özdemir et al. (2010)[q]	20	Non-selected	Early adulthood	0	Group	Yes	Multiple	Passive	Posttest only
Paxton et al. (2007)[r]	1, 2, 3, 4, 17, 18, 22, 26, 32, 34, 37, 38, 43, 44	Selected	Early adulthood	100	Group	Yes	Multiple	Passive	Posttest only
Paxton et al. (2007)[s]	1, 2, 3, 4, 17, 18, 22, 26, 32, 34, 37, 38, 43, 44	Selected	Early adulthood	100	Group	Yes	Multiple	Passive	Posttest only
Pearson et al. (2012)	1, 3, 7, 4, 6, 8, 10, 12, 13, 22, 38, 39, 40, 47, 48	Selected	Middle adulthood	100	Group	Yes	Single	Passive	Short-term
Peterson et al. (2006)[t]	25, 46	Non-selected	Early adulthood	100	Individual	No	Single	Passive	Posttest only
Peterson et al. (2006)[u]	21, 38, 39	Non-selected	Early adulthood	100	Individual	No	Single	Passive	Posttest only

Study	Change techniques	Sample	Age	Gender	Intervention format	Facilitator present	Nr. of sessions	Type of control	Follow-up
Ridolfi & Vander Wal (2008)[a]	21, 22, 25, 37, 39, 43	Non-selected	Early adulthood	100	Group	Yes	Single	Active	Short-term
Rosen et al. (1995)[v]	1, 2, 3, 4, 7, 8, 10, 17, 18, 30, 37, 38, 39, 40	Selected	Middle adulthood	100	Group	Yes	Multiple	Passive	Posttest only
Rosen et al. (1995)[w]	1, 2, 4, 6, 7, 9, 17, 18, 37, 38, 39, 40	Selected	Middle adulthood	100	Group	Yes	Multiple	Passive	Posttest only
Rosen et al. (1989)	1, 2, 7, 9, 17, 18, 37, 39, 40	Selected	Early adulthood	100	Group	Yes	Multiple	Active	Short-term
Stanford & McCabe (2005)	16, 21, 22, 31, 39	Non-selected	Childhood	0	Group	Yes	Multiple	Passive	Posttest only
Waggoner (1999)[g]	1, 2, 4, 6, 9, 10, 17, 18, 37, 39, 40	Non-selected	Childhood	100	Group	Yes	Multiple	Active	Posttest only
Waggoner (1999)[x]	1, 2, 4, 6, 9, 10, 17, 18, 37, 39, 40	Non-selected	Childhood	100	Group	Yes	Multiple	Active	Posttest only

Note. [a] Females. [b] Males. [c] Dance aerobics. [d] Step aerobics. [e] Video intervention. [f] Video Intervention 1. [f] Video Intervention 2. [g] Cognitive-behavioural therapy (CBT). [h] Fitness training intervention. [i] Gratitude diaries. [j] Monitoring and restructuring. [k] High-risk women. [l] Low-risk women. [m] 3rd and 4th grade students. [n] 5th and 6th grade students. [o] Cycling. [p] Running. [q] Swimming. [r] Face-to-face intervention. [s] Internet intervention. [t] Feminist intervention. [u] Psychoeducation intervention. [v] Rosen, Orosan, & Reiter (1995). [w] Rosen, Reiter, & Orosan (1995). [x] Cognitive therapy. Gender is the percentage of female participants in the sample. Change techniques are coded as follows: 1 = Discuss cognitions and their role in body image; 2 = Teach self-monitoring and restructuring of cognitions; 3 = Teach self-monitoring of behaviour; 4 = Change negative body language; 5 = Change the biased focus toward the body; 6 = Conduct guided imagery exercises; 7 = Conduct exposure exercises; 8 = Write about the body; 9 = Provide size-estimate exercises; 10 = Prompt action-planning; 11 = Teach time management skills; 12 = Agree on a contract; 13 = Barrier identification; 14 = Provide performance feedback; 15 = Provide encouragement; 16 = Prompt identification as a role model; 17 = Provide relapse-prevention strategies; 18 = Provide stress-management training; 19 = Provide alternative help resources; 20 = Provide physical activity exercises; 21 = Provide media literacy training; 22 = Discuss the beauty ideal; 23 = Teach strategies for resisting the effect of the media; 24 = Provide media-critique exercises; 25 = Provide alternative images of women and/or men; 26 = Discuss self-esteem; 27 = Provide self-esteem enhancement exercises; 28 = Discuss individual differences; 29 = Discuss alternatives to focusing on appearance; 30 = Discuss stereotypes; 31 = Discuss age-related issues and challenges; 32 = Discuss interpersonal relations; 33 = Teach interpersonal skills; 34 = Discuss social comparisons; 35 = Provide social comparison exercises; 36 = Provide a positive role-model; 37 = Discuss the concept of body image; 38 = Discuss the causes of negative body image; 39 = Discuss the consequences of negative body image; 40 = Discuss the behavioural expression of negative body image; 41 = Discuss healthy eating; 42 = Discuss physical activity; 43 = Discuss eating pathology; 44 = Discuss stress; 45 = Use evaluative conditioning; 46 = Discuss feminism; 47 = Discuss mindfulness; 48 = Provide mindfulness exercises; 49 = Technique not covered by the prior codes (specify).

Table 7 presents the results of meta-regressions of body image on each of the 31 change techniques (where $k \geq 4$). Twelve change techniques were significantly associated with larger intervention effects on body image. Interventions were more effective if they discussed cognitions and their role in body image, taught monitoring and restructuring of cognitions, changed negative body language, and incorporated guided imagery, exposure, and size-estimate exercises. Interventions also had a larger effect on body image if they provided relapse-prevention strategies and stress management training, and if they involved discussing the concept of body image, the causes of negative body image, the consequences of negative body image, or the behavioural expression of negative body image. Three of the 31 techniques – providing self-esteem enhancement exercises, discussing individual differences, and discussing physical activity– were associated with *poorer* body image. Although it would have been desirable to undertake multivariate meta-regression analyses (to determine which change techniques best predict improvement when the other techniques are taken into account), the modest number of available tests ($k = 62$) and high correlations between the use of the effective techniques (range = |.49 to .85|, $Mdn = 0.69$, $M = 0.69$) precluded these analyses (see Peters, de Bruin, & Crutzen, 2013, for discussion of the "co-occurrence" of behaviour change techniques).

Table 7 Effect of Specific Change Techniques on Body Image

Technique	N	k	β	SE	R^2
General cognitive-behavioural techniques for improving body image					
Discuss cognitions and their role in body image	939.5[a]	19	.53***	.13	35.95
Teach self-monitoring and restructuring of cognitions	823.5[a]	17	.61***	.13	40.81
Teach self-monitoring of behaviour	971	17	.03	.15	2.78
Change negative body language	602	15	.61***	.14	45.18
Change the biased focus toward the body	240	4	-.18	.26	2.18
Conduct guided imagery exercises	359	11	.38*	.18	10.22
Conduct exposure exercises	689	15	.56***	.14	28.48
Write about the body	651	9	.08	.18	2.42
Provide size-estimate exercises	128	6	.82**	.27	23.30
Prompt action-planning	255	7	.43	.22	10.21
Provide relapse-prevention strategies	559	15	.75***	.14	58.57
Provide stress management training	498	14	.66***	.15	41.17
Techniques for enhancing physical fitness					
Provide physical activity exercises	1,088	22	-.01	.14	2.91
Techniques providing media-literacy and promoting media resistance					
Provide media literacy training	527.5[a]	8	-.03	.19	3.24
Discuss the beauty ideal	734	13	.06	.16	1.91

Technique	N	k	β	SE	R²
Techniques designed to enhance self-esteem					
Discuss self-esteem	524	6	.05	.21	3.15
Provide self-esteem enhancement exercises	368	4	-.49*	.23	8.83
Discuss individual differences	642	6	-.59**	.18	25.79
Discuss alternatives to focusing on appearance	698	12	-.15	.17	.03
Discuss interpersonal relations	862	10	-.32	.16	8.21
Teach interpersonal skills	439	6	-.36	.20	5.80
Discuss social comparisons	506	7	.11	.20	1.69
Provide social comparison exercises	560	7	-.17	.19	1.04
Techniques providing psychoeducation related to body image and healthy lifestyle					
Discuss the concept of body image	1,069	16	.32*	.15	6.68
Discuss the causes of negative body image	1,494.5[a]	23	.29*	.13	10.12
Discuss the consequences of negative body image	750.5[a]	17	.47**	.14	23.32
Discuss the behavioural expression of negative body image	327	10	.67**	.18	30.52
Discuss healthy eating	512	7	-.21	.20	.26
Discuss physical activity	871	11	-.36*	.16	12.65
Discuss eating pathology	397	8	.35	.20	8.85
Additional techniques for improving body image					
Provide mindfulness exercises	607.5[a]	4	.24	.24	.22

Note. k = number of effect sizes; ß = beta from meta-regression; SE = standard error; R^2 = percentage of variance explained by the change technique. [a] A .5 results from a study where the sample size for the control condition was halved (to accommodate comparison with two experimental conditions/interventions) and where the change technique was used in one intervention but not the other.
* $p < .05$; ** $p < .01$; *** $p < .001$.

Moderation by Features of the Sample, Intervention, and Methodology

Table 6 shows the moderator features for each intervention separately. The majority of interventions targeted samples that were not screened for having a negative body image ($k = 40$), and samples at early adulthood ($k = 34$). Most interventions were conducted in a group format ($k = 39$), with a facilitator present ($k = 44$), and involved multiple sessions ($k = 48$). Interventions were most often compared to a passive control group ($k = 35$) and included only a pretest and immediate posttest measurement ($k = 44$).

Table 8 presents findings for meta-regression of effect sizes on features of the sample, intervention, and methodology. Interventions that selected participants for the presence of a negative body image produced significantly larger improvements in body image ($d_+ = .79$) compared to interventions where participants were not screened for having a negative body image ($d_+ = .14$), $Q(1) = 81.16$, $p < .001$. The percentage of females in the sample did not moderate the effect of the interventions on body image (ß = .001, $SE = .002$, $p = .42$). Interventions targeting participants in adolescence

showed significantly larger improvements in body image (d_+ = .79) compared to interventions targeting participants at childhood (d_+ = -.03), $Q(1)$ = 29.30, $p < .001$, and early adulthood (d_+ = .33), $Q(1)$ = 9.86, $p < .001$. The effect size for interventions targeted at children was not reliable (95% CI = -.16 to .10). Interventions targeting participants in early adulthood showed significantly larger improvements in body image compared to interventions targeting participants in childhood, $Q(1)$ = 18.85, $p < .001$, but significantly smaller improvements compared to interventions targeting participants in middle adulthood, $Q(1)$ = 21.01, $p < .001$. The effects were larger for participants in middle adulthood (d_+ = .70) compared to childhood, $Q(1)$ = 65.95, $p < .001$, but did not differ compared to adolescence (p = .36). None of the interventions targeted participants at late adulthood.

Table 8 Moderators of Intervention Effects on Body Image

Moderator	N	k	d_+ (95% CI)	Q	I^2
Sample					
Selected	1,148	22	.79 (.53 to 1.05)	83.77***	74.9
Nonselected	2,698	40	.14 (.06 to .22)	40.04	2.6
Age					
Childhood	938	13	-.03 (-.16 to .10)	11.91	0
Adolescence	232	5	.79 (.16 to 1.42)	22.31***	82.1
Early adulthood	1,549	34	.33 (.22 to .44)	36.08	8.5
Middle adulthood	1,127	10	.70 (.34 to 1.06)	71.08***	87.3
Intervention format					
Group	1,968	39	.50 (.32 to .69)	137.29***	72.3
Individual	1,878	23	.20 (.09 to .31)	29.39	25.2
Presence of facilitator					
Facilitator present	2,143	44	.49 (.33 to .66)	146.68***	70.7
No facilitator present	1,703	18	.16 (.06 to .27)	18.41	7.6
Number of sessions					
Single-session	749	14	.18 (.03 to .32)	13.11	.8
Multisession	3,097	48	.45 (.31 to .60)	160.58***	70.7
Type of control group					
Active	1,544	27	.27 (.11 to .44)	61.17***	57.5
Passive	2,302	35	.47 (.30 to .63)	108.54***	68.7
Time to follow-up					
Posttest only	2,530	44	.46 (.31 to .62)	134.56***	68.0
Short-term	1,316	18	.19 (.03 to .36)	32.28*	47.3

Note. k = number of effect sizes; 95% CI = 95% confidence interval; d_+ = sample-weighted average effect size; Q = homogeneity Q statistic; I^2 = homogeneity I^2 statistic.
* $p < .05$; *** $p < .001$.

Interventions delivered in a group format resulted in significantly greater improvements in body image (d_+ = .50) compared to interventions delivered on an individual basis (d_+ = .20), $Q(1) = 21.15$, $p < .001$. Interventions where a facilitator was present (d_+ = .49) were significantly more effective than were interventions where no facilitator was present (d_+ = .16), $Q(1) = 25.54$, $p < .001$. Multisession interventions also produced significantly larger improvements in body image (d_+ = .45) compared to single-session interventions (d_+ = .18), $Q(1) = 11.33$, $p = .001$. Interventions tested against an active control group reported significantly smaller improvements in body image (d_+ = .27) compared to interventions tested against a passive control group (d_+ = .47), $Q(1) = 8.45$, $p = .004$. The intervention effect was significantly larger for studies with an immediate posttest (d_+ = .47) compared to studies with a short-term follow-up (d_+ = .19), $Q(1) = 15.98$, $p < .001$. None of the interventions included a longer-term follow-up.

Discussion

The aim of this meta-analysis was to determine the effectiveness of stand-alone interventions to improve body image and to identify the specific change techniques that are associated with improvement. Overall, the effect size for improvement in body image was reliable and of small-to-medium magnitude. However, the effect size for studies with high risk of bias was significantly larger than the effect size for less biased studies, where a small effect was observed. Moreover, correction for publication bias and small sample bias also indicated that the effect of interventions on body image was of small magnitude. In sum, the present findings suggest that the overall effect of stand-alone interventions on body image is inflated by biases both within and across studies. After correcting for bias, interventions are found to generate a small, but reliable, improvement in body image.

With regard to the secondary outcomes, the overall analyses indicated that interventions produced a reliable and small-to-medium effect on internalisation of the beauty ideal and a large effect on the tendency to make social comparisons. However, the effects for these outcomes were small – and no longer reliable – once corrections for publication bias and small sample bias had been applied. Thus, whereas previous reviews of interventions in this area indicate that sample-weighted average effect sizes ranged from small to large, the present meta-analysis finds that stand-alone interventions have a small effect on body image, and negligible effects on beauty ideal internalisation and social comparison tendencies.

Which Change Techniques Were Effective at Improving Body Image?

A novel feature of our review is that interventions were coded and evaluated at the technique level and not merely at the level of the broad approach taken. So doing af-

forded the opportunity to identify which specific change techniques are associated with improvements in body image, in an equivalent manner to the procedures that are well established in research on behaviour change (e.g., Michie et al., 2009). Of the 48 change techniques that we defined, 31 techniques were used in at least four interventions and could be analysed via meta-regression (cf. Michie et al., 2009). Twelve change techniques were associated with significant improvements in body image. These techniques included discussing the role of cognitions in body image, and teaching monitoring and restructuring of cognitions. Cognitive distortions related to body image – such as dichotomous thinking (e.g., in terms of fat vs. thin; Jakatdar, Engle, & Cash, 2006) or overestimation of negative social feedback about one's body (Alleva, Martijn, & Jansen, 2016) – create distress, and serve to reinforce and maintain negative body image (Williamson, White, York-Crowe, & Stewart, 2004). Exercises that train participants to monitor and restructure their cognitions may make them aware of the complex interplay between their thoughts, emotions, and behaviour, thereby helping them to break this negative cycle (Bennett-Levy, 2003; Cash, 2011; Jarry & Cash, 2011). Cognitive restructuring may also help people to approach day-to-day situations in more adaptive ways, for example by using positive self-talk before a social gathering to remind oneself that appearance does not determine self-worth (see, e.g., Bennett-Levy, 2003, for discussion).

Changing negative body language also improved body image. This technique directly targets the language that people use to describe or talk about their body, with the aim of helping individuals to use objective or positive terms rather than negative, judgemental language. For instance, *fat talk* involves comments or conversations that are focussed on weight and appearance, and are typically evaluative and judgemental (e.g., "I'm so fat!" or, "I should skip meals to help me lose weight;" Arroyo & Harwood, 2012, p. 173; Nichter & Vuckovic, 1994). Engaging in fat talk is related to negative body image and greater levels of psychological distress, and affects body image above and beyond merely thinking negatively about one's body (Arroyo & Harwood, 2012; Carlson Jones, 2011; Salk & Engeln-Maddox, 2011). The current findings underline the need to address such harmful self-talk in order to improve body image.

Guided imagery, exposure exercises, and size-estimate exercises all emerged as effective techniques to improve body image. Guided imagery and exposure exercises are targeted at experiential and behavioural avoidance, which perpetuate negative body image (Jarry & Cash, 2011). Exposure exercises may be effective because they create "heart level" emotional beliefs. That is, positive thoughts about one's body that are accompanied by the feeling that the respective thoughts are true and convincing, and are experienced as more than mere dispassionate thinking (Barnard & Teasdale, 1991; Bennett-Levy, 2003). According to Bennett-Levy (2003), exposure exercises are one of the most direct methods for challenging maladaptive thinking, and for testing and improving the believability of new, adaptive thoughts. Size-estimate exercises may operate in similar fashion, as they require participants to estimate the size of a body

part and then to objectively measure that body part. The present findings suggest that it may be important for interventions to include such exercises, notwithstanding any reservations that participants or intervention practitioners may have (e.g., that these techniques are anxiety-provoking; Jarry & Cash, 2011).

Two techniques from Abraham and Michies' (2008) taxonomy of behaviour change techniques – stress management training and relapse prevention – were associated with improved body image. These findings would seem to speak to the importance of learning adaptive coping strategies to deal with challenges and setbacks in efforts to enhance body image. A further four effective techniques involved psychoeducation. Although psychoeducation has been associated with smaller effect sizes in interventions targeting other issues (e.g., programs to prevent eating disorders or reduce alcohol consumption; Larimer & Cronce, 2002; Stice, Shaw, & Marti, 2007), teaching participants about the concept of body image and its causes and consequences, as well as how it is expressed behaviourally, was associated with improved body image here. These findings are not consistent with the idea that psychoeducation may actually instil negative body image (e.g., by glamorising eating pathology; O'Dea, 2004). Psychoeducation may give people a better understanding of the factors that precipitate and exacerbate negative body image, and may help them to recognise and manage the impact of 'triggers' (e.g., reading fashion magazines).

Three change techniques were contra-indicated in the present review: Providing self-esteem enhancement exercises, discussing physical fitness, and discussing individual differences each decreased the effectiveness of the interventions. Findings regarding self-esteem enhancement exercises should be interpreted with caution, however, because the four tests that incorporated this technique are derived from the same study (McCabe, Ricciardelli, & Salmon, 2006), and additional tests are needed. One explanation for the negative effect of discussing physical fitness is that discussing physical activity may inadvertently draw attention to weight and appearance, and highlight societal standards for physical fitness and attractiveness (O'Dea, 2004). Along the same lines, discussing individual differences could underscore the discrepancy between an individual's current body and the 'ideal body.' Similar reasoning could explain why providing media literacy did not improve body image. Although a wealth of evidence points to the adverse impact of the media on body image (e.g., Grabe et al., 2008; Groesz et al., 2002), and media literacy may increase media scepticism, such increased scepticism may not be sufficient to improve body image (Irving & Berel, 2001). It is possible that scepticism occurs at the level of reasoning and logic (e.g., knowing that the beauty ideal is unachievable) but does not get translated into "heart level" emotional beliefs (Barnard & Teasdale, 1991). Perceived self-efficacy may also play a role as people may not feel confident in their ability to control media influences on their body image. Future research might usefully measure putative moderators (e.g., scepticism, perceived self-efficacy) in order to clarify whether media literacy and media resistance interventions are effective in certain circumstances.

The Influence of Features of the Sample, Intervention, and Methodology on Intervention Effectiveness

Interventions were more effective when they targeted participants with a negative body image or participants at adolescence or middle adulthood, when they were delivered in multiple sessions, in a group format, with a facilitator present, and when the intervention was tested against a passive control group and included only an immediate posttest measurement. These findings raise three issues. First, it is noteworthy that 10 of the interventions (16%) were targeted at participants at middle adulthood and that these interventions had large effects on body image. Similar to adolescence – where interventions produced the largest effects on body image – the period of middle adulthood may be a time when individuals are particularly vulnerable to developing a negative body image (e.g., due to menopause or changes in body fat-to-muscle composition; Deeks & McCabe, 2001; Slevec & Tiggemann, 2011). The present findings highlight the potential for intervention in participants at middle adulthood, and indicate that additional research about body image in people at middle adulthood is important. Second, although interventions targeting body image had smaller effects for participants that were not screened for having a negative body image and for participants at childhood, it is possible that interventions could buffer against future challenges and help to prevent the development of negative body image over time. Future studies could carefully consider the appropriate age at which to target participants, and include long-term follow-ups to test whether control participants develop a more negative body image compared to participants who receive the intervention. Third, the benefit of multisession interventions will need to be weighed against the potential costs (e.g., the resources needed for delivery; Campbell & Hausenblas, 2009). It may be important for future studies to investigate efficient ways to administer multisession interventions, or to strengthen extant single-session interventions.

Limitations and Directions for Future Research

The current meta-analytic review is limited by biases both within and across studies. None of the individual studies could be coded as low risk, and the majority were considered high risk with regard to blinding of participants and outcome assessment, which can inflate estimates of intervention effects especially on subjective outcomes (Pildal et al., 2007; Wood et al., 2008). Approximately one-third of the studies exhibited unclear risk of bias in summary analyses because insufficient information was provided in the primary reports. None of the studies provided sufficient information about selective reporting of outcomes; this is problematic because reporting bias (e.g., failure to report nonsignificant effects on particular outcomes) has considerable influence on research findings (Liberati et al., 2009). Regarding bias across studies, the trim and fill analyses imputed 21 additional effect sizes; this value amounts to one-third of

the total number of tests ($k = 62$). It appears that a considerable proportion of interventions that observed negative or null effects on body image either were not submitted or were not published. Interventions involving small samples ($n < 35$ per cell) were also commonplace, and only one-quarter of the interventions had 55% power to detect a medium-sized effect. Equivalent problems were observed with the secondary outcomes that appeared to be reliable in the overall analyses.

Coyne et al. (2010), Ferguson and Brannick (2012), and Ioannidis, Munafò, Fusar-Poli, Nosek, and David (2014) all offered helpful recommendations for tackling bias. First, risk of bias within individual studies and across studies should routinely be tested in future meta-analyses. Second, appropriate procedures to correct for these sources of bias should be undertaken. These procedures include extensive searches for unpublished studies and the use of trim and fill, Coyne et al.'s (2010) computation, or similar statistical techniques. Third, the use of study registries (e.g., http://clinical-trials.gov) and registries that allow researchers to pre-specify design and analysis plans (e.g., Open Science Framework; http://osf/.io) would enable meta-analysts both to discover studies that were conducted but were not reported, and to identify instances of selective reporting, and could make the need for statistical post-hoc methods for assessing publication bias obsolete (Niemeyer, Musch, & Pietrowsky, 2012). Researchers should aim to conduct interventions with sufficiently large sample sizes, and follow established reporting guidelines (e.g., the CONSORT Statement; Schulz, Altman, Moher, & the CONSORT Group, 2010) to provide readers and meta-analysts with complete and transparent information about the methodology and findings of the research.

The present findings suggest several considerations that will be important in future stand-alone interventions to improve body image. The majority of the studies reviewed here recruited female participants in their early adulthood, and tested intervention effects against a passive control group, using outcomes measured in the immediate wake of the intervention. Active control groups provide a stricter test of intervention effects than do passive control groups, and the present findings – like previous reviews (e.g., Portnoy, Scott-Sheldon, Johnson, & Carey, 2008) – indicate that the use of passive control conditions is associated with larger intervention effect sizes. The present findings also showed that intervention effects diminished over time, and none of the studies followed participants for longer than 3 months. Future studies should therefore prioritise active control conditions and longer-term follow-ups and test stand-alone interventions among under-represented samples (e.g., men, adolescents).

Conclusions

The present meta-analysis addressed two questions: How effective are stand-alone interventions at improving body image, and what change techniques lead to improvements in body image? The answer to the first question is that improvement in body

image attributable to stand-alone interventions is small in magnitude, after correcting for publication and small sample bias. Stand-alone interventions have negligible effects on internalisation of the beauty ideal and social comparison tendencies. To answer the second question, a novel and reliable taxonomy of change techniques was developed. Three techniques were contra-indicated whereas 12 techniques were associated with improved body image. The present findings suggest that more, better powered, and higher quality interventions to improve body image are needed and that increased efforts to combat publication bias are warranted. The findings also specify several effective change techniques that can and should be tested in future research.

PART 2

How Can We Improve the Way That
Individuals Relate to Their Own Body?

CHAPTER 3

Body Language
Improving Body Satisfaction by Describing the Body in Functionality Terms

Abstract

Objectives: With the current studies, we aimed to improve body satisfaction by inducing a functionality-based focus on the body. Objectification theory (Fredrickson & Roberts, 1997) was used as a guiding framework for this approach. **Methods:** In Study 1, 59 female and 59 male undergraduates and, in Study 2, 118 women between the ages of 30 and 50 years completed a writing assignment to experimentally manipulate their body focus. The writing assignment instructions were to describe what one's body can do (functionality focus) or what one's body looks like (appearance focus); a control writing task was also included. Functionality and appearance satisfaction, as well as global self-esteem, were measured at baseline, on test-day, and at a 1-week follow-up. **Results:** In Study 1, male undergraduates in the functionality condition experienced an increase in functionality satisfaction from baseline to test-day; female undergraduates in the appearance condition experienced a decrease in functionality satisfaction both from baseline to test-day and from baseline to follow-up. In Study 2, women in the functionality condition experienced an increase in functionality satisfaction from baseline to follow-up. **Conclusions:** The current studies are the first known to experimentally manipulate the functionality-based approach to the body and to investigate its effects on body image – serving to suggest perceived functionality as a potentially fruitful focus for further research and intervention.

Introduction

The majority of women are dissatisfied with their bodies and when asked about the specific source of body dissatisfaction, most women point to body weight and shape (Garner, 1997; Tiggemann, 2004). Body dissatisfaction has become second nature to women, so much so that it has been termed the "normative discontent" (Rodin, Silberstein, & Striegel-Moore, 1984). Importantly, discontent about one's body is neither a harmless nor a trivial discontent: Body dissatisfaction has been associated with low self-esteem (Cash & Pruzinsky, 2002b), depression (Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006), social anxiety (Cash & Fleming, 2002a), and diminished quality of life (Cash & Fleming, 2002b). Further, body dissatisfaction has been identified as a main causal and maintenance factor in eating disorders and body dysmorphic disorders (Cooley & Toray, 2001; Stice, 2002). Considering the serious consequences of body dissatisfaction on well-being, it is imperative to develop novel strategies to ameliorate it. Accordingly, our aim with the present studies was to develop an innovative technique to improve body satisfaction, namely by focusing on the *functionality* of the body. The theoretical framework for this approach stems from objectification theory (Fredrickson & Roberts, 1997) – one of the most researched theories related to the body image of women.

Objectification Theory

Objectification theory posits that, in Western culture, girls and women are judged and valued mainly for their appearance, rather than for their internal qualities (Fredrickson & Roberts, 1997). Central to the objectification theory is the experience of sexual objectification. A woman is sexually objectified any time her body (parts) or sexual functions are seen as separate from her person, are seen as reflecting who she really is, or are "reduced to the status of mere instruments" (Fredrickson & Roberts, 1997, p. 175) for the pleasure of others (Bartky, 1990). In other words, when a woman is sexually objectified, she is seen as less fully human. For example, studies have shown that when focusing on a woman's appearance, rather than on her personality, the degree of human nature assigned to her may be diminished (the attribution of human nature helps people distinguish between humans and objects; Haslam, Loughnan, & Holland, 2013; Heflick & Goldenberg, 2009; Heflick, Goldenberg, Cooper, & Puvia, 2011; Loughnan & Haslam, 2007; Vaes, Paladino & Puvia, 2011). Sexual objectification may be present in social interactions (e.g., as when a woman is the subject of a "cat call") and is omnipresent in mainstream media where women are often portrayed in a sexually explicit, submissive manner (Halliwell, Malson, & Tischner, 2011).

Another central tenet of objectification theory is self-objectification, women's internalisation of the observer's perspective toward their own bodies (Fredrickson & Roberts, 1997). Within the cultural milieu of sexual objectification, where women's

bodies are viewed as objects (Bernard, Gervais, Allen, Campomizzi, & Klein, 2012; Gervais, Vescio, Förster, Maass, & Suitner, 2012), women are socialised to see their own bodies as objects, too. For instance, throughout a woman's life, investment in her appearance will be reinforced (e.g., through receiving attention for wearing revealing clothing or by being praised for losing weight). Again, this self-objectification may be strengthened by the social environment (e.g., getting honked at by a driver in a passing car; Kozee, Tylka, Augustus-Horvath, & Denchik, 2007) and by the media (e.g., through the depiction of the thin ideal whereby slim, attractive women are depicted as happy and successful; Tolman & Debold, 1994).

As a result of being sexually objectified, and of seeing their own bodies as aesthetic objects, women inevitably learn to focus predominantly on the *appearance* of their bodies (Fredrickson & Roberts, 1997). Furthermore, women may experience anxiety and body shame (when the body does not measure up to unrealistic cultural standards of appearance), which may ultimately contribute to the development of depression, sexual dysfunction, and even eating disorders (see Fredrickson & Roberts, 1997, for an overview). These relations have been confirmed by empirical tests of the objectification theory (e.g., Tiggemann & Williams, 2011), as well as by a comprehensive review of over a decade of research on objectification (Moradi & Huang, 2008).

Self-Objectification and Body Dissatisfaction

Given the relations between self-objectification, body shame, and eating disorders, it seems logical that self-objectification is also closely related to body dissatisfaction. Indeed, this appears to be the case. To take a few key examples, self-objectification has been significantly correlated with measures of body dissatisfaction and negative body image (Myers & Crowther, 2007; Noll & Fredrickson, 1998). Moreover, Myers and Crowther (2007) found evidence for the mediating role of self-objectification between thin-ideal internalisation and body dissatisfaction. In other words, in women who internalise the thin-ideal, evaluating the body predominantly for its appearance may lead to body dissatisfaction. In addition, in an experiment by Quinn, Kallen, and Cathey (2006), participants tried on either a swimsuit or a sweater in a private dressing room with a full-length mirror. Here, trying on a swimsuit was hypothesised to induce self-objectification. After changing back into their regular clothing, participants completed a word-stem completion task and then wrote down their thoughts for several minutes. The results showed that women who tried on a swimsuit experienced more body shame and defined their bodies more by appearance compared to women who tried on a sweater. Further, these women also demonstrated more body-related thoughts, such as "I need to get in better shape" or "My body has gone downhill since I came to college" (p. 871). The authors concluded that engaging in self-objectification induced body shame and caused women to have more (negative) body-related thoughts, even after the experimental manipulation was over.

Body Functionality: An Alternative to Body Appearance

As Fredrickson and Roberts (1997) proposed, self-objectification necessitates a predominant focus on the appearance of the body. Research has shown that, through this predominant focus on appearance, women may eventually separate themselves from their bodily functioning (Moradi & Huang, 2008; Roberts & Waters, 2004). In other words, their experience of their bodies becomes more about "How do I look?" than about "How do I feel?" and "What am I capable of?" (Roberts & Waters, 2004). This shift is important because bodily functioning comprises the unobservable dimension of the body (e.g., health, fitness, physical strength) that forms a substantial part of the experience of the body (Franzoi, 1995; Franzoi & Shields, 1984; Fredrickson & Roberts, 1997). In comparison to body appearance, bodily functioning has been scarcely investigated (Cash & Pruzinsky, 2002a; Franzoi, 1995). Considering the negative consequences of viewing the body as an aesthetic object and focusing on its appearance, it is imperative to investigate the alternative: focusing on bodily functioning. In our studies, we termed bodily functioning *body functionality*, and we examined whether focusing on body functionality, as opposed to focusing on body appearance, can improve body satisfaction.

Conceptualisation of Body Functionality

To date, body functionality has most often been conceptualised as related either to the fitness of the body or to its internal biological functioning. For instance, in the validation of the Body Esteem Scale (BES), Franzoi and Shields (1984) identified three body esteem dimensions. Two of these dimensions were related to appearance (Sexual Attractiveness and Weight Concern in women; Physical Attractiveness and Upper Body Strength in men). The third dimension, Physical Condition, was related to body functionality and constituted stamina, strength, and agility. Further, Avalos and Tylka (2006) conceptualised body functionality as the internal signals and functions of the body, such as feelings of fullness or hunger cues. In addition, Avalos, Tylka, and Wood-Barcalow (2005, p. 286) identified the "respect of the body by attending to its needs and engaging in healthy behaviours" as one of the main components of positive body image. Attending to this aspect of positive body image necessitates an emphasis on body functionality. Although these studies conceptualised body functionality in terms of fitness or internal biological functioning, it is important to note that the current studies will extend upon this conceptualisation of body functionality by including aspects such as the body's skills (e.g., drawing, playing an instrument) or the ways in which the body may interact with others (e.g., holding hands, body language).

Current Evidence for Body Functionality

Despite the scarcity of body functionality research, several studies do suggest that focusing on body functionality may benefit body image. For instance, Avalos & Tylka (2006) tested a model of intuitive eating in two samples of undergraduate women. In both samples, their model demonstrated that focusing on body functionality (here: how the body functions and feels internally), rather than on body appearance, was related to more positive feelings toward the body and to greater body appreciation. In addition, focusing on body functionality was related to healthier eating behaviour, namely to intuitive eating (i.e., eating in response to internal physiological cues, rather than in response to internal emotional cues or external environmental cues; Tylka, 2006). Avalos and Tylka even stressed that focusing on body functionality, rather than focusing on looking attractive for others, should be encouraged to promote a healthier relationship with the body.

To provide a better understanding of positive body image, Wood-Barcalow, Tylka, and Augustus-Horvath (2010) conducted interviews with women who identified as having positive body image. One of the overarching themes among these women was the appreciation of body functionality and engagement in behaviours to keep their bodies functioning well (e.g., by participating in sports or by eating healthy meals). In a similar vein, Frisén and Holmqvist (2010) interviewed early adolescent boys and girls with the aim of identifying common positive body image characteristics. Like the women interviewed by Wood-Barcalow et al., these adolescents' positive body image was characterised by a predominant focus on the functionality of the body, rather than on the appearance of the body. These students valued their bodies' capability to perform in sports (e.g., "I can run really fast!") or in school activities (e.g., studying for an exam). In addition, most participants viewed physical activity as important in taking care of their bodies and in improving what their bodies can do. Frisén and Holmqvist advised parents and teachers to underline the importance of evaluating the body for its functionality, rather than for its appearance.

Further evidence for the benefits of focusing on body functionality comes from research on physical activity and yoga-based fitness. According to Martin and Lichtenberger (2002), engaging in physical activity may encourage people to focus more on the functionality of their bodies and to focus less on their appearance. They also stated that, unlike appearance, there are no strict cultural standards regarding body functionality to which people can compare. In a meta-analysis of physical activity interventions, Campbell and Hausenblas (2009) found that the interventions had a small positive effect on body satisfaction. Moreover, although greater exercise frequency produced larger improvements in body satisfaction, these improvements were unrelated to objective changes in physical fitness. These results paralleled previous findings (Fox, 2000; Martin & Lichtenberger, 2002) and support the notion that exercise interventions may effectively improve body image by encouraging people to focus more on their body

functionality. However, Campbell and Hausenblas noted that the underlying mechanisms must be better understood because it could also be that physical activity produces subtle changes in appearance from which people may derive body satisfaction (Martin & Lichtenberger, 2002).

Regarding yoga-based fitness specifically, it has been theorised that yoga teaches people to focus on how the body feels internally, rather than on how the body looks (Boudette, 2006). For instance, exercises in yoga classes are based on observing internal sensations rather than on monitoring appearance, and mirrors are usually absent. Thus, by learning to focus on body functionality "on the mat," participants may adopt this focus outside yoga classes as well (Boudette, 2006). In support of this notion, Prichard and Tiggemann (2008) found that participation in yoga-based fitness classes was related to lower levels of self-objectification and to exercising for health and fitness reasons (which may reflect a functionality-based focus). Likewise, Daubenmier (2005) found that women who attended yoga-based fitness classes showed lower levels of self-objectification compared to women who participated in aerobics classes and to women who did not exercise. Notably, they also experienced greater levels of body satisfaction.

Lastly, a massage intervention conducted by Dunigan, King, and Morse (2010) may provide more insight into the benefits of focusing on body functionality. In their study, the effect of massage on body image was investigated, wherein participants in the experimental group received a 50-minute massage from a massage therapist, and participants in the control group watched a neutral documentary. The results showed that participants who received a massage experienced increased body satisfaction compared to the control participants. Dunigan et al. suggested that one of the reasons massage may improve body image is because it offers participants the opportunity to experience their bodies as a "vehicle for the experience of pleasure" (p. 411), where the focus is on how the body feels, rather than on how the body looks.

These studies investigated body functionality in different ways and in different contexts, including mediational models, in-depth interviews, (yoga-based) fitness, and massage. The extant evidence for the benefits of focusing on body functionality is piecemeal, yet promising. At the same time, the scarcity of this research highlights the importance of further investigation into body functionality.

The Current Studies

A handful of body image interventions included elements related to body functionality as a component of their programmes, for example by encouraging participants to engage in behaviours that induce a feeling of mastery or pleasure, rather than focusing on appearance (Butters & Cash, 1987; Fisher & Thompson, 1994; McLean, Paxton, & Wertheim, 2011). Moreover, some eating disorder prevention programmes have also challenged participants to describe their bodies in non-appearance terms, such as by commenting on their behavioural, emotional, or social characteristics while standing in

front of a full-length mirror (Becker, Ciao, & Smith, 2008; Stice, Trost, & Chase, 2002). Although all of these programs have evidenced successful reductions in body dissatisfaction, it is important to note that the techniques related to body functionality that were included in these interventions were only a small part of a broader programme.

Cash and Pruzinsky (2002b) stated that the lack of research into body functionality is one of the major limitations to research in body image and how to improve it. To the authors' knowledge, currently no body image interventions have focused exclusively on body functionality. In addition, the evidence for the body functionality approach discussed above has yet to be supported by experimental studies that have manipulated a functionality focus on the body. An experiment of this sort is necessary to determine causality and to directly evaluate the impact of focusing on body functionality. Therefore, by experimentally inducing a focus on body functionality in the current studies, we aimed to investigate emphasising body functionality as a method to improve body satisfaction. To this effect, we employed a randomised-control design across two samples (an undergraduate sample of men and women and a community sample of 30 to 50-year-old women) with a pretest, posttest, and 1-week follow-up assessment.

We formulated the following hypotheses. First, we predict that focusing on the functionality of the body will improve body satisfaction because previous research has suggested that a functionality-based approach to the body is related to positive body image. Second, in contrast, we expect that focusing on the appearance of the body will lead to a decrease in body satisfaction because an appearance-based focus on the body is an expression of self-objectification and has been related to negative body image. Third, we hypothesize that improvements in body image will persist at the 1-week follow-up because a recent review of stand-alone body image interventions showed that body image gains persist over time (Jarry & Berardi, 2004). Finally, we assessed global self-esteem because studies of body image interventions have shown that changes in body satisfaction are often paralleled by changes in self-esteem (Martijn, Vanderlinden, Roefs, Huijding, & Jansen, 2010), which may be explained by the importance of appearance to women's self-esteem (Fredrickson & Roberts, 1997; Lerner, Orlos, & Knapp, 1976; Rodin et al., 1985). We therefore predict that focusing on body functionality will lead to an increase in global self-esteem, whereas focusing on body appearance will lead to a decrease in global self-esteem (given the negative effects of an appearance-based focus on body image).

Study 1

In Study 1, we tested our hypotheses in a sample of undergraduate women and men. We decided to include men because, although women are more body dissatisfied than men are (Muth & Cash, 1997), nearly half of all men are dissatisfied with their bodies

as well (Garner, 1997). In addition, body dissatisfaction in men has been shown to have many of the same negative consequences it has in women, such as low self-esteem, depression, and eating disorders, in addition to steroid use, muscle dysmorphia, and preoccupation with muscularity (Cafri, Olivardia, & Thompson, 2008; Olivardia, Pope, Borowiecki, & Cohane, 2004). Regarding objectification theory, research suggests that women are the primary targets of sexual objectification, not men (see Fredrickson & Roberts, 1997, for a review), and that women show higher levels of trait self-objectification than men do (Fredrickson, Roberts, Noll, Quinn, & Twenge, 1998). Moreover, in an experimental study where female and male participants tried on either a swimsuit (to induce self-objectification) or a sweater (control), men who tried on a swimsuit neither experienced body shame nor demonstrated restrained eating (Fredrickson et al., 1998). These results were replicated by Quinn et al. (2006), with the additional finding that there were no differences in amount of body-related thoughts between men who tried on a swimsuit and men who tried on a sweater. These findings suggest that, although many men may be dissatisfied with their bodies, focusing on the appearance of their bodies does not immediately elicit body dissatisfaction.

With regard to focusing on the functionality of the body, men may be especially well-suited to this approach. From a young age, differences in the ways that girls and boys view their bodies emerge. Stephens, Hill, and Hanson (1994) noted that girls view their bodies as objects to attract others whereas boys view their bodies as instruments to achieve mastery over their environments. This contrast emerges largely due to differences in how girls and boys are socialised, such as through the toys they are given with which to play (e.g., Barbie vs. Ninja Turtle), the clothes in which they are dressed (e.g., dress vs. overalls), and the compliments given to them (e.g., "You look so pretty!" vs. "You're so strong!"; Franzoi, 1995; Stephens et al., 1994). Similar to differences between girls and boys, women are more likely to focus on and judge their bodies for their beauty, but men are more likely to focus on and judge their bodies for their functionality (Cash & Brown, 1989; Lerner et al., 1976). Moreover, women's self-concept is more affected by their perception of physical attractiveness, whereas men's self-concept is more affected by their perception of physical effectiveness (Lerner et al., 1976). These findings suggest that men's body orientation may be more functionality-based than women's and that body functionality is important to men.

In light of this information, we specified our hypotheses for Study 1 to incorporate expectations based on the sex of the participants. We hypothesised that (a) focusing on the functionality of the body would improve body satisfaction both in women and in men, (b) focusing on the appearance of the body would lead to a decrease in body satisfaction in women but not in men, and (c) improvements in body image would persist at 1-week follow-up. As for self-esteem, we predicted that focusing on body functionality would improve global self-esteem both in women and in men. However, we predicted that focusing on body appearance would only lead to a decrease in self-

esteem in women (because the appearance manipulation should not negatively affect men's body satisfaction).

Method

Participants. Fifty-nine female (M_{age} = 20.31, SD = 2.10) and 59 male (M_{age} = 21.36, SD = 2.02) participants completed baseline and test-day measures. The nationality of most participants was Dutch (n = 63, 53.8%) followed by German (n = 31, 26.1%), Eastern-European (e.g., Czech, Polish, Slovakian; n = 4) and Northern European (e.g., Finnish, Swedish; n = 4). The nationalities of the remaining participants were American (n = 3), French (n = 3), South American (e.g., Brazilian, Chilean; n = 3), Southern European (e.g., Portuguese, Spanish; n = 3), Asian (e.g., Chinese; n = 2), and Belgian (n = 2). Two female and six male participants did not complete the follow-up measures, leaving a total of 57 female (M_{age} = 20.23, SD = 2.08) and 53 male (M_{age} = 21.52, SD = 2.06) participants. Power analyses using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) indicated that the present sample size (N = 118) can detect significant small to medium differences (f = .18) between the groups with a minimum statistical power of .84 and α = .05.

Procedure. Participants (N = 125) were recruited from the undergraduate psychology program or by advertisements on campus for a study about "life satisfaction." After providing informed consent and using a randomisation program (Graph Pad Software, 2012), participants were randomly assigned into one of three Body Approach conditions: functionality, appearance, or control. Participants who completed at least baseline and test-day measures were included in our analyses.

The study was completed from the participants' homes via an online experiment system. Each participant received a personalised link to the study that was e-mailed 2 days before the measures were to be completed. Reminder e-mails were sent until the participants completed the measures. At baseline, participants completed measures of body concern, body satisfaction, and global self-esteem. At test-day (one week later), participants first completed the writing assignment and then measures of body satisfaction, global self-esteem, mood, and demographic information. At follow-up (one week later), participants filled in measures of body satisfaction and global self-esteem. They were also asked to guess the purpose of the study (note that no participant guessed the purpose of the study). At the end of data collection, participants in the appearance condition received the functionality writing assignment to counteract any negative effects of the appearance writing assignment. Participants were debriefed at the end of the experiment and were compensated with 10 Euro and a chance to win an iPod.

Experimental manipulation. To manipulate the body focus, a writing assignment was used, the structure of which was inspired by Pennebaker (1997). Participants in the functionality condition received the following instructions:

This is a writing assignment. I would like you to describe **what your body can do.** *In your writing, I would like you to take your time, really let go and explore the different things your body can do. For example, you might want to tie your answer to physical activity and movement (e.g. walking, stretching), to health (e.g., healing, digesting), to daily functions (e.g. eating, sleeping), or even to your body's relationship with other people (e.g. hugging, holding hands). Different bodies can do many different things, so there are no right or wrong answers. Your answer will be unique depending on your body. All of your answers will be completely confidential and anonymous. Don't worry about spelling, sentence structure, or grammar. The only rule is that you* **write at least 100 words.** *(total word count of these instructions: 133)*

Paralleling this same general structure, participants in the appearance condition received these instructions:

This is a writing assignment. I would like you to describe **what your body looks like.** *In your writing, I would like you to take your time, really let go and explore the appearance of your body. For example, you might want to tie your answer to body shape and weight (e.g. height, bone structure), to facial features (e.g. eye brows, hair texture), to body parts (e.g. arms, hands), or even to your body's other markings (e.g. birthmarks, piercings). Different bodies… [continuing as above]. (total word count: 129)*

Finally, the control participants received the following directions:

This is a writing assignment. I would like you to describe **what your route to university is like.** *In your writing, I would like you to take your time, really let go and explore what your route is like. For example, you might want to tie your answer to signs (e.g. street signs, shop signs), to buildings (e.g. garages, libraries), to public areas (e.g. parks, market squares), or even to fine details (e.g. flowers, colours). Everyone takes a different route to the university, so there are no right or wrong answers. Your answer will be unique depending on the route you take. All of your answers… [continuing as above]. (total word count: 131)*

Measures. Body concern was measured to check for group differences at baseline using the 36-item Eating Disorder Examination–Questionnaire (EDE–Q; Fairburn & Beglin, 1994). The EDE–Q measures eating disorder pathology over the past 28 days and contains four subscales: Restraint, Eating Concern, Shape Concern, and Weight Concern. Answers are gathered on 7-point Likert scales ranging from 0 (*not at all*) to 6 (*highly frequent*). Participants completed all 36 items, but we only used items from the Shape Concern subscale (8 items; e.g., "On how many of the past 28 days have you had a definite desire to have a totally flat stomach?") and the Weight Concern subscale (5 items; e.g., "On how many of the past 28 days have you had a strong desire to lose weight?"). The two subscale items were averaged to create a single body concern score, with higher scores representing greater body concern (most of these items load onto one underlying factor; Peterson et al., 2007). In a sample of undergraduate women, the EDE–Q demonstrated good-to-excellent internal consistency (αs of the subscales ranged from .81 to .93) and 2-week test-retest reliability (*rs* ranging from .81 to .94; Luce & Crowther, 1999). In a community sample of women, EDE–Q scores were

correlated with scores on the Eating Disorder Examination (EDE) interview (*r* of the subscales ranged from .68 to .78; Mond, Hay, Rodgers, Owen, & Beaumont, 2004).

Body satisfaction was divided into appearance satisfaction and functionality satisfaction. Appearance satisfaction was measured using the 6-item Body Image States Scale (BISS; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002) which taps the following dimensions based on how the participant feels "right now, at this very moment": (a) dissatisfaction-satisfaction with physical appearance, (b) dissatisfaction-satisfaction with body size and shape, (c) dissatisfaction-satisfaction with weight, (d) feelings of physical attractiveness-unattractiveness, (e) feelings about how one looks compared to how one usually feels, and (f) evaluation of appearance in comparison to the appearance of others. Participants rated their responses on 100mm visual analogue scales (VAS). The ratings were averaged to create an appearance satisfaction score, with possible scores between 0 and 100, and with higher scores reflecting greater appearance satisfaction. In a sample of female and male undergraduates, the BISS demonstrated acceptable internal consistency as well as 2- to 3-week test-retest reliability of .68 (women) and .69 (men); BISS scores were also highly correlated with scores on other measures of body image (e.g., objectified body consciousness) and were sensitive to positive and negative contexts (Cash et al., 2002).

Functionality satisfaction was measured using an adapted version of The Visual Analogue Body Dissatisfaction Scale (VABDS; Heinberg & Thompson, 1995). The VABDS is sensitive to changes in body satisfaction and correlates highly with other measures of body satisfaction (e.g., with the Body Dissatisfaction subscale of the Eating Disorder Inventory; Garner, 1991; Heinberg & Thompson, 1995). In our study, participants were asked to rate how they feel "right now" regarding the statement "Overall, I am satisfied with everything that my body can *do*." The participants put a mark on a 100mm horizontal line, with answer possibilities ranged from 0 (*not at all*) to 100 (*very much*).

Global self-esteem was assessed using the 10-item Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965). RSES items (e.g., "On the whole I am satisfied with myself") are rated on a 4-point Likert scale, ranging from 1 (*strongly agree*) to 4 (*strongly disagree*). After re-coding the reverse-scored items, item ratings were summed, with higher scores indicating greater self-esteem. In a sample of undergraduate women and men, RSES scores were shown to be stable across measurement points (mean *r* = .69; Robins, Hendin, & Trzesniewski, 2001); mean Cronbach's α across samples from over 50 countries including undergraduates and participants from the general population was .81 (Schmitt & Allik, 2005). Across most of these countries, RSES scores were correlated positively with extroversion and negatively with neuroticism (Schmitt & Allik, 2005).

Mood was measured to test for differences in mood at test-day. Participants were asked to rate how they feel "right now" regarding the feelings anxious (reverse scored), happy, sad (reverse scored), positive, and energetic on 100mm VASs, ranging from 0

(*not at all*) to 100 (*very much*). An average of the ratings was taken for a mood score (α = .78), with a higher score representing a more positive mood.

Demographic information included participants' age, sex, nationality, height, and weight. Self-reported weight and weight were used to calculate body mass index (BMI, kg/m^2) to check for any differences in BMI between conditions at baseline. To disguise the purpose of the study, all questionnaires were interspersed with filler questions (e.g., "Overall, I think that the availability of public transport in Maastricht is excellent"; "Overall, I think that the availability of housing options in Maastricht is excellent").

As a manipulation check, the writing assignment responses were scored for valence (i.e., how positively or negatively the participants described their bodies in the writing assignment) because we expected that describing body functionality would induce a more positive stance toward the body than describing appearance. Valence was scored using a 5-point scale from 1 (*very negative*) through 3 (*neutral*) to 5 (*very positive*). The control writing assignment was not scored because it was unrelated to the body (the responses were checked to make sure that none mentioned the body). Two independent raters (one female and one male, for whom the condition, sex of respondent, and hypotheses were masked) were trained by the first author regarding what constituted each score. The raters then scored every appearance and functionality writing assignment response separately. Valence ratings that differed by at least two points (four cases) were discussed to reach consensus (i.e., a new score was decided upon). To compute the valence score, an average was taken of both raters' scores. The inter-rater reliability between the raters was high; the intra-class coefficient was .80. Finally, the word count of each writing assignment response was tallied to check for differences among conditions.

Results

Participant characteristics. Thirty-seven participants (19 male, 18 female) composed the functionality condition, and 39 participants (18 male, 21 female) composed the appearance condition. The remaining 42 participants (22 male, 20 female) took part in the control condition. Female participants' BMI ranged from 17.99 to 31.19 (*M* = 21.97, *SD* = 2.58); male participants' from 15.50 to 35.14 (*M* = 22.91, *SD* = 3.43). There were no group differences at baseline in BMI, body concern, appearance and functionality satisfaction, or self-esteem scores, all *F*s < 1. There were no group differences in mood at test-day, $F(2, 115) = 1.22$, $p = .30$. The means and standard deviations for all comparisons are reported in Table 1, and the correlations among the questionnaire scores at baseline are given in Table 2. The results reported here did not change when the analyses were run with mood, BMI and body concern as covariates. Also, no outliers (i.e., scores 3 *SD* above or below the group mean) were identified.

Table 1 Undergraduate's Mean Body Satisfaction and Self-esteem Scores in the Three Body Approach Conditions Over Time

Time Point	Functionality Condition			Appearance Condition			Control Condition		
	FS (M, SD)	AS (M, SD)	SE (M, SD)	FS (M, SD)	AS (M, SD)	SE (M, SD)	FS (M, SD)	AS (M, SD)	SE (M, SD)
Women									
Baseline	68.44 (19.65)	52.18 (13.46)	29.56 (4.90)	67.86 (22.26)	54.51 (19.93)	29.00 (5.19)	64.95 (19.86)	55.24 (11.92)	30.25 (5.07)
Testing	62.28 (19.74)	54.73 (14.41)	29.39 (4.67)	**56.38 (23.74)***	53.36 (18.70)	28.38 (4.65)	69.35 (14.54)	58.37 (11.60)	29.30 (4.89)
Follow-up	63.24 (17.56)	54.34 (14.31)	29.65 (4.97)	**57.52 (25.05)***	55.08 (18.18)	29.43 (5.17)	72.68 (11.47)	56.44 (10.18)	29.21 (4.59)
Men									
Baseline	66.11 (20.68)	59.29 (11.05)	30.63 (5.30)	67.37 (22.11)	54.74 (15.13)	29.68 (4.64)	73.09 (18.21)	61.59 (11.43)	31.44 (4.47)
Testing	**78.32 (12.11)***	61.57 (14.74)	31.37 (4.80)	58.42 (25.99)	53.69 (18.67)	29.84 (5.33)	70.30 (13.60)	61.74 (13.20)	31.52 (4.21)
Follow-up	69.39 (17.66)	66.16 (12.79)	30.94 (4.84)	63.94 (23.90)	55.20 (20.36)	30.94 (5.60)	68.10 (17.23)	61.93 (15.34)	31.86 (4.56)

Note. Significant differences are always in reference to scores at baseline in the corresponding condition. FS = functionality satisfaction; AS = appearance satisfaction; SE = self-esteem.

* $p < .05$

Table 2 Correlations Among the Measures of Study 1 and Study 2 at Baseline

Measures	FS	BISS	RSES	EDE-Q
Functionality satisfaction (FS)	--	.42**	.41**	-.27**
Appearance satisfaction (BISS)	.53**	--	.52**	-.71**
Global self-esteem (RSES)	.43**	.46**	--	-.39**
Body concern (EDE-Q items)	-.57**	-.79**	-.52**	--

Note. Correlations for Study 1 appear above the diagonal, and correlations for Study 2 appear below the diagonal; BISS: Body Image State Scale; RSES: Rosenberg Self-Esteem Scale; EDE–Q: Eating Disorders Examination-Questionnaire (Shape and Weight Concern subscales).

** $p < .01$.

Manipulation checks. Men's valence scores on the writing assignment were: functionality condition, $M = 3.53$, $SD = 0.61$; appearance condition, $M = 3.03$, $SD = 0.54$. Women's valence scores on the writing assignment were: functionality condition, $M = 3.31$, $SD = 0.69$; appearance condition, $M = 2.75$, $SD = 0.79$. Results of an ANOVA of Body Approach and Sex on valence showed that only the main effect of Body Approach was significant, $F(1, 70) = 11.42$, $p = .001$. Overall, responses to the writing assignments were more positive in the functionality condition, $M = 3.42$, $SD = 0.65$, compared to those in the appearance condition, $M = 2.88$, $SD = 0.69$.

Men's word count on the writing assignments was: functionality condition, M = 154.00, SD = 115.97; appearance condition, M = 160.00, SD = 71.91; control condition, M = 184.26, SD = 83.37. Women's word count on the writing assignments was: functionality condition, M = 167.78, SD = 77.00; appearance condition, M = 156.90, SD = 92.87; control condition, M = 264.42, SD = 138.62. An ANOVA of Body Approach and Sex on word count showed no significant effects.

Functionality satisfaction. Participants' functionality satisfaction scores were analysed in a 2 between (Sex: female, male) x 3 between (Body Approach: functionality, appearance, control) x 3 within (Time: baseline, test-day, follow-up) repeated measures ANOVA. The result of Mauchly's test indicated a violation of the sphericity assumption, $\chi 2(2)$ = .936, p = .03, so Greenhouse-Geisser corrections were applied. The main effects of Sex, Body Approach, and Time were nonsignificant, Fs < 1. The interaction between Sex and Time was nonsignificant, $F(1.88, 195.45)$ = .28, p = .74. Similarly, the interaction between Body Approach and Time was nonsignificant, $F(3.76, 195.45)$ = 2.42, p = .054. However, the three-way interaction of Sex, Body Approach, and Time was significant, $F(3.76, 195.45)$ = 3.42, p = .01, η^2 = .06 (Note: the following guidelines apply for interpreting eta-squared effect sizes: small = 0.01, medium = 0.06, and large = 0.14; Cohen, 1988).

This analysis was followed up with separate repeated measures ANOVAs for men and women. The sphericity assumption was not violated for these analyses, so no corrections were applied. For men, the main effect of Time was nonsignificant, $F(2, 100)$ = .14, p = .87, whereas the interaction between Body Approach and Time was significant, $F(4, 100)$ = 2.96, p = .02, η^2 = .11. Similarly, for women, the main effect of Time was nonsignificant, $F(2, 108)$ = 1.08, p = .34, whereas the interaction between Body Approach and Time was significant, $F(4, 108)$ = 2.85, p = .03, η^2 = .09.

Subsequently, we followed these interactions with planned contrasts based on our hypotheses; we compared the different time points (baseline with test-day, and baseline with follow-up) per Sex, and per Body Approach condition. Compared to baseline, men's functionality satisfaction significantly increased after writing about what their bodies can do, p = .03, 95% CI [-21.91, -1.20]. However, at one week follow-up this difference was no longer significant, p = .64, 95% CI [-13.32, 8.32]. Moreover, there were no significant changes at test-day or at follow-up in men in the appearance condition or in the control condition. Men's functionality satisfaction scores over time are presented in Figure 1a.

In contrast to men, women's functionality satisfaction did not change at test-day or at follow-up after writing about what their bodies can do. However, immediately after women wrote about their appearance, they showed decreased functionality satisfaction compared to baseline, p = .02, 95% CI [1.86, 21.06]. Further, this difference was maintained at follow-up, p = .04, 95% CI [0.51, 20.16]. Women in the control condition experienced no changes in functionality satisfaction at test-day or at follow-up. Women's functionality satisfaction scores over time are presented in Figure 1b.
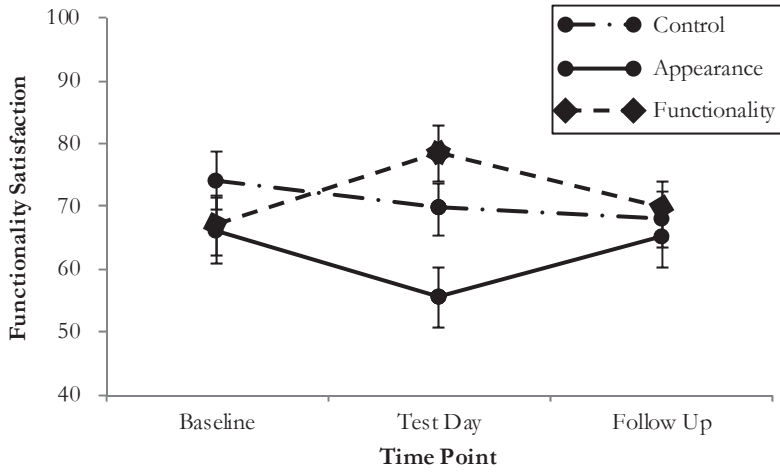
a) Men
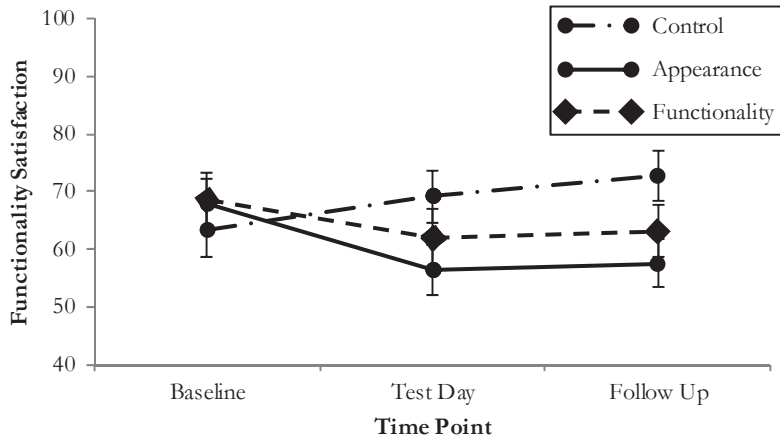
b) Women

Figure 1. Undergraduate (a) men's and (b) women's functionality satisfaction scores across time for the control, appearance, and functionality conditions.

Appearance satisfaction and self-esteem. Participants' scores on appearance satisfaction were also analysed using a repeated measures ANOVA. The result of Mauchly's test of sphericity was nonsignificant, thus no corrections were applied. No main effects of Sex, Body Approach, or Time were found, $Fs < 2.36$. The two-way interactions of Sex x Time and Body Approach x Time were both nonsignificant, $Fs < 1$. The three-way interaction of Sex x Body Approach x Time was also nonsignificant, $F < 1$.

Regarding self-esteem, the result of Mauchly's test of sphericity was nonsignificant, so no corrections were needed. Results of a repeated measures ANOVA showed that the main effects of Sex, Body Approach, and Time were nonsignificant, Fs < 3.47. The two-way interactions of Sex x Time, and Body Approach x Time were both nonsignificant, Fs < 1.84. Finally, the three-way interaction of Sex, Body Approach, and Time was also nonsignificant, F < 1.

Discussion

The aim of Study 1 was to establish whether focusing on body functionality would improve body satisfaction in a sample of undergraduate women and men. Our hypotheses were partially supported. First, in line with our first hypothesis, men in the functionality condition experienced an increase in one aspect of body satisfaction, namely functionality satisfaction. Previous research has shown that people are more positive about their body functionality compared to their body appearance (Franzoi, 1995) and that men specifically are more inclined to think of their bodies in terms of functionality (Cash & Brown, 1989; Franzoi, 1995; Stephens et al., 1994). In addition, men's self-concept is sculpted by their perception of their body functionality (Lerner et al., 1976). Thus, this 'match' between men and the functionality-based focus on the body may have made the writing assignment both meaningful and effective for them.

Contrary to our first hypothesis, women in the functionality condition did not experience any changes in their satisfaction with their body functionality or appearance. Research has shown that women are accustomed to thinking of their bodies in appearance terms, rather than in functionality terms (e.g., Cash & Brown, 1989; Franzoi, 1995; Fredrickson & Roberts, 1997; Lerner et al., 1976; Stephens et al., 1994). Therefore, it is possible that the current writing assignment was too brief for these women to sufficiently focus and reflect on their body functionality. It may thus be necessary to have women complete the writing assignment more often and to require them to write longer responses to encourage more reflection on their body functionality.

Regarding our second hypothesis, as expected, women in the appearance condition experienced a decrease in functionality satisfaction. It is noteworthy that describing how their bodies *look* made women feel less satisfied with what their bodies can *do*. Focusing on body appearance may have made the appearance dimension more salient, encouraging women to see their bodies as objects (Fredrickson & Roberts, 1997; Fredrickson et al., 1998; Quinn et al., 2006). When seeing their bodies as objects, women may be less likely to perceive their body functionality positively (Roberts & Waters, 2004). It is also important to note that this decrease in functionality satisfaction even persisted at one week follow-up, which may reflect the overall, longer-term negative impact of seeing the body as an object. One reason why women's appearance satisfaction did not decrease after writing about how their bodies look may be that appearance dissatisfaction has become normative to them (Rodin et al., 1984). Another

reason may be that writing about the appearance of the body was not as confrontational as looking at the body in a mirror. Many studies have induced an appearance focus by having women stand in front of a mirror in a swimsuit, which has been shown to reduce body satisfaction (Moradi & Huang, 2008). Lastly, as expected, men in the appearance condition did not experience any changes in body satisfaction. This is in agreement with extant research that has demonstrated that men's body satisfaction is not immediately affected by focusing on the appearance of the body (Fredrickson et al., 1998; Quinn et al., 2006).

Finally, contrary to hypothesis, the positive changes in functionality satisfaction in men were not maintained at follow-up. The manipulation may not have been intense enough to instil longer-lasting effects because writing 100 words did not consume much of the participants' time. Similarly, it is likely that global self-esteem, a rather stable construct, was not affected by the writing assignment given the short-term effects of the manipulation. Despite the absence of longer-term positive changes in body satisfaction, or improvements in self-esteem, the current writing task did produce some of the expected effects at test-day, which is noteworthy considering its short duration and the ease with which it can be distributed.

Study 2

Our aim in Study 2 was to investigate if focusing on body functionality would improve body satisfaction in a community sample of women between the ages of 30 and 50 years. Although most body image research has been conducted in women between 18 and 25 years old (Grogan, 1999), some studies have investigated body image in older women. Unfortunately, body dissatisfaction remains remarkably stable across the female lifespan (Grogan, 1999; Stevens & Tiggemann, 1998; Tiggemann, 1992, 2004; Tiggemann & Lynch, 2001). Considering that aging inevitably takes women's bodies further from the thin, youthful beauty ideal (Tiggemann, 2004), it is perhaps counter-intuitive that body dissatisfaction does not *increase* with age.

However, there are reasons to suggest why body dissatisfaction in fact remains unaltered with time. For instance, a distinction can be made between the *importance* women place on their appearance and the *evaluation* of their appearance (i.e., body satisfaction; Muth & Cash, 1997). Importance of appearance is reflected by how much women invest in their 'looks' (e.g., via beauty rituals) and by how much appearance defines their sense of self (Muth & Cash, 1997). In line with this notion, studies have shown that the importance of appearance decreases as women get older, even though body dissatisfaction remains stable (Pliner, Chaiken, & Flett, 1990; Tiggemann & Lynch, 2001). Furthermore, Webster and Tiggemann (2003) demonstrated that as women age, they adopt more cognitive strategies that help them cope with body changes, such as making reappraisals, lowering their expectations (e.g., regarding a realistic weight),

or accepting physical aspects they cannot change (e.g., the appearance of wrinkles). It has also been hypothesised that, over time, women compare their bodies with more age-appropriate peers (Grogan, 1999), which has been supported by research that demonstrates that women's ideal body shape becomes more realistic as they age and as their BMI increases (Stevens & Tiggemann, 1998; Tiggemann & Lynch, 2001).

Another explanation for the stability of body dissatisfaction across the female lifespan stems from objectification theory (Fredrickson & Roberts, 1997). Objectification theory posits that women are most targeted for sexual objectification in the reproductive stage of their lives. Thus, self-objectification should intensify during adolescence and decline as women get older, allowing older women to "escape from the culture of objectification along with its negative psychological repercussions" (Fredrickson & Roberts, 1997, p. 195) such as body shame and anxiety. Central to this shift is that older women should no longer hold the outside observer perspective on their bodies as the main view of themselves, thus they will likely place less importance on their appearance (Fredrickson & Roberts, 1997; Tiggemann & Lynch, 2001). The first known study to investigate the relation among self-objectification, body image, and age was conducted by Tiggemann and Lynch (2001) and has supported these postulations. In their cross-sectional study, they showed that self-objectification decreases as women get older, as do its corollaries body monitoring and appearance anxiety. (Note, however, that levels of body dissatisfaction and body shame remained stable.) The authors concluded that as women age, appearance is deemphasised (lower self-objectification), is critiqued less (reduced body monitoring), and evokes less anxiety (lower appearance anxiety).

Regarding body functionality, to the authors' knowledge, no studies have investigated satisfaction with body functionality over the lifespan so the notions we propose here are speculative. Similar to aspects of appearance, certain aspects of body functionality may decline as women age (Hurd, 2000). For example, as women get older, they may need to rely on functional aides (e.g., glasses) or may experience more frequent bodily pain compared to younger women. In addition, physical life changes, such as menopause, may pose a challenge to body image (Tiggemann, 2004). In this light, satisfaction with body functionality should decrease as women get older (Hurd, 2000).

On the other hand, mature women may have more positive body functionality experiences to draw from than younger women do, such as childbirth or raising a family. Also, many skills may become more refined and improved over time, which may elicit satisfaction with body functionality as well. Moreover, as discussed above, women focus less on their appearance as they get older (Fredrickson & Roberts, 1997; Tiggemann & Lynch, 2001). This may give women 'room' to shift their focus to other dimensions of their bodies, namely to the functionality dimension. These two factors may counteract negative changes in body functionality satisfaction that women may experience as they get older. For these reasons, and considering the benefits of focusing on body functionality (discussed in the general introduction), in Study 2 we hypothe-

sised that focusing on body functionality would improve body satisfaction. Given that importance of appearance decreases with age, we hypothesised that describing body appearance would not lead to decreases in body satisfaction. We further hypothesised that changes in body satisfaction would persist at 1-week follow-up and that global self-esteem would improve in women who focus on body functionality. We did not expect changes in global self-esteem in the appearance group.

Method

Participants and procedure. A total of 118 participants (M_{age} = 40.98, SD = 5.84, range = 30-50) completed baseline and test-day measures. Eight participants did not complete follow-up measures, leaving a total of 110 participants (M_{age} = 40.78, SD = 5.75, range = 30- 50). All participants were of Dutch nationality. Power analyses using G*Power (Faul et al., 2007) indicated that the present sample size (N = 118) can detect significant small differences (f = .10) between the groups with a minimum statistical power of .88 and α = .05.

To recruit baseline participants (N = 125), a chain or snowball sampling method was used. An initial sample of five women between 30 and 50 years old each distributed an invitation to participate in the study to approximately 10 other women in this age group. These women, in turn, invited other eligible women to participate in the study. Note that the initial five women did not participate in the study themselves, nor were they aware of the hypotheses. Participants who completed at least baseline and test-day measures were included in the analyses. The remainder of the procedure was identical to Study 1. Regarding the experimental manipulation, control participants described the route to the store or shopping centre where they do their shopping. All other instructions remained the same.

Measures. In Study 2, the original BISS (six 7-point Likert scales) was administered. All other measures remained the same: EDE–Q (Weight and Shape Concern items combined), RSES, and mood (α = .86). The ratings for valence scores differed by two points between the raters in four cases; these cases were discussed to reach consensus. Inter-rater reliability was high between the two raters; the intra-class correlation coefficient was .72.

Results

Participant characteristics. Forty-one participants composed the functionality condition, and 39 participants composed the appearance condition. The remaining 38 participants took part in the control condition. BMIs ranged between 18.10 and 43.36 (M = 24.04, SD = 3.99). There were no group differences at baseline in BMI, body concern, appearance and functionality satisfaction, or in self-esteem, Fs < 1.10. There were no group differences in mood at test-day, $F(2, 115)$ = 0.01, p = .99. The correla-

tions among the questionnaire scores at baseline are given in Table 2, and the means and standard deviations for all comparisons are reported in Table 3. The results of the analyses reported below did not change when run with mood, BMI, and body concern as covariates. Regarding outliers (identified as a score 3 *SD*s above or below the group mean), only one was detected; the results did not change when this participant was excluded, so she was not removed from the dataset.

Table 3 Women's Mean Body Satisfaction and Self-esteem Scores in the Three Body Approach Conditions Over Time

Time Point	Functionality Condition			Appearance Condition			Control Condition		
	FS (*M, SD*)	AS (*M, SD*)	SE (*M, SD*)	FS (*M, SD*)	AS (*M, SD*)	SE (*M, SD*)	FS (*M, SD*)	AS (*M, SD*)	SE (*M, SD*)
Baseline	77.00 (21.47)	4.60 (1.01)	32.60 (4.89)	77.62 (21.89)	4.31 (1.09)	34.03 (4.95)	74.05 (21.67)	4.69 (1.01)	33.13 (5.55)
Testing	81.15 (17.30)	4.73 (0.89)	32.85 (4.74)	81.15 (14.87)	4.55 (1.03)	33.48 (4.81)	71.63 (19.10)	4.57 (1.08)	33.18 (4.87)
Follow-up	**80.17** (15.54)*	4.57 (0.93)	32.86 (5.74)	76.35 (21.61)	4.51 (1.06)	33.43 (4.41)	74.06 (21.12)	4.71 (1.14)	33.39 (5.12)

Note. The significant difference is in reference to the baseline score in the corresponding condition. FS = functionality satisfaction; AS = appearance satisfaction; SE = self-esteem.
* $p < .05$.

Manipulation checks. The valence scores for the writing assignment were: functionality condition, $M = 3.39$, $SD = 0.63$; appearance condition, $M = 2.99$, $SD = 0.67$. Valence scores differed by Body Approach condition, $F(1, 78) = 7.68$, $p = .001$, $\eta^2 = .09$. Participants described their bodies more positively in the functionality condition compared to the appearance condition. The word count on the writing assignments was: functionality condition, $M = 156.59$, $SD = 79.99$; appearance condition, $M = 168.77$, $SD = 69.42$; control condition, $M = 169.18$, $SD = 78.38$. An ANOVA of Body Approach on word count showed no significant results, $F(2, 115) = 0.36$, $p = .70$.

Functionality satisfaction. Women's functionality satisfaction scores were analysed in a 3 between (Body Approach: functionality, appearance, control) x 3 within (Time: baseline, test-day, follow-up) repeated measures ANOVA. The result of Mauchly's test of sphericity revealed no violation of the sphericity assumption, so no corrections were applied. The main effects of Body Approach and Time were nonsignificant, *F*s < 1. A significant interaction between Body Approach and Time was found, $F(4, 206) = 2.58$, $p = .04$, $\eta^2 = .05$. Subsequently, we followed this interaction with planned contrasts based on our hypotheses, comparing levels of functionality satisfaction from baseline to test-day, and from baseline to follow up, for each group separately. Although women in the functionality condition experienced improvements in functionality satisfaction from baseline to test-day (see Table 3 and Figure 3), the results did not reach significance, $p = .12$, 95% CI [-8.46, 1.02]. However, at follow-up, the improvements in

functionality satisfaction in women in the functionality condition were significant, p = .04, 95% CI [-9.25, -.31]. No significant changes were found in women in the appearance condition or in the control conditions, both at test-day and at follow-up. Women's functionality satisfaction scores over time are presented in Figure 2.
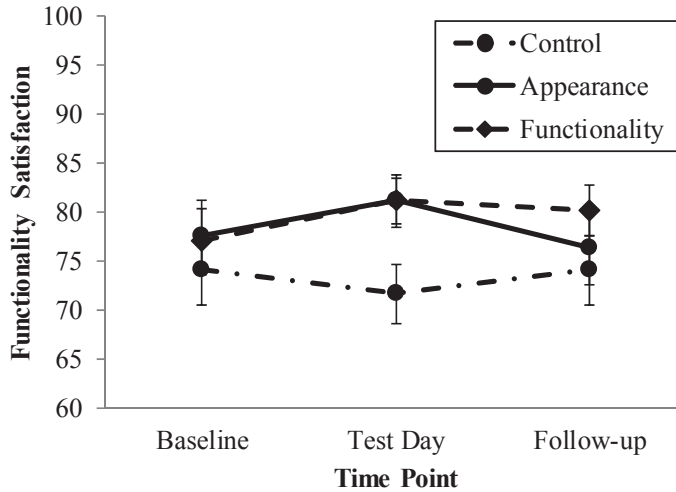

Figure 2. Women's functionality satisfaction scores across time for the control, appearance, and functionality conditions.

Appearance satisfaction and self-esteem. Participants' scores on appearance satisfaction were analysed using a repeated measures ANOVA. The result of Mauchly's test of sphericity showed a significant violation of the sphericity assumption, $\chi^2(2)$ = .93, p = .02, so Greenhouse-Geisser corrections were applied. The results showed that the main effects of Body Approach and Time were nonsignificant, Fs < 1. Furthermore, the interaction between Body Approach and Time was also nonsignificant, F < 1.81. Additionally, a repeated measures ANOVA was conducted to analyse participants' self-esteem scores. The sphericity assumption was not violated according to Mauchley's test, so no corrections were applied. The main effects of Body Approach and Time were both nonsignificant, Fs < 1. Additionally, the interaction between Body Approach and Time was nonsignificant, F < 1.67.

Discussion

The aim of Study 2 was to establish whether focusing on body functionality would improve body satisfaction in a community sample of mature women. In Study 2, our hypotheses were partially supported. Although women who focused on their body functionality experienced improvements in functionality satisfaction at test-day, these

improvements did not reach significance. Interestingly, these women did experience significant improvements in functionality satisfaction from baseline to follow-up. This finding implies that the improvements in functionality satisfaction were gradual yet longer-lasting. It could be that these women reflected more on their bodies in functionality terms between test-day and follow-up. Moreover, similar to the men in Study 1, for mature women, body functionality may be a suitable 'match' with their self-concept that becomes less dependent on appearance over time (Fredrickson & Roberts, 1997).

As expected, women who described their appearance did not experience any changes in body satisfaction. This may also reflect an underlying decrease in the importance of appearance, whereby describing appearance does not negatively affect women's body image. Contrary to expectation, self-esteem did not improve in the functionality condition. Similar to Study 1, the brevity of the writing assignment may not have been strong enough to alter a stable construct such as global self-esteem. It is also likely that the writing task needs to be intensified to achieve stronger and longer lasting effects.

General Discussion

Body functionality constitutes the unobservable dimension of the body, which largely goes unnoticed in comparison to body appearance – the observable dimension of the body on which an inordinate amount of focus and importance is placed (Avalos & Tylka, 2006; Franzoi, 1995; Franzoi & Shields, 1984; Fredrickson & Roberts, 1997; Wood-Barcalow et al., 2010). Using objectification theory as a guiding framework, we have argued that focusing on body functionality (instead of body appearance) may improve body satisfaction. The current studies are the first known to experimentally manipulate a functionality-based approach to the body. Our hypotheses were partially supported. In Study 1, we found that undergraduate men (but not women) became more satisfied with everything their bodies can do when they focused on their body functionality. We also found that undergraduate women who focused on their body appearance felt less satisfied with what their bodies can do, both at test-day and at follow-up. In Study 2, we showed that mature women also became more satisfied with their body functionality when they described their bodies in functionality terms, but these changes were more gradual and only reached significance at one week follow-up. Unexpectedly, although undergraduate men and mature women experienced improvements in functionality satisfaction, they did not experience any improvements in appearance satisfaction. Therefore, the effects of the functionality writing assignment appear to be dimension-specific and did not extend to the appearance dimension of body image. Also unexpectedly, no improvements in global self-esteem were found.

Apart from discussing the findings of Study 1 and Study 2 separately, it is vital to draw some of the findings of both studies together. Fredrickson and Roberts (1997)

posited that women are most targeted for sexual objectification in their reproductive years, whereas mature women gradually become free of this burden. We suggested that mature women would therefore focus more on the functionality of their bodies and that body functionality would be a source of greater satisfaction for them. Indeed, retrospectively, looking at functionality satisfaction at baseline between Study 1 women and Study 2 women, we do see that mature women (M = 76.25, SD = 21.54) are significantly more satisfied with their body functionality than the younger women (M = 68.05, SD = 20.37) are, $t(175)$ = 2.73, p = .01. Furthermore, in Study 1, women who wrote about their appearance experienced both a short and longer-term decrease in functionality satisfaction, whereas this was not the case in mature women. These findings suggest that, as appearance becomes less important in mature women (Muth & Cash, 1997), other aspects of their body (such as body functionality) become more important.

Another commonality between Study 1 and Study 2 is the absence of effects on appearance satisfaction. One reason for this absence may be the nature of the writing assignment instructions. The instructions for all writing assignments were purposely phrased in a neutral way to avoid biasing the participants' answers positively or negatively. In fact, responses to the appearance writing assignments received a neutral valence score in both studies. Previous research has shown that having participants describe their bodies neutrally may diffuse negative feelings toward their appearance (Jansen et al., 2008). This may explain why women in the appearance condition did not experience changes in appearance satisfaction. This does not explain, however, why undergraduate men and mature women who focused on their body functionality did not experience an improvement in appearance satisfaction (despite experiencing improvements in functionality satisfaction). First, the relations between appearance satisfaction and functionality satisfaction are unclear; it could be that neither causes the other. Additionally, it is possible that describing body functionality does not change appearance satisfaction, but rather the *importance* placed on appearance. In other words, reflecting on all the things the body can do may put appearance into perspective, without necessarily increasing satisfaction with appearance.

Limitations and Future Directions

Several limitations to the current studies should be mentioned. First, information about ethnicity, socioeconomic status, sexual orientation, and eating disorder history was not collected. These factors may have influenced participants' responses and should be incorporated into future studies. Second, although the online administration of the studies was convenient for participants, it was not possible to control for factors that may have influenced participants while writing. Third, several participants did not write the requested number of words for the writing assignment (8 participants in Study 1 wrote between 37 and 97 words; and 13 participants in Study 2, 16 - 92

words). In future experiments, participants should be required to fulfil the word count before continuing with the outcome measures so as to ensure that all participants reflect on the subject matter sufficiently. Fourth, the writing assignment did not instil any longer-term improvements in body satisfaction in Study 1. As previously noted, to strengthen the effects of the writing assignment, it may be necessary to administer it repeatedly (e.g., several times per week), to intensify it (e.g., by increasing the required word count), and to alter the instructions (e.g., by framing the writing instructions positively rather than neutrally). Fifth, any comparisons made between Study 1 and Study 2 women are speculative. To directly compare between these groups of women, it will be important to conduct a study that includes women of various age groups within the same study. Finally, a major limitation of the current studies concerns the measurement of functionality satisfaction. Unfortunately, a validated questionnaire devoted entirely to body functionality does not currently exist. Therefore, we stress the importance of developing a measure of body functionality to drive and improve research in this field.

For future research, it will be important to incorporate these changes. In addition, it will be necessary to investigate how the functionality approach can be applied in younger women. It could be that an intensified manipulation is required because younger women are accustomed to thinking of and evaluating their bodies in terms of appearance, rather than functionality (Cash & Brown, 1989; Fredrickson & Roberts, 1997; Lerner et al., 1976). Furthermore, given the relevance of objectification theory for the functionality-based approach, it will also be imperative to include measures of self-objectification, as well as body shame and body monitoring. In this way, the proposed mechanisms of the functionality-based approach can be empirically tested and developed further.

Conclusion

In sum, the current studies contributed to the body image literature by experimentally manipulating a functionality-based focus on the body as a novel technique to improve body satisfaction. Two groups that are largely underrepresented in body image research were included, namely undergraduate men and mature women. We provided preliminary support for focusing on the functionality of the body and have identified important limitations that should be addressed in future research on body functionality. Furthermore, we have also incorporated objectification theory, one of the most substantial theories regarding women's body image, into the field of body functionality research. We echo the statements of previous researchers who stressed the importance of focusing on the functionality of the body as a method of improving body image (Avalos & Tylka, 2006; Frisén & Holmqvist, 2010). It is hoped that the groundwork laid by our studies will only be the start of a burgeoning field into a neglected, yet potentially vital, aspect of body image.

CHAPTER 4

Expand Your Horizon
*A Programme That Improves Body Image
and Reduces Self-Objectification by Training
Women to Focus on Body Functionality*

Abstract

Objectives: This study tested *Expand Your Horizon*, a programme designed to improve body image by training women to focus on the functionality of their body using structured writing assignments. **Methods:** Eighty-one women (M_{age} = 22.77) with a negative body image were randomised to the *Expand Your Horizon* programme or to an active control programme. Appearance satisfaction, functionality satisfaction, body appreciation, and self-objectification were measured at pretest, posttest, and one-week follow-up. **Results:** Following the intervention, participants in the *Expand Your Horizon* programme experienced greater appearance satisfaction, functionality satisfaction, and body appreciation, and lower levels of self-objectification, compared to participants in the control programme. Partial eta-squared effect sizes were of small to medium magnitude. **Conclusions:** This study is the first to show that focusing on body functionality can improve body image and reduce self-objectification in women with a negative body image. These findings provide support for addressing body functionality in programmes designed to improve body image.

Introduction

Approximately 60% of women have a negative body image (Tiggemann, 2004), which is characterised by negative feelings, cognitions, behaviours, and perceptions regarding an individuals' own body (Garner & Garfinkel, 1981; Rosen, Saltzberg, & Srebnik, 1989; Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Negative body image is a risk factor for numerous unhealthy behaviours including fasting, self-induced vomiting, laxative misuse, and excessive exercise (Cafri et al., 2005; Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006), and is associated with low self-esteem (Cash & Fleming, 2002b), depression (Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006), impaired sexual functioning (Weaver & Byers, 2006), and a diminished quality of life (Cash & Fleming, 2002b). In addition, negative body image is a main risk factor for the development and maintenance of an eating disorder (Stice, 2002) and predicts treatment response and relapse in women who have developed an eating disorder (Cash & Deagle, 1997; Rosen, 1996a). For these reasons, negative body image is an important target for intervention. The current study evaluates a novel programme for improving body image, which centres on training women to focus on the functionality of their body.

What is Body Functionality?

Body functionality is an aspect of body image that refers to everything that the body can *do* (Abbott & Barber, 2010; Alleva, Martijn, Jansen, & Nederkoorn, 2014). It encompasses body functions related to physical capacities (e.g., stamina; Abbott & Barber, 2010; Franzoi, 1995; Franzoi & Shields, 1984), health and internal processes (e.g., digestion; Avalos & Tylka, 2006), as well as senses (e.g., sight), creative endeavours (e.g., dancing), self-care (e.g., showering), and communication with others (e.g., via body language; Alleva et al., 2014). Body functionality can also be seen as the "body as *process*" or "what is my body *capable* of?" component of body image, in contrast to physical appearance, which captures the "body as *object*" or "how do I *look*?" component of body image (Franzoi, 1995; Fredrickson & Roberts, 1997; see also Fox, 2000). In conceptualising body functionality, it is important to keep in mind that it is not limited to physical capacities, which would position body functionality as a construct that is restricted to able-bodied people (cf. Webb, Wood-Barcalow, & Tylka, 2015), but also encompasses many functions that fall under the other categories listed above.

How Might Focusing on Body Functionality Affect Women's Body Image?

Body functionality and body satisfaction. Several studies have demonstrated that focusing on body functionality is associated with higher levels of body satisfaction. For example, interviews with women (Wood-Barcalow, Tylka, & Augustus-Horvath, 2010) and

adolescents (Frisén & Holmqvist, 2010) who score high on measures of body satisfaction have shown that these individuals focus on the functionality of their body more than their appearance and actively strive to take care of their body's functions. In addition, across fitness interventions designed to improve body image, objective changes in fitness (e.g., muscle tone) explain less than 15% of variance in measures of body satisfaction (Martin Ginis & Bassett, 2011); it has been proposed that learning to focus on body functionality (more than appearance) may play a larger role in explaining in fitness-related improvements in body satisfaction (Boudette, 2006; Campbell & Hausenblas, 2009; Grogan, 2011; Martin & Lichtenberger, 2002). Indeed, in contrast to exercising for appearance-related reasons (e.g., weight control), exercising for functionality-related reasons (e.g., health) has been associated with higher levels of body satisfaction (e.g., DiBartolo, Lin, Montoya, Neal, & Shaffer 2007; Gonçalves & Gomes, 2012; Hubbard, Gray, & Parker, 1998; Tiggemann & Williamson, 2000). Lastly, in an experimental study, Alleva, Martijn, Jansen, and Nederkoorn (2014) demonstrated that focusing on body functionality leads to improvements in body satisfaction (specifically, satisfaction with body functionality) in undergraduate men and 30 to 50-year-old women.

Focusing on the functionality of the body may foster body satisfaction because it encourages individuals to positively "reframe" (e.g., Lambert, Graham, Fincham, & Stillman, 2009) the way that they think about their body. Whereas an appearance-based focus on the body often entails focusing on perceived imperfections (i.e., a negative orientation), which may cause individuals to feel less satisfied with their body, a functionality-based focus on the body entails focusing on what the body can do (i.e., a positive orientation), which may instead generate positive feelings toward the body (Alleva, et al., 2014; Franzoi, 1995; Fredrickson & Roberts, 1997; Tylka & Wood-Barcalow, 2015). Further, common conceptions of appearance are often limited to few attributes (e.g., weight, measurements), whereas body functionality encompasses a diverse range of attributes from which people can derive satisfaction. In addition, in contrast to appearance, there is no overarching cultural ideal for body functionality, so focusing on body functionality might be less likely to evoke body-related social comparisons that can cause body dissatisfaction (Martin & Lichtenberger, 2002; Myers & Crowther, 2007).

Body functionality and body appreciation. Focusing on body functionality has also been related to *body appreciation*, which is an "unconditional approval and respect for the body" (Avalos & Tylka, 2006; p. 486). For instance, Avalos and Tylka (2006) demonstrated that a functionality-based focus on the body is related to greater body appreciation in samples of undergraduate women. Similarly, interviews with women who score high on measures of body satisfaction demonstrated that body appreciation was consistently linked with valuing body functionality (e.g., "A big thing with my body is that it allows me to do physical activity like hiking and biking;" Wood-Barcalow et al., 2010, p. 114). In addition, engaging in physical activity that emphasis-

es the functionality of the body has been related to higher levels of body appreciation (Langdon & Petracca, 2010; Swami & Tovée, 2009). Focusing on body functionality may encourage individuals to realise how their body facilitates (e.g., via physical movement), sustains (e.g., via digestion), and gives (e.g., via communicating with others) regarding various aspects of their life, which should foster feelings of appreciation for the body.

Body functionality and self-objectification. Objectification theory (Fredrickson & Roberts, 1997) proposes that women in Western societies are routinely sexually objectified; they are evaluated and valued predominantly based on their physical appearance, rather than on their body functionality and internal qualities (e.g., personality). In other words, women are seen as mere bodies, rather than as human beings (e.g., Haslam, Loughnan, & Holland, 2013; Heflick, Goldenberg, Cooper, & Puvia, 2011; Loughnan & Haslam, 2007; Vaes, Paladino, & Puvia, 2011). Experiences of sexual objectification routinely occur in interpersonal encounters (e.g., via the sexualised male gaze) and mass media (e.g., where women are portrayed with an emphasis on their body or body parts, rather than on their face; Archer, Iritani, Kimes, & Borrios, 1983; Fredrickson & Roberts, 1997; Halliwell, Malson, & Tischner, 2011). According to objectification theory, living in a cultural milieu of sexual objectification can socialise women to engage in *self-objectification*, meaning that they evaluate and value their *own* body based on appearance, from a third-person "observer perspective" instead of from a first-person perspective (Fredrickson & Roberts, 1997; Huebner & Fredrickson, 1999). Self-objectification, in turn, can lead to serious consequences such as negative body image, anxiety, depression, sexual dysfunction, and disordered eating (see Moradi & Huang, 2008, for a review).

Focusing on body functionality has been related to lower levels of self-objectification. For example, exercising for functionality-related reasons is associated with lower levels of self-objectification (e.g., Prichard & Tiggemann, 2008; Strelan, Mehaffey, & Tiggemann, 2003), as is engaging in physical activity that emphasises body functionality (Daubenmier, 2005; Impett, Daubenmier, & Hirschman, 2006; Prichard & Tiggemann, 2008; Tiggemann, Coutts, & Clark, 2014). Conversely, the more that women engage in self-objectification, the more they 'disconnect' from, and hold negative attitudes toward, their body functionality (e.g., by concealing signs of their menstruation or decreased awareness of internal bodily signals; Fredrickson & Roberts, 1997; Moradi & Huang, 2008; Roberts, 2000; Roberts & Waters, 2004). Theoretically, a focus on body functionality is "antithetical" to self-objectification, which entails emphasising appearance over body functionality (Roberts & Waters, 2004; Webb et al., 2015). Focusing on body functionality may therefore decrease self-objectification because it encourages women to think of their body as active, dynamic, and instrumental, and consequently discourages them from thinking of their body as passive, static, and aesthetic (Abbott & Barber, 2010; Fredrickson & Roberts, 1997; Moradi & Huang, 2008; Tiggemann, 2001; Tylka & Augustus-Horvath, 2011).

The Current Study

The aim of the current study is to investigate whether a programme designed to teach women to focus on the functionality of their body can increase levels of body satisfaction and body appreciation, and reduce levels of self-objectification. To do so, we created the *Expand Your Horizon* programme, which trains women to focus on the functionality of their body using three structured writing assignments (see Appendix). Although a handful of body image interventions include aspects related to body functionality, such as encouraging participants to engage in nonappearance-related experiences that induce a feeling of mastery or pleasure (e.g., Cash, 2008; Fisher & Thompson, 1994; McLean, Paxton, & Wertheim, 2011), these aspects are small parts of broader intervention programmes. *Expand Your Horizon* is unique in the extent of its focus on body functionality, and thus provides insight into the specific (causal) effects of focusing on body functionality on changes in women's body image.

   We administered the *Expand Your Horizon* programme to a sample of 18 to 30-year-old women with a negative body image, and employed a randomised controlled design with an active control group and pretest, posttest, and one-week follow-up measurements. Based on the foregoing discussion of the relation between focusing on body functionality and higher levels of body satisfaction (e.g., Wood-Barcalow et al., 2010) and body appreciation (e.g., Avalos & Tylka, 2006), and lower levels of self-objectification (e.g., Roberts & Waters, 2004), we hypothesised that participants who receive the *Expand Your Horizon* programme will experience: (1) improvements in body satisfaction, (2) an increase in body appreciation, and (3) a decrease in self-objectification, at both posttest and follow-up, compared to participants who receive the control programme.

Method

Participants

Women had to be between 18 and 30 years and have a sum score of ≥ 90 on the Body Shape Questionnaire (BSQ; Cooper, Taylor, Cooper, & Fairburn, 1987) to be included in the study (cf. McLean et al., 2011). A total of 167 women expressed interest in the study, of which 145 filled in the BSQ. Eighty-seven women were eligible but six no longer responded to our e-mails. Therefore, 81 women participated in the study; 41 were randomised to the functionality group (i.e., the *Expand Your Horizon* programme) and 40 were randomised to the control group. Participants were between 18 and 30 years (M = 22.77, SD = 3.19) with a body mass index (BMI; BMI = weight in kilograms / height in metres squared) between 18.56 and 37.09 (M = 23.26, SD = 2.94). Note that BMI could not be calculated for 14 participants because they did not

provide information about their height and/or weight (height and weight were self-reported). Participants' BSQ scores ranged between 90 and 160 (*M* = 117.65, *SD* = 19.69). Most participants identified as heterosexual (*n* = 74); two participants identified as lesbian, two identified as bisexual, and three did not provide information about their sexual orientation. The majority of participants (*n* = 55) were university students.

Measures

Screening measure. As aforementioned, the BSQ (Cooper et al., 1987) was used to assess women's eligibility to participate in the study. The BSQ contains 34 items (e.g., "Have you felt so bad about your shape that you have cried?"), rated on a 6-point scale (1 = *never* to 6 = *always*), that assess individuals' concerns about their body shape. Scores on the items of the BSQ are summed, with higher scores reflecting higher levels of body concern. The BSQ was chosen as a screening measure because it measures *trait* levels of body concern, is relatively quick and easy to complete, and has demonstrated good internal consistency and construct validity (Cooper et al., 1987; McLean et al., 2011).

Body satisfaction. Body satisfaction was measured using items from two questionnaires: Items from the Multidimensional Body-Self Relations Questionnaire- Appearance Subscales (MBSRQ-AS; Brown, Cash, & Mikulka, 1990; Cash, 2000) were used to measure satisfaction with physical appearance, and items from the Body Esteem Scale (BES; Franzoi & Shields, 1984) were used to measure satisfaction with body functionality.

The MBSRQ-AS consists of 34 items and comprises five subscales: Appearance Evaluation, Appearance Orientation, Body Areas Satisfaction, Overweight Preoccupation, and Self-Classified Weight. For the purpose of this study, only items of the Appearance Evaluation Subscale (seven items; e.g., "I like my looks just the way they are") and the Body Areas Satisfaction Subscale (nine items; e.g., satisfaction with weight) were administered (cf. Cash, 2000). The Appearance Evaluation Subscale is rated from 1 = *definitely disagree* to 5 = *definitely agree*, and the Body Areas Satisfaction Subscale is rated from 1 = *very dissatisfied* to 5 = *very satisfied*. We averaged scores on the items of these two subscales to create an index of appearance satisfaction; higher scores indicate greater appearance satisfaction. In women, the Appearance Evaluation Subscale and the Body Areas Satisfaction Subscale demonstrated good internal consistency and one month test-retest reliability (Cash, 2000). In our sample, the internal consistency of the items of these two subscales (combined) at pretest, posttest, and follow-up was, respectively, α = .83, .89, and .91.

The BES measures satisfaction with 35 body attributes that are rated on a 5-point scale (1 = *strongly dislike* to 5 = *strongly like*), and consists of three subscales for women: Sexual Attractiveness, Weight Concern, and Physical Condition. For the purpose of this study, only the Physical Condition Subscale (nine items) was administered. Scores

on the items of this subscale (e.g., health, energy level) were averaged, with higher scores reflecting greater functionality satisfaction. The BES evidenced adequate internal consistency and construct validity in female undergraduates (Franzoi & Herzog, 1986; Franzoi & Shields, 1984). In this study, the internal consistency of the Physical Condition Subscale at pretest, posttest, and follow-up was, respectively, α = .83, .88, and .90.

Body appreciation. The Body Appreciation Scale (BAS; Avalos, Tylka, & Wood-Barcalow, 2005) was used to measure body appreciation. The BAS consists of 13 items (e.g., "I respect my body") that are rated on a 5-point scale (1 = *never* to 5 = *always*). Scores on the 13 items were averaged; higher scores indicate greater body appreciation. In female undergraduates, the BAS demonstrated good internal consistency, three week test-retest reliability, and construct validity (Avalos et al., 2005). In our sample, the internal consistency of the BAS at pretest, posttest, and follow-up was, respectively, α = .86, .90, and .91.

Self-objectification. The Self-Objectification Questionnaire (SOQ; Noll & Fredrickson, 1998) and the Objectified Body Consciousness Scale (OBC; McKinley & Hyde, 1996) were used to measure self-objectification. The SOQ instructs participants to rank 10 body attributes according to how important they are to their physical self-concept, ranging from *least important* to *most important*. Five of the attributes are related to appearance (e.g., weight) and five are related to functionality (e.g., health). In scoring the SOQ, participants' most important attribute is given a score of 9, the second-most important attribute is given a score of 8, the third-most important attribute is given a score of 7, and so on (with the lowest-ranked attribute given a score of 0). Then, the sum of the scores for the functionality-related attributes is subtracted from the sum of the scores for the appearance-related attributes. Final SOQ scores range from -25 to 25, with higher scores reflecting higher levels of self-objectification. The SOQ demonstrated satisfactory construct validity in female undergraduates (Noll & Fredrickson, 1998).

The OBC consists of 24 items that are measured on an 8-point scale (1 = *strongly disagree* to 7 = *strongly agree*, with a "does not apply" response option) and comprises three subscales: Body Surveillance, Body Shame, and Control Beliefs. For the purpose of this study, only the Body Surveillance Subscale (eight items) was used. Scores on the items of this subscale (e.g., "During the day, I think about how I look many times") were averaged, with higher scores reflecting a stronger tendency to think of the body in terms of appearance. In female undergraduates, the OBC evidenced good internal consistency and construct validity (McKinley & Hyde, 1996). In our sample, the internal consistency of the Body Surveillance Subscale at pretest, posttest, and follow-up was, respectively, α = .72, .82, and .81.

Procedure

Participants were recruited using advertisements on university and college campuses, at supermarkets, gyms, and libraries, and two participant recruitment websites (i.e., websites that individuals can use to search for studies that they can participate in), for a study about "body image improvement programmes." When women expressed interest in the study, they filled in an electronic version of the BSQ and were invited to participate if they met the cut-off score. Note that participants were aware that the study comprised two programmes and that they would be randomised to one of the two. However, participants were not given information about the content of the programme until they were randomised to either the functionality or control group (using Graph Pad Software, 2012). The entire study took place online using Qualtrics Research Suite (Qualtrics, 2013), via which participants could electronically fill in the measures as well as type and submit their writing assignment responses. First, participants signed an electronic informed consent sheet and then completed the pretest measures and first writing assignment. Two days later, participants completed the second writing assignment. Two days afterward, they completed the third writing assignment and then they immediately completed the posttest measures. One week later, participants completed the follow-up measures. All measures were administered at all three time points. Participants received reminder e-mails 24 hours before each test day and if they did not complete the measures and writing assignments on time. Note that Qualtrics Research Suite affords researchers direct insight into the completeness and content of participants' writing assignment responses and questionnaire data. In addition, for each writing assignment participants reported the time that they started writing and the time that they finished writing. At the end of the study, participants were debriefed and received a 10 Euro voucher. Ethical approval was obtained by the ethics committee of Maastricht University.

The Programmes

The *Expand Your Horizon* programme consists of three structured writing assignments. At the start of the programme, participants are given a brief introduction to body functionality – including a list of examples of body functions – and why it is important. Each of the three writing assignments focuses on two different areas of body functionality: The first focuses on the body's senses and physical capacities, the second focuses on health and creative endeavours, and the third focuses on self-care and communication with others. Participants may refer back to the list of body functions throughout the programme. For each writing assignment, participants describe the functions that their body performs (regarding the respective areas of body functionality) and why they are personally important and meaningful to them. The guidelines are that participants should: (1) try to write for at least 15 minutes, (2) not stop writing once started, and

(3) reread what they have written once finished writing (note that they are not given instruction to edit their response). Participants are reminded not to worry about spelling or grammar, and that their response will be unique because everyone's body is different (see Appendix for more details of the *Expand Your Horizon* programme).

The active control programme was a "creativity training programme." The first writing assignment provided an introduction to the concept of creativity and why it is important to develop creative skills (e.g., for fostering overall well-being). Participants were told that the programme would help them to improve their creative skills by working on a series of fictional short stories. The first writing assignment instructed participants to select a main character (not themselves), setting, and plot for their story, and to write using as much detail as possible. In the second and third writing assignments, participants were instructed to choose a different main character, setting, and plot than they did in the previous writing assignment(s). The three guidelines for the *Expand Your Horizon* programme (mentioned above) were also used for this active control programme.

Statistical Analyses

The data were analysed in a series of 2 (Group: functionality vs. control) x 2 (Time: posttest vs. follow-up) mixed repeated measures ANCOVAs, with grand-mean centred pretest scores on the respective outcome as covariate (that is, for each outcome, the sample mean was subtracted from each individual's score on that outcome). This method of analysis (i.e., using grand-mean centred pretest scores as covariate) is superior to analysing the data with pretest as a repeated measure because it increases the power and reduces the risk of Type I errors arising from multiple testing (van Breukelen, 2013; see van Breukelen & van Dijk, 2007, for details about this method of analysis).

As a *first step* for each analysis, we checked the presence of Group x Time x Pretest and Group x Pretest interactions. These interactions were not significant for any of the outcomes and were therefore excluded from the statistical models. The analyses were then rerun in a *second step* with only the Group x Time and Time x Pretest interactions, as well as the main effects of Group, Time, and Pretest. Additionally, each of these analyses was rerun with BMI as a covariate; however, adding BMI as a covariate did not affect the results, and there were no Group x BMI interactions. The reported results are therefore based on the statistical models without BMI.

For the primary outcome (body satisfaction: appearance and functionality satisfaction) an alpha of .05 was chosen; to control for multiple testing, a stricter alpha of .01 was chosen for the secondary outcomes (body appreciation and self-objectification; Howell, 2009). To control for attrition bias, we conducted intention-to-treat analyses where missing data were imputed using participants' corresponding data at the previous time point. Outliers were defined as values that were more than 3 *SD* above or below the group mean; these values were replaced with the boundary values identified

(i.e., the group mean plus or minus 3 *SD*). We calculated partial eta-squared as effect sizes for each main effect and interaction effect, where η_p^2 = 0.01, 0.06, and 0.14 constitute small, medium, and large effect sizes, respectively. It can be shown that for the Group main effect of interest these values correspond to values of Cohen's *d* effect size equal to 0.20, 0.50 and 0.80, respectively (Cohen, 1988). Partial eta-squared was chosen instead of Cohen's *d* because the latter is defined only for a between-subject effect, not for within-subject effects or interaction effects.

Results

Missing Data, Outliers, and Pretest Scores

Three participants ($N_\text{functionality}$ = 2) dropped out after pretest, and one participant in the functionality group dropped out halfway through the online follow-up measurement. The resulting missing values were imputed as aforementioned to include all participants in the analyses. Two outliers were identified and replaced: One outlier was in the functionality group and concerned pretest data for functionality satisfaction; the second was in the control group and concerned posttest data for self-objectification (OBC Body Surveillance Subscale). Table 1 presents pretest, posttest, and follow-up scores on all outcomes for the functionality and control groups. As expected given the randomisation of participants to condition, there was no significant group difference on any outcome at pretest: appearance satisfaction, $F(1, 79)$ = 2.43, p = .12, η_p^2 = 0.03; functionality satisfaction, $F(1, 79)$ = 0.670, p = .42, η_p^2 = 0.01; body appreciation, $F(1, 79)$ = 3.01, p = .09, η_p^2 = 0.04; self-objectification (SOQ), $F(1, 75)$ = 0.06, p = .81, η_p^2 = 0.001; and self-objectification (OBC Body Surveillance Subscale), $F(1, 79)$ = 1.07, p = .30, η_p^2 = 0.01.

Adherence to Programme Instructions

The content of participants' writing assignment responses was checked and the self-reported time spent on each writing assignment was calculated. The content of all participants' writing assignment responses was in line with the instructions of their respective programme. For all three writing assignments there was no group difference in the amount of self-reported time spent writing, all ps > .05.

Table 1 Pretest, Posttest, and Follow-up Scores for the Functionality and Control Groups

	Functionality Group	Control Group
	M (SD)	M (SD)
Appearance satisfaction		
Pretest	2.70 (0.47)	2.52 (0.52)
Posttest	2.92 (0.55)	2.61 (0.58)
Follow-up	3.02 (0.57)	2.68 (0.63)
Functionality satisfaction		
Pretest	3.33 (0.62)	3.20 (0.76)
Posttest	3.50 (0.60)	3.11 (0.66)
Follow-up	3.54 (0.64)	3.24 (0.72)
Body appreciation		
Pretest	3.05 (0.53)	2.83 (0.56)
Posttest	3.28 (0.57)	2.88 (0.61)
Follow-up	3.33 (0.63)	2.93 (0.65)
Self-objectification (SOQ)		
Pretest	4.89 (13.85)	5.89 (10.22)
Posttest	-2.09 (15.50)	5.81 (10.44)
Follow-up	0.03 (14.06)	4.44 (9.32)
Self-objectification (OBC-BS)		
Pretest	5.28 (0.81)	5.45 (0.68)
Posttest	5.03 (0.88)	5.26 (0.92)
Follow-up	5.05 (0.89)	5.28 (0.78)

Note. SOQ = Self-Objectification Questionnaire (note that scores range from -25 to 25); OBC-BS = Objectified Body Consciousness: Body Surveillance Subscale.

Body Satisfaction

With regard to appearance satisfaction, the analyses revealed a significant main effect of Group, $F(1, 78) = 4.44$, $p = .038$, $\eta_p^2 = 0.05$, indicating that, overall, participants in the functionality group felt more satisfied with their appearance than participants in the control group. The difference in appearance satisfaction between groups was the same at posttest as at follow-up, as demonstrated by the nonsignificant Group x Time interaction, $F(1, 78) = 0.26$, $p = .61$, $\eta_p^2 = 0.003$. That is, at both posttest and follow-up, participants in the functionality group were more satisfied with their appearance than participants in the control group. There was also a significant main effect of Time, $F(1, 78) = 7.66$, $p = .007$, $\eta_p^2 = 0.09$, indicating that, overall, participants in both groups felt more satisfied with their appearance at follow-up than at posttest. This effect neither depended on participants' pretest scores, as demonstrated by the nonsignificant Time x Pretest interaction, $F(1, 78) = 0.04$, $p = .838$, $\eta_p^2 = 0.001$, nor on their Group, as demonstrated by the nonsignificant Time x Group interaction.

With regard to functionality satisfaction, the results showed a significant main effect of Group, $F(1, 78) = 9.48$, $p = .003$, $\eta_p^2 = 0.11$, indicating that, overall, participants in the functionality group felt more satisfied with their body functionality than participants in the control group. Again, this difference was the same at both posttest and follow-up, as demonstrated by the nonsignificant Group x Time interaction, $F(1, 78) = 0.07$, $p = .283$, $\eta_p^2 = 0.02$. The results also showed a significant main effect of Time, $F(1, 78) = 4.82$, $p = .031$, $\eta_p^2 = 0.06$, indicating that, overall, participants in both groups felt more satisfied with their body functionality at follow-up than at posttest. This effect did not depend on participants' pretest scores, as demonstrated by the nonsignificant Time x Pretest interaction, $F(1, 78) = 0.001$, $p = .977$, $\eta_p^2 < 0.001$, or on their Group, as demonstrated by the nonsignificant Time x Group interaction.

Body Appreciation

The results showed that participants in the functionality group experienced greater body appreciation than participants in the control group, Group, $F(1, 78) = 6.46$, $p = .013$, $\eta_p^2 = 0.08$, although this effect was only marginally significant at $p < .01$. As in the former analyses, the group difference was the same at both time points, Group x Time, $F(1, 78) = 0.004$, $p = .950$, $\eta_p^2 < 0.001$. The main effect of Time, $F(1, 78) = 2.33$, $p = .131$, $\eta_p^2 = 0.03$, was nonsignificant, showing that, overall, there were no changes in body appreciation from posttest to follow-up. The Time x Pretest interaction, $F(1, 78) = 0.23$, $p = .634$, $\eta_p^2 = 0.003$, was also nonsignificant.

Self-Objectification

SOQ. These analyses were conducted with 62 participants ($N_{functionality} = 35$) because data were excluded from participants who did not fill in the SOQ correctly at one or more time points (cf. Noll & Fredrickson, 1998). The main effect of Group, $F(1, 59) = 7.22$, $p = .009$, $\eta_p^2 = 0.11$, was significant, showing that, overall, participants in the functionality group experienced lower levels of self-objectification than participants in the control group. At both posttest and follow-up, participants in the functionality group experienced lower levels of self-objectification than participants in the control group, Group x Time, $F(1, 59) = 3.19$, $p = .079$, $\eta_p^2 = 0.05$. The main effect of Time, $F(1, 59) = 0.14$, $p = .711$, $\eta_p^2 = 0.002$, was nonsignificant, demonstrating that, overall, there were no changes in self-objectification from posttest to follow-up. The Time x Pretest interaction, $F(1, 59) = 0.14$, $p = .714$, $\eta_p^2 = 0.002$, was also nonsignificant.

Given the large amount of missing data for this outcome, we mimicked these analyses using mixed regression to check if the results could be replicated when all participants with at least posttest or follow-up data for the SOQ ($N = 77$) could be included in the analyses (which is possible with mixed regression but not with ANOVA; see van

Breukelen, 2013, for details). These results confirmed those of the original analyses. Further, given the absence of both a main effect of Time and a Group x Time effect, a reasonable alternative method was to solve the problem of missing data by calculating, per participant, the average of posttest and follow-up data. This allowed us to conduct an ANCOVA analysis with N = 77, where Group was entered as a predictor variable and Pretest was entered as a covariate. This analysis also confirmed the original analyses, demonstrating that participants in the functionality group experienced lower levels of self-objectification than participants in the control group, $F(1, 74)$ = 7.95, p = .006.

OBC (Body Surveillance Subscale). The main effect of Group, $F(1, 77)$ = 0.45, p = .503, η_p^2 = 0.01, was nonsignificant. The main effect of Time, $F(1, 77)$ = 0.25, p = .622, η_p^2 = 0.002, as well as the interaction effects of Group x Time, $F(1, 77)$ = 0.07, p = .787, η_p^2 = 0.001, and Time x Pretest, $F(1, 77)$ = 2.58, p = .113, η_p^2 = 0.03, were also nonsignificant.

Discussion

This study evaluated the *Expand Your Horizon* programme: a novel programme designed to improve body image by training women to focus on the functionality of their body. Compared to participants in the control programme, participants who took part in the *Expand Your Horizon* programme experienced higher levels of appearance satisfaction and functionality satisfaction, and lower levels of self-objectification. In addition, they tended to feel greater appreciation for their body. These findings are in line with the prior literature that suggested that focusing on body functionality can have beneficial effects on women's body image.

First, the finding that the *Expand Your Horizon* programme led to increases in body satisfaction provides experimental support for the correlational and interview-based studies that demonstrated a relation between focusing on body functionality and higher levels of body satisfaction (e.g., Frisén & Holmqvist, 2010; Tiggemann & Williamson, 2000; Wood-Barcalow et al., 2010). Focusing on the functionality of the body may encourage individuals to positively reframe the way that they think about their body, thus shifting their orientation from negative (appearance-focused) to positive (functionality-focused; Alleva, et al., 2014; Franzoi, 1995; Fredrickson & Roberts, 1997; Tylka & Wood-Barcalow, 2015). In this sense, the *Expand Your Horizon* writing assignments may work in a similar fashion as fitness-based interventions (Martin & Lichtenberger, 2002), although it is possible that the present writing assignments make this shift more explicit and consequently encourage participants to shift their orientation with explicit cognitive effort. It must be mentioned, however, that focusing on body functionality may not necessarily entail a positive orientation for *every* individual. Some aspects of body functionality may be perceived less positively, for instance if

someone strives to become a professional athlete, suffers from chronic pain, or has a physical disability. These individual differences should be investigated in future research. Nevertheless, given the fact that body functionality encompasses several areas (i.e., it is not limited to physical capacities; Webb et al., 2015), each with several different aspects, dissatisfaction with one area or aspect may be less likely to 'spread' and affect an individual's overarching evaluation of his or her body functionality.

Second, the fact that the *Expand Your Horizon* programme led to improvements in body appreciation supports the prior studies that demonstrated a relation between a functionality-based focus on the body and greater levels of body appreciation (e.g., Avalos & Tylka, 2006; Langdon & Petracca, 2010; Swami & Tovée, 2009). Focusing on body functionality may foster body appreciation because many areas (e.g., health) and aspects (e.g., absorbing vitamins) of body functionality are important – and often central – to leading a normal and fulfilling life; contemplating this fact should generate appreciation and gratitude for one's own body. This notion has also been expressed by participants in prior interview-based studies (e.g., "Just be glad that you do have a body that's healthy and working properly. Just be glad that you're able to do the things you are;" Wood-Barcalow et al., 2010, p. 114). In-depth content-based analyses of individuals' responses to the *Expand Your Horizon* writing assignments may provide additional insight into this relationship.

Lastly, the present findings show that focusing on body functionality leads to lower levels of self-objectification; this lends experimental support to the prior studies that demonstrated this relationship using correlational research (e.g., Daubenmier, 2005; Prichard & Tiggemann, 2008). It is also noteworthy that the *Expand Your Horizon* programme had a medium-sized effect on self-objectification (η_p^2 = 0.11). These findings are promising because they demonstrate that self-objectification – which many women habitually engage in (Fredrickson & Roberts, 1997) and which has been shown to have serious consequences for well-being (Moradi & Huang, 2008) – can be effectively counteracted, at least on the short term. Furthermore, sexual objectification of women is ubiquitous in Western culture, and will likely take time and extensive effort to change (Tylka & Augustus-Horvath, 2011). Therefore, it is also promising that this technique might provide women with an individual-level strategy to buffer these persistent societal-level influences. Future studies could investigate, experimentally, whether focusing on body functionality can prevent the negative effects of exposure to sexual objectification (e.g., media images of sexually objectified women).

It is important to note that the reductions found in self-objectification in this study were only found with regard to the SOQ – no changes in self-objectification were found with regard to the Body Surveillance Subscale of the OBC. Findings from the SOQ and OBC Body Surveillance Subscale have varied in previous research as well (Moradi & Huang, 2008). The divergence found in this study might be caused by the different aspects captured by each questionnaire. The SOQ asks individuals to rank functionality and appearance-based body attributes according to how important they

are for their physical self-concept. Thus, individuals make reflective, controlled decisions when filling in the SOQ. In contrast, many items of the Body Surveillance Subscale of the OBC capture thought tendencies that might occur automatically and without conscious control, such as the tendency to make social comparisons (Mussweiler, Rüter, & Epstude, 2004; e.g., "I rarely compare how I look with how other people look"). It could be that the *Expand Your Horizon* programme helped participants realise that appearance is less important than body functionality, but that this change did not yet translate to improvements in habitual thoughts about their body. Future research may elucidate these differences by including longer-term follow-up measurements.

Another important direction for future research will be to investigate the potential mechanisms and relationships that underlie the functionality-based approach to improving body image. For example, given that a functionality-based focus on the body is "antithetical" to self-objectification (Roberts & Waters, 2004; Webb et al., 2015), focusing on body functionality may directly reduce self-objectification, which in turn could lead to improvements in body satisfaction and body appreciation. In fact, Tiggemann, Coutts, and Clark (2014) have shown that engaging in belly dancing (a form of dance that emphasises body functionality; Tiggemann et al., 2014) is associated with greater body appreciation via reductions in self-objectification. Another possibility is that focusing on body functionality may directly increase body appreciation, which should foster positive feelings toward the body and decrease levels of self-objectification; this is because body appreciation entails an unconditional approval of the body – irrespective of perceived imperfections – and an emphasis on body functionality over appearance (Avalos & Tylka, 2006; Tylka, 2011; Wood-Barcalow et al., 2010).

More broadly, it is also possible that, for women with a negative body image, writing about the functionality of their body could highlight a discrepancy between their beliefs (e.g., that their body is inadequate) and behaviour (e.g., writing about the many capabilities of their body). According to cognitive dissonance theory (Festinger, 1957), this discrepancy should create psychological discomfort, or *cognitive dissonance*. Consequently, women with a negative body image might alter their cognitions in order to alleviate this cognitive dissonance, which could lead to improvements in body image (e.g., Halliwell & Diedrichs, 2014, Stice, Trost, & Chase, 2002). This same situation could also be explained from the perspective of self-perception theory (Bem, 1972): Women with a negative body image might infer their body-related attitudes based on their behaviour (e.g., "I was able to describe all of these positive aspects about my body, so perhaps I do not feel so bad about my body after all"). Future studies that investigate these and other potential relations and mechanisms will contribute to an improved understanding of body functionality and how to foster a healthy body image.

Strengths and Limitations

The main strengths of the current study are that it tests a novel approach to improving body image and focuses on body functionality, an understudied aspect of body image (Smolak & Cash, 2011). In addition, we tested a group of women with a negative body image, employed an active control group, and only four participants dropped out of the study. The *Expand Your Horizon* programme is also relatively inexpensive and easy to administer (via the Internet), and requires less than one hour of participants' time. Further, the *Expand Your Horizon* programme encourages women to focus on what their body is capable of, rather than on perceived imperfections or negative feelings and cognitions, and therefore contributes to a growing literature on positive body image (Halliwell, 2015; Tylka, 2011; Tylka & Wood-Barcalow, 2015; Webb et al., 2015).

This study also has its limitations, however. At pretest, we did not measure participants' expectations about the programme that they were randomised to. It could be that participants in the *Expand Your Horizon* programme expected greater improvements in body image than participants in the control programme, who may have been less convinced that a creativity training programme could affect their body image. In addition, as with all studies that investigate an intervention programme, it is possible that our findings resulted in part from demand characteristics. The inclusion of an active control group should have reduced the impact of demand characteristics on our results, but future research may benefit from an active control programme with a theme that is more closely related to body image. Also, although we were able to check participants' writing assignment responses (to ensure that they complied with the instructions of their respective programme), the amount of time participants spent on the writing assignments was self-reported, so participants might have misreported this information. Future research should implement methods to register this information objectively.

A further limitation of this study concerns the instrument that was used to measure satisfaction with body functionality, the Physical Condition Subscale of the BES. The Physical Condition Subscale only focuses on two areas of body functionality: physical capacities and health. To our knowledge, an instrument measuring satisfaction with body functionality in the broader sense (i.e., incorporating other areas of body functionality) does not yet exist (Webb et al., 2015). To progress research on body functionality, it is important to create and validate such a questionnaire. Further, it will be important to consider improvements to the *Expand Your Horizon* programme that may increase the magnitude of its effects on body image. One possibility is to administer 'booster' writing assignments after completion of the initial programme. Lastly, we tested 'high-risk' women between the age of 18 and 30, so it is an unanswered question whether the programme will have similar effects in 'low-risk' samples, different age groups, or in men. It is also unclear whether the effects of the *Expand Your Horizon*

programme are long-lasting, as we included a one-week follow-up. Future studies using longer-term follow-ups are necessary.

Conclusion

In sum, the current study provides support for a promising technique for improving body image and decreasing self-objectification – namely, training women to focus on the functionality of their body. This study also provides the first experimental evidence that focusing on body functionality can increase body satisfaction and body appreciation and reduce self-objectification in women with a negative body image. Future research should be directed at improving the *Expand Your Horizon* programme and investigating the mechanisms that underpin this approach. This study underlines the statements of other scholars (e.g., Smolak & Cash, 2011; Tylka & Wood-Barcalow, 2015) that body functionality is an important construct that merits further attention.

Appendix

Material for the *Expand Your Horizon* Programme

Information for Researchers and Practitioners

The *Expand Your Horizon* programme was designed to be delivered in an online format, whereby the Introduction and Writing Assignment #1 are delivered on the first day of the programme. Writing Assignment #2 and Writing Assignment #3 are each delivered on subsequent days of the programme. The list of body functions should be made available to individuals during each writing assignment.

We ask that individuals inform us if they would like to use and/or make changes to the *Expand Your Horizon* programme. In addition, when referencing the *Expand Your Horizon* programme, please use the reference provided below.

For more details about the programme, please contact us, or see:

Alleva, J.M., Martijn, C., van Breukelen, G. J. P., Jansen, A., & Karos, K. (2015). *Expand Your Horizon:* A programme that improves body image and reduces self-objectification by training women to focus on body functionality. *Body Image, 15,* 81-89.

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Be sure to omit this first page when administering the programme.

Expand Your Horizon

Writing Assignment Introduction

When we think about our body, we usually think about the ***appearance*** of our body (e.g., weight and shape). In addition, we may often be negative about the appearance of our body (e.g., "I'm not thin enough," or, "I wish I were more attractive"). Over the coming days, however, you are going to practice looking at your body in a different, more positive way. Instead of focusing on the appearance of your body, you are going to practice focusing on **all of the things that your body can do.** We call this aspect of the body *functionality*.

Before clicking on "next," take a few minutes now to contemplate the things that your body can do. What kinds of things come to mind?

_____
_____
_____

Below is a list of body functions that other women have come up with. Take a moment to read through them. Some of these functions may have already been on your mind, but you may not have thought of the other ones yet.

Body Functions Related to Senses and Sensations
Sight
Taste
Touch
Hearing
Smell
Experience pleasure
Feel emotion
Sex drive

Body Functions Related to Physical Activity and Movement
Running
Jumping
Walking
Stretching
Flexibility
Physical coordination
Agility
Balance
Strength
Stamina
Energy level
Reflexes
Sports (e.g., soccer, swimming, Zumba)
Yoga
Climbing
Cycling

Body Functions Related to Health
Healing from a cold
Digesting food
Absorbing vitamins
Creating a baby
Healing from a wound
Growing (hair, nails, new skin cells, etc.)
Regulating temperature, hunger, thirst, etc.
General restoration (e.g., during sleep)

Removing toxins from the body (e.g., through the liver)
Breathing

Body Functions Related to Creative Endeavours
Dancing
Painting
Drawing
Building
Sculpting
Carving
Writing
Singing
Playing an instrument
Reading
Photography
Gardening

Body Functions Related to Self-Care and Daily Routines
Sleeping/napping
Eating
Drinking
Cooking
Caring for the body (e.g., by showering or taking a bath)

Body Functions Related to Relationships with Others and Communication
Talking
Body language
Facial expressions (e.g., smiling)
Sexual activities
Hugging
Cuddling
Kissing
Crying
Shaking hands
Making eye contact
Being a shoulder to cry on
Giving (or receiving) a massage
Writing a letter

Now, take a moment to contemplate the **importance** of some of these body functions to your life. **What do these functions mean to you?** For example, where would you be if you couldn't walk or bike to work every day? Or, how dull would life be if you couldn't taste food, or listen to music? To take another example, where would you be if you couldn't communicate to others using your body (e.g., to give hugs, hold hands)? Or, what if you couldn't use your body for creative expression (e.g., for painting, dancing)? Body functions can be simple (e.g., running), or complex (e.g., healing from a flu), but all of them are important for us to lead a normal and fulfilling life.

At first, it is very difficult for many women to think of the different things that their body can do, because they are so used to thinking of their body in terms of appearance. You may also find it challenging to think about your body in terms of functionality. But, with practice, it will become easier and more natural to you. Completing our writing tasks over the coming days will help you to accomplish this.

If at any time during the study you have questions or need help regarding the writing assignment, please send me an e-mail at [insert researcher's e-mail address here].

Now, let's get started with your first writing assignment.

Writing Assignment #1

At the start, I asked you to think of some of the things that your body can do. Now, in this writing assignment, I would like you to **describe in more detail what your body can do.**

In your writing, I would like you to take your time, really let go and explore the many different things that your body can *do.* Specifically, in this first writing assignment you will focus <u>only</u> on body functions that are related to (1) **the body's senses and sensations** (e.g., seeing, feeling pleasure) and (2) **physical activity and movement** (e.g., going for a walk, dancing). You will focus on the other types of body functions in your second and third writing assignments. If you need inspiration, you can always refer back to the list of body functions (see attachment).

When you are writing about your body's functions, it is important that you **reflect on what these functions mean to you**. Ask yourself, "Why are these functions important to me?" Remember that, even though we don't often stop to contemplate the functionality of our body, each simple and complex function plays an important role in our lives.

There are only 3 rules for this writing assignment:
(1) Write for at least 15 minutes (you can write for longer, if you like);
(2) Once you have started writing, do not stop until at least 15 minutes have passed;
(3) After you have finished the writing assignment, please reread what you have written.

Your writing will be completely confidential and anonymous. Don't worry about spelling, sentence structure, or grammar. Lastly, different bodies can do different things, so everyone's writing will be different. Therefore, there are no right or wrong answers. Your writing will be unique depending on **your own body**.

Now, go ahead and get started!

Please record the starting time of this writing assignment: _____
Please record the end time of this writing assignment: _____

Writing Assignment #2

A few days ago, you completed your first writing assignment, wherein you described the functionality of your body and why it is important to you. Specifically, you focused on body functions that are related the body's senses and sensations, and physical activity and movement.

Today, in your second writing assignment, you will focus <u>only</u> on body functions that are related to (1) **health** (e.g., healing, digesting) and (2) **creative endeavours** (e.g., drawing, writing). Please take your time, really let go, and explore the functions that are related to these areas of body functionality. If you need inspiration, you can always refer back to the list of body functions (see attachment).

As in your first writing assignment, it is important that you **reflect on what these different functions mean to you.** Ask yourself, "Why are these functions important to me?" Each simple and complex body function plays an important role in our lives.

These are the rules for this writing assignment:
(1) Write for at least 15 minutes (you can write for longer, if you like);
(2) Once you have started writing, do not stop until at least 15 minutes have passed;
(3) After you have finished the writing assignment, please reread what you have written.

Remember that your writing will be completely confidential and anonymous, and that you do not need to worry about spelling, sentence structure, or grammar. Lastly, your writing will be unique depending on **your own body** – There are no right or wrong answers.

Now, go ahead and get started!

Please record the starting time of this writing assignment: _____
Please record the end time of this writing assignment: _____

Writing Assignment #3

Over the past few days, you have completed two writing assignments about the functionality of your body and why it is important to you. In these writing assignments, you focused on body functions that are related to (1) the body's senses and sensations, (2) physical activity and movement, (3) health, and (4) creative endeavours.

Today, in your final writing assignment, you will focus only on body functions that are related to (1) **self-care and daily routines** (e.g., eating, sleeping) and (2) **communication and your body's relationship with other people** (e.g., hugging, holding hands). Once again, I would like you to take your time, really let go, and explore the body functions that are related to these areas of body functionality. As always, you may refer back to the list of body functions if you need inspiration (see attachment).

When you are writing about your body's functions, remember to **reflect on what these functions mean to you,** and to ask yourself "Why are these functions important to me?" Each simple and complex function plays an important role in our lives.

These are the rules for the writing assignment:
(1) Write for at least 15 minutes (you can write for longer, if you like);
(2) Once you have started writing, do not stop until at least 15 minutes have passed;
(3) After you have finished the writing assignment, please reread what you have written.

Remember that your writing will be completely confidential and anonymous, and that you do not need to worry about spelling, sentence structure, or grammar. **Your body is unique**, so your writing will be unique, too. There are no right or wrong answers.

Now, go ahead and get started!

Please record the starting time of this writing assignment: _____
Please record the end time of this writing assignment: _____

PART 3

How Can We Improve the Way That Individuals Relate to Their Own Body With Regard to the Social Environment?

CHAPTER 5

Seeing Ghosts
Negative Body Evaluation Predicts Overestimation of Negative Social Feedback

Abstract

Objectives: The current study investigated whether negative body evaluation predicts women's overestimation of negative social feedback related to their own body (i.e., *covariation bias*). **Methods:** Sixty-five female university students completed a computer task where photos of their own body, of a control woman's body, and of a neutral object, were followed by nonverbal social feedback (i.e., facial crowds with equal numbers of negative, positive, and neutral faces). Afterward, women estimated the percentage of negative, positive, and neutral social feedback that followed their own body, the control woman's body, and the neutral object. **Results and Conclusions:** The findings provided evidence for a covariation bias: Negative body evaluation predicted higher estimates of negative social feedback for women's own body, but not for the other stimuli. Additionally, the covariation bias was not explained by differences in how women interpreted the social feedback (the facial stimuli). Clinical implications of the covariation bias to body image are discussed.

Introduction

Cognitive-behavioural perspectives on body image propose that body evaluation (i.e., satisfaction or dissatisfaction with one's body) has a profound influence on cognitive processing, and vice versa (see Cash, 2011, for a review). For example, individuals with negative body evaluation may demonstrate various distortions in cognitive processing, such as dichotomous thinking (e.g., "If I'm not a size 0 then I must be fat!"), biased social comparisons (e.g., with media models), and magnification/minimisation (e.g., of perceived flaws in appearance; Cash, 2011; Jakatdar, Cash, & Engle, 2006). In turn, distortions in cognitive processing may serve to reinforce and maintain negative body evaluation (Williamson, White, York-Crowe, & Stewart, 2004).

Likewise, cognitive-behavioural perspectives propose that interpersonal experiences play a crucial role in shaping body evaluation (Cash, 2011). Social feedback ranging from implicit body language and gaze, to explicit comments and teasing, has the power to make individuals feel dissatisfied with their body (for details, see Carlson Jones, 2011; Cash & Fleming, 2002a; Fredrickson & Roberts, 1997; Tantleff-Dunn & Lindner, 2011). In addition, negative body evaluation may also cause individuals to behave in ways that actually elicit negative social feedback from others (e.g., by avoiding eye contact, by not approaching others), thereby creating a self-fulfilling prophecy that confirms their beliefs (e.g., "I really am fat and unapproachable!") and maintains negative body evaluation (Cash & Fleming, 2002a; Tantleff-Dunn & Lindner, 2011).

In the present study, we sought to integrate the domains of cognitive processing and interpersonal experiences with regard to body evaluation. In particular, we investigated the role of negative body evaluation on covariation bias with regard to interpersonal experiences, which has not been investigated before.

Covariation bias is a distortion in cognitive processing whereby an individual overestimates the contingency between a certain stimulus and an aversive outcome, even when in reality the contingency is absent or is correlated in the opposite direction (Chapman & Chapman, 1967). In the field of psychopathology, covariation bias has most often been studied with regard to anxiety. For example, experimental studies have shown that individuals with spider phobia overestimate the association between images of spiders and an electric shock (e.g., De Jong, Merckelbach, Arntz, & Nijman, 1992; Tomarken, Cook, & Mineka, 1989; Tomarken, Sutton, & Mineka, 1995). Furthermore, there is also evidence to suggest that individuals with social anxiety disorder overestimate the relation between social stimuli (e.g., ambiguous social situations) and aversive outcomes (e.g., negative social feedback; Hermann, Ofer, & Flor, 2004). Regardless of the context in which it is studied, covariation bias may have a direct and powerful influence on confirming danger expectations, enhancing fear, and maintaining psychological distress (De Jong, van den Hout, & Merckelbach, 1995; Hirsh & Clark, 2004).

We proposed that a covariation bias may also play a role in individuals with a negative body evaluation. Similar to covariation bias in individuals with social anxiety disorder, it could be that individuals with a negative body evaluation overestimate the relation between their own body (the stimulus) and negative social feedback (the aversive outcome). Consequently, this covariation bias may confirm negative expectations (e.g., "Everyone really does think that I am unattractive!") and maintain psychological distress (i.e., negative body evaluation; Bentz, Williamson, & Smith, 1998; Williamson et al., 2004). Further, this covariation bias could be an additional distortion in cognitive processing that affects body evaluation, one that may influence how individuals perceive their interpersonal experiences and thus how individuals feel about their body.

In the present study, women completed a computer task wherein photos of their own body, of a control woman's body, and of a neutral object, were followed by non-verbal social feedback (i.e., facial crowds with equal numbers of negative, positive, and neutral faces). Images of faces are commonly used to simulate social feedback in research about social anxiety (Hirsch & Clark, 2004) and have been shown to produce corresponding physiological responses in participants (e.g., photos of angry faces increase skin conductance responses; Dimberg, 1997; Merckelbach, van Hout, van den Hout, & Mersch, 1989). After the computer task, women estimated the total percentage of negative, positive, and neutral social feedback that they thought followed their own body, the control woman's body, and the neutral object. This type of estimate, in which participants estimate the frequency that a stimulus (e.g., their body) is followed by a particular outcome (e.g., angry faces), is commonly used to investigate covariation bias (Hermann et al., 2004; Hirsch & Clark, 2004; Tomarken et al., 1995).

Reflecting the proposed covariation bias, we hypothesised that women with a more negative body evaluation would estimate a higher level of negative social feedback for their own body. We included the additional stimuli (photos of the control woman and of the neutral object) to control for the selectivity of the covariation bias. In addition, we recorded how positively or negatively women rated the social feedback stimuli to test whether body evaluation also predicted the interpretation of the stimuli.

Method

Participants

Participants were 65 women aged between 18 and 30 years (M = 21.17, SD = 2.60) with a self-reported body mass index (BMI) between 16.76 and 29.41 (M = 21.17, SD = 2.42).[4] The participants were students at a university in the south of the Netherlands,

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[4] Seventeen participants did not provide information about their height and/or weight, so their BMI could not be calculated.

where the student population is predominantly Caucasian. A power analysis using G*Power (Faul, Erdfelder, Lang, & Buchner, 2007) showed that the power achieved by this sample size was .73.

Materials

Computer task. Participants received the following information on the computer screen: (a) in one of four quadrants they would see a photo of themselves, a photo of another woman, or a photo of an object; (b) as soon as they saw the photo, they should click on it as quickly as possible; (c) after they clicked on the photo, a group of portrait photos would briefly appear; and (d) Steps (a) to (c) would be repeated until they reached the end of the computer task.

The photos for Step (a) were three full-body photos of the participant, three full-body photos of a control woman, and three photos of a neutral object. Each photo was presented 30 times, for a sum of 270 trials. The control woman was a female university student of average build, dressed in a black t-shirt and pants. A standing lamp was chosen as the neutral object because it roughly resembled a human shape.

The portrait photos for Step (c) were chosen from the NimStim Facial Stimuli Set (Tottenham et al., 2009) and consisted of sets of portrait photos of nine Caucasian men and nine Caucasian women, chosen based on the highest validity for the emotions portrayed. There were portrait photos signalling negative (angry, mouth closed), positive (happy, mouth closed), and neutral (mouth closed) social feedback for each man and woman (54 portrait photos total). The portrait photos were arranged in a 4 x 3 matrix, which was presented for 400ms per trial (Baccus, Baldwin, & Packer, 2004). The matrix for each trial was different because the portrait photos that composed the matrices were randomised per participant. However, for each matrix the following rules were met: (a) there was an equal proportion of negative, positive, and neutral social feedback; (b) 50% of the portrait photos were of female faces; and (c) portrait photos could only appear once in each matrix. So, each matrix consisted of 12 portrait photos that were of six different women (two angry, two happy, two neutral) and six different men (two angry, two happy, two neutral). Each portrait photo was presented an equal number of times across the computer task.

Estimates of social feedback. Participants estimated the amount of negative, positive, and neutral social feedback that they perceived during the computer task, with regard to: (a) their own body, (b) the control woman's body, and (c) the neutral object (the lamp). Therefore, a total of nine estimates of social feedback were retrieved. An example of these items is, "All in all, how many (%) of the portrait photos were positive (smiling) after the presentation of the photos of your own body?" Participants indicated their estimates on the computer by sliding a small tick across a bar ranging from 0% to 100%. Each estimate of social feedback was given separately and the order of the

questions was randomised per participant. To disguise the purpose of the study, we also included six filler estimates (e.g., about the percentage of portrait photos of women).

Body evaluation. The Multidimensional Body-Self Relations Questionnaire (MBSRQ; Brown, Cash, & Mikulka, 1990; Cash, 2000) was used to measure trait body evaluation. The MBSRQ consists of 69 items (e.g., "I like my looks just the way they are") rated on 5-point scales (1 = *definitely disagree* to 5 = *definitely agree*). Only items from the Appearance Evaluation subscale (satisfaction with one's appearance; seven items) and the Body Areas Satisfaction subscale (satisfaction with specific aspects of one's appearance; nine items) were used. As suggested by Cash (2000), we averaged the normalised Z-scores of these two subscales, with higher scores reflecting more positive body evaluation. The Appearance Evaluation subscale and the Body Areas Satisfaction subscale evidenced good internal consistency (α = .88 and .73) and one month test-retest reliability (r = .91 and .74) in women over 18 years old (Cash, 2000). In the current sample, the internal consistency for the items of these two subscales together was α = .88.

The Body Image States Scale (BISS; Cash, Fleming, Alindogan, Steadman, & Whitehead, 2002) was used to measure state body evaluation. The BISS consists of six 9-point scale items that measure the following dimensions based on how the participant feels "right now, at this very moment:" (a) dissatisfaction-satisfaction with physical appearance, (b) dissatisfaction-satisfaction with body size and shape, (c) dissatisfaction-satisfaction with weight, (d) feelings of physical attractiveness-unattractiveness, (e) feelings about how one looks now compared to how one usually looks, and (f) evaluation of appearance in comparison to the appearance of others. The item scores are averaged, with higher scores reflecting a more positive state body evaluation. In an undergraduate sample, the BISS demonstrated acceptable internal consistency. Further, BISS scores were sensitive to positive and negative contexts and were highly correlated with scores on related measures (e.g., objectified body consciousness; Cash et al., 2002). Unfortunately, due to an error in our online research system, the BISS was delivered with a 7-point scale. For each item, only the first and last response options were labelled; the five response options in between were simply numbered. An example item is "Right now I feel…" where participants could choose a response option from 1 = *extremely dissatisfied with my physical appearance* to 7 = *extremely satisfied with my physical appearance* (response options two to six were numbered but unlabelled). In our sample, the internal consistency of this version of the BISS was good, α = .87.

Facial ratings. Participants rated each of the 54 portrait photos that appeared in the computer task based on how they thought each person looked, using a 7-point scale (1 = *very angry* to 7 = *very happy*). They were instructed to rate each face separately and to not compare the faces with one another. Each portrait photo was presented separately, and the order in which the portrait photos were presented was randomised for each participant.

Mood. Participants rated their own mood using five visual analogue scales (0 = *not at all* to 100 = *very much*) for the feelings happy, positive, energetic, sad (reverse scored), and anxious (reverse scored). Ratings were summed for a total score (α = .81 in the present study), with higher scores reflecting a more positive mood.

Procedure

This study was approved by the ethical committee of Maastricht University. Participants were recruited by advertisements on campus or via the university's research website for a study about "facial recognition." Participants were tested individually in a university laboratory and all measures were completed on a computer. At Session 1, participants signed an informed consent sheet and then completed the measure of trait body evaluation. Afterward, the participants changed into a black t-shirt and pants that we provided for them, and were then photographed from the front and both sides in front of a white canvas. They were asked to stand with their arms at their sides and to look straight into the camera with a neutral expression. At Session 2 (one week later), participants completed the computer task, followed by the estimates of social feedback, the measures of mood and state body evaluation, and the facial ratings. The participants were aware that both sessions related to the same study. At the end of Session 2, they were asked to guess the purpose of the study[5] and then they received a 10 Euro voucher or course credit for participation. The participants were debriefed via e-mail following completion of data collection.

Statistical Analyses

We conducted separate stepwise (backward) regression analyses to test the relations between women's body evaluation and estimates of social feedback (for their own body, for the control woman's body, and for the neutral object), as well as between body evaluation and the facial ratings. Separate analyses were performed for state and trait body evaluation and mood was included as a covariate in all analyses. For each analysis, all predictors (e.g., trait body evaluation and mood) were entered into the model at Step 1. At Step 2, any predictors that did not significantly contribute to the model were removed. All variables were treated as continuous variables. Normality of the error distribution was checked for all outcome variables prior to the analyses.

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[5] Two participants correctly guessed the purpose of the study. Their data were included in the study because their inclusion did not change any of the results.

Results

Primary Analyses of the Covariation Bias

There were no missing data in the current study (aside from the aforementioned missing data with regard to BMI). Further, the errors for all outcome variables were normally distributed. The results showed that women's trait body evaluation predicted their estimates of negative social feedback for their own body, $B = -7.57$, $t(63) = -2.20$, $p = .031$, $R^2 = .07$. As expected, women with a more negative body evaluation gave higher estimates of negative social feedback for their own body. Note that mood was not a significant covariate ($p = .922$) and had been removed from the model. Further, women's state body evaluation was not a significant predictor of negative social feedback for their own body, $B = -3.79$, $t(63) = -1.83$, $p = .072$, $R^2 = .05$. Again, mood was not a significant covariate ($p = .817$) and had been removed from the model.

Secondary Analyses of the Covariation Bias

To assess the selectivity of the covariation bias for negative social feedback, we repeated these analyses with participants' positive and neutral social feedback for their own body as outcome variables. Neither trait nor state body evaluation predicted estimates of positive social feedback for the own body (all $ps > .10$). However, trait body evaluation predicted estimates of neutral social feedback for the own body, $B = 5.61$, $t(63) = 2.03$, $p = .047$, $R^2 = .06$, as did state body evaluation, $B = 3.87$, $t(63) = 2.37$, $p = .021$, $R^2 = .08$. In sum, women with a more negative body evaluation gave lower estimates of neutral social feedback for their own body. For these analyses, as well, mood did not emerge as a significant covariate ($p = .576$ and $p = .910$, respectively).

    We then investigated women's reported contingencies between the control woman's body and different kinds of social feedback, and between the neutral object and different kinds of social feedback. The results of these regression analyses were all nonsignificant (for both trait and state body evaluation; all $ps > .097$), indicating that the covariation bias was specific for the own body.

    Next, we investigated whether body evaluation predicted the facial ratings for the negative, positive, and neutral social stimuli. Results of these regression analyses yielded nonsignificant findings for all types of social stimuli (all $ps > .497$). Therefore, body evaluation did not predict how the social stimuli were interpreted.

Discussion

The aim of the current study was to investigate whether women with negative body evaluation demonstrate a covariation bias for negative social feedback related to their own body. As predicted, we found that women with a more negative trait body evalua-

tion estimated higher levels of negative social feedback related to their own body – even though there was absolutely no contingency between their own body and negative social feedback. We also confirmed that the covariation bias was specific for their own body and not for another woman's body or for a neutral object. In addition, we found that the covariation bias was not explained by differences in interpretation of the social feedback.

The way individuals perceive social interactions, including the social feedback that they receive, has a profound influence on body image. In effect, these perceptions of interpersonal experiences form the "looking glass" through which individuals evaluate their body (Cash & Fleming, 2002a; Tantleff-Dunn & Lindner, 2011). Distortions in cognitive processing can powerfully influence body image, as well, by reinforcing and maintaining existing negative body evaluation (Williamson et al., 2004). The covariation bias evidenced in the present study integrates the influence of distortions in cognitive processing and interpersonal experiences: it is possible that the tendency to perceive an association between the own body and negative social feedback when in fact there is none (read: covariation bias) has serious consequences for body image, both by 'tainting' the looking glass through which women evaluate their body, and by confirming women's existing negative body evaluation. Another potential consequence of this covariation bias is that women may behave in ways that elicit negative social feedback, thereby further affecting their body evaluation (Cash & Fleming, 2002a).

It is important to note that we found that women with a more negative trait and state body evaluation estimated lower levels of neutral social feedback for their own body. One explanation could be that because women with a more negative body evaluation estimated higher levels of negative social feedback, they consequently estimated lower levels of neutral social feedback. However, this would not explain why women with a more negative body evaluation did not estimate lower levels of positive social feedback. Another possibility is that women with a more negative body evaluation filter social feedback dichotomously (i.e., social feedback is either negative or positive). This would reflect a broader tendency to engage in dichotomous thinking, which has been evidenced in previous research (Cash, 2011; Jakatdar et al., 2006).

Several limitations to this study must be noted. First, it is unclear whether the covariation bias for negative social feedback causes negative body evaluation, or vice versa. This limitation could be addressed by experimentally manipulating the covariation bias and investigating if body evaluation is affected. Second, the covariation bias might be explained by biased attention to negative social feedback. Running a similar experiment while registering women's eye movements could investigate this notion. Third, in research investigating covariation bias it is common to have participants estimate the frequency that a stimulus is followed by a particular outcome (e.g., De Jong et al., 1995; Hermann et al., 2004; Hirsch & Clark, 2004). However, it remains to be determined whether women's estimates of negative social feedback inside the laboratory are equivalent to their perception of negative social feedback outside the laboratory.

Fourth, another limitation concerns the measurement of state body evaluation after the computer task. It is possible that the computer task may have influenced participants' state body evaluation, for example via exposure to negative social feedback. Instead, state body evaluation could be measured immediately prior to the computer task, although participants may then be aware that the study concerns body image, which may influence their answers. Fifth, regarding our sample, our sample size was modest (the achieved power fell below .80), many participants did not provide us with information to calculate their BMI, and we did not collect information about participants' ethnicity. In addition, because we tested young women, our results cannot yet be extended to men or to other age groups. Lastly, we regret that we did not use the original version of the BISS (using a 9-point scale with each response option labelled) due to an error in our online research system.

Despite these limitations, the findings of this study have potential clinical implications. Specifically, our findings underscore the importance of addressing the social context in improving body evaluation. Namely, it may be important to address both women's thoughts about their body and women's thoughts about what *others* think about their body. Not addressing the latter thoughts may impede improvement in body evaluation (e.g., if women keep overestimating negative social feedback for their own body). However, it is an unanswered question whether women with a covariation bias for negative social feedback also demonstrate corresponding explicit thoughts (e.g., "Most people think that I am unattractive"). Another clinical implication of this study is that it may be important to use techniques designed to improve body evaluation that directly target social feedback. For instance, in an evaluative conditioning paradigm developed by Martijn, Vanderlinden, Roefs, Huijding, and Jansen (2010), participants' bodies were systematically paired with positive social feedback (smiling faces). Even though participants were unaware of the association between their own body and the positive social feedback, their body evaluation and self-esteem improved at posttest (the effect was specific for women high in body concern; see Martijn et al., 2010, for more details).

In sum, the current study provided evidence for a covariation bias for negative social feedback in women with a more negative body evaluation. Thereby we also integrated two domains, interpersonal experiences and cognitive processing, that play a pivotal role in determining how positively or negatively women feel about their body. Future research should address the aforementioned limitations to further delineate the covariation bias and its role in negative body evaluation. If additional support is found for the covariation bias, it will be an exciting next step to determine whether it can be unlearned to improve body evaluation in women.

CHAPTER 6

Covariation Bias in Women With a Negative Body Evaluation
How Is It Expressed and Can It Be Diminished?

Abstract

Objectives: Women with a negative body evaluation display *covariation bias*: They overestimate the relation between their own body and negative social feedback. This study aimed to develop a more fine-grained understanding of this covariation bias and to determine whether it could be diminished. **Methods:** Seventy women completed a computer task wherein three categories of stimuli – pictures of their own body, a control woman's body, and a neutral object – were followed by (nonverbal) negative social feedback or nothing. Participants' estimates of the relation between each stimulus category and negative social feedback were assessed throughout the task. **Results:** Before starting the task, women with a more negative state body evaluation *expected* their body to be followed by more negative social feedback (demonstrating *a priori* covariation bias). During the task, when the relation between stimulus category and negative social feedback was random, women with a more negative trait and state body evaluation perceived at the present moment (*online* covariation bias) and retrospectively (*a posteriori* covariation bias) that their body was followed by more negative social feedback. When contingencies were manipulated so that women's own body was rarely followed by negative social feedback, covariation bias was temporarily diminished; this coincided with improvements in state body evaluation. **Conclusions:** Covariation bias exists *preexperimentally* and occurs when situational information is ambiguous. It is possible to (temporarily) diminish covariation bias. This might be a technique for improving body evaluation.

Introduction

Individuals with a negative body evaluation (i.e., dissatisfaction with one's body) demonstrate distortions in cognitive processing (Cash, 2011), such as dichotomous thinking (e.g., in terms of fat vs. thin) and magnification of perceived flaws in appearance (Jakatdar, Cash, & Engle, 2006). These distortions in cognitive processing are related to greater psychological investment in one's appearance, preoccupation with being or becoming overweight, and pathological eating attitudes and behaviours (Jakatdar et al., 2006). Furthermore, distortions in cognitive processing reinforce and maintain negative body evaluation (Williamson, White, York-Crowe, & Stewart, 2004). For these reasons, investigating distortions in cognitive processing is important for understanding the aetiology and maintenance of negative body evaluation and how to alleviate it. The present study focuses, in particular, on covariation bias.

Covariation bias (often called *illusory correlation*) is a distortion in cognitive processing whereby an individual overestimates the contingency between a particular stimulus and an aversive outcome – even when the contingency is absent or is correlated in the opposite direction (Chapman & Chapman, 1967). Covariation bias has frequently been studied in individuals with an anxiety disorder or high levels of anxiety symptomatology. For example, in the classic covariation bias paradigm (Tomarken, Mineka, & Cook, 1989), individuals are presented with pictures belonging to three categories of stimuli: (a) spiders (fear-relevant), (b) snakes (fear-relevant), and (c) mushrooms or flowers (neutral). Across a series of trials, the pictures are followed by an electric shock (the aversive outcome), a tone (the nonaversive outcome), or nothing. Importantly, the contingencies between each stimulus category and each type of outcome are random. At the end of the task, participants estimate the percentage of trials of each stimulus category that were followed by each type of outcome. The key finding is that individuals who are highly fearful of spiders markedly overestimate the contingency between pictures of spiders and the electric shock, whereas their other estimates are quite accurate (Tomarken et al., 1989; see also De Jong & Merckelbach, 1993; De Jong, Merckelbach, & Arntz, 1995). This may reflect an underlying assumption that spiders are dangerous (Tomarken et al., 1989).

Alleva, Lange, Jansen, and Martijn (2014) demonstrated that negative body evaluation is associated with covariation bias as well. In their study, 65 women completed a computer task wherein pictures of their own body, a control woman's body, and a neutral object, were followed by nonverbal social feedback (i.e., facial crowds with equal numbers of negative, positive, and neutral faces). Their findings showed that women with a more negative body evaluation estimated higher levels of negative social feedback (the aversive outcome) for their own body (the stimulus), but not for the other stimuli (i.e., the control woman's body and the neutral object). In addition to reinforcing and maintaining body image distress in itself, such a covariation bias could cause women to inadvertently *elicit* negative social feedback from others (e.g., by avoid-

ing eye contact), thereby further reinforcing negative body evaluation (Alleva et al., 2014; Tantleff-Dunn & Lindner, 2011).

The first aim of the present study is to develop a more fine-grained understanding of the covariation bias for the relation between women's own body and negative social feedback. Covariation bias can be expressed in three ways (Mayer, Muris, Freher, Stout, & Polak, 2012; Pauli, Montoya, & Martz, 1996; Pauli, Montoya, & Martz, 2001). *A priori covariation bias* refers to an individual's expectancy of a relation between a stimulus and an outcome, *before* the stimulus-outcome pairings have occurred or been presented (e.g., "When I arrive at the party, everyone will look at me and think I am unattractive;" Mayer et al., 2012). On the other hand, *online covariation bias* refers to an individual's *current* perception of a relation between a stimulus and an outcome (e.g., "Right now, everyone is looking at me and thinking I am unattractive;" Pauli et al., 2001). Lastly, *a posteriori covariation bias* refers to an individual's perception of a relation between a stimulus and an outcome *after* the stimulus-outcome pairings have occurred or been presented (e.g., "At the party last night, everyone looked at me and thought I was unattractive;" Tomarken et al., 1989). The covariation bias demonstrated by Alleva et al. (2014) was in fact an *a posteriori* covariation bias, as participants' covariation estimates were assessed at the end of the computer task.

Prior experimental research has shown that although both high and low fear individuals – that is, individuals with high and low scores on a measure of the pathology under investigation (e.g., spider phobia, panic disorder) – may demonstrate an *a priori* covariation bias for the relation between fear-relevant stimuli and an aversive outcome (e.g., Amin & Lovibond, 1997), only high fear individuals demonstrate an *a posteriori* covariation bias as well (e.g., Amin & Lovibond, 1997; Pauli et al., 1996; Pauli et al., 2001; Tomarken et al., 1989). These findings suggest that covariation bias exists *preexperimentally*, and is not merely formed during an experiment due to differential 'online' processing of stimuli (Amin & Lovibond, 1997; De Jong, Merckelbach, & Arntz, 1990; McNally & Heatherton, 1993). In addition, these findings suggest that high fear individuals are resistant to "disconfirming situational information" (i.e., the fact that there is absolutely no relation between the stimulus and the aversive outcome; Pauli et al., 1996), whereas low fear individuals do adjust their pre-experimental estimates according to disconfirming situational information (Pauli et al., 1996). This would also explain why high fear individuals, but not low fear individuals, have been shown to display an online covariation bias as well (e.g., Pauli et al., 1996; Pauli et al., 2001). In the present study, we expected that women with a more negative body evaluation would demonstrate *a priori*, online, and *a posteriori* covariation biases.

The second aim of this study was to investigate if the covariation bias for the relation between women's own body and negative social feedback could be diminished. Pauli and colleagues (2001) showed that a covariation bias for fear-relevant stimuli (pictures of emergency situations) and an aversive outcome (electric shocks) could be abolished by manipulating the contingency between different types of stimuli and the

aversive outcome. To do so, in a computer task, pictures of emergency situations were followed by shocks on a minority (17%) of trials, whereas fear-irrelevant stimuli were followed by shocks on a majority (83%) of trials. This manipulation successfully diminished the covariation bias found in high fear participants in a prior block of the experiment. Interestingly, the covariation bias did not return in a subsequent block where contingencies returned to random.

To our knowledge, Pauli et al.'s (2001) study is the only study to have reported a technique for diminishing covariation bias. Therefore, in the current study, we adapted Pauli et al.'s approach to try to diminish the covariation bias for the relation between women's own body and negative social feedback. That is, we created a computer task that was modelled as closely as possible to Pauli et al.'s computer task, but with stimuli (e.g., pictures of women's own body) and an aversive outcome (negative social feedback instead of an electric shock) that were specific for the covariation bias under investigation. In addition, to explore whether any changes in the covariation bias coincide with changes in body evaluation, we assessed women's state body evaluation throughout the computer task. We expected that the covariation bias in women with a more negative body evaluation would be diminished by the computer task, and that this change would persist when contingencies returned to random.

Method

Participants

Seventy-eight women participated in this study. Six participants were excluded from the dataset because they were aware of the study aim, one participant was excluded because her body mass index (BMI) indicated that she was obese (BMI = 34.26), and one participant was excluded because her BMI indicated that she was severely underweight (BMI = 15.57; BMI was calculated based on participants' self-reported weight and height). The final dataset comprised 70 women between 18 and 29 years (M_{age} = 22.30, SD = 2.66), with a BMI between 17.31 and 28.71 (M_{BMI} = 21.87, SD = 2.60). The majority of the participants were university students (80.0%).

Materials

Computer task. At the start of the computer task, participants were told that it was their job to determine the relation between three categories of pictures – their own body, another woman's body (i.e., the control woman's body), and a lamp (i.e., the neutral object) – and two outcomes: "negative portrait photos" (i.e., the negative social feedback), or nothing (i.e., a white screen). The computer task consisted of three blocks, each comprising 36 trials (12 trials per stimulus category). In Block 1, pictures of each

category were followed by negative social feedback on 50% of trials (i.e., contingencies were random). In Block 2, pictures of women's own body and the control woman's body were each followed by negative social feedback on 17% of trials, and pictures of the neutral object were followed by negative social feedback on 83% of trials. Block 3 was identical to Block 1.

Pictures of each category were presented for six seconds each and the negative social feedback (or the white screen) was presented for two seconds. Pictures of the three categories were presented in random order; however, for Blocks 1 and 3, pictures of a given category were not presented on more than 2 consecutive trials. During each block, covariation estimates were assessed after each trial – immediately after the negative social feedback (or the white screen) disappeared – and before Block 1, after Block 2, and after Block 3. Base-rate estimates were collected at the end of each block. Block 1 started with three practice trials (using pictures of mushrooms) to familiarise participants with the computer task. In contrast to Pauli et al.'s (2001) version of the computer task, participants also filled in a measure of state body evaluation before Block 1, after Block 2, and after Block 3.

Pictorial stimuli. Three categories of pictures, consisting of three pictures each, were used for the computer task. The pictures of the participants' own body and the control woman's body were full-body pictures taken from the front and both sides. The control woman was a graduate student (approximate BMI = 22.50), wearing a black t-shirt and pants. Three pictures of a lamp (photographed from the front and sides) were chosen for the neutral object stimuli, because the shape of the lamp roughly resembled a human form. The negative social feedback was derived from the NimStim Facial Stimuli Set (Tottenham et al., 2009) and consisted of portrait photos of nine Caucasian men and nine Caucasian women, all frowning (mouth closed). Each portrait photo served as negative social feedback twice per block.

Covariation estimates. Three types of covariation estimates, concerning each category of stimuli, were collected during the computer task (cf. Pauli et al., 2001). *A priori* covariation estimates (collected before Block 1) concerned participants' estimates of the expected relationship between each category of stimuli and the negative social feedback (e.g., "How strongly do you expect that pictures of your own body will be followed by a negative (frowning) portrait photo?"). Online covariation estimates (collected during each block, after each trial) concerned participants' current estimates of the relationship between each category of stimuli and the negative social feedback (e.g., "You just saw a picture of your own body. How strongly do you expect that the next time you see a picture of your own body, it will be followed by a negative (frowning) portrait photo?"). *A posteriori* covariation estimates (collected after each block) concerned participants' estimates of the relationship between each category of stimuli and the negative social feedback during the now-completed block (e.g., "Given that you saw pictures of your own body, on what percentage of those trials was your own body followed by a negative (frowning) portrait photo?"). For each covariation estimate, participants indi-

cated their answer by sliding a bar across a line on the computer screen, with end points 0 and 100 (e.g., 0 = *Definitely DO NOT expect that a negative portrait photo will follow pictures of my own body*, 100 = *Definitely DO expect that a negative portrait photo will follow pictures of my own body*).

Base-rate estimates. Base-rate estimates concerned participants' estimates of the percentage of trials (taking all stimulus categories together) that were followed by negative social feedback (e.g., "Taking all three categories of pictures together, on what percentage of trials were pictures followed by a negative (frowning) portrait photo?" cf. Pauli et al., 2001). These base-rate estimates were collected after each block. At the end of the computer task, participants also estimated the percentage of trials (across all three blocks) that concerned each stimulus category (e.g., "Taking all three blocks together, what percentage of the pictures presented were pictures of your own body?" cf. Pauli et al., 2001). Participants indicated their answers by sliding a bar across a line on the computer screen, with end points 0% and 100%. These base-rate estimates are necessary to ensure that the covariation bias is not explained by differences in participants' perception of the amount of negative social feedback or the number of trials of each stimulus category.

Body evaluation – trait. The Multidimensional Body-Self Relations Questionnaire – Appearance Scales (MBSRQ-AS; Brown, Cash, & Mikulka, 1990; Cash, 2000) was used to measure trait body evaluation. The MBSRQ-AS consists of 34 items rated on 5-point scales (1 = *definitely disagree*, 5 = *definitely agree*), and comprises five subscales: Appearance Evaluation, Appearance Orientation, Overweight Preoccupation, Self-Classified Weight, and Body Areas Satisfaction. For the purpose of this study, only items from the Appearance Evaluation subscale (e.g., satisfaction with appearance; seven items) and Body Areas Satisfaction subscale (e.g., satisfaction with various aspects of appearance; nine items) were administered (cf. Cash, 2000). Scores on the items of these two subscales were converted to Z-scores and were then averaged (cf. Cash, 2000); lower scores reflect a more negative trait body evaluation. In women 18 years and older, these two subscales have demonstrated good internal consistency and one-month test-retest reliability (Cash, 2000). The internal consistency for the items of these two subscales together was α = .90 in this sample.

Body evaluation – state. Two VAS items (Birkeland et al., 2005; Heinberg & Thompson, 1995) were used to measure state body evaluation. These items were, "Please rate your current level of physical appearance satisfaction," and, "Please rate your current level of physical appearance dissatisfaction" (reverse-scored). Three mood-related items were included (cf. Birkeland et al., 2005) to disguise the focus of the questionnaire. Participants indicated their responses by sliding a bar across a line on the computer screen, with end points 0 = *none* and 100 = *extreme*. Participants' responses to the two body evaluation items were averaged, with lower scores reflecting a more negative state body evaluation. These two items have demonstrated good 5-minute test-retest reliability and are sensitive to experimental manipulations (Birkeland et al.,

2005). In this study, the internal consistency for these two items at all measurement points was good (M_α = .89, Range: α = .86 to .91).

Procedure

This study was approved by the university's ethical committee. Participants were recruited using advertisements on campus and the university's online participant recruitment system. At Session 1, participants signed an informed consent sheet and completed the measure of trait body evaluation. Participants were then asked to change into a black t-shirt and pants that were provided for them. Participants could choose their own size, ranging from small to extra-large (t-shirts) and from 36 to 46 (pants). The clothing was athletic, stretchy, and close-fitting, but not skin-tight. After changing into the clothing, participants were photographed from the front and both sides in front of a white canvas. They were instructed to stand with their arms at their sides and to look straight into the camera with a neutral expression. At Session 2 (one week later), participants completed the computer task. Afterward, we conducted an awareness check to determine whether participants had guessed the aim of the study. Lastly, participants were given a 10 Euro voucher or participation credit. They were fully debriefed via e-mail at the end of data collection.

Statistical Analyses and Data Reduction

First, to investigate the presence of *a priori*, online, and *a posteriori* covariation biases, we conducted separate univariate regression analyses to test the relation between trait and state body evaluation and the covariation estimates. In particular, to investigate *a priori* covariation bias, we used participants' *a priori* covariation estimates. To investigate online covariation bias, we averaged participants' online covariation estimates (for each stimulus category separately) collected during Block 1. To investigate *a posteriori* covariation bias, we used participants' *a posteriori* covariation estimates collected after Block 1. Second, to investigate whether Block 2 diminished the covariation bias, and whether this effect persisted at Block 3, we conducted separate univariate regression analyses to test the relation between trait and state body evaluation and the *a posteriori* covariation estimates that were collected after Block 2 and after Block 3.

For all of these analyses, separate analyses were conducted for trait body evaluation and state body evaluation (as measured before Block 1), with BMI as covariate. For each analysis, each predictor (e.g., trait body evaluation and BMI) was first entered into the model. Any predictors that did not significantly contribute to the model were subsequently removed from the model and the analysis was rerun. To check that the results were specific for covariation estimates in relation to women's own body, we additionally tested the relation between women's trait and state body evaluation and their covariation estimates for the control woman's body and the neutral object. We also

tested the relation between women's trait and state body evaluation and their base-rate estimates.

To explore whether the manipulation in Block 2 coincided with changes in state body evaluation, we conducted a repeated measures ANCOVA, with Block (Block 1, Block 2, Block 3) as within-subjects factor and BMI as covariate. Note that Block 1, Block 2, and Block 3 refer to state body evaluation as measured immediately *after* Block 1, Block 2, and Block 3, respectively. For the purpose of this analysis, we created a median split on trait body evaluation, which was the between-subjects factor Group (participants with a more vs. less negative trait body evaluation). Greenhouse-Geisser corrections were applied whenever the assumption of sphericity was not met. To control for multiple testing, an alpha of .01 was chosen for all of the aforementioned analyses (Howell, 2009).

Results

A Priori, Online, and A Posteriori Covariation Biases

Trait body evaluation did not significantly predict women's *a priori* covariation estimates for their own body, $B = -7.35$, $t(68) = -2.28$, $p = .026$, $R^2 = .07$. However, trait body evaluation significantly predicted women's online, $B = -12.16$, $t(68) = -4.65$, $p < .001$, $R^2 = .24$, and *a posteriori* covariation estimates for their own body, $B = -8.86$, $t(68) = -2.87$, $p = .006$, $R^2 = .11$. State body evaluation significantly predicted women's *a priori*, $B = -.43$, $t(68) = -4.51$, $p < .001$, $R^2 = .23$, online, $B = -.27$, $t(68) = -2.95$, $p = .004$, $R^2 = .11$, and *a posteriori* covariation estimates for their own body, $B = -.27$, $t(68) = -2.70$, $p = .009$, $R^2 = .10$. Thus, women with a more negative body evaluation estimated higher levels of negative social feedback for their own body – *a priori* (predicted by state body evaluation only), online, and *a posteriori*. Note that BMI was not a significant covariate for these analyses and had been removed from the models ($ps > .09$).

To assess the specificity of these covariation biases for women's own body, we repeated the above analyses for the covariation estimates in relation to the control woman's body and the neutral object; none of these analyses proved significant ($ps > .34$). In addition, neither trait nor state body evaluation predicted women's base-rate estimates as assessed after Block 1 ($ps > .30$). That is, women's perception of the percentage of trials that were followed by negative social feedback did not depend on their trait or state body evaluation.

Covariation Bias Manipulation

After Block 2, in which we had attempted to manipulate the covariation bias, both trait body evaluation, $B = -4.18$, $t(68) = -1.13$, $p = .26$, $R^2 = .02$, and state body evaluation, B

= -.11, $t(68)$ = -.94, p =.35, R^2= .01, no longer predicted women's covariation estimates for their own body, suggesting that the covariation bias had been diminished. However, after Block 3 (where contingencies returned to random), trait body evaluation again significantly predicted women's covariation estimates for their own body, B = -11.85, $t(68)$ = -3.70, p < .001, R^2= .17, suggesting that the covariation bias had returned. In contrast, state body evaluation did *not* predict women's covariation estimates for their own body after Block 3, B = -.20, $t(68)$ = -1.79, p =.08, R^2= .05. BMI was not a significant covariate for these analyses and was removed from the models (ps > .50).

We repeated the above analyses for the covariation estimates in relation to the control woman's body and the neutral object (after Block 2 and Block 3); none of these analyses proved significant (ps > .18). Also, neither trait nor state body evaluation predicted women's base-rate estimates as assessed after Block 2 and Block 3 (ps > .03). Thus, there were no differences between women of various levels of trait and state body evaluation scores regarding their perception of the percentage of trials that were followed by negative social feedback and the percentage of trials of each stimulus category.

Changes in State Body Evaluation

The results of the analyses (Figure 1) showed a nonsignificant Block x Group interaction, $F(1.56, 106.22)$ = .85, p = .41. The results also showed a significant main effect of Group, $F(1, 68)$ = 26.62, p < .001, indicating that participants who scored lower on trait body evaluation also scored lower on state body evaluation (as would be expected). In addition, the results showed a significant main effect of Block, $F(1.56, 106.22)$ = 14.87, p < .001. Planned comparisons indicated that there was a significant increase in state body evaluation from after Block 1 to after Block 2, $t(69)$ = -4.09, p < .001, and that state body evaluation did not change from after Block 2 to after Block 3, $t(69)$ = .36, p = .72. These results demonstrate that all participants experienced an improvement in state body evaluation from before to after manipulation of the covariation bias, and that this improvement was maintained until the end of the computer task. Again, BMI was not a significant covariate in the analysis, p = .35, and had been removed from the model.
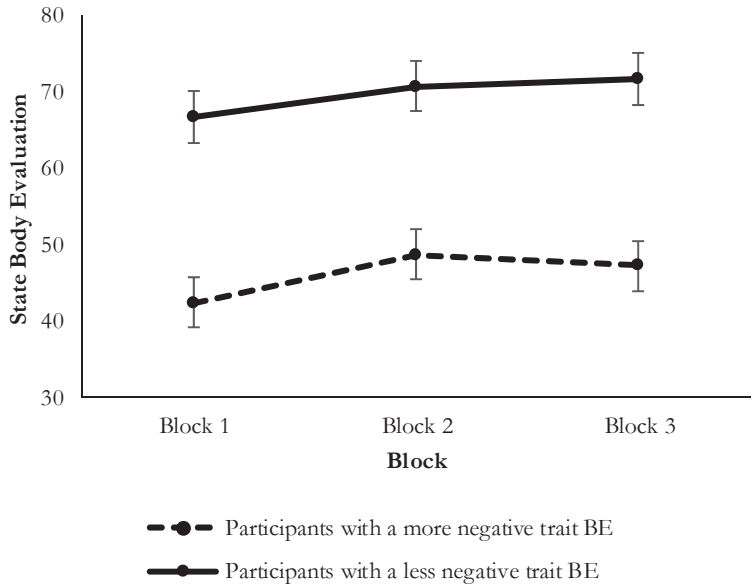
Figure 1. Participants' state body evaluation across the computer task. Block 1 and Block 2 refer to state body evaluation immediately before and after manipulation of the covariation bias, respectively. Block 3 refers to state body evaluation immediately after Block 3, where contingencies returned to random. BE = body evaluation. Error bars represent standard errors.

Descriptive

Lastly, to provide additional insight into participants' covariation estimates across the computer task, we plotted participants' online covariation estimates for the 12 trials (per block) in which their own body was presented (Figure 2). We plotted the data separately for participants with a more vs. less negative trait body evaluation (using a median split, as aforementioned). The figure appears to confirm the analyses. That is, women with a more negative body evaluation gave higher covariation estimates for their own body (Block 1), and covariation estimates decreased during manipulation of the covariation bias. However, at Block 3, participants' covariation estimates seem to have returned to their initial levels.
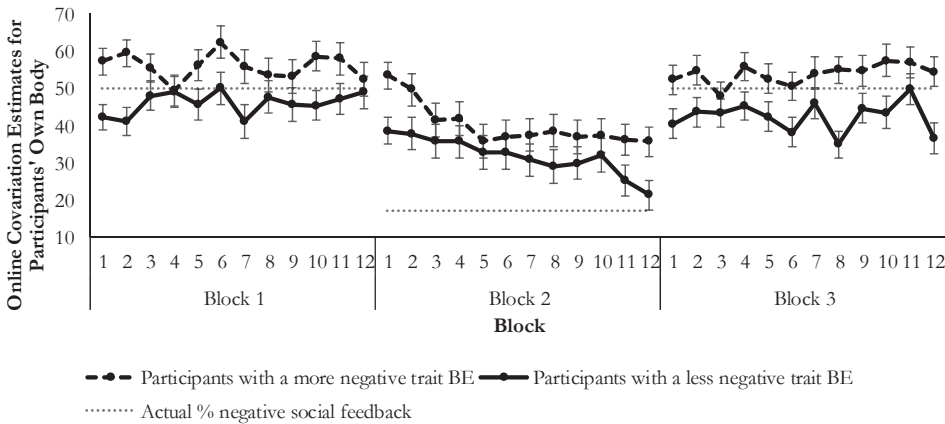
Figure 2. Participants' online covariation estimates for their own body across the course of the computer task. Each block comprised 12 trials in which the participants' own body was presented. At Block 1, the participants' own body was followed by negative social feedback on 50% of trials (i.e., contingencies were random). At Block 2, the participants' own body was followed by negative social feedback on 17% of trials. Block 3 was identical to Block 1. BE = body evaluation. Error bars represent standard errors.

Discussion

The present study aimed to develop a more fine-grained understanding of the covariation bias for the relation between women's own body and negative social feedback, and to determine whether this covariation bias could be diminished. We found that women with a more negative body evaluation demonstrate *a priori* (as predicted by state body evaluation only), online, and *a posteriori* covariation biases. These findings were specific for women's own body. Also, women's perception of the percentage of trials that were followed by negative social feedback and the percentage of trials of each stimulus category did not depend on their trait or state body evaluation. Furthermore, we found that the covariation bias could be diminished – at least temporarily – and that state body evaluation improved as well.

A Priori, Online, and A Posteriori Covariation Biases

These findings replicate those of Alleva et al. (2014) in which it was demonstrated that women with a more negative body evaluation display an *a posteriori* covariation bias for the relation between their own body and negative social feedback. However, we extended these findings by showing that women with a more negative body evaluation also display *a priori* covariation bias (as predicted by state body evaluation only) and online covariation bias. The present findings are also in line with those of prior studies conducted in individuals with anxiety symptomatology (e.g., Amin & Lovibond, 1997;

Pauli et al., 1996), in that we showed that online and *a posteriori* covariation biases are restricted to individuals scoring high on the pathology under investigation (here, women with a more negative body evaluation).

Taken together, the present findings suggest that covariation bias exists *preexperimentally* in women with a more negative body evaluation. Furthermore, the expectation that their own body will be followed by negative social feedback seems resistant to disconfirming situational information (i.e., the fact that there was absolutely no relation between their own body and negative social feedback) – specifically, when situational information is more ambiguous (e.g., when contingencies are 50%). Why might this be? One explanation concerns *self-schemas*, which are an "integrated set of memories, beliefs, and generalizations about one's behaviour in a given domain" (Kunda, 1999, p. 452). Self-schemas influence how individuals process information about themselves and others: Individuals tend to process information in a manner that serves to *maintain* their self-schemas (see Kunda, 1999, for details). Individuals also possess a self-schema about their body (i.e., a *body-schema*; Cash, 2011). Women with a more negative body evaluation likely have a body-schema that is characterised by negative generalisations and beliefs about their body (Altabe & Thompson, 1996). In line with self-schema research, a negative body-schema should cause women to process information in a manner that is consistent with, and maintains, their body-schema (Altabe & Thompson, 1996; Cash, 2011) – including resisting "counterschematic" information (Markus, 1977). This might be why the covariation bias in women with a more negative body evaluation persisted during Block 1 of this study.

Diminishing the Covariation Bias

Using an adapted version of Pauli et al.'s (2001) computer task, we were able to diminish the covariation bias for the relation between women's own body and negative social feedback – at least on the very short term. This finding is promising because it suggests that the covariation bias may be malleable under certain circumstances. In this case, it could be that greatly reducing the contingency between women's own body and negative social feedback (to 17%) made it abundantly clear to participants that their own body was in fact rarely followed by negative social feedback. In contrast, when contingencies were random (50%), there may have been more 'room' for participants' biases in cognitive processing to play a role. Indeed, prior studies have suggested that covariation bias only occurs when situational information is ambiguous (i.e., when contingencies are random; Alloy & Tabachnik, 1984; Pauli et al., 2001; Pauli et al., 1996). This may also explain why the covariation bias seemed to have returned in Block 3 (as predicted by trait body evaluation), when contingencies had returned to random.

It is noteworthy that participants' state body evaluation improved after manipulation of the covariation bias and that this improvement persisted until the end of the computer task. This finding suggests that manipulating the covariation bias might be a

potential technique for improving body evaluation. Furthermore, this finding demonstrates that diminishing the covariation bias may cause improvements in body evaluation, supporting the role of covariation bias in the maintenance of negative body evaluation. However, this does not explain why *all* participants – not just women with a more negative trait body evaluation – experienced an improvement in state body evaluation. It could be that the experience of having one's body *rarely* followed by negative feedback has a beneficial impact on women's state body evaluation, regardless of whether or not they possess a covariation bias. Future research is necessary to determine whether these findings replicate across studies.

Lastly, it is important to note that some deviations were found in the results between trait and state body evaluation. As aforementioned, only state body evaluation predicted women's *a priori* covariation estimates, and only trait body evaluation predicted the re-emergence of the covariation bias at Block 3. One reason for this divergence might be due to the measures used in this study. The two subscales that were used to assess trait body evaluation capture a range of aspects related to body evaluation (e.g., satisfaction with various body areas), whereas the VAS items that were used to assess state body evaluation focus on participants' overall feelings of appearance satisfaction. In addition, trait body evaluation was assessed at Session 1, whereas state body evaluation was assessed at Session 2. It is currently unclear whether trait or state body evaluation provides a more reliable picture of the relations under investigation. Future research may clarify whether these divergences persist across studies.

Limitations

To our knowledge, Pauli and colleagues (2001) are the only researchers that have developed a computer task for diminishing covariation bias. Given this fact, and the demonstrated effectiveness of this computer task, we modelled our computer task as closely as possible to Pauli et al.'s computer task. Consequently, we only used negative social feedback (vs. nothing) as outcome stimuli. However, a more ecologically valid version of the computer task might also incorporate positive and neutral social feedback (cf. Alleva et al., 2014), and future research will benefit from investigating such an alternative version of the present computer task. Another limitation of this study is that it is unclear how long the effects of the computer task on the covariation bias last, as trait body evaluation predicted the re-emergence of the covariation bias at Block 3. This is perhaps unsurprising considering the persistence of the covariation bias and the tendency of self-schemas to direct cognitive processing in a schema-consistent manner. Future research could investigate strategies for strengthening the computer task, for example by administering it over multiple sessions. Lastly, we tested women between 18 and 30 years old, so it is unclear whether similar results would be found in other age groups or in men.

Conclusions

Despite the aforementioned limitations of this study, the present findings are noteworthy because they provide evidence for *a priori*, online, and *a posteriori* covariation biases in women with a more negative body evaluation. In addition, the findings show that the covariation bias can be (temporarily) diminished, and that state body evaluation seems to improve as well. More broadly, the current study provides further insight into covariation bias, and how it may affect women's experience of their own body.

CHAPTER 7

Discussion

The central aim of this thesis was to answer the question: How can negative body image be improved? To answer this question, we formulated three sub-questions that guided the research conducted during the PhD project. This chapter provides a summary and discussion of the main findings regarding each sub-question. The key limitations of the studies, as well as future directions for research and clinical practice, will also be described.

1. How Is Negative Body Image Currently Treated – and Are Existing Interventions Effective?

Summary

Extant interventions designed to improve body image generally concern cognitive-behavioural therapy (CBT), media literacy, fitness training, self-esteem enhancement, or psychoeducation. Prior reviews demonstrated that interventions were effective at improving body image, with effect sizes ranging from small to large magnitude (Campbell & Hausenblas, 2009; Farrell, Shafran, & Lee, 2006; Jarry & Berardi, 2004; Jarry & Ip, 2005; Yager, Diedrichs, Ricciardelli, & Halliwell, 2013). However, there were three caveats of these reviews: (1) they focused on the broad category of intervention deployed rather than on the specific change techniques used within interventions, (2) it was unclear whether effect size estimates were inflated by bias within individual studies (e.g., attrition bias) and across studies (e.g., publication bias), and (3) studies were included that did not administer a pretest measure of body image or randomly assign participants to condition. In our meta-analytic review (Chapter 2), we sought to determine the overall effectiveness of stand-alone body image interventions and to identify the *specific change techniques* that improve body image. To this end, we created a taxonomy of 48 change techniques used in stand-alone interventions to improve body image. We used strict inclusion criteria to select eligible studies, and tested for bias within and across studies according to the standards of the Cochrane Handbook of Systematic Reviews (Higgins & Green, 2011) and the PRISMA Statement (Moher, Liberati, Tetzlaff, Altman, & the PRISMA Group, 2009).

The results of the meta-analysis showed that the interventions produce reliable and small-to-medium improvements in body image ($d_+ = .38$). The interventions also had a reliable, small-to-medium effect on internalisation of the beauty ideal ($d_+ = -.37$), and a reliable, large effect on the tendency to make social comparisons ($d_+ = -.72$). However, effect sizes were inflated by bias both within and across studies. When taking these biases into account, it appeared that interventions in fact produce *small*, yet reliable, improvements in body image. The effects for internalisation of the beauty ideal and social comparison tendencies were small – and no longer reliable – once corrections for publication bias and small sample bias had been applied.

With regard to the effectiveness of the specific change techniques, 12 change techniques were associated with improvements in body image. These included: discussing the role of cognitions in body image; teaching monitoring and restructuring of cognitions; changing negative body language; providing guided imagery, exposure, and size-estimate exercises; providing stress-management training and relapse-prevention strategies; and discussing the concept of body image and its causes, consequences, and behavioural expression. Three change techniques were contra-indicated: Discussing physical activity, providing self-esteem enhancement exercises, and discussing individual differences were each associated with *decreased* effect sizes for body image. Moderator analyses revealed that interventions were more effective if they targeted participants with a negative body image, participants at adolescence or middle adulthood, and if the interventions were delivered in a group format, with a facilitator present, and across multiple sessions. Larger effects were also observed for interventions that were tested against a passive (vs. active) control group and that included only a pretest and posttest measurement (i.e., no follow-up measurement).

Discussion

The findings of the meta-analysis show that, overall, interventions targeted at body image are not as effective as has previously been concluded. Half of the studies included in the meta-analysis were considered 'high risk' with regard to bias within individual studies. In particular, these studies were at high risk of selection bias, performance bias, and detection bias. Only risk of attrition bias and "other potential sources of bias" were low in most studies. With regard to risk of bias across studies, it appears that studies with a zero or negative effect size were either not submitted or not published, and only one-quarter of the included studies were adequately powered (i.e., $n \geq 35$ per cell; cf. Coyne, Thombs, & Hagedoorn, 2010). Bias within and across studies is not unique to the present meta-analysis or to the field of body image research, however. For instance, Sutton, Duval, Tweedie, Abrams, and Jones (2000) calculated that 26 out of the 48 meta-analyses (54%) that they reviewed had missing studies. More recently, Kicinski (2013) reviewed 28 meta-analyses of clinical trials and concluded that in 10 meta-analyses "there was strong evidence that statistically significant results favouring the treatment were more likely to be included" (p. 1). Unfortunately, despite the seriousness of bias for the implications of interventions and meta-analytic reviews (Liberati et al., 2009) – and the existence of structured guidelines such as the PRISMA Statement (Moher et al., 2009) – testing and correcting for bias seems to be infrequent (Coyne et al., 2010; Ferguson & Brannick, 2012).

Although the current meta-analysis suggests the presence of bias within and across studies, it is important to note that such bias should not influence the association between change techniques (or other features of the research) and observed effect sizes. This is because, for example, the associations between moderator variables and the

observed effect sizes should also hold for the simulated effects supplied by the trim and fill procedure. Thus, beyond the usual caveat that additional tests (and especially null and negative effects) would offer valuable corroboration, the findings in relation to the moderators and specific change techniques still afford valuable insight. For instance, it is interesting that most of the change techniques that were associated with improved body image are CBT-based techniques. This underlines the powerful role that dysfunctional thoughts, feelings, and behaviours play in shaping an individual's body image, as proposed by the cognitive-behavioural perspective of body image (Cash, 2011). It is also noteworthy that providing exposure exercises – such as exposing an individual to situations that are avoided and that arouse distress – emerged as an especially effective technique, given that exposure exercises can be anxiety-provoking and are often met with resistance (Jarry & Cash, 2011). This implies that exposure exercises should be deployed even if participants fear them or practitioners worry about their clients' distress. In addition, although concern has arisen about the potential adverse effects of providing psychoeducation (e.g., glamorising disordered eating; O'Dea, 2004), many of the effective change techniques were psychoeducation-based (e.g., discussing the causes of negative body image). This supports the notion that providing individuals with a framework for understanding their negative body image can be beneficial (O'Dea, 2004). An important implication of these findings is that the twelve effective change techniques warrant consideration in designing the content of future interventions.

Aside from the aforementioned discussion points and those raised in Chapter 2, there are two additional points that should be raised. First, it is striking that, when correcting for sources of bias, interventions engendered only small and nonreliable reductions in internalisation of the beauty ideal and the tendency to make social comparisons – especially considering that these outcomes are closely related to negative body image (Cafri, Yamamiya, Brannick, & Thompson, 2005; Myers & Crowther, 2009). However, it is possible that interventions were not geared appropriately to change these outcomes. For example, the beauty ideal is pervasive in Western culture (Tiggemann, 2011), and although it may be possible to increase *scepticism* toward the beauty ideal, reducing *internalisation* of the beauty ideal might be more challenging (Irving & Berel, 2001). There is also evidence that social comparison tendencies can occur automatically and without conscious control (Mussweiler, Rüter, & Epstude, 2004). It may be difficult to reduce the tendency to make social comparisons using the conscious, reflective strategies that are characteristically deployed in interventions (Martijn et al., 2012). Drawing from these findings, an important direction for future research will be to investigate how interventions can target internalisation of the beauty ideal and social comparison tendencies more effectively.

Second, it is unfortunate that 17 out of the 48 specific change techniques identified in the taxonomy were not deployed in at least four interventions and thus could not be analysed in the meta-analysis (cf. Michie, Abraham, Whittington, McAteer, & Gupta,

2009). For example, the *feminist perspective* of body image proposes that women's body image is affected by systemic gender inequality and gendered power relations (McKinley, 2011), and it has been suggested that an awareness and understanding of these influences might help women to create a healthier relationship with their body (Tylka & Augustus-Horvath, 2011). Further, Martijn, Alleva, and Jansen (2015) proposed that implicit strategies for targeting negative body image, such as evaluative conditioning, might be effective because some of the processes involved in negative body image (e.g., social comparisons) can occur without conscious control. However, discussing topics related to feminism and using evaluative conditioning were each used in only three studies, so we cannot yet conclude whether these techniques (and the other 16 techniques for which $k < 4$) may also prove beneficial for improving body image. Continued investigation of these techniques is therefore needed.

Limitations and Future Directions

The primary limitation of the meta-analytic review concerns bias within and across studies. In Chapter 2, we have outlined recommendations for tackling these biases, such as having meta-analysts routinely test and correct for publication bias and small sample bias (Coyne et al., 2010; Ferguson & Brannick, 2012; Ioannidis, Munafò, Fusar-Poli, Nosek, & David, 2014). It may also be useful to further investigate the causes of bias. For example, publication bias seems to be more a result of researchers not 'having the time' to write and submit articles that are based on nonsignificant data, or viewing such data as "not interesting enough to merit publication" (Sterne, Egger, & Moher, 2011, p. 303), rather than a result of scientific journals rejecting studies with nonsignificant findings (Decullier, Lheritier, & Chapuis, 2005; Hartling, Craig, Russell, Stevens, & Klassen, 2004). Furthermore, the quality of a study is often a reflection of "the best the authors have been able to do" (Liberati et al., 2009, p. 10) with regard to the resources, time, and money available to them. In other words, researchers are simply not always able to conduct studies that are at low risk of bias on all accounts. A related limitation is that the studies included in the review were not reported in sufficient detail (e.g., to determine whether selective reporting of outcomes occurred). Structured guidelines such as the CONSORT Statement (Schulz, Altman, Moher, & the CONSORT Group, 2010) should be followed to ensure that studies are transparently reported. Scientific journals may require submitted articles to conform to such guidelines.

Additional limitations pertain to the samples that were targeted by the interventions and to the methodological features of the studies. Participants were predominantly female and between 18 and 29 years old. Interventions that included men were comparatively rare, as were interventions delivered to children. It will be important to deliver interventions to such samples, considering that negative body image also affects men (Grogan, 2011) and can develop at a young age (Littleton & Ollendick, 2003;

Smolak, 2011). It is also surprising that few interventions were targeted at participants with an eating disorder, body dysmorphic disorder, or who were obese. This limitation has also been noted by other scholars, who have observed that intervention studies with clinical samples "seem to have stagnated in the past decade" (Smolak & Cash, 2011, p. 475). Regarding obesity, this could reflect a broader debate about whether enhancing body image might actually facilitate weight gain – a concern that has "likely been misplaced" (Smolak & Cash, 2011, p. 475) given that, to date, no empirical research has shown that improving body image leads to disengagement in adaptive self-care behaviours (Tylka & Wood-Barcalow, 2015). Renewed research interest in clinical samples is essential. Lastly, the majority of interventions were compared to a passive control group and did not include a follow-up measurement; these features may have also inflated intervention effects. Future interventions should be tested against active control groups and include follow-up measurements.

2. How Can We Improve the Way That Individuals Relate to Their Own Body?

Summary

The remainder of the PhD project focused on improving the way that individuals relate to their own body, as well as how they perceive their own body in relation to the social environment. To answer the question of how we can improve the way that individuals relate to their own body, we investigated the potential influence of focusing on body functionality. Drawing from the objectification theory (Fredrickson & Roberts, 1997), we reasoned that learning to focus on the functionality of the body would lead to improvements in body image. Prior research had only demonstrated a correlational relationship between focusing on body functionality and improved body image (e.g., Avalos & Tylka, 2006; Frisén & Holmqvist, 2010; Wood-Barcalow, Tylka, & Augustus-Horvath, 2010). Therefore, the first two studies of this research line (Chapter 3) aimed to establish a causal relationship between focusing on body functionality and improvements in body satisfaction. To do so, female and male undergraduates (Study 1) and 30 to 50-year-old women (Study 2) completed a brief writing assignment about either their body functionality, physical appearance, or the route that they take to the university or shopping centre (as an active control). Functionality satisfaction, appearance satisfaction, and self-esteem were assessed at pretest, posttest, and one-week follow-up.

In Study 1, male participants who focused on their body functionality experienced an increase in functionality satisfaction immediately after completing the writing assignment. The functionality writing assignment had no effect on female participants. However, female participants who focused on their *appearance* experienced a decrease

in functionality satisfaction. In Study 2, participants who completed the functionality writing assignment experienced improvements in functionality satisfaction from baseline to follow-up. In both studies, no changes were found in appearance satisfaction or self-esteem. Taken together, the findings of these studies indicate that focusing on body functionality can cause improvements in at least one aspect of body image.

In the third study (Chapter 4), we developed a more elaborate programme for training individuals to focus on the functionality of their body. This programme, called *Expand Your Horizon*, involved three structured writing assignments completed over the course of one week. Each writing assignment concerned two different areas of body functionality and required participants to describe the functions that their body is capable of and why those functions are important to them. The *Expand Your Horizon* programme was administered to women with a negative body image. Functionality satisfaction, appearance satisfaction, body appreciation, and self-objectification were measured at pretest, posttest, and one-week follow-up. The results of the study are promising: At both posttest and follow-up, women who completed the *Expand Your Horizon* programme experienced greater improvements in appearance satisfaction, functionality satisfaction, and body appreciation, and greater reduction in self-objectification, compared to women in the control programme. The effect sizes ranged from small to medium magnitude. This study provided evidence that training women with a negative body image to focus on the functionality of their body can improve their body image and reduce self-objectification.

Discussion

One important question derived from this line of research is: By which mechanism(s) does focusing on body functionality lead to improvement in body image? One possibility is that focusing on body functionality improves body image via reducing self-objectification. To reiterate, objectification theory posits that women in western society are valued and evaluated based predominantly on their physical appearance. Women may learn to internalise this view of their body and engage in self-objectification, whereby they value and evaluate *their own body* based predominantly on physical appearance. Self-objectification, in turn, has been shown to cause negative body image (Fredrickson & Roberts, 1997; Moradi & Huang, 2008). Roberts and Waters (2004) stated that focusing on body functionality is "antithetical" to self-objectification: Focusing on body functionality can be equated with seeing the body as active, dynamic, and instrumental, whereas self-objectification can be equated with seeing the body as passive, static, and aesthetic. Training individuals to see their body in terms of functionality should reduce their tendency to engage in self-objectification, and reductions in self-objectification should lead to improvements in body image (Tylka & Augustus-Horvath, 2011). It is also possible that focusing on body functionality may foster body appreciation and – given that self-objectification is maintained by nonappreciative

attitudes toward the body – increased body appreciation may lead to reductions in self-objectification and improvements in body image (Tylka & Augustus-Horvath, 2011). These mechanisms seem to be supported by the findings of Chapter 4, where participants in the *Expand Your Horizon* programme experienced reductions in self-objectification and improvements in body appreciation and body satisfaction. Future studies that test these relations within a mediational model will be useful.

Another potential mechanism concerns *self-complexity*: the number of different aspects that comprise one's self-concept, and the degree of interrelatedness between those aspects (Linville, 1985). An individual high in self-complexity would have a self-concept comprised of many different and independent self-aspects (e.g., PhD student, ballet dancer, photographer, blogger). In contrast, an individual low in self-complexity would have a self-concept comprised of few and interrelated self-aspects (e.g., PhD student, lecturer). Theoretically, high self-complexity could serve as a buffer against stressful events (Linville, 1985; Linville, 1987). For instance, if an individual low in self-complexity receives a rejection letter from a scientific journal, the perceived 'failure' related to that specific self-aspect (e.g., PhD student) may affect his or her overall feelings of self-worth. The same rejection letter received by an individual high in self-complexity, however, would be less likely to cause generalised feelings of self-doubt because the perceived failure in one self-aspect should not "spill over" and affect the many other, unrelated self-aspects (Linville, 1987).

Body image could be studied in terms of self-complexity, as well. We propose the term *body-complexity*, referring to the degree of complexity of the body-schema and the interrelatedness of its aspects. From this perspective, self-objectification in women can be equated with low body-complexity, as women's feelings toward their body are based almost entirely on appearance – and, more specifically, on weight and shape (Tiggemann, 2004). Given that most women cannot possibly achieve the weight and shape prescribed by the current beauty ideal (Grabe, Ward, & Hyde, 2008), perceived failure in that aspect of body image should affect women's overall evaluation of their body. Training women to focus more on the functionality of their body should increase their body-complexity and, consequently, dissatisfaction with aspects of appearance should be less likely to "spill over" and affect overall body image. The fact that body functionality in itself is complex (Webb, Wood-Barcalow, & Tylka, 2015) – comprised of many different and relatively independent aspects (e.g., bodily senses, creative endeavours) – should further contribute to a highly complex body-schema.

It is also possible that body image improved in our studies for reasons that are not directly related to body functionality. For instance, reflecting on the functions of the body, such as the ability to cycle or paint, could highlight the different roles of the self, such as cyclist or artist. In this sense, merely reflecting on different self-aspects might produce benefits, perhaps because individuals learn to base their self-concept on valued domains that are not related to physical appearance (e.g., Stein, Corte, Ding-Geng, Ushapoorna, & Wing, 2013). Focusing on body functionality might also encourage

individuals to reflect on the things that they feel positively about, such as their friends (related to communication with others) or hobbies (related to creative endeavours). In other words, having individuals contemplate favourable aspects of the self might be beneficial, regardless of whether the body is explicitly targeted. However, focusing on the favourable aspects of the self could induce positive feelings overall, but individuals may not realise the centrality of their body with regard to these self-aspects, and thus body image itself might not improve (this could explain why change techniques related to global self-esteem did not prove especially beneficial in Chapter 2). Instead, directly addressing the body might produce the most benefits with regard to body image-related outcomes, especially for individuals with a negative body image.

Limitations and Future Directions

One of the main limitations of this line of research concerns the measurement of body functionality. We have measured satisfaction with body functionality using a visual analogue scale (VAS; Chapter 3) and the Physical Condition subscale of the Body Esteem Scale (Franzoi & Shields, 1984; Chapter 4). The limitation of the VAS item is that it is merely a single item that captures overall feelings of functionality satisfaction. Although the Physical Condition subscale is more comprehensive and derived from a validated questionnaire, it focuses solely on physical capacities, and health and internal processes. A validated questionnaire that captures satisfaction with body functionality in a broader sense does not yet exist (Webb et al., 2015). It will be necessary to develop such a questionnaire to improve and facilitate research on body functionality. Another limitation is that we only included a one-week follow-up measurement, so longer-term follow-ups are needed to determine the persistence of the intervention effects. Furthermore, it would be useful to investigate how the programme affects men with a negative body image, or individuals from other age groups. Lastly, it is difficult to discern whether participants completed the intervention under similar circumstances and whether they spent the required amount of time writing. One solution is to deliver the intervention in a face-to-face manner, but this would need to be weighed against potential disadvantages (e.g., participants may feel less comfortable writing in a lab setting).

Despite these limitations, the present studies point to valuable directions for future research. It will be necessary to investigate the underlying mechanisms of the functionality-based approach to improving body image, such as those concerning body-complexity. Relatedly, it would be insightful to study whether the effects of the approach are related to focusing on body functionality, or to other aspects that are not directly related to the body. Further, analysing the contents of participants' responses to the writing assignments in Study 2 could yield additional insight into body functionality, such as those functions that were viewed especially positively or negatively. Also, Tylka and Augustus-Horvath (2011) have suggested that teaching girls to view

their body in functionality-based terms would be a promising method for preventing the development of negative body image and self-objectification. Longitudinal studies could investigate this prospect.

Additional directions for future research pertain to clinical populations. Negative body image maintains eating pathology and predicts treatment response and relapse in individuals who have developed an eating disorder (Cash & Brown, 1987; Cooley & Toray, 2001 Fairburn, Peveler, Jones, Hope, & Doll, 1993). Thus, the *Expand Your Horizon* programme might benefit individuals with an eating disorder, for example by encouraging them to create a more balanced view of their body that is less dependent on physical appearance. The present research could also be extended to individuals with chronic pain. When suffering from chronic pain, individuals experience a shift from seeing their body as an *enabler* (i.e., allowing them to carry out their desired actions) to a *disabler* (i.e., preventing them from doing the things that they want to do; Bode, 2014; Corbin, 2003). There is evidence that individuals with chronic pain develop a negative body image, and that negative body image is related to greater pain intensity, psychosocial impairments, and reduced treatment adherence (Bode, 2014; see Jolly, 2011, for a review). However, research in this area is lacking, and individuals with chronic pain report feeling that their body image is neglected by medical professionals (Jolly, 2011). Programmes that train individuals to focus on the functionality of their body might help them to create a healthier relationship with their body and might affect additional outcomes such as psychological distress. Individuals with chronic pain could learn to focus on the functions that their body can perform *despite pain* and to focus on the functions that their body can perform that are *not* limited to physical capacities (cf. Webb et al., 2015). Such interventions could complement existing interventions that train individuals to work toward leading a fulfilling life despite pain (e.g., Flink, Smeets, Bergbom, & Peters, 2015; Vowles & McCracken, 2008).

3. How Can We Improve the Way That Individuals Relate to Their Own Body With Regard to the Social Environment?

Summary

To answer the question of how we can improve the way that individuals relate to their own body with regard to the social environment, we focused specifically on covariation bias. Drawing predominantly from the cognitive-behavioural perspective of body image (Cash, 2011), we reasoned that covariation bias – here, overestimating the relation between one's own body and negative social feedback – would reinforce and maintain body image distress, and so diminishing covariation bias might be a potential technique for improving body image. In a first study (Chapter 5), we aimed to establish whether women with a more negative body image demonstrate a covariation bias for

the relation between their own body and negative social feedback. To do so, participants completed a computer task wherein pictures of their own body, a control woman's body, and a neutral object were followed by 'facial crowds' containing equal proportions of negative, positive, and neutral social feedback. Afterward, participants estimated how often their own body, the control woman's body, and the neutral object were followed by each type of social feedback. As predicted, women with a more negative body image estimated higher levels of negative social feedback for their own body. Unexpectedly, women with a more negative body image also estimated lower levels of *neutral* social feedback for their own body. The results were specific for participants' own body (not the control woman's body or the neutral object) and did not depend on participants' mood or on how they judged the facial stimuli (in terms of the emotion portrayed).

In a second study (Chapter 6), we aimed to provide a deeper understanding of the covariation bias, and to determine whether it could be diminished. Participants completed an adapted version of a computer task developed by Pauli, Montoya, and Martz (2001). Pictures of participants' own body, a control woman's body, and a neutral object were followed by negative social feedback or nothing (a white screen). Before starting the computer task, women with a more negative state body image expected their own body to be followed by negative social feedback (demonstrating *a priori* covariation bias). When contingencies were random, women with a more negative trait and state body image perceived both at the present moment (online covariation bias) and retrospectively (*a posteriori* covariation bias) that their own body was followed by more negative social feedback. However, when contingencies were manipulated so that participants' own body was only rarely followed by negative social feedback, the covariation bias was diminished. This change appeared to be temporary: When contingencies returned to random, the covariation bias seemed to re-emerge. Interestingly, all participants experienced an improvement in state body evaluation from before to after manipulation of the covariation bias, and these improvements persisted to the end of the computer task. The findings were specific for the participants' own body (not for the other stimuli) and did not depend on participants' perception of the percentage of trials that were followed by negative feedback, the percentage of trials of each stimulus category, or on their body mass index.

Discussion

The present findings demonstrate that women with a more negative body image show a covariation bias for the relation between their own body and negative social feedback. By investigating covariation bias more closely (Chapter 6), we were also able to show that it exists *preexperimentally* and is not merely formed due to differential processing of stimuli during the computer task. Moreover, the covariation bias seems resistant to disconfirming situational information: Even though there was no relation between

their own body and negative social feedback, women with a negative body image perceived that there was, both online and *a posteriori*. These findings align with the cognitive-behavioural perspective of body image. That is, individuals with a negative body image possess a body-schema that is characterised by negative beliefs, thoughts, and memories about their own body (Altabe & Thompson, 1996; Cash, 2011). Various cues or contexts – such as body-related information, ambiguous stimuli, or "situations that require the person to reflect on themselves, especially their body" (Williamson, White, York-Crowe, & Stewart, 2004, p. 714) – can activate the body-schema, which in turn directs cognitive processing. The body-schema drives cognitive processing in a biased manner that serves to confirm and reinforce negative body image (Williamson et al., 2004). In the current studies, pictures of the participants' own body could have activated their body-schema and, consequently, covariation bias (in those with a more negative body image). Interestingly, although covariation bias appeared resistant to objective situational information, it was possible to diminish the covariation bias (at least temporarily) by reducing the contingency between the participants' own body and negative social feedback. These findings are in line with the notion that *ambiguous* stimuli activate the body-schema and cognitive biases (Williamson et al., 2004) and that covariation bias only occurs when situational information is ambiguous (e.g., Alloy & Tabachnik, 1984; Pauli, Montoya, & Martz, 1996; Pauli et al., 2001).

According to cognitive-behavioural perspectives, cognitive biases occur outside the realm of conscious awareness and individuals experience them as "real" (Williamson, Muller, Reas, & Thaw, 1999; Williamson et al., 2004). Williamson and colleagues (2004) proposed that CBT can draw individuals' attention to their cognitive biases and help them to consciously modify their thought processes to become "more reasonable" (p. 719). Our findings imply that covariation bias is another cognitive bias that could be addressed by CBT, for instance by helping individuals to realise that they perceive their social environment in a biased manner. Yet, it is noteworthy that the present computer task successfully reduced covariation bias and improved state body evaluation even though participants were unaware that such a manipulation was taking place. Therefore, our findings also imply that covariation bias could be addressed implicitly. As aforementioned, implicit strategies to target body image may be useful because negative body image is in part maintained by automatic processes that individuals may be unaware of (Martijn et al., 2012; Martijn et al., 2015). Targeting implicit processes with implicit change techniques might be a promising strategy for intervention. However, one potential barrier, which likely applies to most implicit techniques, concerns implementation. Namely, if implicit techniques are administered to individuals in a treatment setting, they will likely be aware that the techniques aim to improve their body image, or at least to provide some benefit. It will be necessary to explore whether the effects of such techniques are influenced by participants' awareness of their aims.

Lastly, it is important to distinguish covariation bias from other forms of cognitive bias and to explore how other forms of cognitive bias may explain some of the present

findings. *Memory bias* pertains to the phenomenon that individuals encode and recall certain types of information more easily than others (Williamson et al., 2004). Conceptually, *a posteriori* covariation bias may resemble memory bias. In our second study (Chapter 6), women with a more negative body image may have more readily recalled instances where their body was followed by negative social feedback than instances where their body was followed by nothing. However, an important distinction is that *a posteriori* covariation bias pertains to the perceived *relationship* between a stimulus and an aversive outcome, rather than merely the perceived *occurrence* of a particular stimulus.

Relatedly, *attention bias* refers to the tendency to attend to certain types of stimuli more than others, and *interpretation bias* occurs when information is interpreted in a manner that confirms one's self-schema rather than considering other interpretations (Williamson et al., 2004). In the present studies, individuals with a more negative body image may have attended more to the negative social feedback or interpreted it as more severe. However, in our first study (Chapter 5), the social feedback was shown for only 400ms per trial, which should not have allowed participants sufficient time to focus differentially on negative social feedback compared to the positive and neutral social feedback. Given that participants with a more or less negative body image did not differ in their ratings of the facial stimuli, it also seems that interpretation bias does not explain the findings. Nevertheless, in our second study, participants did not rate the facial stimuli, so it is impossible to rule out the potential effects of interpretation bias; attention bias could not have played a role because only negative social feedback was presented. Future research could elucidate whether women with a negative body image display memory, attention, and interpretation biases for negative social feedback, using different experimental paradigms.

Limitations and Future Directions

The main limitations of these studies are as follows. The computer task in our second study was a close replication of the computer task developed by Pauli et al. (2001), and therefore incorporated negative social feedback vs. nothing. A more ecologically valid version of the computer task should also incorporate neutral and positive social feedback, especially considering that we found evidence that women with a more negative body image estimate lower levels of neutral social feedback for their own body (Chapter 5). Further, the effects of the computer task on diminishing covariation bias were brief, so it will be necessary to investigate how the effects can be strengthened. One option is to increase the number of trials in the manipulation block (Block 2). Participants' online covariation estimates consistently decreased across trials in Block 2, and these estimates might have continued to decrease if more trials were delivered. A modulated version of the computer task could be used to investigate this possibility. It is also important to note that after Block 1 and Block 2, participants were reminded

that their task was to determine the relations between the categories of stimuli and the outcomes, and that the relations between the categories of stimuli and the outcomes *may or may not be* the same as in the now-completed block(s). This could explain why covariation estimates seem to have increased at the start of Block 3. Repeating the computer task without these reminders could yield different results. Lastly, it remains to be determined whether the covariation bias pertains to actual (not simulated) social feedback, and whether the findings extend to male participants or to those in other age groups.

In addition to the suggestions for future research that have already been proposed, another potential direction concerns the clinical application of this research. For instance, social feedback is proposed to play a critical role in the development of body dysmorphic disorder (BDD; Rosen, 1996b). Many individuals with BDD report experiences of having received negative social feedback related to their appearance during childhood or adolescence, such as being teased by peers or receiving appearance-related criticism from family members (Rosen, 1996b). These experiences are said to generalise to other social situations, and to foster dysfunctional beliefs about the normality of one's appearance and the importance of appearance for social approval (Rosen, 1996b). These dysfunctional beliefs are strengthened by subsequent avoidance of social situations and selectively focusing on schema-consistent information (Rosen, 1996b; Vitousek & Hollon, 1990). Some scholars have even noted that individuals with BDD are so concerned about how others might evaluate them, that this should be considered a central feature of the disorder (e.g., Anson, Veale, & de Silva, 2012). Taking this into account, it is likely that individuals with BDD have a covariation bias for the relation between their own body and negative social feedback. If so, this covariation bias could play an important role in the maintenance of BDD. Future studies in individuals with BDD could test this idea and investigate whether diminishing covariation bias leads to improvements in BDD symptoms.

Conclusion

How can negative body image be improved? Based on the studies conducted during this PhD project, we can provide the following answers. Overall, existing stand-alone interventions to improve body image have reliable but small effects on body image and negligible effects on internalisation of the beauty ideal and social comparison tendencies. Twelve specific change techniques have proven effective. Several additional features may strengthen intervention effects, such as targeting participants at particularly vulnerable periods of the lifespan. Two specific avenues for improving body image that we have investigated concern the way that individuals relate to their own body (body functionality) and the way that they relate to their own body with regard to the social environment (covariation bias). First, individuals can improve their relationship with

their own body by learning to focus more on its functionality, rather than its appearance, for example with the help of the *Expand Your Horizon* programme. This programme has been shown to improve body satisfaction and body appreciation, and reduce levels of self-objectification. Second, our research has shown that women with a more negative body image overestimate the relation between their own body and negative social feedback. The way that individuals feel about their own body in relation to the social environment can be improved by targeting this covariation bias. Both of these avenues of research show promise for improving body image and warrant further attention.

The studies conducted in this PhD project also provide valuable directions for the future of body image research. To summarise the most important ones, the meta-analytic review identified 12 specific change techniques that are evidence-based and should be considered when designing the content of future interventions. Evidence for bias within and across studies was found, which points to the necessity of executing higher-quality intervention trials (e.g., deploying active control groups) and improving scientific conduct among researchers (e.g., submitting papers regardless of the statistical significance of the findings), journals (e.g., evaluating papers independent of the statistical significance of the findings), and meta-analysts (e.g., routinely testing and correcting for sources of bias). Furthermore, body functionality is an under-researched yet important aspect of body image (Smolak & Cash, 2011). Our research underscores the need for increasing the amount of research on body functionality, such as by elucidating the mechanisms that explain the benefit of focusing on body functionality and investigating how functionality-based programmes can be applied to clinical populations. Lastly, it will be fruitful to investigate the role that covariation bias might play in individuals diagnosed with BDD, and to determine whether (implicitly) targeting covariation bias can induce meaningful improvements in body image.

Summary

Negative body image affects a sizeable percentage of women and men at all stages of the lifespan (Smolak, 2011; Tiggemann, 2004; Tiggemann, 2011). It is a problem in and of itself, but also because it can have serious consequences. For example, negative body image is associated with unhealthy eating behaviour, physical inactivity or (at the other extreme) excessive exercise, low self-esteem, depression, obesity, and the development and maintenance of an eating disorder (Cafri et al., 2005; Grabe, Hyde, & Lindberg, 2007; Grogan, 2006; Johnson & Wardle, 2005; Levine & Piran, 2004; Neumark-Sztainer, Paxton, Hannan, Haines, & Story, 2006; Paxton, Neumark-Sztianer, & Hannan, & Eisenberg, 2006; Tiggemann, 2005). Considering the prevalence and potential consequences of negative body image, it is important to investigate how negative body image can be treated. Therefore, the overarching aim of this thesis was to answer the question: How can body image be improved? This question was divided into the following three sub-questions that guided the research conducted during the PhD project: (1) how is negative body image currently treated – and are existing interventions effective?; (2) how can we improve the way that individuals feel about their own body?; and (3) how can we improve the way that individuals feel about their own body in relation to the social environment?

Chapter 1 described the concept of negative body image as well as its consequences. The central aim of the thesis was presented, along with the three sub-questions that motivated the studies (as aforementioned). Thereafter, the background pertaining to each sub-question was briefly introduced, along with a specification of how it was addressed by the research. At the end of the chapter, an outline of the remainder of the thesis was given.

Chapter 2 concerned research that was carried out to address the first sub-question: How is negative body image currently treated – and are existing interventions effective? The chapter described a meta-analytic review that we conducted both to evaluate the overall effectiveness of extant stand-alone interventions to improve body image, and to identify the *specific change techniques* that improve body image. To do so, we created a taxonomy of 48 change techniques used in stand-alone interventions to improve body image. Studies were only selected if they met strict inclusion criteria, and risk of bias within individual studies (e.g., attrition bias) and across studies (e.g., publication bias) was assessed.

Overall, interventions seemed to produce reliable and small-to-medium improvements in body image. However, evidence was found for bias both within and across studies and, when accounting for these sources of bias, it appeared that interventions produced reliable but *small* improvements in body image. Although interventions appeared to produce reliable reductions in internalisation of the beauty ideal and the tendency to make social comparisons, the effects were no longer reliable once sources of bias were accounted for. In addition, 12 specific change techniques were associated with improvements in body image, and three techniques were contra-indicated. Several features of the sample, intervention, and methodology moderated intervention effects.

The main conclusions of the meta-analytic review were that efforts must be taken to tackle sources of bias in the field of body image research, and the 12 change techniques that were associated with improved body image warrant consideration in designing the content of future interventions. It was also concluded that, in general, interventions must be strengthened to engender larger improvements in body image and to affect secondary outcomes such as internalisation of the beauty ideal and social comparison tendencies.

Chapter 3 described two studies that were conducted to answer the second sub-question: How can we improve the way that individuals feel about their own body? Drawing from the *objectification theory* (Fredrickson & Roberts, 1997), we reasoned that focusing on the functionality of the body (i.e., everything the body can *do*) – rather than on physical appearance – would lead to improvements in body image. Given that prior studies had only demonstrated a correlation between focusing on body functionality and indicators of a healthier body image, it was first necessary to demonstrate that focusing on body functionality can *cause* improvements in body image. To this end, we conducted two experiments with female and male undergraduates (Study 1) and 30 to 50-year-old women (Study 2). Participants in both studies completed a writing assignment wherein they either described the functionality of their body, the appearance of their body, or the route that they take to the university or shopping centre (as an active control). Questionnaires assessing body image (namely, functionality satisfaction and appearance satisfaction) and self-esteem were administered at pretest, posttest, and one-week follow-up.

In Study 1, male undergraduates who described the functionality of their body experienced an improvement in functionality satisfaction from pretest to posttest. In contrast, female undergraduates who described the functionality of their body did not experience any improvements. However, female undergraduates who described the *appearance* of their body felt less satisfied with their body functionality both at posttest and follow-up. In Study 2, 30 to 50-year-old women who described the functionality of their body experienced an increase in functionality satisfaction from pretest to follow-up. In both Study 1 and Study 2, no changes in self-esteem were found. The main conclusion of these studies was that focusing on body functionality can indeed cause improvements in at least one aspect of body image.

Chapter 4 also concerned research that was related to the second sub-question. In the study described in this chapter, we created a one-week intervention programme, called *Expand Your Horizon*, which was designed to train women to focus on the functionality of their body using three structured writing assignments. In contrast to the research described in Chapter 3, this study was conducted in women with a negative body image. Half of the participants completed the *Expand Your Horizon* programme, and the other half completed an active control programme. Functionality satisfaction, appearance satisfaction, body appreciation, and self-objectification were measured at pretest, posttest, and one-week follow-up. Compared to participants in the control

programme, participants in the *Expand Your Horizon* programme experienced greater improvements in functionality satisfaction, appearance satisfaction, and body appreciation, as well as a greater reduction in self-objectification, at posttest and follow-up. The findings demonstrated that focusing on body functionality may be a fruitful technique for improving body image and reducing self-objectification. Future investigations are needed to explore the underlying mechanisms of this approach and to determine the persistence of the effects.

Chapter 5 pertained to research that was conducted to address the last subquestion: How can we improve the way that individuals feel about their own body in relation to the social environment? It is important to consider this question because body image is shaped not only by how individuals feel about their own body, but also by how they think *others* feel about their body (Tantleff-Dunn & Lindner, 2011). Drawing predominantly from the *cognitive-behavioural perspective* of body image (Cash, 2011), it was theorised that individuals may display distortions in cognitive processing that serve to reinforce and maintain negative body image. In particular, the study described in Chapter 5 investigated *covariation bias*: the tendency to overestimate the contingency between a particular stimulus and an aversive outcome (Chapman & Chapman, 1967). We hypothesised that women with a more negative body image would demonstrate a covariation bias for the relationship between their own body (the stimulus) and negative social feedback (the aversive outcome). Such a cognitive bias would reinforce and maintain negative body image, and could thus be a potential target for intervention.

In the first session of the study, participants (female undergraduates) filled in a questionnaire to assess their body image and were photographed from the front and both sides. In the second session, participants completed a computer task wherein pictures of their own body (taken at the first session), a control woman's body, and a neutral object were followed by 'facial crowds' consisting of equal proportions of negative, positive, and neutral social feedback. At the end of the computer task, participants estimated the relation between each category of pictures and the different types of social feedback. As predicted, the results showed that women with a more negative body image estimated higher levels of negative social feedback for their own body, but not for the control woman's body or the neutral object. Unexpectedly, women with a more negative body image also estimated lower levels of *neutral* social feedback for their own body. In sum, the findings provided initial evidence that women with a more negative body image display a covariation bias for the relation between their own body and negative social feedback.

Chapter 6 described a study that was also conducted to address the last subquestion. The aim of this study was to develop a more fine-grained understanding of the covariation bias established in Chapter 5, and to determine whether it could be diminished. The first session of this study was identical to the first session described in Chapter 5. In the second session, participants (female undergraduates) completed a

computer task that was based on a computer task developed by Pauli, Montoya, and Martz (2001). Pictures of the participant's own body, a control woman's body, and a neutral object were followed by negative social feedback (a picture of a frowning face) or nothing (a white screen). Throughout the computer task, participants estimated the relation between each category of picture and the negative social feedback, and filled in a measure of state body evaluation (i.e., state appearance satisfaction or dissatisfaction).

Before the start of the computer task, women with a more negative state body image expected that their body would be followed by higher levels of negative social feedback (demonstrating *a priori* covariation bias). Moreover, when the relationship between the categories of pictures and negative social feedback was random, women with a more negative trait and state body image estimated both at the present moment (online covariation bias) and retrospectively (*a posteriori* covariation bias) that their own body was followed by higher levels of negative social feedback. When contingencies were manipulated so that pictures of the participants' own body were only rarely followed by negative social feedback, covariation bias was temporarily diminished. All participants experienced improvements in state body evaluation from before to after manipulation of the covariation bias. It was concluded that covariation bias exists *preexperimentally* and seems resistant to disconfirming situational information (as evidenced by online and *a posteriori* covariation bias). It was also concluded that diminishing covariation bias could be a useful technique for improving body image, but future research will need to confirm the present findings and strengthen the effects of the computer task.

Chapter 7 provided a general discussion of the research presented in Chapter 2 to Chapter 6. For each sub-question, and its subsequent line of research, the key findings were first summarised. Important discussion points as well as the main limitations and future directions pertaining to each sub-question were then presented. Chapter 7 concluded with a summary of the answers that the PhD project provided to the question of how body image can be improved. In brief, it was concluded that the 12 effective change techniques identified in the meta-analytic review should be considered when designing the content of future stand-alone interventions to improve body image, and that the additional moderating features should also be considered. Furthermore, it was also concluded that the way that individuals feel about their own body can be improved by training them to focus more on the functionality of their body. Lastly, our research revealed that women with a more negative body image overestimate the relation between their own body and negative social feedback. Therefore, the way that individuals feel about their own body in relation to others can potentially be improved by targeting this bias.

Valorisation

In the context of academic research, *valorisation* refers to creating value from scientific knowledge that can benefit or be utilised by individuals outside of the academic setting. The research conducted in the present PhD project lends itself excellently to valorisation. In this chapter, we focus specifically on two areas that we think will profit the most from the present research: clinical practice, and (scholar) activism.

Valorisation for Clinical Practice

Given that body image is a "core feature" of physical and psychological health (Grabe, Ward, & Hyde, 2008), improving body image may be of interest to a broad range of practitioners. For example, negative body image predicts weight gain and physical inactivity, (e.g., Grogan, 2006; van den Berg & Neumark-Sztainer, 2007), and a recent study has shown that a healthy body image is the strongest predictor of healthy weight loss and maintenance (Santos, Malta, Silva, Sardinha, & Teixeira, 2015). At the present moment, we are collaborating with the *Dutch Obesity Clinic* (in Dutch: *Nederlandse Obesitas Kliniek*; NOK) to test whether a tailored variant of the *Expand Your Horizon* programme (described in Chapter 4) can help morbidly obese individuals to develop a healthier relationship with their body. Focusing on what their body can do might be especially beneficial for these individuals, as they have a very negative body image and may be accustomed to thinking of their body solely in terms of weight and shape (Schwartz & Brownell, 2004). Moreover, with regard to body functionality, they might be used to thinking of what their body *cannot* do in terms of physical activity and movement. Focusing on what their body can still do – *despite* their weight – and on body functionality in the broader sense, might be beneficial.

The plan for the study is to recruit approximately 70 morbidly obese individuals from the NOK. Half of the participants will receive the intervention programme, and half of the participants will be placed on a waiting list. The programme will be administered online, and will take place over the course of one week. Measures of body image (e.g., body satisfaction, body appreciation) – as well as secondary outcomes such as self-esteem and body weight – will be measured at pretest, posttest, one week follow-up, and three month follow-up. The study is currently in the preparation phase, and testing is scheduled to begin in the autumn of 2015. The NOK has expressed interest in implementing the programme into their existing treatment protocol if it is proven effective.

In addition to this collaboration with the NOK, our research group is currently working with *Accare*, an institution for children and adolescents with psychiatric illnesses. At Accare, some of the intervention techniques developed by our research group will be tested in children and adolescents with an eating disorder. For example, the evaluative conditioning paradigm developed by Martijn and colleagues (e.g., Martijn, Vanderlinden, Roefs, Huijding, & Jansen, 2010; see also Aspen et al., 2015) will be

one of the techniques tested, and will teach participants to associate accepting, positive social feedback with their own body. The research described in Chapter 5 and Chapter 6 of this thesis might be a beneficial addition to further change how these individuals perceive social feedback in relation to their own body. Furthermore, given that individuals with an eating disorder tend to place an inordinate amount of importance on their body weight and shape (Crowther & Williams, 2011; Delinsky, 2011), they might also benefit from a programme that teaches them to focus more on the functionality of their body, instead. It is hoped that the existing collaboration with Accare will provide ample opportunity to test these ideas in the coming two years.

Lastly, as mentioned in Chapter 3, an additional clinical application of the *Expand Your Horizon* programme concerns individuals with chronic pain. Treatment of negative body image in individuals that suffer from chronic pain is currently an unfilled niche, and these individuals report feeling that their body image concerns are neglected by medical professionals (Jolly, 2011). Given that chronic pain can elicit a *body-self split* – where individuals begin to see their body as a disabler (vs. enabler) and focus on what their body *cannot* do (Bode, 2014; Corbin, 2003) – learning to focus on what one's body can do in the broader sense (i.e., not limited to physical capacities) and *despite pain* may be beneficial. During the PhD project, we have explored the possibility of administering a variant of the *Expand Your Horizon* programme to young women with chronic pain, as a compliment to their current treatment programme. We currently have contact with a colleague that works at Maastricht University and the academic hospital of Maastricht who is interested in collaborating on such a project. Further details about this potential collaboration will be discussed at the beginning of 2016.

Valorisation for (Scholar) Activism

In recent years, body image has been a topic that the general public has considered relevant and interesting. For example, *Kellogg's*, a multinational food manufacturing company, launched their "Shhhhut Down Fat Talk" campaign, with world-renowned supermodel and actress Tyra Banks as spokeswoman. The aim of this campaign is to reduce *fat talk*, a form of conversation or self-talk that focuses on appearance and is judgemental and evaluative in nature (e.g., "I'm so fat!" or, "I should skip meals to help me lose weight;" Arroyo & Harwood, 2012, p. 173). In addition, another multinational company, *Unilever*, launched the "Dove Campaign for Real Beauty," which aims to encourage women to celebrate their own body and to broaden society's conceptualisation of beauty. Both campaigns have been very successful and continue to receive worldwide attention; they have garnered both praise (e.g., for going against the current beauty ideal) and criticism (e.g., both companies may merely be using a positive body image approach as a marketing strategy to sell more products). Regardless of whether

they have been wholly positively received, the campaigns have sparked public discussion and raised awareness about issues related to body image.

Even without the money and resources of a multinational company, however, the research covered in this PhD project can be successfully translated to the general public, and may further contribute to ongoing discussions about body image. During the PhD project, I have maintained my own blog where I write about research studies in the field of body image. The primary aim of the blog is to translate research findings into knowledge that is relevant and understandable for a broader public. After posting the blog entries, they are shared via social media such as Facebook and Twitter. On several occasions, the blog entries have sparked lively discussions and were shared by many people. Some readers have even expressed gratitude that certain topics were covered that they considered especially helpful (e.g., body image issues in men). In addition to my own blog, I have recently been selected to join *About-Face*'s team of writers. About-Face is a blog that is based in the United States, and features articles that focus on issues related to body image and media. About-Face has a broad readership, and many popular outlets (e.g., a website, social media pages), so my blog entries will reach a wider audience. I plan to write blog entries that relate to issues in the media and that are also grounded in research (e.g., an experimental study that tests the notion that "thinness sells").

Lastly, at the time of the PhD defence, a press release about the PhD research will be sent to various media outlets. We plan to do interviews with journalists from these media outlets in order to ensure that the research findings are disseminated to the general public. Some examples of the specific findings that readers or viewers may find interesting are that learning about body image and reducing negative body language (e.g., fat talk) can be beneficial (Chapter 2), focusing on body functionality (instead of physical appearance) can foster body satisfaction and body appreciation (Chapter 4), and that women with a negative body image may misperceive the amount of negative social feedback that their body receives (Chapter 5 and Chapter 6).

Taken together, it is hoped that these combined efforts in the areas of clinical practice and scholar activism will help the PhD research benefit individuals outside of the academic setting.

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Curriculum Vitae

Jessica Marie Alleva was born on January 5th, 1987, in Windsor, Ontario, Canada. She graduated from St. Joseph's Catholic High School in 2005, with best overall grade of her graduating year. Jessica then moved to London, Ontario, to complete courses in political sciences, international relations, psychology, French, and Spanish, at Huron University College. In 2006, Jessica moved to Middelburg, the Netherlands, to complete a Bachelor of Science – with a major in biomedical sciences and a minor in literature – at the Roosevelt Academy. During her bachelor programme, Jessica completed an internship at the Maternity and Gynaecology Ward of *Ziekenhuis Walcheren* (Hospital of Walcheren), under the supervision of Dr. Bert Gerritsen and Angelique Schalkwijk (RN). She also served as the Vice-President of the Roosevelt Academy Medical Affairs Committee. She graduated in 2009 with best overall grade of her graduating year.

In 2009, Jessica received the Huygens International Talent Scholarship from the Nuffic Organisation. This allowed her to complete the Research Master in Psychopathology at Maastricht University in Maastricht, the Netherlands. As part of the master programme, she conducted a clinical internship at the Anxiety and Psychotrauma Division of PsyQ, in Heerlen, the Netherlands, under the supervision of Dr. Bea Beckers and Dr. Chantal Dolmans. Her main activities focused on cognitive-behavioural therapy for clients with an anxiety disorder. At PsyQ, she also conducted a study investigating the impact of comorbidity on the treatment of social anxiety disorder. In addition to her clinical internship, Jessica completed a research internship at Maastricht University, under the supervision of Prof. Arnoud Arntz and Dr. Marisol Voncken. Her experiment investigated the impact of perceived responsibility on hand washing behaviour in individuals with obsessive compulsive disorder. Jessica also worked as a research assistant for Prof. Jacques van Lankveld and Dr. Marieke Dewitte, concerning a project on the role of liking vs. wanting in sexual arousal.

After graduating in 2011, Jessica started a PhD project in the Eating Disorders and Obesity Group at Maastricht University, under the supervision of Dr. Carolien Martijn, Prof. Anita Jansen, and Prof. Paschal Sheeran. Her research focused on interventions and change techniques for improving body image. In 2013, she spent two months at Sheffield University to work on her meta-analytic review of body image interventions, under the supervision of Prof. Paschal Sheeran, Dr. Thomas Webb, and Dr. Eleanor Miles. Later that year, she visited the research group of Prof. Barr Taylor at Stanford University to complete a collaborative research article. Jessica also received a bursary from the British Feeding and Drinking Group (BFDG) to present her research at the 2012 BFDG Research Meeting, and she received an award for the Best Presentation at the 2013 Faculty of Psychology and Neuroscience Research Day at Maastricht University. During her PhD, Jessica also gained extensive teaching experience and in 2015 she received her Basic Teaching Qualification Certificate. She has also gained experience as a reviewer for several scientific journals, such as Appetite and the European Archives of Psychiatry and Clinical Neuroscience. As of September,

2015, Jessica has been working as a post-doctoral fellow in the Eating Disorders and Obesity Group at Maastricht University, under the supervision of Dr. Carolien Martijn and Prof. Anita Jansen. Since 2015, she has also been a regulator contributor to the About-Face Blog, on current issues related to body image and media.

Publications

Alleva, J. M., Martijn, C., & Jansen, J. (2016). Covariation bias in women with a negative body evaluation: How it is expressed and can it be diminished? *Journal of Behaviour Therapy and Experimental Psychiatry, 50,* 33-39. doi: 10.1016/j.jbtep. 2015.04.012

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,* e0139177. doi:10.1371/journal.pone.0139177

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Alleva, J. M. (2014). Lichaam is meer dan uiterlijk: Het belang van lichaamsfunction-aliteit [The body is more than its appearance: The importance of body functionality]. *De Psycholoog, 49,* 50-57.

Alleva, J., Jansen, A., Martijn, C., Schepers, J., & Nederkoorn, C. (2013). Get your own mirror: Investigating how strict eating disordered women are in judging the bodies of other eating disordered women. *Appetite, 68,* 98-104. doi: 10.1016/j.appet.2013.04.015

Martijn, C., **Alleva, J.**, & Jansen, A. (2012). "Help, Ik ben zo lelijk!" Nieuwe interventies om tevredenheid met eigen uiterlijk te vergroten ["Help! I'm so ugly!" New interventions to improve body satisfaction]. *De Psycholoog, 47,* 10-18.

Manuscripts Submitted or in Preparation

Alleva, J. M., Veldhuis, J., & Martijn, C. (2015). Focusing on body functionality as protection against the potential negative effects of thin-ideal media images. Manuscript under review.

Veldhuis, J., & **Alleva, J. M.** (2015). Profiling the 'Typical Selfie-Maker' and investigating the impact of selfie-behaviour on body image and self-objectification. Manuscript in preparation.

Conference Presentations

Alleva, J. M. (2015, November). Covariation bias in vrouwen met een negatief lichaamsbeeld [Covariation bias in women with a negative body image]. Presentation at the annual conference of the Vereniging voor Gedragstherapie en Cognitieve Therapie [Organisation for Behavioural Therapy and Cognitive Therapy]; Veldhoven, the Netherlands.

Alleva, J. M. (2015, August). "What can my body do?" The importance of focusing on body functionality for a healthy body image. Presentation at the 2015 APA Annual Convention; Toronto, Canada.

Alleva, J. M. (2015, August). A meta-analytic review of interventions designed to improve body image. Poster presented at the 2015 APA Annual Convention; Toronto, Canada.

Alleva, J. M. (2015, January). A meta-analytic review of body image interventions. Poster presented at the Faculty of Psychology and Neuroscience Research Day; Maastricht, the Netherlands.

Alleva, J. M. (2014, July). Affecting body satisfaction by describing the body in functionality terms. Presentation at Appearance Matters 6; Bristol, England.

Alleva, J. M. (2014, July). Seeing ghosts: Negative body image predicts overestimation of negative social feedback. Poster presented at the 17th General Meeting of the European Association of Social Psychology; Amsterdam, the Netherlands.

Alleva, J. M. (2014, January). Body dissatisfaction predicts overestimation of negative social feedback. Poster presented at the Faculty of Psychology and Neuroscience Research Day; Maastricht, the Netherlands.

Alleva, J. M. (2013, November). Lichaamstaal [Body language]. Presentation at the annual conference of the Vereniging voor Gedragstherapie en Cognitieve Therapie [Organisation for Behavioural Therapy and Cognitive Therapy]; Veldhoven, the Netherlands.

Alleva, J. M. (2013, January). What are you looking at? Investigating the effect of body dissatisfaction on estimation of (negative) social feedback. Presentation at the Faculty of Psychology and Neuroscience Research Day; Maastricht, the Netherlands.

Alleva, J. M. (2012, October). Novel strategies to increase body satisfaction. Presentation at Beauty: Common versus Contest; Antwerp, Belgium.

Alleva, J. M. (2012, March). Body language: The differential impact of describing the body in terms of appearance or functionality. Presentation at the British Feeding and Drinking Group Research Meeting; Brighton, England.