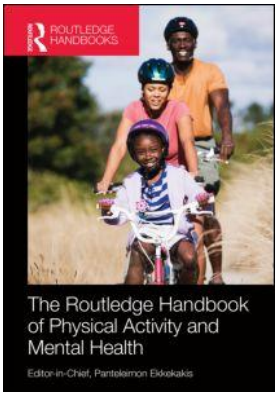

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PHYSICAL ACTIVITY AND BODY IMAGE

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The uptake of products, services, and informational resources devoted to helping men and women change and feel better about their bodies is staggering. For instance, the weight loss market in the United States alone is estimated to be over $60 billion per annum (Marketdata, 2011). Americans spend roughly $10 billion per year on cosmetic surgery (Fast facts, 2011). In addition, newsstands, grocery checkouts, and convenience stores are flooded with fitness and health magazines that are filled with stories and advertisements promoting strategies for physical self-improvement. Together, these examples attest to the importance—and fragility—of men's and women's body image within contemporary society.

Body image is defined as "the multifaceted psychological experience of embodiment, especially but not exclusively one's physical appearance" (Cash, 2004, p. 1), and reflects how people think, feel, see, and act toward their own bodies. Data derived from large-scale surveys indicate that rates of body image dissatisfaction are high among men and women living in westernized societies. For example, in 2006, an online survey (Frederick, Peplau, & Lever, 2006) of over 50,000 men and women revealed that only 54 percent of men and 41 percent of women felt "good" or "great" about their bodies. The remainder felt that their bodies were "just okay" or even unattractive.

These statistics are frequently cited as evidence of the prevalence of negative body image. However, it can be misleading to define "negative body image" solely in terms of body dissatisfaction. Such an approach fails to take into account the psychological significance and consequences of negative body image evaluations. Indeed, many people may be dissatisfied with their appearance, but their dissatisfaction does not necessarily impact their emotional well-being or daily functioning. In this chapter, we use the term "body image disorder" to refer to situations when body image concerns are persistent and result in some degree of impairment in psychosocial functioning, social activities, or occupational functioning (cf. Cash, Phillips, Santos, & Hrabosky, 2004). We interchangeably use "negative body image," "poor body image," and "body image disturbance" to capture the various multidimensional manifestations of a negative body image (e.g., body dissatisfaction, social physique anxiety, inaccurate perceptions of body shape or size).

We begin this chapter by discussing the role of body image in mental health. We then discuss both the positive and negative effects of exercise on body image. The chapter concludes with commentary regarding limitations of the extant research and some proposed future directions.

Body image and mental health

The mental health implications of a negative body image and body image disorders cannot be overstated. Poor body image has been linked to low self-esteem, is believed to be a cause of depression and anxiety, and plays a significant role in the etiology of psychiatric disorders such as eating disorders and muscle dysmorphia.

Self-esteem

Body image is an important contributor to global self-esteem such that people who feel better about their bodies tend to feel better about themselves overall. A positive relationship between body image and self-esteem has been demonstrated in studies of adolescents (Davison & McCabe, 2006) and adults (Davison & McCabe, 2005). However, because physical appearance is more central to the self-esteem of girls/women than to boys/men, body image tends to be a stronger predictor of global self-esteem in the former population than the latter (cf. Gentile et al., 2009). It is unclear whether a poor body image lowers self-esteem or if lowered self-esteem leads to poor body image. It is possible that the direction of the relationship varies at different points in development (Cash & Smolak, 2011).

Depression and anxiety

Depressed and anxious individuals view their appearance more negatively than do nondepressed and nonanxious individuals, even after controlling for actual differences in body weight and shape. The association between body image and emotional well-being has been demonstrated in both male (e.g., Olivardia, Pope, Borowiecki, & Cohane, 2004) and female (e.g., Cohen & Esther, 1993) samples. Although most studies have focused on adolescents, there is some evidence that this relationship persists into adulthood (e.g., Lichtenberger, Martin Ginis, MacKenzie, & McCartney, 2003). Preliminary data suggest that poor body image is a cause, rather than consequence, of increased depression (Paxton, Neumark-Sztainer, Hannan, & Eisenberg, 2006) and anxiety (Stice & Whitenton, 2002), such that having a poor body image may compromise emotional well-being.

Eating disorders

Body image disturbance is a risk factor for the development and relapse of eating disorders and is a key feature of eating disorder symptomatology (Polivy & Herman, 2002). For example, individuals diagnosed with anorexia nervosa or bulimia nervosa report greater body image dissatisfaction and more distorted body image perceptions than the general population (e.g., Cash & Deagle, 1997).

Muscle dysmorphia

Muscle dysmorphia (MD) is a psychiatric condition characterized by a preoccupation with, and inaccurate beliefs about, one's muscularity (Phillips, O'Sullivan, & Pope, 1997). Not surprisingly, given societal differences in the body image ideals for men versus women, MD is more prevalent among men (Olivardia, 2001). In addition to expressing greater body dissatisfaction, men with MD tend to be more preoccupied with their appearance (i.e., spend more time thinking about their muscularity), engage in more appearance checking behaviors, and are more likely to

experience bodybuilding dependence (i.e., compulsive and excessive weight-lifting) than those without the condition (Cafri, Olivardia, & Thompson, 2008).

Using exercise to improve body image

Given the importance of body image to mental health, it is important to identify effective interventions to treat body image disorders and disturbances. Psychosocial interventions such as cognitive-behavioral therapy and experiential therapies (e.g., hypnotherapy, art therapy) are most commonly applied. However, there is evidence to suggest that exercise may be just as effective (Fisher & Thompson, 1994).

Three meta-analyses have examined the effects of exercise training interventions on body image (Campbell & Hausenblas, 2009; Hausenblas & Fallon, 2006; Reel et al., 2007). Overall, the average effect sizes were all statistically significant, and ranged from .29 in the largest and most rigorous meta-analysis to .47 in the smallest and methodologically weakest meta-analysis. Although the magnitude of these effects may not seem particularly impressive, the meta-analyses included studies that varied tremendously in overall methodological quality and rigor. Variability along these dimensions will impact the effects observed in individual studies and the average effect size across studies. Nevertheless, the results yield a consistent message: exercise has significant, positive effects on body image.

What remains unclear, however, is *how* exercise improves body image. An understanding of underlying mechanisms is crucial to the development of exercise programs that maximize improvements in body image. One possibility is that exercise alleviates the psychological comorbodities associated with a poor body image (e.g., depression, anxiety, low self-esteem) and, in turn, alleviates body dissatisfaction. Indeed, Fox (2000) has suggested that exercise improves body image by eliciting an undetermined psychophysiological mechanism that enhances mood and positive self-regard. To date, this hypothesis has been largely untested. Rather, most research has focused on three putative mechanisms: actual changes in physical fitness, perceived changes in fitness, and changes in self-efficacy.

Actual and perceived changes in physical fitness

Physical fitness encompasses body composition, cardiorespiratory endurance (aerobic fitness), muscular strength and endurance, flexibility, and the ability to perform functional activities such as those required for activities of daily living. It is often assumed that exercise improves body image through its effects on body composition—specifically through reductions in body fat and increases in muscle mass. Indeed, changes in body composition are the most frequently studied mechanism of exercise-induced body image change. However, a review of 11 exercise interventions that included measures of body composition change (Martin Ginis, Bassett, & Conlin, 2012) revealed that only six studies produced a statistically significant relationship between such changes and body image improvements. Furthermore, body composition change accounted for less than 15 percent of the variance in body image change, indicating that it plays a relatively minor role in body image improvements.

Changes in strength and cardiovascular fitness also seem to be minimally related to changes in body image. Martin Ginis and colleagues (2012) reported that only four published interventions examined the association between strength change and body image change, and only two yielded a significant association. Likewise, of six interventions that measured cardiovascular fitness change, only one found fitness changes to be associated with body image improvements. When significant

relationships have emerged, changes in aerobic fitness and strength have accounted for only modest variance (typically less than 20 per cent).

One explanation for these findings is that absolute improvements in fitness are not as important as the exerciser's *interpretation* of those improvements. For instance, some people may experience large improvements in body image after losing relatively small amounts of fat and/or gaining minute amounts of muscle mass, while others may remain body dissatisfied despite losing considerable fat and/or significantly increasing their lean muscle mass. Body image responses to the physical changes will depend on whether the individual has moved closer to his/her body ideal. In short, *perceptions* of changes in fitness likely play a more important role than *actual* fitness changes when determining the effects of exercise on body image.

A recent exercise training study (Martin Ginis, McEwan, Josse, & Phillips, 2012) examined the relative importance of perceived versus actual fitness changes for body image change. Participants were 97 overweight and obese women involved in a 16-week diet, aerobic, and strength-training intervention. The investigators measured change in body image, and perceived and actual changes in aerobic fitness, strength, and body composition. Hierarchical regression analyses revealed that actual fitness changes accounted for just 9 percent of the variance in changes in body satisfaction while perceived fitness changes accounted for an additional 38 percent. In this sample of women, perceived fitness improvements were more relevant to body image change than actual improvements. Men's body image also seems to be more influenced by perceived than actual fitness improvements. Researchers (Martin Ginis, Eng, Arbour, Hartman, & Phillips, 2005) examined the extent to which perceived and actual changes in muscularity, strength, and body fat were related to men's body image improvements following a 5-day-per-week, 12-week strength training program. Changes in all three types of fitness perceptions—but none of the objective fitness measures—were significantly associated with changes in body image. Taken together, these results suggest that body image is most likely to improve when exercisers perceive a meaningful transformation in their physique and their physical capabilities.

Changes in self-efficacy

Self-efficacy refers to beliefs in one's capabilities to organize and execute the activities required to produce a given outcome (Bandura, 1997). Research has shown conclusively that exercise training programs increase physical self-efficacy (McAuley, Mailey, Szabo, & Gothe, Chapter 14, this volume). Such changes reflect an increased sense of personal control and mastery over one's body that, in turn, can bolster body image (Lindwall & Lindgren, 2005).

In their review, Martin Ginis, Bassett and colleagues (2012) identified three intervention studies that tested the relationship between self-efficacy change and body image change. Significant relationships emerged in all three studies and the predictive strength of self-efficacy was greater than the predictive strength of various objective measures of physical fitness such as body fat and aerobic fitness. More recently, Martin Ginis and colleagues (2012) found that although self-efficacy accounted for a significant 3 percent of the variance in body satisfaction change after controlling for actual fitness changes, perceived fitness improvements explained an additional 38 percent of the variance beyond self-efficacy.

Once again, the evidence suggests that when it comes to using exercise to improve body image, actual changes in physical abilities are not nearly as important as the experience and interpretation of those changes. However, an important caveat is that virtually all of this evidence is based on studies that measured changes in mechanism variables and changes in body image variables at the same time-point (i.e., at the end of the study). Such designs and analyses preclude any causal interpretations; prospective designs and meditational analyses are needed to establish

firm conclusions regarding the mechanistic role of perceived fitness and self-efficacy for driving body image change.

Moderators of the effects of exercise on body image

The meta-analytic reviews have produced mixed evidence as to whether the effects of exercise on body image are moderated by characteristics of the exerciser (e.g., sex, age, gender-role orientation) and the exercise intervention (e.g., type, intensity, frequency). For instance, regarding a participant's sex as a moderator, the most recent meta-analysis found no significant differences in the effects of exercise on body image for men and women (Campbell & Hausenblas, 2009), whereas a previous meta-analysis found a larger effect for women (Hausenblas & Fallon, 2006). Similarly, regarding age as a moderator, the most recent meta-analysis yielded larger effects for older adults than youth (Campbell & Hausenblas), whereas a previous meta-analysis produced the opposite finding (Hausenblas & Fallon). With regard to exercise characteristics, the results of an intervention comparing aerobic and resistance exercise (Tucker & Mortell, 1993) produced superior body image effects for resistance training whereas the meta-analytic data (Campbell & Hausenblas) suggest the effects of the two modalities are equivalent.

Such equivocal findings suggest that other factors may be at play. Specifically, we propose that the exerciser's *body image ideals* supersede moderators such as age, sex, and exercise characteristics. For example, an individual with a body image goal of gaining muscle mass (typically produced through an intensive strength-training program) may experience little change in body image following a 6-week aerobic exercise program (typically resulting in little or no gain in muscle mass). Alternatively, an individual with a body image goal of losing body fat may experience significant improvements in body image following the same 6-week aerobic exercise program. Consistent with this perspective, preliminary data (Martin Ginis, McEwan et al. 2012) indicate that greater progress toward one's goals is associated with greater increases in body satisfaction.

We also propose that variables that have been considered moderators of the exercise–body image relationship may actually be moderators of *body image goals*. For instance, body image ideals are known to vary between the sexes, across cultures, and as a function of age and gender roles. Such variability may explain why the same exercise program can have a different effect on the body image for individuals drawn from different populations. Likewise, the explanation that body image goals are a key underlying moderator may help explain why different types (e.g., aerobic versus anaerobic), intensities, and amounts of exercise can differentially impact body image. Again, depending on the individual's body image goals, a given type and amount of exercise may be sufficient to improve body image for some, and insufficient for others.

Exercise and body image: the dark side

For some individuals, exercise may exacerbate body image concerns. For example, people who are motivated to exercise primarily for appearance-related reasons (e.g., weight control) are more likely to develop body image disturbance than those who exercise for other reasons (e.g., health, enjoyment; Strelan & Hargreaves, 2005). Likewise, attainment of personal fitness goals may generally lead to body image improvements (Martin Ginis, Bassett et al., 2012), but unrealistic expectations for body appearance change may exacerbate body image concerns in exercisers who do not perceive progress toward their goals. In addition, the pursuit of unrealistic body change goals can lead to excessive exercise.

Excessive exercise, also known as exercise dependence syndrome, is characterized by exercise that is uncontrollable, extreme, and obsessive and results in negative physiological and/or

psychological symptoms (Hausenblas & Symons Downs, 2002). With primary exercise dependence, exercise is performed simply for the sake of exercising. With secondary dependence, exercise is used as a strategy to control body composition (Pierce, 1994). For individuals who are highly body dissatisfied, the compulsive need to exercise can control their lives. In some instances, self-regulatory behaviors that are normally considered positive and facilitative—such as scheduling exercise into one's day or setting exercise goals—can become obsessive and a concomitant of body image disturbance (e.g., Courtney, Munroe-Chandler, & Gammage, 2009).

Because men and women have different body ideals, excessive exercise behaviors typically differ between the sexes. For women, striving to achieve the societal ideal of a lean and thin body often involves calorie-burning activities (e.g., running). For men, striving to achieve the ideal of a muscular and lean body typically involves muscle-building activities (e.g., strength training). Regardless of exercise type, excessive activity can lead to physical (e.g., neuroendocrine system imbalances, suppression of the immune system; Fry, Morton, & Keast, 1991) and psychological problems (e.g., mood disturbances; Raglin, 1990).

The combination of body image disturbance and excessive exercise is particularly dangerous. This combination often presents itself in women with eating disorders such as anorexia nervosa—a disorder that can damage virtually every organ in the body and be fatal (Crow et al., 2009). Indeed, it is estimated that 40–80 percent of women with clinical eating disorders are also compulsive exercisers (Davis et al., 1997). In men, the combination of excessive exercise and body dissatisfaction is a risk factor for steroid use—a behavior linked to numerous physiological (e.g., increased risk for cardiovascular disease and liver disease) and psychological health problems (e.g., psychotic and manic episodes, depression; Cafri et al., 2005).

Interestingly, steroid use does not necessarily improve body image. Studies of recreational weightlifters have shown that those who use anabolic steroids tend to feel worse about their appearance than those who do not (Kanayama, Pope, Cohane, & Hudson, 2003). This finding raises the possibility that men with body image disturbance may be drawn to exercise-related activities that they believe will bring them closer to their body ideals. In support of this notion, Hildebrandt and colleagues (2006) found that over 70 percent of weightlifters had a body image disturbance and nearly 17 percent met the DSM-IV-TR criteria for body dysmorphic disorder (BDD)—a psychiatric disorder characterized by excessive preoccupation with a perceived defect of one's body. Given that only 1.4 percent of men in the general population meet the criteria for BDD (Rief, Buhlmann, Wilhelm, Borkenhagen, & Brahler, 2006), it seems that a disproportionately large number of men with BDD engage in weightlifting. Taken together, research on individuals with clinical body image disturbances (e.g., BDD) and related psychiatric disorder (e.g., anorexia nervosa) suggests that in these clinical populations, other forms of body image therapy (e.g., cognitive-behavioral and experiential therapies) may be more appropriate than exercise.

Limitations and future directions

In this section, we discuss key issues to be addressed in future research as well as some limitations of the existing research.

Theory development

As outlined in this chapter, there is still much to be learned about the mechanisms by which exercise exerts its effects, and the conditions when exercise is most versus least effective for eliciting body image improvements. A primary hindrance to the study of mediators and

moderators has been the lack of an explicit model or framework to guide exercise and body image research. Currently, there are no frameworks explicitly designed to explain the effects of exercise on body image, although some investigators have couched their studies and hypotheses in complementary frameworks such as Bandura's (1997) Social Cognitive Theory and the Exercise and Self-Esteem Model (EXSEM; Sonstroem & Morgan, 1989). Recently, Martin Ginis, Bassett et al. (2012) developed a very basic model to help body image researchers select measures of putative mediator and moderator variables to be included in exercise training studies (see Figure 15.1). Testing relationships in this model will be vital to developing a theory to account for the effects of exercise on body image.

The dose–response relationship

Epidemiological data indicate that with larger volumes of exercise come greater improvements in health and larger reductions in disease risk (Warburton, Katzmarzyk, Rhodes, & Shephard, 2007). It is not known if a similar dose–response relationship exists between exercise and body image. To date, the relationship has been examined primarily through meta-analyses. Of the four exercise prescription components (frequency, intensity, type, time), only intensity has shown a positive relationship with body image change (Hausenblas & Fallon, 2006; Reel et al., 2007). The meta-analytic evidence indicates that body image benefits are greater for moderate- than mild-intensity exercise, but no additional benefits are incurred with heavy-intensity exercise (Campbell & Hausenblas, 2009; Hausenblas & Fallon, 2006). Within individual studies, the few investigations that have tested for a dose–response relationship have yielded mixed results. A couple of studies have shown greater participation leads to greater body image improvements, while other studies have found no such relationship (for a review, see Martin Ginis, Bassett et al., 2012). Clearly, there is a need to further examine dose–response effects to determine how much exercise is necessary to obtain short- and long-term body image improvements. Furthermore, given the potential risks associated with excessive exercise, there is merit in determining whether the exercise–body image relationship is truly linear or if it is curvilinear (i.e., an inverted U).

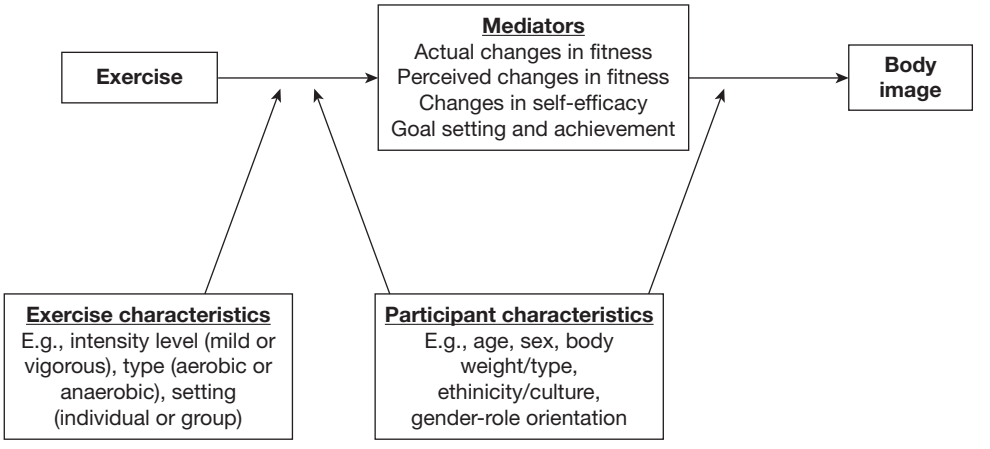

Figure 15.1 Basic model to guide research examining the effects of exercise interventions on body image (adapted from Martin Ginis, Bassett, & Conlin, 2012).

Determining the body image dimensions influenced by exercise

A limitation of the extant research is that most exercise studies have focused only on the cognitive and affective dimensions of body image (Martin Ginis, Bassett et al., 2012). Exercise may differentially affect thoughts, feelings, perceptions, and behaviors toward one's body. The four dimensions of body image are related but conceptually distinguishable constructs that require separate measurement approaches. To fully understand the effects of exercise on body image, researchers need to expand their scope to include appropriate measures of all dimensions. Having said that, exercise researchers are doing an excellent job of selecting the most valid and reliable body image measures available for their training studies. Ninety-five percent of the studies included in Campbell and Hausenblas's (2009) meta-analysis utilized psychometrically sound measures. Nevertheless, as researchers expand the measurement of body image dimensions in their studies, it will be important to consider the appropriateness of measures for different target populations, and to confirm the validity, reliability, and responsiveness of measures within study samples (see Bassett & Martin Ginis, 2009; Thompson, 2004).

The acute effects of exercise

Although most exercise studies have looked at the long-term effects of training on trait measures of body image, emerging research indicates that an acute bout of exercise can have a positive impact on state body image. For example, over a 10-day period, women's state body dissatisfaction was found to be lower immediately after exercise than at random points throughout the day (LePage & Crowther, 2010). Further research is needed to determine the mechanisms that underlie these improvements, the conditions when they are most likely to emerge, and how long the effects persist. There would also be merit in examining whether the accumulation of acute body image-enhancing bouts of exercise contributes to sustained improvements in trait body image. When addressing these issues, investigators will need to carefully consider the appropriateness of state and/or trait body image measures for their research questions. Trait measures may be insensitive to the effects of acute exercise manipulations (Martin Ginis, Murru, Conlin, & Strong, 2011). Hence, interpretation of some extant acute exercise studies has been limited because investigators have reported only the effects on trait (and not state) body image outcomes. The careful selection of state versus trait measures is integral to advancing knowledge regarding the acute and long-term effects of exercise on body image.

The effects of exercise on men's body image

Exercise and body image research has disproportionately focused on women. For example, in their meta-analysis of 57 exercise-training studies, Campbell and Hausenblas (2009) were able to extract 56 effect sizes for women and just 12 for men. Although they reported no differences in the effects of exercise for men versus women, with so relatively few studies of men to draw on, it is difficult to speak to the generalizability of this conclusion. Moreover, we know very little about mechanisms that drive exercise-induced body image change in men and variables that may moderate such changes. Given that men generally have a very different body ideal than women, it is likely that the mediators and moderators of body image change are also different. These issues require investigation.

A key limitation of the existing research on exercise and male body image is that many studies have utilized measures that do not fully capture men's body image concerns. Historically, the desire for a thin appearance has been equated with body image dissatisfaction (Thompson,

Heinberg, Altabe, & Tantleff-Dunn, 1999). Although measures that tap into concerns about not being sufficiently thin are appropriate for assessing women's body image, some men may be body dissatisfied because they believe they are too thin and not sufficiently muscular. Muscularity is a highly desirable trait for men (Cafri & Thompson, 2004), and a source of male body image concern. Measures of muscularity satisfaction, such as the Drive for Muscularity scale (McCreary & Sasse, 2000), can provide important information about the effects of exercise on men's body image. Measures of changes in muscularity concerns, coupled with measures that tap into men's concerns about body fatness, should be included in future studies of exercise and male body image.

Psychophysiological correlates of exercise-induced body image change

Preliminary data suggest that body image concerns may be related to biometric indicators of physiological stress. Putterman and Linden (2006) examined the relationship between body image and cortisol—a stress hormone that plays a critical role in regulating several bodily functions. They found that women's afternoon cortisol levels were negatively correlated with body image such that the highest levels of cortisol were present among women who felt worst about their bodies. On the one hand, the high levels of cortisol may have been due to a comorbid mood disorder, as people with anxiety and depressive disorders have elevated levels of cortisol secretion (McEwen, 1998). On the other hand, body image dissatisfaction may be a unique source of stress that increases cortisol secretion independent of mood disorders.

Exercise training has been shown to reduce cortisol secretion *vis-à-vis* re-regulation of the hypothalamic pituitary adrenal (HPA) axis (e.g., Foley et al., 2008). A question for future investigation is whether exercise-induced improvements in body image yield concomitant reductions in cortisol. Demonstrating such a relationship would attest to the potential for utilizing a biopsychosocial approach to better understand the effects of exercise on body image.

Conclusions

In general, exercise is an effective treatment for improving body image. Although the mechanisms underlying these effects are not fully understood, there is good evidence that perceived changes in physical fitness are a more potent determinant of body image improvements than are actual fitness improvements. A more complete understanding of the mechanisms underlying the effects of body image would contribute to the design of more effective exercise interventions. Furthermore, the effects of exercise on body image may depend on characteristics of the exerciser and the exercise intervention itself. The body image ideals of the exerciser, and the effects of the intervention on bringing the exerciser closer to his or her ideal, may be particularly important.

Under certain circumstances, exercise may exacerbate body image concerns, particularly when exercise is obsessive and compulsive. Future research should aim to determine the optimal exercise intervention characteristics to improve body image and the individuals who stand to benefit most from exercise as treatment for body image disturbance. A more complete understanding of the intricacies of the exercise–body image relationship could have important implications for improving mental health.

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