Examining the role of body image, body mass index, body esteem, and perfectionism in anti-fat attitudes: A comparison of gymnasium and non-gymnasium users

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Abstract

The aim of this study was to examine the interactions between body mass index (BMI), body image, body esteem, perfectionism, and anti-fat attitudes (AFA) within a New Zealand sample of 39 regular gymnasium (gym) users and 33 non-gym users. An online questionnaire was administered to assess BMI, body image, body esteem, perfectionism, and implicit and explicit anti-fat attitudes. Results showed high BMI was associated with greater weight dissatisfaction, regardless of gender or gym use. BMI was positively associated with body and appearance dissatisfaction, but only among non-gym users and females. Regular gym users displayed greater weight preoccupation, overall explicit AFA, and fear of weight gain, compared to non-gym users. Females reported higher appearance, body, and weight dissatisfaction, and lower overall explicit AFA, dislike of overweight individuals, and willpower, compared to males. Implicit and explicit AFA were weakly associated, except among females as implicit AFA significantly correlated with overall explicit AFA and fear of weight gain. A relationship was found between body image and explicit AFA. Specifically, high weight preoccupation correlated with greater overall explicit AFA, regardless of gender or gym use. Furthermore, high appearance and body dissatisfaction and greater weight preoccupation was associated with greater fear of weight gain. Regular gym users high in appearance investment displayed greater fear of weight gain, whereas non-gym users with greater investment in physical appearance reported greater dislike of overweight individuals. Greater weight preoccupation, body and weight dissatisfaction, and investment in physical appearance were associated with greater willpower among men, whereas only weight preoccupation correlated with willpower among women. Body image correlated with implicit AFA, but only among non-gym users and females, such that individuals with high body dissatisfaction and greater weight preoccupation displayed greater implicit AFA. No moderation or mediation effect was found for body esteem on the relationship between body image and AFA. However, perfectionism mediated the effect of body image on AFA. Specifically, maladaptive perfectionism mediated the relationship between Appearance Orientation and overall explicit AFA, Appearance Orientation and Dislike, Appearance Orientation and Fear, Overweight

Preoccupation and overall explicit AFA, and Overweight Preoccupation and Fear. Directions for future research and implications within a fitness context are discussed.

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This project has been reviewed and approved by the Massey University Northern Region Human Ethics Committee.

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Introduction

Overview

Anti-fat attitudes toward overweight and obese individuals have consistently been demonstrated across a number of educational (Crandall, 1994), occupational (Ding & Stillman, 2005), and health settings (Chambliss, Finley, & Blair, 2004; O'Brien, Hunter, & Banks, 2007; Robertson & Vohora, 2008). In Western culture, it is argued that internalisation of the thin female ideal and muscular male ideal encourages anti-fat attitudes, where overweight individuals are viewed as possessing undesirable physical and social qualities (Klaczynski, Goold, & Mudry, 2004).

In particular, the presence of anti-fat bias is widespread within health and fitness environments. Robertson and Vohora (2008) found both fitness professionals and regular exercisers to display a strong implicit anti-fat bias towards overweight individuals. Consequently, this can negatively impact interactions between overweight gym users and fitness professionals. This was supported by Shapiro, King, and Quinones (2007) who found fitness trainers were more likely to have lower training expectations and lower success expectations for overweight trainees compared to average weight trainees. It appeared that the overweight trainees picked up on these subtle negative expectations, thus influencing them to perceive the quality of training as being low compared to average weight trainees. Anti-fat attitudes have also been demonstrated in educational health settings. Chambliss and colleagues (2004) examined the presence of implicit and explicit anti-fat attitudes among exercise science students in the U.S. Results showed a strong implicit anti-fat bias, as fat people were rated higher on the lazy (versus motivated) and bad (versus good) attribute, compared to thin people. A strong explicit anti-fat bias was also evident, as fat people were rated higher in laziness, compared to thin people. However, there was no significant explicit anti-fat bias when rating intelligence (very smart/very stupid). Furthermore, exercise science students who displayed greater anti-fat bias appeared to endorse particular anti-fat beliefs regarding personal controllability of weight, self-control of junk food consumption, and physical coordination of overweight individuals.

Negative consequences associated with anti-fat bias toward overweight individuals have been demonstrated within many fitness and health settings. Vartanian and Novak (2011) found that greater experience of weight stigma was positively associated with exercise avoidance and body dissatisfaction. Puhl and Heuer (2009) explain that overweight individuals seeking access to exercise facilities may often avoid gyms due to poor body image, low self-esteem and fear of receiving negative judgement from others. In order to help reduce anti-fat attitudes within fitness environments, it is important to understand factors that may underlie these prejudiced attitudes. This thesis will examine the relationships between BMI, body image, body esteem, perfectionism, and implicit and explicit anti-fat attitudes within a New Zealand sample of regular gym users and non-gym users.

Anti-Fat Attitudes, Body Image, Body Mass Index, Body Esteem, and Perfectionism

Anti-Fat Attitudes

Anti-fat attitudes are discriminatory beliefs and views about overweight and obese individuals based on their weight (Pepper & Ruiz, 2007). It is argued that individuals with strong anti-fat bias hold the belief that people are responsible for their weight, thus perceive obesity as being a controllable condition (Crandall, 1994). Anti-fat attitudes have shown to exist among fitness professionals, (Robertson & Vohora, 2008), fitness trainers (Shapiro et al., 2007) and exercise science students (Chambliss et al., 2004). However, research examining anti-fat attitudes among regular gym users appears limited, despite fitness centres being a likely commonplace for anti-fat bias to exist.

Research assessing anti-fat bias typically employs measures that explore both explicit and implicit discriminatory attitudes. Implicit anti-fat attitudes are negative attitudes towards overweight and obese individuals which are unable to be consciously retrieved and expressed, whereas explicit anti-fat attitudes are able to be consciously retrieved and therefore directly expressed (Nosek, Greenwald, & Banaji, 2007). Self-report measures are one of the most widely used tools for assessing explicit anti-fat attitudes. Self-report questionnaires ask participants about their thoughts, feelings, and

attitudes, therefore obtaining direct information regarding a particular issue. However, self-report measures are often criticised for being prone to social desirability bias, as individuals may under-or-over report information in order to appear socially acceptable, particularly when sensitive topics are being assessed such as anti-fat attitudes (Teachman, Gapinski, Brownell, Rawlins, & Jeyaram, 2003).

In order to overcome limitations of explicit measures, researchers typically employ implicit measures, which do not rely on introspection. The Implicit Association Test (IAT) is the most common measure used to explore implicit anti-fat bias. Greenwald, McGhee, and Schwartz (1998) developed the IAT in order to assess automatic associations between target categories (e.g., 'fat people' or 'thin people') and attribute categories (e.g., 'good' or 'bad'). The IAT is a computer-based reaction time task where participants are required to classify positive and negative word stimuli (e.g., wonderful, horrible) into the given target and/or attribute categories (e.g., 'thin people' and 'good' or 'fat people' and 'bad') presented at the top left and right side of the screen (O'Toole, Barnes-Holmes, & Smyth, 2007). Participants are asked to categorise word stimuli as quickly and as accurately as possible. An IAT effect is calculated by comparing the response latencies produced in the consistent blocks (e.g., 'thin people' and 'good') to the inconsistent blocks (e.g., 'thin people' and 'bad'). If response latencies are faster in the consistent blocks compared to the inconsistent blocks, this suggests presence of an implicit anti-fat bias. Although the IAT has been successfully used to assess implicit anti-fat attitudes within fitness (Chambliss et al., 2004; O'Brien, Hunter, & Banks, 2007; Robertson & Vohora, 2008) and non-fitness (O'Brien, Hunter, Halberstadt, & Anderson, 2007; Schwartz, Vartanian, Nosek, & Brownell, 2006) samples, it does possess several limitations. It is argued that the IAT only indicates an individual's relative preference for one target category over another, rather than establishing the direction of an observed bias (De Houwer, 2002). For example, a preference for 'thin people' over 'fat people' may be an indication of an anti-fat/pro-slim bias, or it could indicate a neutral bias toward one group and a bias (anti-fat or pro-thin) against/towards the other group (De Houwer, 2002). The IAT is also criticised on whether associations found between target categories and negative attributes are indicative of prejudice or familiarity of a stereotype (Whitley & Kite, 2013).

Generally, implicit anti-fat attitudes tend to be stronger than explicit anti-fat attitudes and have shown to be better predictors of biased attitudes. Bessenoff and Sherman (2000) found that the lexical decision task (implicit measure) better predicted how far participants chose to sit from an overweight woman, compared to the explicit self-report measure. Research examining the relationship between implicit and explicit measures of anti-fat attitudes often display weak correlations (Hofmann, Gawronski, Gschwendner, Le, & Schmitt, 2005; Robertson & Vohora, 2008; Teachman & Brownell, 2001). Teachman and colleagues (2003) explain that the lack of relationship could be due to the social desirability bias or due to negative implicit biases occurring outside an individual's awareness.

Body Image

More recently, research has begun to explore factors that may underlie anti-fat bias. In particular, body image has been suggested to play a significant role in anti-fat attitudes. Body image refers to how an individual perceives, thinks, and feels about his or her body (Grogan, 2007). It is argued that body image is a multi-dimensional concept as it embodies perceptual, affective, cognitive, evaluative, and behavioural aspects of an individual's appearance, weight, and body shape (Grogan, 2007). Research has shown low body image satisfaction to be associated with high levels of depressive symptoms, anxiety, stress, and mental health-related quality of life impairment, and low self-esteem (Wilson, Latner, & Hayashi, 2013). Gender differences in body image appear to exist, as females tend to display lower weight and body dissatisfaction, compared to males (Paxton et al., 1991).

Within the fitness context, poor body image has been shown to be greater among female exercisers compared to non-exercisers. For example, Imm and Pruitt (1991) found that body shape dissatisfaction was greater among women who engaged in high frequency exercise (engages in exercise for 6 or more hours per week), compared to non-exercisers, despite not differing in body weight or body fat percentage. Research has also demonstrated low body image to be significantly related to exercise centre environments. Prichard and Tiggemann (2008) examined the relationships between exercise type and body image outcomes among female fitness centre members in South Australia. Results showed that women who spent more time exercising within fitness

centres reported higher levels of self-objectification and disordered eating, and lower body esteem, compared to women who spent more time exercising outside fitness centres. This supports the idea that exercise environments are objectifying, as individuals' bodies are constantly on display and the ideal body is greatly emphasised, thus creating an atmosphere that facilitates self-surveillance (Prichard & Tiggemann, 2008). The relationship between poor body image and gym use has also been demonstrated among men. Stapleton, McIntyre, and Bannatynne (2016) explored differences in body image and eating pathology between male gym users and non-gym users. It was found that males who engaged in exercise at fitness centres reported significantly greater body dissatisfaction and eating pathology, compared to males not engaging in exercise at fitness centres. It is evident from these studies that individuals who engage in regular exercise, particularly within fitness environments such as gyms, are more vulnerable to higher levels of body dissatisfaction, compared to non-exercisers and non-gym users.

The assessment of body image typically employs self-report measures, which assess affective, cognitive, and behavioural components of an individual's body image (Shroff, Calogero, & Thompson, 2009). Affective measures aim to assess body image satisfaction through the use of body size estimation procedures. For example, figural stimuli of silhouettes varying in size are often used to easily assess how an individual perceives their current self compared to their ideal self. The difference between the two judgments is used as an indication of body dissatisfaction. However, figural rating scales have often been criticised for being unrealistic, such that changes from one silhouette to the next are not proportionate or gradual, and lacking resemblance to individuals' actual body dimensions (Reel, 2013). In addition to visual instruments, questionnaires are also employed to assess body image satisfaction such as the Appearance Evaluation subscale of the Multidimensional Body Self-Relations Questionnaire (Cash, 2000). Cognitive measures assess attitudes, thoughts and beliefs regarding an individual's physical appearance. For example, the Assessment of Body Image Cognitive Distortions (Jakatdar, Cash, & Engle, 2006) is a 37-item self-report questionnaire that measures eight types of distorted cognitions associated with one's physical appearance. Lastly, behavioural measures assess observational signs of body image disturbance, such as body checking and avoidance of body image-related

situations. For example, the Body Checking Questionnaire (Reas, Whisenhunt, Netemeyer, & Williamson, 2002) is a 23-item self-report questionnaire that assesses how often an individual engages in body checking behaviours. Similar to explicit measures of anti-fat attitudes, self-report questionnaires examining body image may be prone to social desirability bias due to the sensitive nature of the topic.

Body Mass Index

Body mass index (BMI) is used as an estimation of body fat among adults, by dividing an individual's weight (kilograms) by the square of his or her height (metres^2) (World Health Organization, 2000). This calculation indicates whether an individual classifies as being underweight (<18.5), healthy (18.5 – 24.9), overweight (25 – 29.9), or obese (>30). A large amount of research has demonstrated negative physical and psychological problems associated with obesity, including cardiovascular disease, metabolic difficulties, body dissatisfaction, eating disorders, social bias, and weight discrimination (World Health Organization, 2000).

Online questionnaires commonly use participants' self-reported weight and height to calculate BMI, particularly when objective measures of body fat are unable to be administered, such as the use of callipers to measure skinfold thickness (Summerfield & Ellis, 2014). Although BMI is inexpensive, non-invasive, and quick to calculate, the measure does suffer from a few limitations. It is argued that BMI tends to overestimate body fat among individuals with greater muscle mass, such as athletes, and underestimate body fat among individuals with loss of muscle or bone mass, such as older adults. This is due to the BMI not accounting for a number of factors including an individual's muscle mass, bone mass, frame size, gender, and ethnicity (Summerfield & Ellis, 2014). Consequently, interpretations of BMI should be considered alongside other indicators of health and fitness, such as an individuals' diet, level of physical activity, and waist circumference (Summerfield & Ellis, 2014).

Body Esteem

Body esteem is argued to be an aspect of self-esteem regarding how an individual evaluates and feels about his or her physical appearance and body (Franzoi &

Shields, 1984). Research has shown that low body esteem is associated with symptoms of depression, anxiety, and obsessive-compulsive disorder (Bohne, Keuthen, Wilhelm, Deckersbach, & Jenike, 2002). Gender differences in body esteem have also been demonstrated, such that men tend to show higher levels of body esteem compared to women (Kamimura et al., 2014; Strelan & Hargreaves, 2005). Fredrickson and Roberts (1997) explain that women are more susceptible to self-objectification as females are often sexually objectified in Western societies where their value is based on physical appearance. Consequently, females are lead to internalise this sociocultural belief, thus resulting in self-objectification. Research has demonstrated a number of negative psychological outcomes associated with self-objectification among European American females, such as high levels of body surveillance and body shame and low body esteem (McKinley, 1998).

Within the fitness population, research has shown low body esteem to be linked to dysfunctional eating patterns. Vinkers, Evers, Adriaanse, and Ridder (2012) found body esteem and eating disorder symptomatology to be positively associated among female fitness centre members. Furthermore, appearance-motivated exercise was found to partially mediate the relationship between body esteem and eating disorder symptomatology, whereas health-related exercise did not mediate this relationship. Furthermore, Prichard and Tiggemann (2008) showed low body esteem to be associated with participation in cardio-based (versus weights-based and yoga-based) workout classes and appearance-related (versus health/fitness and enjoyment/mood improvement) reasons for exercise among female fitness centre members. It appears that individuals within fitness population tend to display low level of body esteem, particularly among those with appearance-related reasons for exercise, such as gym users.

Similar to body image, the assessment of body esteem typically uses self-report measures. Two of the most common tools used are the Body Esteem Scale (BES; Franzoi & Shields, 1984) and the Body-Esteem Scale for Adolescents and Adults (BESAA; Mendelson, Mendelson, & White, 2001). The BES is a multidimensional questionnaire that assesses one's level of satisfaction with 35 body parts and functions using a 5-point Likert scale (1 = "have strong negative feelings" to 5 = "have strong

positive feelings") (Franzoi & Shields, 1984). The BES is gender-specific, such that each subscale represents a different dimension of body esteem specific to males or females. In particular, Physical Attractiveness, Upper Body Strength, and Physical Condition are specific to men, whereas Sexual Attractiveness, Weight Concern, and Physical Condition are specific to women. The BESAA is a 23-item questionnaire that assesses how an individual thinks and feels about their body and physical appearance using a 5-point Likert scale (0 = "never" to 4 = "always") (Mendelson et al., 2001). The BESAA consists of three subscales including Appearance (how one generally feels about their appearance), Weight (degree of satisfaction with one's weight), and Attribution (attributions of evaluations regarding one's body and appearance to others). The BESAA was validated based on a normative sample of adolescents and young adults aged between 12-25 years, thus may not be suitable for use among older adults. Similar to other self-report measures, the BES and the BESAA may be prone to social desirability bias as participants may be inclined to under-or-over report sensitive information.

Perfectionism

Perfectionism is defined as being a multidimensional construct, however a number of theories have been proposed regarding the different dimensions of perfectionism. Hewitt and Flett (1991) argued that perfectionism is comprised of personal and social dimensions, which are reflected in the Multidimensional Perfectionism Scale (HFMPS). The HFMPS is a 45-item measure that examines three dimensions of perfectionism including self-oriented perfectionism (tendency to set high personal standards, self-criticise, and to be motivated to attain perfection whilst avoiding failure), other-oriented perfectionism (tendency to set unrealistic standards for significant others, expect others to be perfect, and strictly evaluating others performances), and socially prescribed perfectionism (tendency to believe others have extremely high standards of them, think they are being strictly evaluated by others, and experience pressure to meet others' expectations). Frost, Marten, Lahart, and Rosenblate's (1990) also developed a measure of perfectionism called the Multidimensional Perfectionism Scale (FMPS). The FMPS is a 35-item self-report measure that assesses six dimensions of perfectionism. Concern over Mistakes assesses negative reactions to mistakes and interpreting mistakes as failure. Personal Standards

refers to setting high personal standards and placing great importance on achieving these standards. Parental Expectations assesses the belief that one's parents set extremely high goals. Parental Criticism refers to the belief that one's parents are excessively critical. Doubt about Actions assesses the tendency to feel dissatisfied with projects. Lastly, Organisation refers to the importance of and preference for order and organisation.

Since the development of the HFMPS and the FMPS, it has been argued that perfectionism consists of both negative and positive aspects. Slaney, Rice, Mobley, Trippi, and Ashby (2001) proposed that perfectionism encompasses both adaptive and maladaptive features. Consequently, the 23-item Almost Perfect Scale-Revised (APS-R) was developed in order to assess three dimensions of perfectionism including High Standards (setting of high personal standards), Discrepancy (distress produced from the discrepancy between performance and standards), and Order (degree of orderliness). Slaney and colleagues (2001) explain that high scores on the High Standards and Order subscales and a low score on the Discrepancy subscale suggest adaptive perfectionism, whereas a high score on the Discrepancy subscale suggest maladaptive perfectionism.

Research has shown maladaptive perfectionism to be significantly associated with depressive mood and adult attachment anxiety (Wei, Mallinckrodt, Russell, & Abraham, 2004), low self-esteem (Ashby & Rice, 2002), and greater stress (Chang, Banks, & Watkins, 2004), whereas adaptive perfectionism has been associated with high self-esteem (Ashby & Rice, 2002) and greater positive affect and life satisfaction (Chang et al., 2004). In fitness environments, maladaptive perfectionism has been found to be positively associated with excessive exercise (Flett & Hewitt, 2005) and athletic burnout (Appleton, Hall, & Hill, 2009). Conversely, a significant relationship has been shown between adaptive perfectionism and better sport performance (Stoeber, Uphill, & Hotham, 2009). A recent study conducted by Miller and Mesagno (2014) found exercise dependence to be positively correlated with the self-oriented and socially prescribed subscales from the HFMPS among regular exercisers. It is argued that individuals may be inclined to engage in exercise in an attempt to attain perfectionism standards that are imposed by the self and others (Miller & Mesagno, 2014).

The assessment of perfectionism typically employs self-report measures such as the FMPS, the HFMPS, and the APS-R, as they are multidimensional, brief and easy to administer. However, it is argued that the validity of these scales is often established by examining the correlation with other self-report perfectionism scales that tend to overlap in content (Egan, Wade, Shafran, & Antony, 2014). Consequently, high correlations between the two measures are often demonstrated, thus it is evident that more comprehensive validity studies are required. It is also argued that more research examining the predictive validity of perfectionism scales is required in order to determine whether self-report perfectionism scales predict perfectionistic behaviours (Egan et al., 2014).

Relationship between Body Image, Body Mass Index, Body Esteem, Perfectionism, and Anti-Fat Attitudes

Body Mass Index and Body Image

Within the current literature, a number of studies have found an association between BMI and body image. Smith, Thompson, Raczynski, and Hilner (1999) examined body image concerns in a population-based sample of black and white US adults. BMI was found to significantly predict body dissatisfaction across all groups (black men, black women, white men, and white women). Similarly, Yates, Edman, and Aruguete (2004) found a positive relationship between BMI and body dissatisfaction among white, Japanese, African-American, Filipino, Chinese, Hawaiian, and multiethnic college students. However, this association appeared to be stronger among females, compared to males.

Research examining gender differences in the relationship between BMI and body image have consistently shown a positive association among females, such that greater BMI predicts lower body satisfaction (Austin, Haines, & Veugelers, 2009; Pingitore, Spring, & Garfield, 1997), whereas research among males appears to be complex. Austin and colleagues (2009) demonstrated a U-shape relationship among males, such that lower body satisfaction was reported among individuals with either low or high BMI. It is argued that these results may reflect Western beauty ideals where women strive toward a thin ideal and men strive for muscularity (Austin et al., 2009).

The relationship between BMI and body image also appears complex when examining fitness sub-groups, such as athletes and regular exercisers. A study conducted by Lim, Omar-Fauzee, and Rosli (2011) examined body dissatisfaction among female athletes and non-athletes. Results showed no significant association between BMI and body dissatisfaction was found for both groups. Lim and colleagues (2011) explain that as the average BMI of the sample was low, a significant relationship may not have been found, as females with lower BMI tend to be more satisfied with their body weight and shape compared to females with greater BMI. Conversely, Davis (1990) found BMI was a significant predictor of weight preoccupation and body dissatisfaction among female non-exercisers but not among female exercisers. Instead, subjective body shape significantly predicted weight preoccupation among the exercise group, thus suggesting females who regularly exercise may place greater importance on the perceptions of how they look rather than actual BMI in relation to body image (Davis, 1990).

Body Image and Anti-fat Attitudes

Research examining the relationship between body image and anti-fat attitudes has shown that individuals who demonstrate a high tendency to make physical appearance comparisons are more likely to hold greater implicit and explicit anti-fat attitudes than individuals with a lesser tendency to make physical appearance comparisons (O'Brien, Hunter, Halberstadt, et al., 2007). It is argued that this increased tendency to make appearance-related comparisons is common among individuals with poor body image (O'Brien, Hunter, Halberstadt, et al., 2007). Anti-fat attitudes have also been shown to be associated with body image concerns, such as body shame and perceived body size. Himmelstein and Tomiyama (2015) found explicit anti-fat attitudes to be positively associated with body shame and negatively associated with perceived body size among both males and females.

Several theories have been proposed to explain the relationship between body image and anti-fat attitudes. Festinger's (1954) social comparison theory explains that humans have a natural tendency to evaluate one's attitudes, abilities, and attributes by engaging in upward or downward comparisons to others. An upward comparison is

made when an individual compares him-or-herself to an individual who is perceived as being physically superior. Consequently, this results in greater body dissatisfaction. In contrast, a downward comparison involves comparing oneself to a physically inferior other, which is often made when attempting to increase one's low self-esteem and self-regard. O'Brien, Hunter, Halberstadt and colleagues (2007) suggest that individuals with poor body image may often attempt to increase their self-image by making comparisons to those perceived as being physically inferior, such as overweight individuals. Consequently, these downward comparisons may be accompanied with anti-fat attitudes towards the inferior target (O'Brien, Hunter, Halberstadt, et al., 2007).

Ehrlich's (1973) self-congruity principle proposes that discriminatory attitudes displayed towards others may be a reflection of how individuals feel about themselves. The principle of self-congruity has mostly been applied to self-esteem and prejudice, such that individuals low in self-esteem tend to display negative attitude towards others (Duckitt, 1992). However, the self-congruity principle appears to be a plausible theory in explaining the relationship body image and anti-fat attitudes, such that implicit and explicit prejudice towards overweight individuals arises due to negative feelings regarding one's own body image.

Body Image, Perfectionism, and Anti-Fat Attitudes

Body Image and Perfectionism

Research has shown a significant relationship exists between body image and perfectionism. Wade and Tiggemann (2013) examined whether maladaptive and adaptive dimensions of perfectionism were associated with weight and body size dissatisfaction (discrepancy between current and desired BMI and the discrepancy between current and ideal figural silhouettes, respectively) among females. Results found both weight and body size dissatisfaction to be positively correlated with Concern over Mistakes, Doubt about Actions, Parental Criticism, and Parental Expectations subscales from the FMPS. It was found that desire for a lower BMI was associated with higher levels of both adaptive (Organisation) and maladaptive (Concern over Mistakes) perfectionism. Results also found that preference towards a thinner ideal was associated with higher levels of both adaptive (Organisation) and maladaptive (Concern over

Mistakes and Doubt about Actions) perfectionism. Wade and Tiggemann (2013) explain that adaptive perfectionism (Organisation) may only become problematic in the presence of high levels of maladaptive perfectionism.

An association between perfectionism and low body image is also evident among males. Grammas & Schwartz (2009) explored predictors of body dissatisfaction among male university students. Results found socially prescribed perfectionism from the HFMPS to significantly predict muscle and low body fat dissatisfaction. However, self-oriented perfectionism and other-oriented perfectionism were not significant predictors of muscle and low body fat dissatisfaction. Furthermore, no relationship was found between perfectionism and height dissatisfaction, perhaps due to height being viewed as uncontrollable (Grammas & Schwartz, 2009). These findings suggest that men who perceive others as having extremely high standards of them and feel pressure to meet such standards are more likely to be dissatisfied with muscularity and body fat, compared to men with high personal standards.

Sociocultural theory proposes that the relationship between perfectionism and low body image is influenced by the internalisation of Western body ideals of muscularity and thinness for men and women, respectively (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999). Tissot and Crowther (2008) explain that individuals high in socially prescribed perfectionism display a greater tendency to internalise unrealistic body ideals that are encouraged by society due to having high personal standards (self-oriented perfectionism). Consequently, individuals high in perfectionism experience greater body dissatisfaction due to discrepancies between ideal and actual body image (Bardone, Vohs, Abramson, Heatherton, & Joiner, 2000).

Perfectionism and Anti-Fat Attitudes

Research examining the relationship between perfectionism and anti-fat attitudes appears limited. Rosewall (2009) explored the moderating effects of perfectionism, anorectic cognitions, and explicit anti-fat attitudes on the relationship between media information and internalisation of the thin ideal among female university students. Although exploration of the relationship between perfectionism and anti-fat attitudes was not central to the study, a positive relationship between maladaptive perfectionism

(consisting of Concern over Mistakes, Doubt over Actions, Parental Criticism, and Parental Expectations subscales from the FMPS) and explicit anti-fat attitudes was found.

A study conducted by Aruguete, Yates, Edman, & Sanders (2007) examined associations between U.S. acculturation, eating pathology, self-loathing, explicit anti-fat attitudes, body dissatisfaction, self-esteem, depression, perfectionism, and family cohesion, among a sample of Filipino American children aged 12-19 years. Again, the relationship between perfectionism and anti-fat attitudes was not of particular interest within this study, however a positive correlation was reported between perfectionism (consisting of Concern over Mistakes, Parental Expectations, and Parental Criticism subscales from the FMPS) and explicit anti-fat attitudes. Based on these studies, it appears that more research is required examining the relationship between adaptive/maladaptive perfectionism and anti-fat attitudes as a significant relationship appears to exist, such that a higher level of perfectionism is associated with greater explicit anti-fat attitudes. Furthermore, it appears that no research to date has examined the relationship between adaptive/maladaptive perfectionism and implicit anti-fat attitudes.

Body Image, Body Esteem, and Anti-Fat Attitudes

Body Image and Body Esteem

A number of studies have demonstrated a relationship between body image and body esteem. Tyler, Johnston, Dalton, and Foreyt (2008) examined the relationships between weight and weight-related factors, including body dissatisfaction, body esteem, and teasing, among a sample of African American girls. A significant relationship was found between body dissatisfaction and body esteem, such that high weight/body shape dissatisfaction was associated with low body esteem. A recent study conducted by Karacan, Caglar, Gürsoy, and Yilmaz (2014) examined the relationship between body dissatisfaction and dysfunctional eating attitudes in a sample of adolescent females with and without polycystic ovary syndrome (PCOS). Body esteem was assessed using the BESAA and figural rating scales were used to assess body dissatisfaction. Results

showed high body dissatisfaction was significantly associated with low body esteem within both the PCOS and control group.

Most research has examined the relationship between body esteem and body image among females, however associations are also evident among males. Davis and Katzman (1997) explored the relationship between body esteem, weight dissatisfaction, depression, and self-esteem among Chinese undergraduate students. It was found that body esteem significantly correlated with weight dissatisfaction, such that both males and females with low body esteem displayed higher levels of body dissatisfaction.

Body Esteem and Anti-Fat Attitudes

A few studies have explored the relationship between body esteem and anti-fat attitudes, however research is still limited. O'Brien, Hunter, and Banks (2007) examined the link between anti-fat attitudes and psychosocial predictors, including investment in physical attributes and abilities, body esteem, and social dominance orientation, among physical education (PE) and psychology university students enrolled in either the first of second year of their degree. It was found that among year one PE students, low body esteem (low physical attractiveness, low upper body strength, and high weight concern) was associated with weaker implicit anti-fat attitudes. Conversely, low body esteem (low physical attractiveness and low physical condition) was associated with greater implicit anti-fat attitudes among year three PE students. No significant relationship was found between body esteem and implicit anti-fat attitudes in year one or year three psychology students. O'Brien, Hunter, and Banks (2007) suggest that a significant link between body esteem and implicit anti-fat attitudes was found among PE students but not psychology students, due to the former group exhibiting greater investment in physical attributes.

Quinlan, Hoy, and Costanzo (2009) investigated the association between teasing and psychosocial factors, including self-esteem, body esteem, depression, weight and body concern, anti-fat attitudes, and participation and social involvement, among a sample of adolescents recruited from a weight loss summer camp. Although the main aim of the study was to explore the relationship between teasing and psychosocial factors, results also reported significant correlations between the examined psychosocial

factors. Specifically, a negative relationship was found between body esteem and explicit anti-fat attitudes, such that low body esteem was associated with greater explicit anti-fat attitudes.

Summary

BMI has been associated with low body image, such that both males and females with higher BMI experience greater body dissatisfaction. Generally, low body image has been found to be greater among females, compared to males. Within the fitness context, low body image has been associated with individuals who engage in regular exercise, particularly within fitness centre environments. Poor body image has been found to be positively associated with greater implicit and explicit anti-fat attitudes and high maladaptive perfectionism.

A positive association between maladaptive perfectionism and explicit anti-fat attitudes appears to exist among both males and females, however more research is warranted. To date, it appears that no research has examined whether perfectionism is associated with implicit anti-fat attitudes.

Research has shown a relationship between body esteem and body image among clinical and non-clinical populations, such that low body esteem is associated with greater weight/body shape dissatisfaction. Low body esteem has also been found to be associated with greater implicit and explicit anti-fat attitudes, however research is limited.

It is evident that body image and anti-fat attitudes are both related to perfectionism and body esteem. However, it appears that no research has examined the mediating/moderating role of body esteem and perfectionism in the relationship between body image and anti-fat attitudes. If body esteem and/or perfectionism are significant mediators/moderators, focussing on enhancing one's body esteem and reducing perfectionist tendencies may help diminish anti-fat attitudes.

Present Study

Rationale

This study aims to examine the relationships between BMI, body image, and anti-fat attitudes and the mediating and moderating effects of body esteem and perfectionism on the relationship between body image and implicit/explicit anti-fat attitudes. These relationships will be explored among a sample of regular gym users and non-gym users in New Zealand. A gym user sample was chosen, as anti-fat attitudes (Robertson & Vohora, 2008; Shapiro et al., 2007) and body image issues (Imm & Pruitt, 1991; Prichard & Tiggemann, 2008; Stapleton et al., 2016) appear to be prevalent within fitness populations.

Particularly within health and fitness environments, it is apparent that anti-fat attitudes can have adverse effects on individuals who hold such attitudes (Himmelstein & Tomiyama, 2015) and overweight individuals who are discriminated against (Puhl & Heuer, 2009; Vartanian & Novak, 2011). Furthermore, research has shown body esteem (Karacan et al., 2014; O'Brien, Hunter, & Banks, 2007; Quinlan et al., 2009; Tyler et al., 2008) and perfectionism (Aruguete et al., 2007; Rosewall, 2009; Grammas & Schwartz, 2009; Wade & Tiggemann, 2013) to be associated with both low body image and anti-fat attitudes, however whether body esteem and perfectionism moderates/mediates the relationship between body image and anti-fat attitudes has yet to be examined. This study will contribute to the literature by identifying significant factors, such as body image, body esteem, and perfectionism, which may underlie anti-fat attitudes. By doing so, these factors can be either minimised or enhanced in order to help reduce weight discrimination.

Hypotheses

Based on previous research, it was hypothesised:

1. Higher BMI will be associated with low body image.

2a. Low body image will be greater among regular gym users, compared to non-gym users.

2b. Low body image will be greater among females, compared to males.

3a. Both implicit and explicit anti-fat attitudes will be greater among regular gym users, compared to non-gym users.

3b. Both implicit and explicit anti-fat attitudes will be greater among females, compared to males.

4. Low body image will be associated with greater implicit and explicit anti-fat attitudes.
5. Implicit and explicit anti-fat attitudes will be weakly associated.
6. The effect of body image on implicit/explicit anti-fat attitudes will be moderated by body esteem. Specifically, the relationship between low body image and implicit/explicit anti-fat attitudes will be greater among individuals with high body esteem.
7. The effect of body image on implicit/explicit anti-fat attitudes will be mediated by body esteem.
8. The effect of body image on implicit/explicit anti-fat attitudes will be moderated by perfectionism. Specifically, the relationship between low body image and implicit/explicit anti-fat attitudes will be greater among individuals high in maladaptive perfectionism.
9. The effect of body image on implicit/explicit anti-fat attitudes will be mediated by perfectionism.

Figure 1 displays the hypothesised model of the relationship between BMI, body image, and implicit/explicit anti-fat attitudes. Figure 2 shows the hypothesised moderating effect of body esteem on the relationship between body image and implicit/explicit anti-fat attitudes, whereas as Figure 3 displays the hypothesised mediating effect of body esteem. Figure 4 displays the hypothesised moderating effect of perfectionism on the relationship between body image and implicit/explicit anti-fat attitudes, whereas as Figure 5 displays the hypothesised mediating effect of perfectionism.

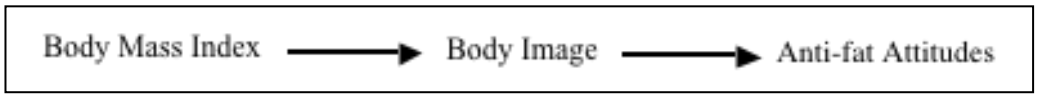

Figure 1. Hypothesised model of the relationship between body mass index, body image, and implicit/explicit anti-fat attitudes.

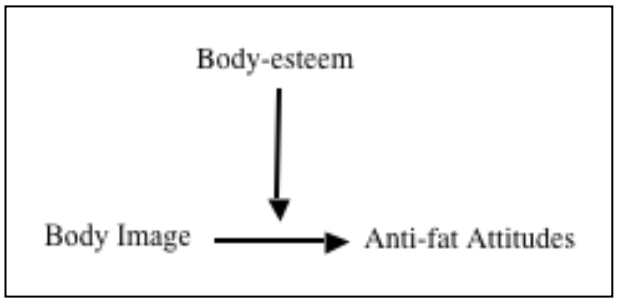

Figure 2. Hypothesised model of the moderating effect of body esteem on the relationship between body image and implicit/explicit anti-fat attitudes.

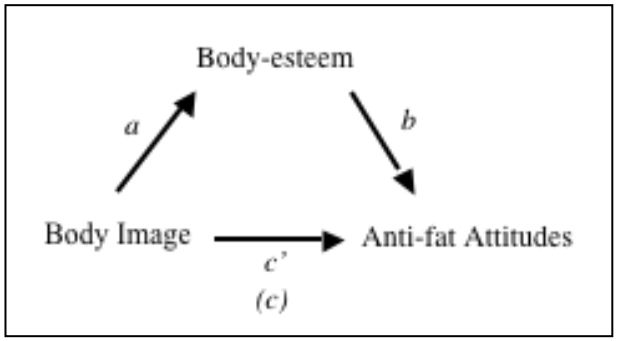

Figure 3. Hypothesised model of the mediating effect of body esteem on the relationship between body image and implicit/explicit anti-fat attitudes.

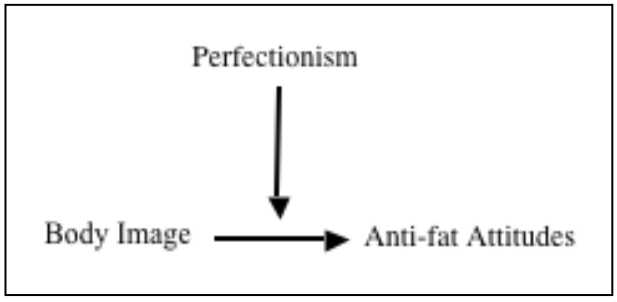

Figure 4. Hypothesised model of the moderating effect of perfectionism on the relationship between body image and implicit/explicit anti-fat attitudes.

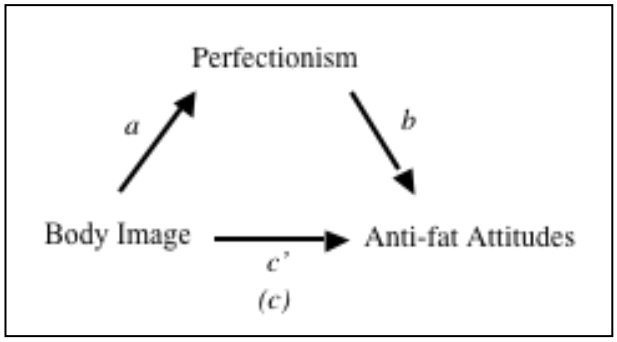

Figure 5. Hypothesised model of the mediating effect of perfectionism on the relationship between body image and implicit/explicit anti-fat attitudes.

Methodology

Research Design

This cross-sectional quantitative study asked participants to complete an online questionnaire, which was advertised using Facebook. Online surveys are a convenient and cheap alternative to traditional pen-and-paper surveys, as it allows researchers to quickly access populations of interest from various geographic locations, as well as individuals who may feel uncomfortable with in person participation, particularly where sensitive information is required from them (Wright, 2005). Online surveys also allow participants to complete the questionnaire at their own convenience (Pedersen et al., 2015). However, online surveys can be prone to self-selection bias as some individuals may be more likely to participate than others (Wright, 2005). Furthermore, online surveys that offer a reward in return for participation may attract individuals who fake their eligibility in order to receive a potential incentive (Pedersen et al., 2015).

In terms of recruitment, Facebook is becoming a frequently used method for obtaining research participants. On average, more than 2.5 million people use Facebook per month in New Zealand (Pelea, 2015). Out of the New Zealand Facebook population, 54% are women and the dominant age group is 25-34 years old. The use of Facebook as a recruitment method gives access to specific populations of interest through the use of Facebook groups and pages. Similar to online surveys, Facebook is also able to reach individuals who are geographically diverse. Although Facebook is popular among younger individuals, access to the Internet and Facebook is lower among the older population, thus the use of Facebook may lead to potential exclusion of older adults (Pedersen et al., 2015).

Participants

Individuals were eligible for participation if they met the following criteria: (a) were aged 18 years or older (to avoid any consent issues) and (b) were either a non-gym user or a regular gym user. Regular gym users were classified as being individuals who attend three or more 30-minute long gym sessions per week. This criterion was used based on previous research that has examined anti-fat bias among regular exercisers

(Robertson & Vohora, 2008). Non-gym users were classified as being individuals who do not attend a gym.

Both non-gym users and regular gym users were recruited through Facebook and by word-of-mouth. Advertisement flyers were distributed on public Facebook pages of 44 gyms located around New Zealand and via a general Facebook status post (see Appendix A). Each advertisement flyer was accompanied with the weblink for participants to directly access the survey online. Ethical approval for the study was granted by Massey University's Human Ethics Committee.

Procedure

An online questionnaire was conducted to assess participants' body image, body esteem, perfectionism, and both implicit and explicit anti-fat attitudes (see Appendix B). An online questionnaire, as opposed to a written questionnaire, was chosen for ease of administration and recruitment of participants. Potential participants were able to access the online questionnaire by clicking on the weblink advertised on Facebook. Upon accessing the website, individuals were presented with an Information Sheet (see Appendix C), which explained the nature of the study, what participation involved, and contact information for support services. Once the Information Sheet was read, individuals were asked to complete an eligibility questionnaire to ensure they met the selection criteria. Once eligibility was determined, participants indicated their consent by selecting the checkbox accompanied by an agreement to participate statement. After consent was obtained, participants were asked to complete a short demographic questionnaire before beginning the study questionnaire. The study questionnaire consisted of one implicit measure (IAT) and four explicit measures (Multidimensional Body-Self Relations Questionnaire – Appearance Scales, Almost Perfect Scale-Revised, Anti-Fat Attitudes Scale, and Body-Esteem Scale). Administration of the IAT and explicit assessment measures were counterbalanced to control for any order effects, thus resulting in two versions of the study questionnaire (Nosek, Greenwald, & Banaji, 2005). Upon completion of the study questionnaire, participants were provided with contact information for support services for those who may have had experienced any psychological discomfort during participation. As a thank you for participation, individuals were able to provide their email address to enter into the prize draw and/or

to receive a summary of the findings when the study has been completed. This section of the survey was separate from the study questionnaire in order to maintain anonymity.

Measures

Demographic Questionnaire

Participants completed a short demographic questionnaire consisting of questions regarding their age range group, gender, weight (kilograms) and height (centimetres), number of gym sessions attended per week, and duration of exercise per gym session.

Multidimensional Body-Self Relations Questionnaire – Appearance Scales

Cognitive, affective, and behavioural aspects of body image were assessed using Cash's (2000) Multidimensional Body-Self Relations Questionnaire – Appearance Scales (MBSRQ-AS). The MBSRQ-AS was chosen based on its widespread use within the body image literature and previous use among fitness populations (Michou & Costarelli, 2011; Pickett, Lewis, & Cash, 2005). The MBSRQ-AS contains 34 items relating to five different subscales. The Appearance Evaluation subscale assesses feelings of physical attractiveness and satisfaction with one's physical appearance (e.g., "I like my looks just the way they are"). A high score indicates greater feelings of satisfaction with one's appearance. The Appearance Orientation subscale measures investment in one's physical appearance (e.g., "Before going out in public, I always notice how I look"). A high score indicates greater investment in one's appearance. The Overweight Preoccupation subscale measures presence of fat anxiety, weight vigilance, and dieting and eating restraint behaviours (e.g., "I constantly worry about being or becoming fat"). A high score indicates greater preoccupation with one's weight and related behaviours. The Self-Classified Weight subscale assesses perception of one's own weight (e.g., "I think I am very underweight"). A high score indicates lower satisfaction with one's weight. The Body Areas Satisfaction Subscale measures satisfaction with specific areas of one's body (e.g., "muscle tone"). A high score indicates greater satisfaction with most areas of one's body. Participants were asked to answer each item using a 5-point Likert scale (ranging from 1 = "definitely disagree" to 5 = "definitely agree" or 1 = "very dissatisfied" to 5 = "very satisfied").

Research examining the psychometric properties of the MBSRQ-AS, has demonstrated strong evidence for its validity and reliability. Good internal consistency scores have been established, based on a normative sample of U.S. adults aged 18 years or older, for Appearance Evaluation (α = .88 and .88), Appearance Orientation (α = .88 and .85), Body Areas Satisfaction (α = .77 and .73), Overweight Preoccupation (α = .73 and .76), and Self-Classified Weight (α = .70 and .89), for males and females, respectively (Cash, 2000). Research examining the validity of the MBSRQ-AS found high correlations to other body image assessment measures, such as similarity between the Appearance Orientation subscale and the Surveillance subscale from the Objectified Body Consciousness Scale (McKinley & Hyde, 1996).

Almost Perfect Scale-Revised

Participants' level of perfectionism was assessed using the Almost Perfect Scale-Revised (APS-R; Slaney et al., 2001). The APS-R was chosen, as it is a brief measure able to distinguish between adaptive and maladaptive perfectionism among adults. The APS-R is a 23-item instrument that measures three dimensions of perfectionism. The High Standards subscale assesses one's personal standards (e.g., "I have high expectations for myself"). The Discrepancy subscale measures distress produced from the discrepancy between performance and standards (e.g., "I often feel frustrated because I can't meet my goals"). The Order subscale assesses one's degree of orderliness (e.g., "Neatness is important to me"). Participants were instructed to answer each item using a 7-point Likert scale ranging from 1 = "strongly disagree" to 7 = "strongly agree". It is suggested that the higher the score on each subscale, the greater the level of perfectionism. However, high scores on the High Standards and Order subscales and a low score on the Discrepancy subscale indicate adaptive perfectionism, whereas a high score on the Discrepancy subscale indicates maladaptive perfectionism.

Research evaluating the psychometric properties of the APS-R has demonstrated favourable evidence for its use. Slaney and colleagues (2001) examined the use of the APS-R among samples of U.S. college students. Results displayed high internal consistency with Cronbach's alpha scores for the Discrepancy, High Standards, and Order subscales being .91, .85, and .82, respectively. The High Standards subscale displayed good construct validity with the Self-Oriented Perfectionism subscale (.64) from the HFMPS and with the Personal Standards subscale (.64) from the FMPS. The

Discrepancy subscale displayed good correlation with the Concern Over Mistakes (.55) and Doubts About Actions (.62) subscales from the FMPS. Lastly, the Order subscale significantly correlated with the Organisation subscale (.88) from the FMPS.

Anti-Fat Attitudes Scale

Participants' explicit anti-fat attitudes were assessed using Crandall's (1994) 13-item Anti-Fat Attitudes (AFA) scale. The AFA scale was chosen, as it is a brief self-report measure that is easily administered. The AFA scale is comprised of three subscales. Dislike assesses one's prejudice against overweight individuals (e.g., "I dislike people who are overweight or obese"). Willpower measures beliefs about the controllability of being overweight (e.g., "It is people's own fault if they are overweight"). Fear of Fat assesses personal concerns about weight gain (e.g., "I worry about becoming fat"). Participants answered each item using a Likert scale (ranging from 0 = "very strongly disagree" to 8 = "very strongly agree"). An average score greater than zero on each of the three subscales indicates the presence of explicit anti-fat attitudes; therefore a higher averaged score indicates stronger anti-fat attitudes.

Research evaluating the psychometric properties of the AFA scale has demonstrated good reliability, with Cronbach's alpha scores for the Dislike, Fear of Fat, and Willpower subscales being .85, .84, and .79, respectively (O'Brien, Hunter, & Banks, 2007). Research evaluating the validity of the AFA scale has shown good construct validity for the Dislike and Willpower subscales. However, support for the construct validity of the Fear of Fat scale appears to be lacking (Morrison, Roddy, & Ryan, 2009). Crandall and colleagues (2001) conducted a cross-cultural study using participants from Australia, India, Poland, Turkey, U.S., and Venezuela. Results showed that the Dislike subscale positively correlated with scores on measures assessing negative cultural value for fatness and the tendency to make judgments of responsibility for being overweight. Furthermore, Crandall (1994) demonstrated that measures assessing a personal worldview in which individuals believe in a just world correlated positively with the Dislike and Willpower subscales but not the Fear of Fat subscale.

Body-Esteem Scale

Participants' body esteem was assessed using Franzoi and Shields' (1984) 35-item Body-Esteem Scale (BES). The BES was chosen, as it is a brief multidimensional measure of body esteem for adults. The BES consists of three subscales for men (Physical Attractiveness, Upper Body Strength, and Physical Condition) and three subscales for women (Sexual Attractiveness, Weight Concern, and Physical Condition). However, in order to assess gender differences, the six subscale scores were summed to produce an overall BES score for each participant (McKinley, 1998). Participants answered each item using a Likert scale (ranging from 1 = "have strong negative feelings" to 5 = "have strong positive feelings"). A higher score indicates greater esteem for one's body.

Research evaluating the psychometric properties of the BES has demonstrated favourable evidence for its reliability and validity. Franzoi and Shields (1984) examined the use of the BES among a sample of 331 undergraduate males and 633 undergraduate females. Results displayed good internal consistency for each of the male and female subscales. For males, Cronbach's alpha scores for the Physical Attractiveness, Upper Body Strength, and Physical Condition subscales were .81, .85, and .86, respectively. For females, Cronbach's alpha scores for the Sexual Attractiveness, Weight Concern, and Physical Condition subscales were .78, .87, and .82, respectively. Evidence supporting the scale's convergent validity has demonstrated a moderate correlation with the Rosenberg Self-Esteem Scale. Furthermore, the BES displays good discriminant validity, such that the Weight Concern subscale has shown to discriminate anorexic females from non-anorexic females. For males, the Upper Body Strength subscale has shown to discriminate male weightlifters from non-weightlifters.

Implicit Association Test

An Implicit Association Test (IAT) was administered to assess participants' implicit anti-fat attitudes by measuring their response latency (time in milliseconds between the start of the trial and a correct response) when making certain associations (see Appendix D). The IAT was chosen for this study, as it is one of the most common methods for assessing implicit anti-fat attitudes and for its ease of administration (Robertson & Vohora, 2008).

The design of the IAT for this study was based on the generic computer-based IAT procedure employed by O'Toole and colleagues (2007). Participants were asked to classify word stimuli into target and/or attribute categories as quickly as possible. For each trial, the first target and/or attribute category was presented at the top left of the computer screen, the second target and/or attribute category was presented at the top right of the screen, and word stimuli was presented in the centre of the screen. Participants were instructed to categorise word stimuli by using the letters on their computer keyboard. The letter 'D' was pressed to categorise the word stimuli into the left category, whereas the letter 'K' was pressed to categorise the word stimuli to the right category. When a correct response was given, the next trial (word) in the block was presented. Each trial was separated with a 400 ms interval, which began once a correct response was given. If the participant categorised the stimuli incorrectly, a red 'X' appeared on screen, which required the participant to press the appropriate response key to continue to the next trial. Participants were given one practice trial in order to familiarise themselves with the procedure. In this trial, participants were instructed to categorise the word 'triangle' into either the two categories displayed on the left side of the computer screen ('animal' or 'shape') or the right side of the screen ('plant' or 'colour'). Once the correct response was obtained, the actual IAT began.

The IAT consisted of seven blocks in total. The first block of 24 trials instructed participants to categorise word stimuli (fat, obese, large, slim, thin, skinny) into the correct target category of 'thin people' ('D' key) or 'fat people' ('K' key). Each word was presented four times. The second block of 24 trials instructed the participants to categorise word stimuli (wonderful, joyful, excellent, terrible, nasty, horrible) relating to the attribute category of 'bad' ('D' key) or 'good' ('K' key). Each word was presented four times. The third block of 24 trials paired up the target and attribute categories, such that on the left side of the computer screen 'thin people' and 'bad' ('D' key) were shown together, whereas 'fat people' and 'good' ('K' key) were paired together on the right side of the screen. Each word was presented twice. The fourth block repeated block three but with 48 trials. Each word was presented four times. The fifth block was similar to block one except the placement of the target categories were switched such that 'fat people' ('D' key) was shown on the left side of the screen and 'thin people' ('K' key) was shown on the right of the screen. This block consisted of 48 trials, as it is

advised to double the number of trials in order to reduce any task order effect (Nosek et al., 2005). Each word was presented eight times. In the sixth block of 24 trials, the pairing of the target and attribute categories switch, such that ‘fat people’ and ‘bad’ (‘D’ key) were paired and ‘thin people’ and ‘good’ (‘K’ key) were paired together. Each word was presented twice. The seventh block repeated block six but with 48 trials. Each word was presented four times.

Generally, participants tend to classify word stimuli quicker when the positive attribute category (‘good’) is paired with ‘thin people’ and when the negative attribute category (‘bad’) is paired with ‘fat people’ (e.g., consistent blocks) compared to when the negative attribute category (‘bad’) is paired with ‘thin people’ and when the positive attribute category (‘good’) is paired with ‘fat people’ (e.g., inconsistent blocks) (see Figure 6). This is due to the consistent blocks being congruent with an individual’s automatic associations (O’Brien, Hunter, Halberstadt, et al., 2007).

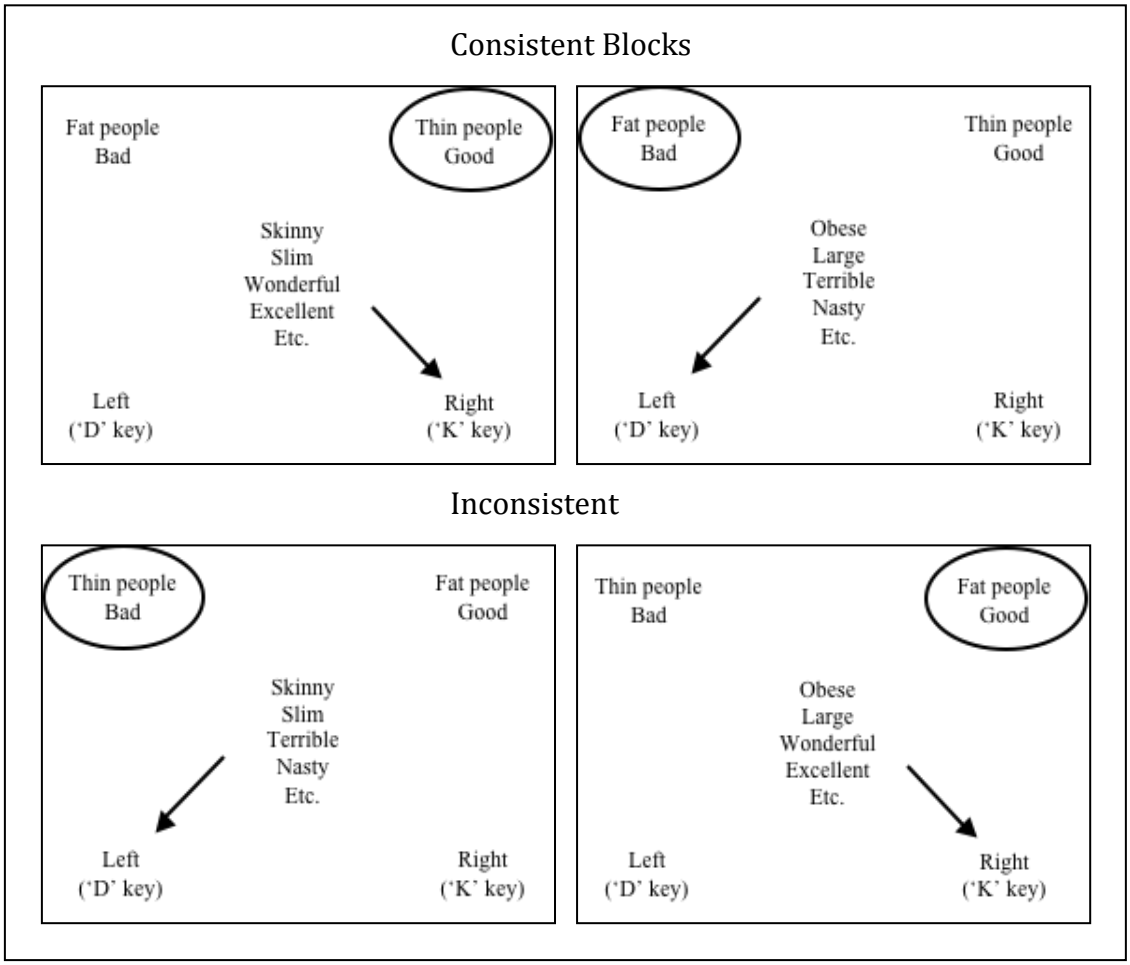

Figure 6. Representation of consistent and inconsistent blocks used in the IAT.[1] Adapted from "A Derived Transfer of Functions and the Implicit Association Test," by C. O'Toole, D. Barnes-Holmes, and S. Smyth, 2007, *Journal of the Experimental Analysis of Behavior*, *88*(2), 263-283. Copyright 2007 by the Society for the Experimental Analysis of Behavior. Inc.

[1] The top-left box demonstrates a trial where the participant is required to press the 'K' key to classify the word stimuli into the right category when a word associated with 'thin people' or 'good' is presented; the top-right box demonstrates a trial where the 'D' key must be pressed to classify the word stimuli into the left category when a word associated with 'fat people' or 'bad' is presented. The bottom-left box demonstrates a trial where the participant is required to press the 'D' key to classify the word stimuli into the left category when a word associated with 'thin people' or 'bad' is presented; the bottom-right box demonstrates a trial where the 'K' key must be pressed to classify the word stimuli into the left category when a word associated with 'fat people' or 'good' is presented. The actual IAT task does not display the arrows and circles.

Blocks one, three, and four were counterbalanced with blocks five, six, and seven, respectively, in order to reduce order effects (Greenwald, Nosek, and Banaji, 2003). Block two remained in the same position across all participants. Consequently, there were two versions of the IAT, with each version representing the different counterbalanced orderings (see Table 1 and Table 2). Word stimuli within blocks one, two, and five were presented in a fully randomised order. For the combination blocks (three, four, six, and seven) the order of words were presented randomly, with the restriction that the trials alternated between target and attribute words (e.g., a target word was never followed by another target word, but was always followed by an attribute word, and same for attribute words). Participants' response latencies were recorded for all trials in each of the seven blocks.

Table 1. *Version one of the IAT*

Phase	Block	No. of trials	Left key	Right Key
Practice	1	24	Thin	Fat
Practice	2	24	Bad	Good
Practice	**3**	**24**	**Thin + Bad**	**Fat + Good**
Test	**4**	**48**	**Thin + Bad**	**Fat + Good**
Practice	5	48	Fat	Thin
Practice	**6**	**24**	**Fat + Bad**	**Thin + Good**
Test	**7**	**48**	**Fat + Bad**	**Thin + Good**

Note. Critical blocks are indicated in bold. IAT = Implicit Association Test. Adapted from " Understanding and Using the Implicit Association Test: I. An Improved Scoring Algorithm," by A. G. Greenwald, B. A. Nosek, and M. R. Banaji, 2003, *Journal of Personality and Social Psychology, 85*(2), 197-216. Copyright 2003 by the American Psychological Association, Inc.

Table 2. *Version two of the IAT*

Phase	Block	No. of trials	Left key	Right key
Practice	5	48	Fat	Thin
Practice	2	24	Bad	Good
Practice	**6**	**24**	**Fat + Bad**	**Thin + Good**
Test	**7**	**48**	**Fat + Bad**	**Thin + Good**
Practice	1	24	Thin	Fat
Practice	**3**	**24**	**Thin + Bad**	**Fat + Good**
Test	**4**	**48**	**Thin + Bad**	**Fat + Good**

Note. Critical blocks are indicated in bold. IAT = Implicit Association Test. Adapted from " Understanding and Using the Implicit Association Test: I. An Improved Scoring Algorithm," by A. G. Greenwald, B. A. Nosek, and M. R. Banaji, 2003, *Journal of Personality and Social Psychology, 85*(2), 197-216. Copyright 2003 by the American Psychological Association, Inc.

Research evaluating the psychometric properties of IAT measures has demonstrated good predictive validity, such that IAT tasks are better at predicting behaviour when measuring discrimination toward social groups compared to explicit measures (Greenwald, Poehlman, Uhlmann, & Banaji, 2009). Furthermore, IAT measures have shown satisfactory internal consistency with Cronbach's alpha scores ranging from .70 to .90 (Nosek et al., 2007).

Data Analysis

Power Analysis

Prior to data collection, a power analysis was conducted. A minimum of 31 participants in each of the four groups (regular gym users, non-gym users, males and females) was determined based on an alpha of 0.05 and beta of 0.50 with 80% power.

D-algorithm

The *D*-algorithm was used to transform the IAT response latency data from each participant into a *D*-score (Greenwald et al., 2003). The *D* score allows for the detection of implicit anti-fat attitudes by calculating the difference in average response latency between trials in blocks 3 and 4 to trials in blocks 6 and 7, and then dividing by the standard deviation of all latencies for all four blocks. As recommended by Greenwald and colleagues (2003), the following scoring procedure was used to calculate *D*-scores: (1) exclude trials exceeding 10,000 ms; (2) exclude all data for a participant if more than 10% of trials have latencies less than 300 ms; (3) calculate one 'inclusive' standard deviation for all trials in blocks 3 and 6 and another standard deviation for all trials in blocks 4 and 7; (4) calculate separate mean latency for trials in each of the four blocks (3, 4, 6, and 7); (5) calculate two mean difference scores ($\text{Mean}_{\text{Block 6}} - \text{Mean}_{\text{Block 3}}$ and $\text{Mean}_{\text{block 7}} - \text{Mean}_{\text{block 4}}$); (6) divide each difference score by its associated 'inclusive' standard deviation calculated in step 3; and (7) calculate the equal-weight average of the two resulting ratios from step 6. The D score ranges from -2 to +2, where a positive *D* score indicates stronger implicit anti-fat attitudes (e.g., stronger associations of negative attributes with fat people compared with thin people) and a negative *D* score indicates weaker implicit anti-fat attitudes. A *D* score of 0 indicates no difference in associations with fat people compared with thin people.

Descriptive Statistics

All data analyses were performed using Statistical Package for the Social Sciences (SPSS) software for Macintosh version 23. Recoding was used to reverse-score all negatively worded items. Descriptive statistics were conducted for the MBSRQ-AS subscales, APS-R subscales, BES, AFA subscales, and the IAT for each of the four groups (regular gym users, non-gym users, males, and females).

Reliability Analysis

Reliability analyses were conducted for all subscales and total scales using Cronbach's alpha. When interpreting Cronbach's alpha, George and Mallery (2003) suggest applying the following criteria: $\alpha \geq 0.9$ = Excellent, $0.9 > \alpha \geq 0.8$ = Good, $0.8 > \alpha \geq 0.7$ = Acceptable, $0.7 > \alpha \geq 0.6$ = Questionable, $0.6 > \alpha \geq 0.5$ = Poor, and $0.5 > \alpha$ = Unacceptable.

Pearson's Correlation

Pearson's correlation coefficients were used to assess relationships between BMI, body image (MBSRQ-AS, Appearance Evaluation, Body Areas Satisfaction, Appearance Orientation, Overweight Preoccupation, and Self-Classified Weight), perfectionism (APS-R, Standards, Order, and Discrepancy), body esteem (BES), explicit anti-fat attitudes (AFA, Dislike, Fear, and Willpower), and implicit anti-fat attitudes (IAT) among regular gym users and non-gym users, and among males and females.

Analysis of Variance (ANOVA)

Two one-way ANOVAs were performed to assess differences in BMI, body image (MBSRQ-AS, Appearance Evaluation, Body Areas Satisfaction, Appearance Orientation, Overweight Preoccupation, and Self-Classified Weight), perfectionism (APS-R, Standards, Order, and Discrepancy), body esteem (BES), explicit anti-fat attitudes (AFA, Dislike, Fear, and Willpower), and implicit anti-fat attitudes (IAT) between regular gym users and non-gym users, and between males and females. One-way ANOVAs were conducted prior to the independent *t*-tests in order to control for Type 1 error.

T-Tests

Independent-sample *t*-tests were conducted comparing regular gym users and non-gym users, and males and females to determine whether the groups differed in BMI, body image (MBSRQ-AS, Appearance Evaluation, Body Areas Satisfaction, Appearance Orientation, Overweight Preoccupation, and Self-Classified Weight), perfectionism (APS-R, Standards, Order, and Discrepancy), body esteem (BES), explicit anti-fat attitudes (AFA, Dislike, Fear, and Willpower), and implicit anti-fat attitudes (IAT).

Moderation and Mediation Analyses

Hayes' (2013) PROCESS macro for SPSS was used to assess the mediating and moderating role of perfectionism and body esteem in the relationship between body image and anti-fat attitudes. PROCESS employs the nonparametric bootstrap method that estimates standard errors and confidence intervals based on a number of resamples from a given sample (Preacher & Hayes, 2004). The bootstrap method was chosen, as opposed to Baron and Kenny's causal steps approach, as it produces greater statistical power, and is better suited to smaller sample sizes (Preacher & Hayes, 2004). For all analyses, coefficients, standard errors and 95% confidence intervals were calculated based on 5000 bootstrap samples, as recommended by Hayes (2013). When testing for mediation, if bootstrap confidence intervals do not include 0, then an indirect (mediation) effect can be assumed with 95% confidence. All coefficients, direct, indirect, and total effects produced from the mediation analyses are reported in unstandardised form, as this is the recommended metric used for causal modelling (Hayes, 2013).

Results

Description of the Sample

Participants were 39 regular gym users and 33 non-gym users recruited through a general Facebook status post and from Facebook pages of gyms located around New Zealand. The two groups resulted in 20 males and 52 females. Demographic characteristics of the sample are displayed in Table 3. For all four groups, the mean age range was 26-30 years of age. The mean BMI for regular gym users, non-gym users, males, and females were 25.31 (SD 4.53), 26.24 (SD 7.67), 24.64 (SD 4.87), and 26.16 (SD 6.56), respectively. Both regular gym users and males displayed a mean duration range of 31-60 minutes spent at the gym per session, whereas females displayed a mean duration of 30 minutes. Mean frequency of gym sessions attended per week was 4.33 (SD 1.40) for regular gym users, 2.90 (SD 2.43) for males, and 2.13 (SD 2.39) for females.

Table 3. *Summary of demographic information*

Variable	Regular gym users (N = 39)	Non-gym users (N = 33)	Males (N = 20)	Females (N = 52)
Age range (years)				
Mean	26-30	26-30	26-30	26-30
BMI				
Mean (SD)	25.31 (4.53)	26.24 (7.67)	24.64 (4.87)	26.16 (6.56)
Range	19.16–39.04	16.98–46.71	18.71–36.02	16.98–46.71
Duration range (minutes)				
Mean	31-60	0	31-60	30
Frequency				
Mean (SD)	4.33 (1.40)	0.00 (0.00)	2.90 (2.43)	2.13 (2.39)

Note. BMI = body mass index. SD = standard deviation. Duration = minutes of exercise per gym session. Frequency = number of gym sessions attended per week.

Descriptive Statistics

Table 4 through to Table 13 display the minimums, maximums, means, standard deviations, skewness and kurtosis statistics for all measures used in the study. All four groups did not exceed a skewness value of 2 or a kurtosis value of 7, thus suggesting normal distributions (West, Finch, & Curran. 1995).

MBSRQ-AS

Mean scores for the MBSRQ-AS subscales were higher among regular gym users, compared to non-gym users, except for Self-Classified Weight, which was slightly lower for non-gym users (see Table 4). Minimum and maximum values were consistent between regular gym users and non-gym users, and similarly for males and females.

Table 5 shows mean scores for Appearance Evaluation, Body Areas Satisfaction, and Appearance Orientation were higher among males compared to females, whereas females displayed higher means for Overweight Preoccupation and Self-Classified Weight.

Table 4. *Descriptive Statistics for MBSRQ-AS Subscales among regular gym users and non-gym users*

Group	Subscale	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Regular gym users	Appearance Evaluation	8	32	22.64	5.41	-0.66	0.60
	Body Areas Satisfaction	13	40	30.10	5.92	-0.64	0.51
	Appearance Orientation	26	57	41.46	7.25	0.23	0.07
	Overweight Preoccupation	5	18	11.56	3.34	-0.10	-0.24
	Self-Classified Weight	5	9	6.62	1.14	0.60	-0.39
Non-gym users	Appearance Evaluation	7	35	21.85	7.76	-0.43	-0.93
	Body Areas Satisfaction	17	44	30.09	7.40	-0.01	-0.95
	Appearance Orientation	25	56	40.70	7.97	0.07	-0.51
	Overweight Preoccupation	4	17	9.58	3.61	0.21	-1.05
	Self-Classified Weight	4	10	6.67	1.81	0.37	-0.82

Note. SD = standard deviation. MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire – Appearance Scales.

Table 5. *Descriptive Statistics for MBSRQ-AS Subscales among males and females*

Group	Subscale	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Males	Appearance Evaluation	13	35	25.50	5.31	-0.43	0.57
	Body Areas Satisfaction	26	43	32.70	5.02	0.37	-0.88
	Appearance Orientation	26	56	41.60	6.94	-0.23	0.50
	Overweight Preoccupation	4	18	9.60	3.69	0.51	-0.18
	Self-Classified Weight	4	8	5.90	1.21	0.41	-0.46
Females	Appearance Evaluation	7	32	21.04	6.60	-0.53	-0.65
	Body Areas Satisfaction	13	44	29.10	6.89	-0.15	-0.63
	Appearance Orientation	25	57	40.92	7.82	0.24	-0.37
	Overweight Preoccupation	4	18	11.06	3.49	-0.19	-0.65
	Self-Classified Weight	4	10	6.92	1.48	0.40	-0.45

Note. SD = standard deviation. MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire – Appearance Scales.

APS-R

Table 6 shows mean scores to be higher on all three APS-S subscales for regular gym users compared to non-gym users. Minimum values for the Standards subscale appeared to differ between regular gym users and non-gym users, with regular gym users (Min = 22) displaying a relatively higher minimum value compared to non-gym users (Min = 8) (see Table 6).

Mean scores for males were lower for Standards and Order but higher for Discrepancy, compared to females (see Table 7). Males and females appeared to differ on the Standards subscale, as females (Min = 21) displayed a higher minimum value compared to males (Min = 8) (see Table 7).

Table 6. *Descriptive Statistics for APS-R Subscales among regular gym users and non-gym users*

Group	Subscale	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Regular gym users	Standards	22	49	40.21	6.68	-0.70	0.03
	Order	8	28	20.95	4.81	-0.60	0.05
	Discrepancy	19	80	49.87	15.12	-0.14	-0.64
Non-gym users	Standards	8	49	39.45	8.17	-2.16	6.32
	Order	11	27	20.52	4.64	-0.64	-0.61
	Discrepancy	14	82	44.33	19.88	0.31	-0.99

Note. SD = standard deviation. APS-R = Almost Perfect Scale-Revised.

Table 7. *Descriptive Statistics for APS-R Subscales among males and females*

Group	Subscale	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Males	Standards	8	48	37.60	9.31	-1.70	4.40
	Order	8	27	19.30	5.47	-0.45	-0.67
	Discrepancy	25	80	51.25	16.81	0.14	-0.76
Females	Standards	21	49	40.73	6.34	-1.13	1.56
	Order	11	28	21.31	4.30	-0.53	-0.40
	Discrepancy	14	82	45.83	17.76	0.02	-0.96

Note. SD = standard deviation. APS-R = Almost Perfect Scale-Revised.

BES

Mean score for body esteem was higher among regular gym users (M = 119.13, SD = 20.57) compared to non-gym users (M = 113.91, SD = 22.13), as shown in Table 8. Minimum and maximum values were consistent between regular gym users and non-gym users.

Table 9 shows that males (M = 125.85, SD = 18.93) displayed a higher mean score on the BES, compared to females (M = 113.23, SD = 21.29). Minimum value between males and females appeared to be relatively higher for males, compared to females (see Table 9).

Table 8. *Descriptive Statistics for BES among regular gym users and non-gym users*

Group	Scale	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Regular gym users	Body Esteem	66	175	119.13	20.57	0.02	1.18
Non-gym users	Body Esteem	75	156	113.91	22.13	0.15	-0.76

Note. SD = standard deviation. BES = Body Esteem Scale.

Table 9. *Descriptive Statistics for BES among males and females*

Group	Scale	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Males	Body Esteem	92	175	125.85	18.93	0.60	1.24
Females	Body Esteem	66	161	113.23	21.29	0.03	-0.33

Note. SD = standard deviation. BES = Body Esteem Scale.

AFA

Table 10 shows regular gym users displayed higher mean scores across all of the AFA subscales compared to non-gym users. Minimum and maximum values for both groups were comparable.

Table 11 reports mean scores for Dislike and Willpower were higher among males, compared to females, whereas Fear was higher among females. Both gender groups displayed similar minimum and maximum values.

Table 10. *Descriptive Statistics for AFA Subscales among regular gym users and non-gym users*

Group	Subscale	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Regular gym users	Dislike	1.57	9	3.87	1.64	1.32	1.91
	Fear	1	9	6.09	2.08	-0.68	-0.07
	Willpower	2.67	8.67	5.93	1.55	-0.20	-0.89
Non-gym users	Dislike	1.43	6.57	3.32	1.42	0.96	-0.06
	Fear	1	9	4.82	2.40	0.19	-1.01
	Willpower	1	9	5.26	1.99	-0.31	0.12

Note. SD = standard deviation. AFA = Anti-fat Attitudes Scale.

Table 11. *Descriptive Statistics for AFA Subscales among males and females*

Group	Subscale	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Males	Dislike	2.14	9	4.62	1.92	0.76	-0.07
	Fear	1	8.33	4.97	2.39	-0.08	-1.30
	Willpower	3.67	9	6.62	1.49	-0.46	-0.50
Females	Dislike	1.43	6.43	3.23	1.21	0.90	0.35
	Fear	1	9	5.72	2.26	-0.36	-0.70
	Willpower	1	9	5.24	1.75	-0.35	0.19

Note. SD = standard deviation. AFA = Anti-fat Attitudes Scale.

IAT

Regular gym users (M = 0.17, SD = 0.66) displayed a higher mean *D* score for the IAT, compared to non-gym users (M = -0.09, SD = 0.78), as shown in Table 12. Minimum and maximum values were consistent between regular gym users and non-gym users, and similarly for males and females.

Table 13 shows males (M = 0.00, SD = 0.66) demonstrated a slightly lower mean IAT *D* score than females (M = 0.07, SD = 0.75).

Table 12. *Descriptive Statistics for IAT among regular gym users and non-gym users*

Group	Measure	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Regular gym users	IAT	-1.18	1.19	0.17	0.66	-0.53	-0.92
Non-gym users	IAT	-1.27	1.26	-0.09	0.78	0.05	-1.42

Note. A positive D-score indicates stronger anti-fat attitudes. A negative D-score indicates weaker anti-fat attitudes. SD = standard deviation. IAT = Implicit Association Test.

Table 13. *Descriptive Statistics for IAT among males and females*

Group	Measure	Minimum	Maximum	Mean	SD	Skewness	Kurtosis
Males	IAT	-1.27	0.96	0.00	0.66	-0.51	-0.75
Females	IAT	-1.22	1.26	0.07	0.75	-0.24	-1.40

Note. A positive D-score indicates stronger anti-fat attitudes. A negative D-score indicates weaker anti-fat attitudes. SD = standard deviation. IAT = Implicit Association Test.

Reliability Analysis

Reliability coefficients for all scales and subscales are displayed in Table 14. Total scale internal consistencies ranged from acceptable (α = 0.74) to excellent (α = 0.93). Cronbach's alpha for the MBSRQ-AS subscales ranged from 0.69 to 0.93. Overweight Preoccupation had the weakest internal consistency out of all the subscales in the study. However, the overall Cronbach's alpha for MBSRQ-AS was 0.74, which suggests good internal reliability. The APS-R subscales displayed good to excellent internal consistency, with Cronbach's alpha ranging from 0.85 to 0.96. Overall, the APS-R produced excellent reliability (α = 0.91). The BES also displayed excellent internal consistency (α = 0.93). For the AFA scale, Dislike, Fear, and Willpower showed good reliabilities ranging from 0.82 to 0.89, and the total scale reliability was 0.89.

Table 14. *Internal consistency reliabilities for four measures (N = 72)*

Scale	Number of items	Subscale/Total	Cronbach's alpha
MBSRQ-AS	7	Appearance Evaluation	0.93
	12	Appearance Orientation	0.87
	9	Body Areas Satisfaction	0.80
	4	Overweight Preoccupation	0.69
	2	Self-Classified Weight	0.86
	34	Total scale	0.74 (n = 70)
APS-R	7	Standards	0.90
	4	Order	0.85
	12	Discrepancy	0.96
	23	Total scale	0.91 (n = 71)
BES	35	Total scale	0.93 (n = 66)
AFA	7	Dislike	0.88
	3	Fear	0.89
	3	Willpower	0.82
	13	Total scale	0.89 (n = 71)

Note. MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire – Appearance Scales. APS-R = Almost Perfect Scale-Revised. BES = Body Esteem Scale. AFA = Anti-fat Attitudes Scale.

Correlational Analyses

Table 15 shows the correlation matrix of the Pearson correlations for each of the variables in the study for regular gym users and non-gym users.

Table 15. *Pearson's correlations coefficients between BMI, body image (MBSRQ-AS, Appearance Evaluation, Body Areas Satisfaction, Appearance Orientation, Overweight Preoccupation, and Self-Classified Weight), perfectionism (APS-R, Standards, Order, and Discrepancy), body esteem (BES), explicit anti-fat attitudes (AFA, Dislike, Fear, and Willpower), and implicit anti-fat attitudes (IAT) for regular gym users and non-gym users*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. BMI	—	**-.486****	**-.425***	**-.399***	-0.25	0.171	**.878****	-0.196	0.048	-0.212	-0.194	**-.443****	0.047	-0.319	0.134	0.171	-0.063
2. MBSRQ-AS	0.049	—	.737**	.715**	.458**	-0.325	-.592**	0.154	0.27	0.2	0.019	**.788****	0.056	**.391***	-0.295	0.201	-0.108
3. Appearance Evaluation	-0.087	.639**	—	.938**	-0.21	-.794**	-.557**	-0.077	0.175	0.038	-0.169	**.844****	-0.268	0.173	**-.659****	0.068	-0.283
4. Body Areas Satisfaction	-0.094	.539**	.730**	—	-0.252	-.762**	-.573**	-0.027	0.276	0.126	-0.174	**.885****	-0.276	0.147	**-.628****	0.03	**-.386***
5. Appearance Orientation	0.09	.522**	-0.192	-0.31	—	.447**	-0.223	0.294	0.086	0.175	0.261	-0.023	0.343	**.345***	0.331	0.125	0.258
6. Overweight Preoccupation	0.049	0.22	-0.295	-.441**	.436**	—	0.326	0.169	-0.179	0.084	0.247	**-.575****	**.510****	0.059	**.812****	0.128	**.418***
7. Self-Classified Weight	**.658***	-0.061	-0.224	-0.142	-0.029	0.135	—	-0.133	-0.046	-0.243	-0.077	**-.578****	0.136	-0.294	0.297	0.158	0.086
8. APS-R	0.197	0.177	-0.183	-0.214	**.482****	0.227	-0.023	—	.420*	.413*	.875**	0.094	0.245	0.338	0.245	0.015	0.155
9. Standards	0.026	0.223	0.053	0.027	0.164	0.227	0.07	.585**	—	.435*	-0.031	**.413***	**-.373***	-0.27	-0.302	-0.282	-0.283
10. Order	0.000	0.218	0.122	0.133	0.152	-0.019	-0.057	.491**	.437**	—	0.06	0.266	-0.182	0.059	-0.203	-0.206	0.113
11. Discrepancy	0.241	0.059	-0.297	**-.329***	**.497****	0.197	-0.043	.868**	0.17	0.119	—	-0.124	**.477****	**.484****	**.452****	0.182	0.267
12. BES	0.187	**.558****	**.629****	**.707****	-0.107	-0.208	0.057	-0.083	0.043	0.125	-0.165	—	-0.243	0.17	**-.539****	-0.02	-0.334
13. AFA	0.204	0.101	-0.277	**-.394***	**.457****	**.487****	0.013	**.506****	0.15	0.158	**.533****	-0.196	—	.704**	.791**	.793**	0.325
14. Dislike	0.149	0.01	-0.009	-0.15	0.142	0.068	-0.18	**.392***	0.052	0.055	**.462****	-0.052	.773**	—	0.308	.497**	0.289
15. Fear	0.126	0.061	**-.535****	**-.504****	**.584****	**.653****	0.127	**.541****	0.204	0.296	**.509****	-0.302	.769**	0.298	—	.355*	0.266
16. Willpower	0.216	0.176	-0.009	-0.214	0.282	**.349***	0.054	0.207	0.069	-0.035	0.245	-0.062	.810**	.599**	.390*	—	0.204
17. IAT	-0.087	-0.18	-0.237	-0.21	-0.009	0.179	-0.002	0.171	0.21	0.024	0.118	-0.192	0.166	0.162	0.313	-0.149	—

Note. Regular gym users are presented in the lower half of the table and non-gym users are presented in the shaded upper half of the table. Significant correlations between scales/subscales are indicated in bold. BMI = body mass index. MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire – Appearance Scales. APS-R = Almost Perfect Scale-Revised. BES = Body Esteem Scale. AFA = Anti-fat Attitudes Scale. IAT = Implicit Association Test.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Body Mass Index and Body Image

For both groups, a significant positive correlation was found between BMI and Self-Classified Weight (Regular gym users, $r = 0.658$, $p < 0.01$; Non-gym users, $r = 0.878$, $p < 0.01$). Within both groups, BMI did not significantly correlate with Appearance Orientation and Overweight Preoccupation.

BMI was negatively correlated with the MBSRQ-AS ($r = -0.486$, $p < 0.01$), Appearance Evaluation ($r = -0.425$, $p < 0.05$), and Body Areas Satisfaction ($r = -0.399$, $p < 0.05$) among non-gym users.

Body Image and Anti-Fat Attitudes

For both regular gym users and non-gym users, Overweight Preoccupation positively correlated with the AFA scale (Regular gym users, $r = 0.487$, $p < 0.01$; Non-gym users, $r = 0.510$, $p < 0.01$). Fear negatively correlated with Appearance Evaluation within both groups (Regular gym users, $r = -0.535$, $p < 0.01$; Non-gym users, $r = -0.659$, $p < 0.01$). Fear also showed a significant negative correlation with Body Areas Satisfaction (Regular gym users, $r = -0.504$, $p < 0.01$; Non-gym users, $r = -0.628$, $p < 0.01$). Lastly, Fear positively correlated with Overweight Preoccupation for both regular gym users and non-gym users ($r = 0.653$, $p < 0.01$; $r = 0.812$, $p < 0.01$, respectively).

Among regular gym users, the AFA scale negatively correlated with Body Areas Satisfaction ($r = -0.394$, $p < 0.05$), and positively correlated with Appearance Orientation ($r = 0.457$, $p < 0.01$). A positive correlation was found between Fear and Appearance Orientation, which was significant among regular gym users ($r = 0.584$, $p < 0.01$). Regular gym users also displayed a significant positive correlation between Willpower and Overweight Preoccupation ($r = 0.349$, $p < 0.05$). No significant correlations were found between the MBSRQ-AS scale/subscales and the IAT among regular gym users.

Among non-gym users, the MBSRQ-AS showed a significant positive correlation with Dislike ($r = 0.391$, $p < 0.05$). A significant positive correlation was also found between Appearance Orientation and Dislike among non-gym users ($r = 0.345$, $p < 0.05$). A negative correlation was found between Body Areas Satisfaction and the IAT, which was significant among non-gym users ($r = -0.386$, $p < 0.05$). The IAT also positively correlated with Overweight Preoccupation among non-gym users ($r = 0.418$, $p < 0.05$).

Body Image and Body Esteem

The MBSRQ-AS and the BES showed a significant positive correlation among both regular gym users and non-gym users ($r = 0.558$, $p < 0.01$; $r = 0.788$, $p < 0.01$, respectively). A significant positive correlation was also found between Appearance Evaluation and the BES for both groups (Regular gym users, $r = 0.629$, $p < 0.01$; Non-gym users $r = 0.844$, $p < 0.01$). Lastly, significant positive correlations were found for Body Areas Satisfaction and the BES among both regular gym users and non-gym users ($r = 0.707$, $p < 0.01$; $r = 0.885$, $p < 0.01$).

The BES was negatively correlated with Overweight Preoccupation ($r = -0.575$, $p < 0.01$) and Self-Classified Weight ($r = -0.578$, $p < 0.01$), which were both significant among non-gym users.

Body Esteem and Anti-fat Attitudes

Correlations between the BES and measures assessing explicit (AFA) anti-fat attitudes were significant only among non-gym users, compared to regular gym users. Specifically, a significant negative correlation was only found between the BES and Fear ($r = -0.539$, $p < 0.01$). No significant correlations were found between the BES and implicit (IAT) anti-fat attitudes among both regular gym users and non-gym users.

Body Image and Perfectionism

Correlations between the MBSRQ-AS scale/subscales and the APS-R scale/subscales were significant only among regular gym users, compared to non-gym users. For regular gym users, Appearance Orientation positively correlated with the APS-R scale ($r = 0.482$, $p < 0.01$). Regular gym users also displayed a negative correlation between Discrepancy and Body Areas Satisfaction ($r = -0.329$, $p < 0.05$), and a positive correlation for Discrepancy and Appearance Orientation ($r = 0.497$, $p < 0.01$).

Perfectionism and Anti-fat Attitudes

For both regular gym users and non-gym users, Discrepancy positively correlated with the AFA scale (Regular gym users, $r = 0.533$, $p < 0.01$; Non-gym users, $r = 0.477$, $p < 0.01$). Discrepancy also showed a significant positive correlation with Dislike within both groups (Regular gym users, $r = 0.462$, $p < 0.01$; Non-gym users, $r =$

0.484, $p < 0.01$). Lastly, Discrepancy and Fear demonstrated a significant positive correlation among both regular gym users and non-gym users ($r = 0.509$, $p < 0.01$; $r = 0.452$, $p < 0.01$, respectively). No significant correlations were found between the APS-R scale/subscales and the IAT among regular gym users and non-gym users.

Regular gym users showed a significant positive correlation between the AFA scale and the APS-R scale ($r = 0.506$, $p < 0.01$). Dislike positively correlated with the APS-R scale, which was significant among regular gym users ($r = 0.392$, $p < 0.05$). Regular gym users also displayed a significant positive correlation between Fear and the APS-R scale ($r = 0.541$, $p < 0.01$).

For non-gym users, a significant negative correlation was found between Standards and the AFA scale ($r = -0.373$, $p < 0.05$).

Relationship between Implicit and Explicit Anti-fat Attitudes

No significant correlations were found between the IAT and the AFA scale/subscales among both regular gym users and non-gym users.

Table 16 shows the correlation matrix of the Pearson correlations for each of the variables in the study for males and females.

Table 16. *Pearson's correlations coefficients between BMI, body image (MBSRQ-AS, Appearance Evaluation, Body Areas Satisfaction, Appearance Orientation, Overweight Preoccupation, and Self-Classified Weight), perfectionism (APS-R, Standards, Order, and Discrepancy), body esteem (BES), explicit anti-fat attitudes (AFA, Dislike, Fear, and Willpower), and implicit anti-fat attitudes (IAT) for males and females*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. BMI	—	**-.346***	**-.302***	**-.281***	-0.172	-0.027	**.832****	-0.221	-0.103	**-.329***	-0.131	**-.351***	-0.012	-0.208	-0.043	0.169	-0.13
2. MBSRQ-AS	0.079	—	.695**	.632**	.475**	-0.027	-.405**	0.18	**.332***	**.280***	0.015	**.661****	0.077	0.219	-0.084	0.14	-0.074
3. Appearance Evaluation	-0.284	.563**	—	.856**	-0.214	-.550**	-.407**	-0.13	0.204	0.127	-0.249	**.826****	-0.261	0.092	**-.541****	0.013	-0.271
4. Body Areas Satisfaction	-0.204	.486*	.779**	—	-.310*	-.586**	-.349*	-0.177	0.181	0.166	**-.303***	**.879****	**-.332***	-0.07	**-.502****	-0.094	**-.290***
5. Appearance Orientation	0.118	.572**	-0.244	-0.249	—	.481**	-0.187	**.446****	0.208	0.232	**.369****	-0.166	**.345***	0.226	**.428****	0.114	0.213
6. Overweight Preoccupation	0.428	0.221	-0.387	-.533*	0.378	—	0.065	**.318***	0.015	0.037	**.342***	**-.490****	**.609****	**.283***	**.736****	**.305***	**.366****
7. Self-Classified Weight	**.777***	-0.002	-0.287	-0.413	0.045	.556*	—	-0.248	-0.203	**-.384****	-0.112	**-.400****	0.068	-0.176	0.075	0.187	-0.024
8. APS-R	0.409	0.221	-0.089	0.061	0.258	0.07	0.31	—	.388**	.351*	.895**	-0.183	**.428****	**.404****	**.483****	0.117	**.310***
9. Standards	0.304	0.306	0.217	0.377	-0.002	-0.049	0.225	.686**	—	.364**	-0.012	0.145	-0.045	-0.01	-0.051	-0.033	0.048
10. Order	0.357	0.27	0.21	0.262	0.052	-0.056	0.14	.650**	.484*	—	0.021	0.125	-0.006	0.061	-0.016	-0.035	0.084
11. Discrepancy	0.315	0.067	-0.32	-0.205	0.363	0.148	0.283	.873**	0.294	0.359	—	**-.287***	**.496****	**.441****	**.562****	0.151	**.309***
12. BES	**.541***	**.645****	0.331	0.377	0.25	0.224	0.307	**.541***	**.673****	**.593****	0.227	—	**-.340***	-0.041	**-.507****	-0.128	-0.211
13. AFA	**.478***	0.058	**-.528***	**-.595****	**.544***	**.577****	0.389	0.36	-0.11	0.161	**.536***	0.004	—	.731**	.843**	.789**	**.274***
14. Dislike	0.203	-0.066	-0.317	-0.267	0.294	0.089	-0.02	0.432	-0.012	0.287	**.547***	-0.062	.778**	—	.433**	.491**	0.273
15. Fear	**.537***	0.08	**-.591****	**-.676****	**.557***	**.776****	**.503***	0.275	-0.144	0.146	0.435	0.111	.882**	.454*	—	.420**	**.344***
16. Willpower	0.441	0.147	-0.371	**-.520***	**.508***	**.532***	**.493***	0.179	-0.113	-0.078	0.35	-0.086	.857**	.531*	.699**	—	0.021
17. IAT	0.081	-0.214	-0.155	-0.357	-0.118	0.25	0.265	-0.11	-0.285	0.034	-0.014	-0.313	0.377	0.337	0.255	0.389	—

Note. Males are presented in the lower half of the table and females are presented in the shaded upper half of the table. Significant correlations between scales/subscales are indicated in bold. BMI = body mass index. MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire – Appearance Scales. APS-R = Almost Perfect Scale-Revised. BES = Body Esteem Scale. AFA = Anti-fat Attitudes Scale. IAT = Implicit Association Test.

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Body Mass Index and Body Image

Both males and females showed significant positive correlations between BMI and Self-Classified Weight (Males, $r = 0.777$, $p < 0.01$; Females, $r = 0.832$, $p < 0.01$). Within both gender groups, BMI did not significantly correlate with Appearance Orientation and Overweight Preoccupation.

BMI was negatively correlated with the MBSRQ-AS ($r = -0.346$, $p < 0.05$), Appearance Evaluation ($r = -0.302$, $p < 0.05$), and Body Areas Satisfaction ($r = -0.281$, $p < 0.05$) among females.

Body Image and Anti-fat Attitudes

The AFA scale and Body Areas Satisfaction were negatively correlated, which was significant among both males and females ($r = -0.595$, $p < 0.01$; $r = -0.332$, $p < 0.05$, respectively). For both males and females, significant positive correlations were also evident between the AFA scale and Appearance Orientation (Males, $r = 0.544$, $p < 0.05$; Females, $r = 0.345$, $p < 0.05$) and between the AFA scale and Overweight Preoccupation (Males, $r = 0.577$, $p < 0.01$; Females, $r = 0.609$, $p < 0.01$). Fear negatively correlated with Appearance Evaluation (Males, $r = -0.591$, $p < 0.01$; Females, $r = -0.541$, $p < 0.01$) and Body Areas Satisfaction (Males, $r = -0.676$, $p < 0.01$; Females, $r = -0.502$, $p < 0.01$) within both gender groups. Both males and females also showed significant positive correlations between Fear and Appearance Orientation (Males, $r = 0.557$, $p < 0.05$; Females, $r = 0.428$, $p < 0.01$), and between Fear and Overweight Preoccupation (Males, $r = 0.776$, $p < 0.01$; Females, $r = 0.736$, $p < 0.01$). Lastly, Willpower and Overweight Preoccupation were positively correlated, which was significant among both males and females ($r = 0.532$, $p < 0.05$; $r = 0.305$, $p < 0.05$, respectively).

Males showed significant negative correlations between Appearance Evaluation and the AFA scale ($r = -0.528$, $p < 0.05$) and between Body Areas Satisfaction and Willpower ($r = -0.520$, $p < 0.05$). Appearance Orientation and Willpower were positively correlated, which was significant among males ($r = 0.508$, $p < 0.05$). Males also displayed significant positive correlations between Self-Classified Weight and Fear ($r = 0.503$, $p < 0.05$), and between Self-Classified Weight and Willpower ($r = 0.493$, $p < 0.05$). No significant correlations were found between the MBSRQ-AS scale/subscales and the IAT among males.

Females showed a significant positive correlation between Dislike and Overweight Preoccupation ($r = 0.283$, $p < 0.05$). Among females, the IAT negatively correlated with Body Areas Satisfaction ($r = -0.290$, $p < 0.05$), and positively correlated with Overweight Preoccupation ($r = 0.366$, $p < 0.01$).

Body Image and Body Esteem

Significant positive correlations were found between the MBSRQ-AS and the BES for both males and females ($r = 0.645$, $p < 0.01$; $r = 0.661$, $p < 0.01$, respectively).

Among females, the BES positively correlated with Appearance Evaluation ($r = 0.826$, $p < 0.01$) and Body Areas Satisfaction ($r = 0.879$, $p < 0.01$), and negatively correlated with Overweight Preoccupation ($r = -0.490$, $p < 0.01$) and Self-Classified Weight ($r = -0.400$, $p < 0.01$).

Body Esteem and Anti-fat Attitudes

Correlations between the BES and measures assessing explicit (AFA) anti-fat attitudes were significant only among females, compared to males. The BES negatively correlated with the AFA scale ($r = -0.340$, $p < 0.05$) and Fear ($r = -0.507$, $p < 0.01$). No significant correlations were found between the BES and implicit (IAT) anti-fat attitudes among both males and females.

Body Image and Perfectionism

Correlations between the MBSRQ-AS scale/subscales and the APS-R scale/subscales were significant only among females, compared to males. The MBSRQ-AS positively correlated with both the Standards ($r = 0.332$, $p < 0.05$) and Order ($r = 0.280$, $p < 0.05$) subscales. Among females, the APS-R scale positively correlated with Appearance Orientation ($r = 0.446$, $p < 0.01$) and Overweight Preoccupation ($r = 0.318$, $p < 0.05$). Self-Classified Weight and Order displayed a significant negative correlation for females ($r = -0.384$, $p < 0.01$). Lastly, Discrepancy negatively correlated with Body Areas Satisfaction ($r = -0.303$, $p < 0.05$), and positively correlated with both Appearance Orientation ($r = 0.369$, $p < 0.01$) and Overweight Preoccupation ($r = 0.342$, $p < 0.05$) among females.

Perfectionism and Anti-fat Attitudes

Both males and females displayed significant positive correlations between Discrepancy and the AFA scale (Males, $r = 0.536$, $p < 0.05$; Females, $r = 0.496$, $p < 0.01$), and between Discrepancy and Dislike (Males, $r = 0.547$, $p < 0.05$; Females, $r = 0.441$, $p < 0.01$).

Among females, the APS-R scale positively correlated with the AFA scale ($r = 0.428$, $p < 0.01$), Dislike ($r = 0.404$, $p < 0.01$), and Fear ($r = 0.483$, $p < 0.01$). Females also displayed a significant positive correlation between Discrepancy and Fear ($r = 0.562$, $p < 0.01$). Lastly, the IAT positively correlated with the APS-R scale ($r = 0.310$, $p < 0.05$) and Discrepancy ($r = 0.309$, $p < 0.05$), which were both significant among females. No significant correlations were found between the APS-R scale/subscales and the IAT among males.

Relationship between Implicit and Explicit Anti-fat Attitudes

No significant correlations were found between the IAT and the AFA scale/subscales among male participants.

For females, a positive significant correlation was found between the IAT and the AFA scale ($r = 0.274$, $p < 0.05$). The IAT was also positively correlated with Fear among females ($r = 0.344$, $p < 0.05$).

Analysis of Variance (ANOVA)

A one-way ANOVA was conducted to assess for significant differences in the variables between regular gym users and non-gym users. Table 17 shows the effect of gym membership on overweight preoccupation was significant, $F(1, 70) = 5.89$, $p = 0.018$. Regular gym users and non-gym users were also found to significantly differ on the AFA scale, $F(1,70) = 6.08$, $p = 0.016$. A significant difference was also evident between the two groups for Fear, $F(1,70) = 5.85$, $p = 0.018$. However, a significant difference was not found for the IAT between regular gym users and non-gym users, $F(1,70) = 2.39$, $p = 0.127$.

Table 17. *One-way ANOVA summary table comparing regular gym users and non-gym users to BMI, body image (MBSRQ-AS, Appearance Evaluation, Body Areas Satisfaction, Appearance Orientation, Overweight Preoccupation, and Self-Classified Weight), perfectionism (APS-R, Standards, Order, and Discrepancy), body esteem (BES), explicit anti-fat attitudes (AFA, Dislike, Fear, and Willpower), and implicit anti-fat attitudes (IAT)*

		Sum of Squares	df	Mean Square	F	Sig.
BMI	Between	15.317	1	15.317	0.402	0.528
	Within	2664.34	70	38.062		
	Total	2679.657	71			
MBSRQ-AS	Between	219.699	1	219.699	1.6	0.21
	Within	9614.746	70	137.354		
	Total	9834.444	71			
Appearance Evaluation	Between	11.228	1	11.228	0.259	0.612
	Within	3035.217	70	43.36		
	Total	3046.444	71			
Body Areas Satisfaction	Between	0.002	1	0.002	0	0.994
	Within	3084.317	70	44.062		
	Total	3084.319	71			
Appearance Orientation	Between	10.449	1	10.449	0.182	0.671
	Within	4028.662	70	57.552		
	Total	4039.111	71			
Overweight Preoccupation	*Between*	*70.669*	*1*	*70.669*	*5.892*	*0.018*
	Within	*839.65*	*70*	*11.995*		
	Total	*910.319*	*71*			
Self-Classified Weight	Between	0.047	1	0.047	0.021	0.884
	Within	154.564	70	2.208		
	Total	154.611	71			
APS-R	Between	807.834	1	807.834	1.834	0.18
	Within	30837.944	70	440.542		
	Total	31645.778	71			

Standards	Between	10.07	1	10.07	0.184	0.669
	Within	3828.541	70	54.693		
	Total	3838.611	71			
Order	Between	3.36	1	3.36	0.15	0.7
	Within	1566.14	70	22.373		
	Total	1569.5	71			
Discrepancy	Between	548.308	1	548.308	1.799	0.184
	Within	21331.692	70	304.738		
	Total	21880	71			
BES	Between	486.9	1	486.9	1.074	0.304
	Within	31747.086	70	453.53		
	Total	32233.986	71			
AFA	*Between*	*12.419*	*1*	*12.419*	*6.078*	*0.016*
	Within	*143.035*	*70*	*2.043*		
	Total	*155.454*	*71*			
Dislike	Between	5.521	1	5.521	2.31	0.133
	Within	167.288	70	2.39		
	Total	172.809	71			
Fear	*Between*	*29.096*	*1*	*29.096*	*5.849*	*0.018*
	Within	*348.231*	*70*	*4.975*		
	Total	*377.327*	*71*			
Willpower	Between	8	1	8	2.572	0.113
	Within	217.764	70	3.111		
	Total	225.764	71			
IAT	Between	1.218	1	1.218	2.385	0.127
	Within	35.752	70	0.511		
	Total	36.97	71			

Note. Significant group differences are italicised. BMI = body mass index. MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire – Appearance Scales. APS-R = Almost Perfect Scale-Revised. BES = Body Esteem Scale. AFA = Anti-fat Attitudes Scale. IAT = Implicit Association Test. Significance $p < 0.05$.

A one-way ANOVA was conducted to assess for significant differences in the variables between males and females. Table 18 shows males and females significantly differed in the MBSRQ-AS, $F(1,70) = 4.28$, $p = 0.042$. Significant differences were also found for Appearance Evaluation, $F(1,70) = 7.30$, $p = 0.009$, Body Areas Satisfaction, $F(1,70) = 4.53$, $p = 0.037$, and Self-Classified Weight, $F(1,70) = 7.59$, $p = 0.007$. Results show the effect of gender on body esteem was significant, $F(1,70) = 5.38$, $p = 0.023$. When assessing anti-fat attitudes, a significant difference was found between males and females for Dislike, $F(1,70) = 13.50$, $p = 0.000$, and Willpower, $F(1,70) = 9.60)$, $p = 0.003$. However, no significant difference was found between the two groups for the IAT, $F(1,70) = 0.11$, $p = 0.744$.

Table 18. *One-way ANOVA summary table comparing regular gym users and non-gym users to BMI, body image (MBSRQ-AS, Appearance Evaluation, Body Areas Satisfaction, Appearance Orientation, Overweight Preoccupation, and Self-Classified Weight), perfectionism (APS-R, Standards, Order, and Discrepancy), body esteem (BES), explicit anti-fat attitudes (AFA, Dislike, Fear, and Willpower), and implicit anti-fat attitudes (IAT)*

		Sum of Squares	df	Mean Square	F	Sig.
BMI	Between	33.332	1	33.332	0.882	0.351
	Within	2646.324	70	37.805		
	Total	2679.657	71			
MBSRQ-AS	*Between*	*566.321*	*1*	*566.321*	*4.277*	*0.042*
	Within	*9268.123*	*70*	*132.402*		
	Total	*9834.444*	*71*			
Appearance Evaluation	*Between*	*287.521*	*1*	*287.521*	*7.295*	*0.009*
	Within	*2758.923*	*70*	*39.413*		
	Total	*3046.444*	*71*			
Body Areas Satisfaction	*Between*	*187.6*	*1*	*187.6*	*4.533*	*0.037*
	Within	*2896.719*	*70*	*41.382*		
	Total	*3084.319*	*71*			
Appearance Orientation	Between	6.619	1	6.619	0.115	0.736
	Within	4032.492	70	57.607		
	Total	4039.111	71			
Overweight Preoccupation	Between	30.693	1	30.693	2.442	0.123
	Within	879.627	70	12.566		
	Total	910.319	71			
Self-Classified Weight	*Between*	*15.119*	*1*	*15.119*	*7.587*	*0.007*
	Within	*139.492*	*70*	*1.993*		
	Total	*154.611*	*71*			
APS-R	Between	1.17	1	1.17	0.003	0.96
	Within	31644.608	70	452.066		
	Total	31645.778	71			

Standards	Between	141.58	1	141.58	2.681	0.106
	Within	3697.031	70	52.815		
	Total	3838.611	71			
Order	Between	58.223	1	58.223	2.697	0.105
	Within	1511.277	70	21.59		
	Total	1569.5	71			
Discrepancy	Between	424.808	1	424.808	1.386	0.243
	Within	21455.192	70	306.503		
	Total	21880	71			
BES	*Between*	*2300.205*	*1*	*2300.205*	*5.379*	*0.023*
	Within	*29933.781*	*70*	*427.625*		
	Total	*32233.986*	*71*			
AFA	Between	6.5	1	6.5	3.055	0.085
	Within	148.954	70	2.128		
	Total	155.454	71			
Dislike	*Between*	*27.935*	*1*	*27.935*	*13.497*	*0.000*
	Within	*144.875*	*70*	*2.07*		
	Total	*172.809*	*71*			
Fear	Between	8.153	1	8.153	1.546	0.218
	Within	369.174	70	5.274		
	Total	377.327	71			
Willpower	*Between*	*27.233*	*1*	*27.233*	*9.602*	*0.003*
	Within	*198.531*	*70*	*2.836*		
	Total	*225.764*	*71*			
IAT	Between	0.057	1	0.057	0.108	0.744
	Within	36.914	70	0.527		
	Total	36.97	71			

Note. Significant group differences are italicised. BMI = body mass index. MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire – Appearance Scales. APS-R = Almost Perfect Scale-Revised. BES = Body Esteem Scale. AFA = Anti-fat Attitudes Scale. IAT = Implicit Association Test. Significance $p < 0.05$.

T-Tests

As shown in Table 19, mean scores for Overweight Preoccupation were significantly higher among regular gym users (M = 11.56, SD = 3.34) compared to non-gym users (M = 9.58, SD = 3.61; $t_{(70)} = 2.43$, $p = 0.02$). Regular gym users (M = 5.30, SD = 1.38) displayed higher mean scores for the AFA scale, compared to non-gym users (M = 4.47, SD = 1.49; $t_{(70)} = 2.47$, $p = 0.02$) (see Appendix E). Mean scores for Fear were also significantly higher among regular gym users (M = 6.09, SD = 2.08), compared to non-gym users (M = 4.82, SD = 2.40; $t_{(70)} = 2.42$, $p = 0.02$).

Mean IAT *D* score was higher among regular gym users (M = 0.17, SD = 0.66) compared to non-gym users (M = -0.09, SD = 0.78; $t_{(70)} = 1.54$, $p = 0.13$), however this difference was statistically non-significant (see Appendix F).

Table 19. *Independent Samples T-Test for regular gym users and non-gym users*

	Regular gym users	Non-gym users	t	df	Sig. (2-tailed)
BMI	25.31 (4.53)	26.24 (7.67)	-0.61	50	0.55
MBSRQ-AS	112.38 (11.10)	108.88 (12.41)	1.27	70	0.21
Appearance Evaluation	22.64 (5.41)	21.85 (7.76)	0.49	56	0.62
Body Areas Satisfaction	30.10 (5.92)	30.09 (7.40)	0.01	61	0.99
Appearance Orientation	41.46 (7.25)	40.7 (7.97)	0.43	70	0.67
Overweight Preoccupation	*11.56 (3.34)*	*9.58 (3.61)*	*2.43*	*70*	*0.02*
Self-Classified Weight	6.62 (1.14)	6.67 (1.81)	-0.14	52	0.89
APS-R	111.03 (19.39)	104.30 (22.75)	1.35	70	0.18
Standards	40.21 (6.68)	39.45 (8.17)	0.43	70	0.67
Order	20.95 (4.81)	20.52 (4.64)	0.39	70	0.70
Discrepancy	49.87 (15.12)	44.33 (19.88)	1.34	70	0.18
BES	119.13 (20.57)	113.91 (22.13)	1.04	70	0.30
AFA	*5.30 (1.38)*	*4.47 (1.49)*	*2.47*	*70*	*0.02*
Dislike	3.87 (1.64)	3.32 (1.42)	1.52	70	0.13
Fear	*6.09 (2.08)*	*4.82 (2.40)*	*2.42*	*70*	*0.02*
Willpower	5.93 (1.55)	5.26 (1.99)	1.60	70	0.11
IAT	0.17 (0.66)	-0.09 (0.78)	1.54	70	0.13

Note. Significant group differences are italicised. BMI = body mass index. MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire – Appearance Scales. APS-R = Almost Perfect Scale-Revised. BES = Body Esteem Scale. AFA = Anti-fat Attitudes Scale. IAT = Implicit Association Test. Significance $p < .05$.

Table 20 shows males and females significantly differed on the MBSRQ-AS, such that males (M = 115.3, SD = 10.21) displayed a higher mean score than females (M = 109.04, SD = 11.95; $t_{(70)}$ = 2.07, p = 0.04). Significant differences were also evident for Appearance Evaluation, Body Areas Satisfaction, and Self-Classified Weight. A higher mean score for Appearance Evaluation was demonstrated among males (M = 25.50, SD = 5.31) compared to females (M = 21.04, SD = 6.60; $t_{(70)}$ = 2.70, p = 0.01). On average, males (M = 32.70, SD – 5.02) significantly scored higher on Body Areas Satisfaction compared to females (M = 29.10, SD = 6.89; $t_{(70)}$ = 2.13, p = 0.04). For Self-Classified Weight, females (M = 6.92, SD = 1.47) displayed a significantly higher mean score compared to males (M = 5.90, SD = 1.21; $t_{(70)}$ = -2.75, p = 0.01). For the BES, a significant difference was found, such that males (M = 125.85, SD = 18.93) displayed a higher mean score compared to females (M = 113.23, SD = 21.29; $t_{(70)}$ = 2.32, p = 0.02). Similar results were also found for the AFA scale, with males displaying a higher mean score than females. Mean scores for the AFA scale were significantly higher among males (M = 5.40, SD = 1.63) than females (M = 4.73, SD = 1.39; $t_{(70)}$ = 1.75, p = 0.09) (see Appendix G). Males (M = 4.62, SD = 1.92) also showed higher mean scores for Dislike, which significantly differed from females mean scores (M = 3.23, SD = 1.21; $t_{(25)}$ = 3.01, p = 0.01). Mean scores for Willpower were also significantly higher among males (M = 6.62, SD = 1.49) compared to females (M = 5.24, SD = 1.75; t(70) = 3.10, p = 0.00).

For the IAT, a higher mean *D* score was shown for females (M = 0.07, SD = 0.75) compared to males (M = 0.00, SD = 0.66; $t_{(70)}$ = -0.33, p = 0.74), however a statistically significant difference between the groups was not evident (see Appendix H).

Table 20. *Independent Samples T-Test for males and females*

	Males	Females	t	df	Sig. (2-tailed)
BMI	24.64 (4.87)	26.16 (6.56)	-0.94	70	0.35
MBSRQ-AS	*115.3 (10.21)*	*109.04 (11.95)*	*2.07*	*70*	*0.04*
Appearance Evaluation	*25.50 (5.31)*	*21.04 (6.60)*	*2.70*	*70*	*0.01*
Body Areas Satisfaction	*32.70 (5.02)*	*29.10 (6.89)*	*2.13*	*70*	*0.04*
Appearance Orientation	41.60 (6.94)	40.92 (7.82)	0.34	70	0.74
Overweight Preoccupation	9.60 (3.69)	11.06 (3.49)	-1.56	70	0.12
Self-Classified Weight	5.90 (1.21)	6.92 (1.48)	-2.75	70	0.01
APS-R	108.15 (24.63)	107.87 (19.86)	0.05	70	0.96
Standards	37.60 (9.31)	40.73 (6.34)	-1.64	70	0.11
Order	19.30 (5.47)	21.31 (4.30)	-1.64	70	0.11
Discrepancy	51.25 (16.81)	45.83 (17.76)	1.18	70	0.24
BES	*125.85 (18.93)*	*113.23 (21.29)*	*2.32*	*70*	*0.02*
AFA	*5.40 (1.63)*	*4.73 (1.39)*	*1.75*	*70*	*0.09*
Dislike	*4.62 (1.92)*	*3.23 (1.21)*	*3.01*	*25*	*0.01*
Fear	4.97 (2.39)	5.72 (2.26)	-1.24	70	0.22
Willpower	*6.62 (1.49)*	*5.24 (1.75)*	*3.10*	*70*	*0.00*
IAT	0.00 (0.66)	0.07 (0.75)	-0.33	70	0.74

Note. Significant group differences are italicised. BMI = body mass index. MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire – Appearance Scales. APS-R = Almost Perfect Scale-Revised. BES = Body Esteem Scale. AFA = Anti-fat Attitudes Scale. IAT = Implicit Association Test. Significance $p < .05$.

Moderation Analyses

Moderation analyses showed body esteem (BES) did not significantly moderate the relationship between body image (MBSRQ-AS scale/subscales) and implicit (IAT) or explicit (AFA) anti-fat attitudes.

Perfectionism (APS-R) was not found to significantly moderate the relationship between body image (MBSRQ-AS scale/subscales) and implicit (IAT) or explicit (AFA scale) anti-fat attitudes.

Mediation Analyses

Mediation analyses demonstrated body esteem (BES) did not have a significant mediation effect on the relationship between body image (MBSRQ-AS scale/subscales) and implicit (IAT) or explicit (AFA scale) anti-fat attitudes.

Significance was found for the mediating effect of perfectionism (APS-R) on the relationship between body image and explicit anti-fat attitudes (see Table 21).

Table 21. *Mediating effect of perfectionism on the relationship between body image (MBSRQ-AS) and explicit anti-fat attitudes (AFA) (N = 72)*

MBSRQ-AS scale/subscale	AFA scale/subscale	Indirect effect [95% BCI]	Pathway a	Pathway b	Pathway c' (direct)	Pathway c (total)
Appearance Orientation	AFA	0.02 (0.01) [0.0008, 0.0560]	1.08** (0.31)	0.02* (0.01)	0.06* (0.02)	0.08** (0.02)
Appearance Orientation	Dislike	0.03 (0.02) [0.0026, 0.0708]	1.08** (0.31)	0.03* (0.01)	0.02^{ns} (0.02)	0.05* (0.02)
Appearance Orientation	Fear	0.03 (0.02) [0.0054, 0.0796]	1.08** (0.31)	0.03* (0.01)	0.10* (0.03)	0.14** (0.03)

Note. Indirect effect = Unstandardised *b* coefficients (with boot standard error between parentheses). BCI = bootstrap confidence interval using 5000 bootstrap samples. If BCI does not include 0, mediation can be assumed with 95% confidence. MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire – Appearance Scales. AFA = Anti-fat Attitudes Scale. *$p < 0.05$, **$p < 0.01$.

As shown in Figure 7 and Appendix I, perfectionism partially mediated the relationship between Appearance Orientation and the AFA scale.

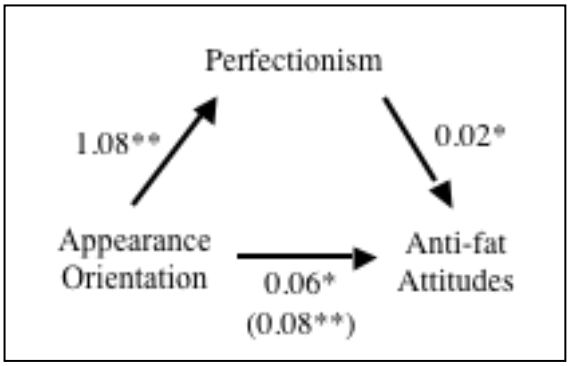

Figure 7. Mediating effect of perfectionism on the relationship between Appearance Orientation and explicit anti-fat attitudes. *$p < 0.05$, **$p < 0.01$.

The second mediation analysis found perfectionism fully mediated the relationship between Appearance Orientation and Dislike (see Figure 8 and Appendix J).

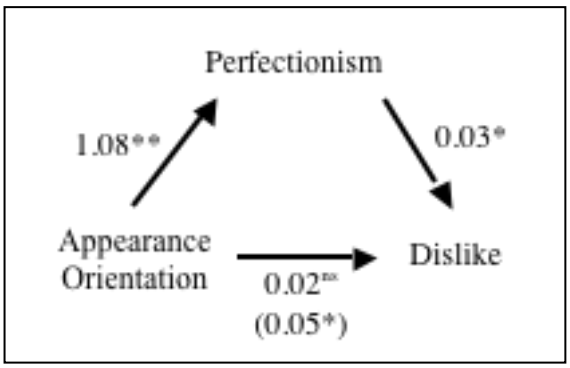

Figure 8. Mediating effect of perfectionism on the relationship between Appearance Orientation and Dislike. *$p < 0.05$, **$p < 0.01$.

As shown in Figure 9 and Appendix K, partial mediation was found for perfectionism on the relationship between Appearance Orientation and Fear.

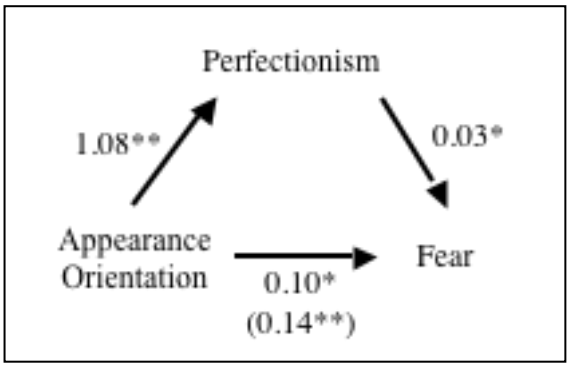

Figure 9. Mediating effect of perfectionism on the relationship between Appearance Orientation and Fear. *$p < 0.05$, **$p < 0.01$.

Table 22 demonstrates the mediation effect of maladaptive perfectionism (Discrepancy) on the relationship between body image and explicit anti-fat attitudes.

Table 22. *Mediating effect of maladaptive perfectionism on the relationship between body image (MBSRQ-AS) and explicit anti-fat attitudes (AFA) (N = 72)*

MBSRQ-AS scale/subscale	AFA scale/subscale	Indirect effect [95% BCI]	Pathway a	Pathway b	Pathway c' (direct)	Pathway c (total)
Appearance Orientation	AFA	0.03 (0.01) [0.0122, 0.0621]	0.86* (0.26)	0.04** (0.01)	0.05* (0.02)	0.08** (0.02)
Appearance Orientation	Dislike	0.03 (0.01) [0.0138, 0.0735]	0.86* (0.26)	0.04** (0.01)	0.01^{ns} (0.2)	0.05* (0.02)
Appearance Orientation	Fear	0.04 (0.02) [0.0132, 0.0864]	0.86* (0.26)	0.05** (0.01)	0.09* (0.03)	0.14** (0.03)
Overweight Preoccupation	AFA	0.04 (0.02) [0.0098, 0.1000]	1.25* (0.57)	0.03** (0.01)	0.18** (0.04)	0.22** (0.04)
Overweight Preoccupation	Fear	0.05 (0.03) [0.0072, 0.1254]	1.25* (0.57)	0.04** (0.01)	0.43** (0.05)	0.49** (0.05)

Note. Indirect effect = Unstandardised *b* coefficients (with boot standard error between parentheses). BCI = bootstrap confidence interval using 5000 bootstrap samples. If BCI does not include 0, mediation can be assumed with 95% confidence. MBSRQ-AS = Multidimensional Body-Self Relations Questionnaire – Appearance Scales. AFA = Anti-fat Attitudes Scale. *$p < 0.05$, **$p < 0.01$.

As shown in Figure 10 and Appendix L, maladaptive perfectionism partially mediated the relationship between Appearance Orientation and the AFA scale.

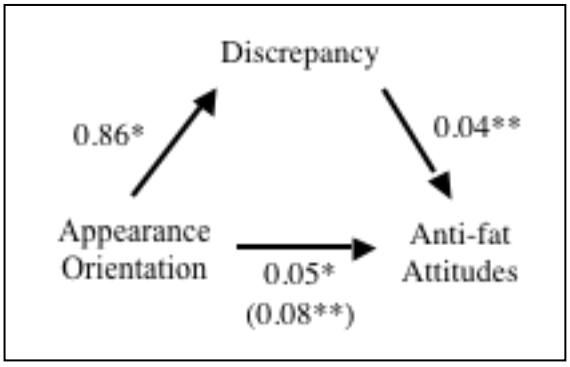

Figure 10. Mediating effect of maladaptive perfectionism on the relationship between Appearance Orientation and explicit anti-fat attitudes. *$p < 0.05$, **$p < 0.01$.

The fifth mediation analysis found full mediation for the effect of maladaptive perfectionism (Discrepancy) on the relationship between Appearance Orientation and Dislike (see Figure 11 and Appendix M).

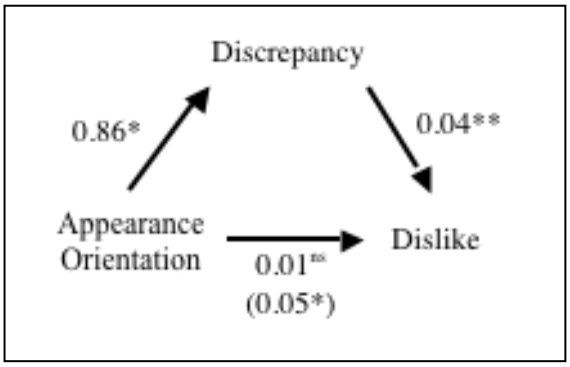

Figure 11. Mediating effect of maladaptive perfectionism on the relationship between Appearance Orientation and Dislike. *$p < 0.05$, **$p < 0.01$.

As shown in Figure 12 and Appendix N, partial mediation was found for maladaptive perfectionism (Discrepancy) on the relationship between Appearance Orientation and Fear.

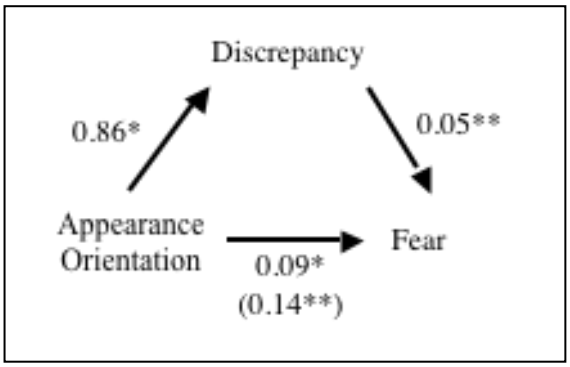

Figure 12. Mediating effect of maladaptive perfectionism on the relationship between Appearance Orientation and Fear. *$p < 0.05$, **$p < 0.01$.

The seventh mediation analysis found maladaptive perfectionism (Discrepancy) partially mediated the relationship between Overweight Preoccupation and the AFA scale (see Figure 13 and Appendix O).

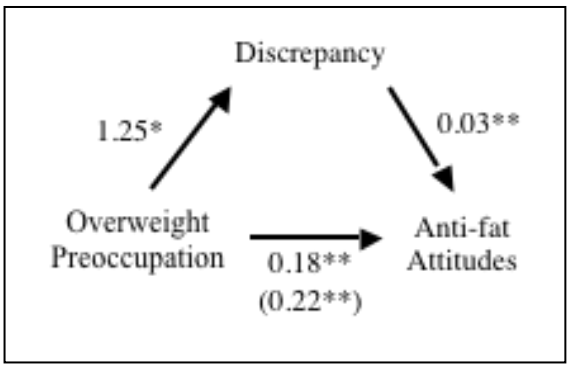

Figure 13. Mediating effect of maladaptive perfectionism on the relationship between Overweight Preoccupation and explicit anti-fat attitudes. *$p < 0.05$, **$p < 0.01$.

Lastly, partial mediation was evident for the effect of maladaptive perfectionism (Discrepancy) on the relationship between Overweight Preoccupation and Fear (see Figure 14 and Appendix P).

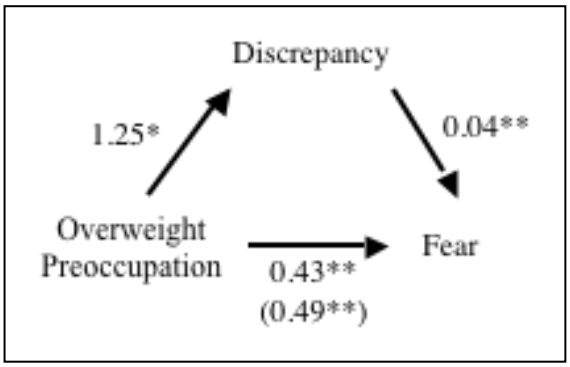

Figure 14. Mediating effect of maladaptive perfectionism on the relationship between Overweight Preoccupation and Fear. *$p < 0.05$, **$p < 0.01$.

Adaptive perfectionism (Standards) did not show a significant mediation effect on the relationship between body image (BES) and anti-fat attitudes (MBSRQ-AS scale/subscales and the IAT).

Discussion

Summary of Findings

Higher BMI was associated with low body image, thus supporting hypothesis 1. Specifically, significant correlations were found between BMI and Self-Classified Weight within all four groups, such that higher BMI individuals displayed greater weight dissatisfaction. However, BMI correlated with Appearance Evaluation and Body Areas Satisfaction only among non-gym users and females, such that higher BMI individuals reported greater appearance and body dissatisfaction. Interestingly, within all four groups, BMI did not significantly correlate with Appearance Orientation and Overweight Preoccupation.

Hypothesis 2a was supported, as low body image was greater among regular gym users, compared to non-gym users. In particular, regular gym users displayed significantly greater preoccupation with one's weight and related behaviours, compared to non-gym users. However, regular gym users and non-gym users did not significantly differ in Appearance Evaluation, Body Areas Satisfaction, Appearance Orientation, and Self-Classified Weight. In support of hypothesis 2b, low body image was greater among females, compared to males. Specifically, females displayed significantly lower MBSRQ-AS, Appearance Evaluation, and Body Areas Satisfaction scores and a higher Self-Classified Weight score, therefore displaying less appearance, body, and weight satisfaction, compared to men.

Hypothesis 3a was partially supported, as explicit anti-fat attitudes were significantly greater among regular gym users, compared to non-gym users. Specifically, regular gym users displayed significantly higher scores on the AFA scale and the Fear subscale, therefore displaying greater overall explicit anti-fat attitudes and greater fear of fat, compared to non-gym users. However, implicit anti-fat attitudes did not significantly differ between the two groups. Hypothesis 3b was not supported, as females did not display significantly greater explicit anti-fat attitudes, than males. Conversely, AFA, Dislike, and Willpower scores were significantly higher among

males, compared to females. For implicit anti-fat attitudes, no significant gender difference was found.

Low body image was associated with greater explicit anti-fat attitudes, thus supporting hypothesis 4. Within both regular gym users and non-gym users, individuals with greater weight preoccupation displayed greater explicit anti-fat attitudes. Furthermore, individuals with greater appearance and body dissatisfaction and greater preoccupation with one's weight displayed greater personal concerns about weight gain. A significant relationship was also found between low body image and implicit anti-fat attitudes, but only among non-gym users. Specifically, high body dissatisfaction and greater preoccupation with one's weight was associated with greater implicit anti-fat attitudes. Within both gender groups, individuals who displayed higher appearance and body dissatisfaction, greater investment in one's appearance, and greater preoccupation with one's weight reported greater personal concerns about weight gain. Furthermore, men and women high in weight preoccupation displayed a stronger belief that obesity results due to lack of willpower. However, the relationship between poor body image and willpower was more apparent among males, as high body and weight dissatisfaction and greater investment in physical appearance was significantly associated with willpower among men, but not females. A significant relationship was also found between low body image and implicit anti-fat attitudes, but only among females. In particular, women high in body dissatisfaction and weight preoccupation demonstrated greater implicit anti-fat attitudes.

Hypothesis 5 was partially supported, as implicit and explicit anti-fat attitudes were weakly associated among regular gym users, non-gym users, and males. However, significant correlations were found between the IAT and the AFA scale/subscales among females. Specifically, women who displayed greater implicit anti-fat attitudes reported greater explicit anti-fat attitudes, in particular greater personal concerns about weight gain.

Body esteem did not significantly moderate the relationship between body image and implicit/explicit anti-fat attitudes, thus hypothesis 6 was not supported. Furthermore, hypothesis 7 was not supported, as no mediation effect was found

regarding the mediating role of body esteem in the relationship between body image and implicit/explicit anti-fat attitudes.

Hypothesis 8 was not supported, as perfectionism did not moderate the relationship between body image and implicit/explicit anti-fat attitudes. However, perfectionism was found to mediate the relationship between body image and explicit anti-fat attitudes but not implicit anti-fat attitudes, thus partially supporting hypothesis 9. In particular, maladaptive perfectionism was found to mediate the relationship between Appearance Orientation and overall explicit anti-fat attitudes, Appearance Orientation and Dislike, Appearance Orientation and Fear, Overweight Preoccupation and overall explicit anti-fat attitudes, and Overweight Preoccupation and Fear.

Relation to Previous Research

In support of previous research (Pingitore, et al., 1997), a link between high BMI and weight dissatisfaction was evident among both males and females. Similarly, no differences appeared to exist between regular gym users and non-gym users, as high BMI individuals within both groups displayed greater weight dissatisfaction. This suggests that higher BMI individuals tend to experience greater weight dissatisfaction regardless of whether or not they engage in regular gym exercise. Also consistent with previous research, higher BMI individuals reported greater appearance and body dissatisfaction among non-gym users (Davis, 1990) and females (Austin et al., 2009; Smith et al., 1999; Yates et al., 2004). However, this relationship was not found among males and regular gym users. It is possible that high BMI within males and regular gym users reflects greater muscle mass, rather than body fat, therefore these individuals are more likely to be satisfied with their appearance. Inconsistent with previous research (Davis, 1990), BMI did not significantly predict Appearance Orientation or Overweight Preoccupation. It is possible that participants may have provided inaccurate responses in order to avoid appearing self-obsessed with their appearance or weight.

Results were consistent with current research examining body image within fitness environments (Kennedy, Reis, Bane, & Stang, 1995), as regular gym users displayed greater preoccupation with one's weight and related behaviours, compared to non-gym users. It is unsurprising that regular gym users are more vigilant about their

weight, as common motivations for exercise tend to be related to appearance and weight (Kilpatrick, Hebert, & Bartholomew, 2005). Contrary to current research (Imm & Pruitt, 1991; Stapleton et al., 2016), regular gym users and non-gym users did not significantly differ in appearance satisfaction, body satisfaction, investment in physical appearance, and weight satisfaction. As the non-gym users criteria for this study only required participants to not be attending a gym, rather than not engaging in any regular exercise, it is possible that individuals who identified as non-gym users may have been engaging in exercise outside of a gym. Consequently, significance may not have been found due to the possibility of the two groups being similar in terms of engagement in regular exercise. Consistent with current research (Paxton et al., 1991), females displayed significantly lower appearance, body, and weight satisfaction, than males. However, no significant gender differences were evident for investment in physical appearance and weight preoccupation. This could be due to social desirability bias, such that females underreported their investment in physical appearance and preoccupation with weight due to the possibility of appearing self-obsessed.

In support of previous research examining anti-fat attitudes within fitness samples (Robertson & Vohora, 2008; Shapiro et al., 2007), regular gym users displayed significantly greater overall explicit anti-fat attitudes and fear of fat, compared to non-gym users. It could be that the gym environment contributes towards the development of fear of weight gain, due to the heavy emphasis on weight loss and obtainment of the ideal body within fitness centres (Prichard & Tiggemann, 2008). Alternatively, gym users may view fear of weight gain as being a significant motivator for engaging in regular gym exercise, thus may feel more comfortable explicitly acknowledging such fears. Conversely, non-gym users may be more likely to conceal fear of weight gain, perhaps due to feelings of guilt about having such a fear but not doing anything about it, such as joining a gym. This explanation seems plausible, as implicit anti-fat attitudes did not significantly differ between the two groups. As the current literature suggests, poor body image is associated with greater anti-fat attitudes (Himmelstein & Tomiyama, 2015; O'Brien, Hunter, Halberstadt et al., 2007). Consequently, it seems plausible to predict that females would display greater anti-fat attitudes due to women displaying greater body image dissatisfaction, compared to males. However, the present study did not reflect this. Conversely, males displayed greater explicit anti-fat attitudes,

compared to females. These findings were similar to those of O'Brien, Hunter, Halberstadt, and colleagues (2007) who explain that females tend to be more empathic towards overweight individuals, perhaps due to experiencing anti-fat bias to a greater extent than males. Consequently, it could be that women in the present study may have under-reported their explicit anti-fat attitudes, as no gender differences were evident for implicit anti-fat attitudes.

Consistent with previous research, poor body image was associated with greater explicit anti-fat attitudes (Himmelstein & Tomiyama, 2015; O'Brien, Hunter, Halberstadt et al., 2007). Specifically, individuals high in weight preoccupation and appearance and body dissatisfaction displayed greater fear of weight gain, regardless of gender or whether they regularly exercised at a gym or not. However, regular gym users highly invested in their physical appearance reported greater fear of weight gain, whereas non-gym users displaying greater investment in physical appearance reported greater dislike of overweight individuals. One possible explanation for these findings is that individuals who are highly invested in their appearance may engage in regular exercise due to being fearful of potential weight gain. Males high in weight preoccupation, body and weight dissatisfaction, and investment in physical appearance displayed a stronger belief that weight is controllable (willpower), whereas only females high in weight preoccupation displayed this association with willpower. These results may reflect the idea that men who display greater efforts in maintaining an ideal physical appearance and weight may expect others to do the same, thus failure to do so results in anti-fat attitudes (O'Brien, Hunter, Halberstadt et al., 2007). Interestingly, implicit anti-fat attitudes were significantly associated with high body dissatisfaction and greater weight preoccupation, but only among non-gym users and females. It is possible that non-gym users and women who are highly dissatisfied with their body and highly preoccupied with their weight may hold greater implicit anti-fat attitudes, particularly when no solution to resolve such dissatisfaction is attempted, such as joining a gym or engaging in regular exercise. Overall, these results displaying a link between poor body image and greater anti-fat attitudes support Ehrlich's (1973) principle of self-congruity, such that discriminatory attitudes towards overweight individuals are a reflection of the

negative thoughts and feelings an individual holds regarding his or her own body image.

In support of previous research (Bessenoff & Sherman, 2000; Hofmann et al., 2005; Robertson & Vohora, 2008; Teachman & Brownell, 2001), implicit and explicit anti-fat attitudes were weakly associated among regular gym users, non-gym users, and males. In contrast, implicit anti-fat attitudes significantly correlated with the AFA scale and the Fear subscale among females. Brochu and Morrison (2007) explain that significant correlations between implicit and explicit anti-fat bias measures reflect the perception that weight bias is socially acceptable. It could be that females in the present study did not view weight discrimination as being a particularly sensitive topic, thus were less motivated to conceal anti-fat attitudes when completing explicit measures.

In the present study, body esteem did not significantly mediate or moderate the relationship between body image and implicit/explicit anti-fat attitudes. This suggests that self-evaluations and feelings regarding one's physical appearance and body did not strengthen or explain the relationship between body image and anti-fat attitudes among regular gym users and non-gym users. As this study examined only a specific domain of self-esteem (body esteem), it is possible that global self-esteem (general feelings about oneself) may moderate or mediate the relationship between body image and anti-fat attitudes.

Perfectionism was not found to significantly moderate the relationship between body image and implicit/explicit anti-fat attitudes, however a mediation effect was evident. Specifically, discrepancy (maladaptive perfectionism) mediated the relationship between Appearance Orientation and overall explicit anti-fat attitudes, Appearance Orientation and Dislike, and Appearance Orientation and Fear. Furthermore, discrepancy mediated the relationship between Overweight Preoccupation and overall explicit anti-fat attitudes, and Overweight Preoccupation and Fear. One possible explanation for these findings is that individuals who are highly invested in their physical appearance (Appearance Orientation) or are highly preoccupied with their weight (Overweight Preoccupation) tend to exhibit explicit anti-fat attitudes due to setting high personal standards regarding one's physical appearance and body

shape/weight. If an individual feels as if they are not attaining such standards, a high level of discrepancy between performance and standards may arise. These individuals may also project their high self-standards onto others, such as unrealistically expecting others to also be heavily invested in and preoccupied with their appearance and weight. Consequently, those who do not attain these imposed standards are discriminated against, thus displaying anti-fat attitudes (O'Brien, Hunter, Halberstadt et al., 2007). Interestingly, maladaptive perfectionism appears to only play a mediating role in the relationship between body image and explicit anti-fat attitudes, but not implicit anti-fat attitudes. It is possible that maladaptive perfectionism (discrepancy) only explains the relationship between body image and explicit anti-fat attitudes due to an individuals' distress, resulting from discrepancy between performance and standards, being a conscious rather than unconscious experience.

Limitations and Future Directions

As with all correlational research, causation is unable to be inferred due to the possibility of an unknown third variable influencing the apparent correlation between two variables (Salazar, Crosby, & DiClemente, 2006). Furthermore, as this study was cross-sectional, directionality cannot be established (Salazar et al., 2006). For example, although poor body image significantly correlated with greater anti-fat attitudes, the direction of which variable causes which cannot be determined. In order to overcome such limitations, future research should consider the use of longitudinal studies due to the ability of measuring directional changes in variables over time. Another limitation is that non-gym users were not asked about whether they regularly exercise despite not attending a gym. Consequently, it cannot be assumed that differences between regular gym-users and non-gym users may be due to an individual's level of engagement in regular exercise. Future research could benefit from comparing gym users, non-gym exercisers, and non-exercisers in order establish whether differences arise due to the gym environment and/or engagement in regular exercise. Lastly, although body esteem (specific domain of self-esteem) did not moderate or mediate the relationship between body image and anti-fat attitudes, it would be interesting for future studies to examine whether global self-esteem plays a significant moderating/mediating role in this relationship.

Implications of the Present Study

The present study contributes to the current literature examining the relationship between BMI, body image, and anti-fat attitudes within a fitness population. In particular, it was shown that individuals with a higher BMI reported greater weight dissatisfaction, regardless of whether they engaged in regular gym exercise. However, significant group differences were evident such that both non-gym users and females with a high BMI displayed greater dissatisfaction with their body and appearance, whereas no significant association was found within regular gym users and males, possibly due to high BMI within these groups reflecting greater muscle mass rather than body fat. These findings may have implications for gym facilities, as it is important for fitness professionals to be aware of body image issues that may accompany non-gym users who are of a higher BMI that may be thinking about joining a gym. Furthermore, being aware of such issues allows for fitness centres to organise specific health or fitness classes that can help improve body image issues, such as female-only classes that aim to improve appearance and body satisfaction.

The current study showed that regular gym users reported significantly greater weight preoccupation, compared to non-gym users. This may be problematic as extreme weight preoccupation is associated with excessive exercise (Davis, Brewer, & Ratusny, 1993), and has shown to be a significant risk factor in the development of eating disorders (Phan & Tylka, 2006). It was also found that regular gym users displayed significantly greater overall explicit anti-fat attitudes and fear of weight gain compared to non-gym users. This could have negative implications for overweight individuals who are thinking about joining a gym or for those who have just begun regular gym exercise. Not only are overweight individuals dealing with possible weight dissatisfaction, they are also vulnerable to receiving discrimination based on their weight from other gym users, thus further impacting their low body image. It could be beneficial for fitness centres to emphasise the health and psychological benefits of regular exercise, rather than focussing on weight loss and attaining a specific body ideal, which may be contributing towards weight preoccupation and fear of weight gain among regular gym users.

It is clear that poor body image is associated with greater explicit anti-fat attitudes. For example, both regular gym users and non-gym users who reported greater weight preoccupation and higher appearance and body dissatisfaction displayed greater fear of weight gain. Also, both men and women who displayed high appearance and body dissatisfaction, greater investment in one's appearance, and high preoccupation with one's weight reported greater concerns about weight gain. As Ehrlich (1973) suggests, weight discrimination towards overweight individuals may be a reflection of how the anti-fat individual negatively feels about their own body image. This may have important implications, particularly within fitness settings, such that efforts can be made towards enhancing an individual's body image, which may in turn, minimise their anti-fat attitudes, thus benefiting both the individual and those who are discriminated against. For example, gyms could consider organising classes that aim to improve one's body image by challenging stereotypes of the ideal body, promoting healthy behaviours and attitudes, and encouraging exercise that is not appearance-oriented (Vogel, 2002).

This study appears to be the first to examine the mediating role of perfectionism in the relationship between body image and anti-fat attitudes. In particular, discrepancy (maladaptive perfectionism) significantly mediated the relationship between Appearance Orientation and overall explicit anti-fat attitudes, Appearance Orientation and Dislike, Appearance Orientation and Fear, Overweight Preoccupation and overall explicit anti-fat attitudes, and Overweight Preoccupation and Fear. This has significant implications for clinicians, as it is important to acknowledge that an individuals' level of maladaptive perfectionism may be contributing towards body image issues they are presenting with. Similarly, fitness classes that aim to enhance body image and minimise anti-fat attitudes, should recognise the potential role of maladaptive perfectionism by challenging unrealistically high personal standards that individuals may hold regarding their body image.

Conclusion

The present study has contributed to the current literature of body image and anti-fat bias by examining the relationships between BMI, body image, body esteem, perfectionism, and anti-fat attitudes within regular gym users and non-gym users. High BMI was significantly associated with greater body, weight, and appearance

dissatisfaction among females and non-gym users, whereas males and regular gym users with high BMI only displayed greater weight dissatisfaction.

Regular gym users reported significantly higher weight preoccupation, greater overall explicit anti-fat attitudes, and greater fear of weight gain, compared to non-gym users. However, regular gym users did not display greater implicit anti-fat attitudes. Similarly, no gender differences were found for implicit anti-fat attitudes. However, males reported significantly higher overall explicit anti-fat attitudes, greater dislike of overweight individuals, and a stronger belief that weight is controllable (willpower), compared to females. Low body image (lower appearance, body, and weight satisfaction) was significantly greater among females compared to males.

This study also found that low body image was significantly associated with greater explicit anti-fat attitudes. In particular, regular gym users highly invested in their physical appearance reported greater fear of weight gain, whereas non-gym users highly invested in their physical appearance reported greater dislike of overweight individuals. Furthermore, males who displayed high weight preoccupation, high body and weight dissatisfaction, and high physical appearance investment reported a stronger belief that weight is controllable (willpower), whereas only females high in weight preoccupation displayed this association with willpower. Only non-gym users and females high in body dissatisfaction and weight preoccupation displayed an association with implicit anti-fat attitudes. Implicit and explicit anti-fat attitudes were weakly associated, except among females where implicit anti-fat attitudes significantly correlated with overall explicit anti-fat attitudes and fear of weight gain.

Body esteem was not found to play a moderating or mediating role in the relationship between body image and anti-fat attitudes. This study highlights the potential mediating role of perfectionism, in particular discrepancy, on the relationship between body image and explicit anti-fat attitudes. This suggests that an individuals' level of maladaptive perfectionism may be important to consider when helping to enhance one's body image and minimise anti-fat attitudes, particularly among regular gym users.

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Appendices

APPENDIX A: Facebook Recruitment Post and Advertisement Flyer

ARE YOU A REGULAR GYM USER OR A NON-GYM USER?

I am currently looking for participants for my research study examining body image attitudes among regular gym users and non-gym users in New Zealand. Your participation would be greatly appreciated!

To access the survey, please click on the following link:
https://qasiasingleuser.asia.qualtrics.com/SE/…

Also, feel free to share this post

MASSEY UNIVERSITY
TE KUNENGA KI PŪREHUROA
UNIVERSITY OF NEW ZEALAND

MASSEY UNIVERSITY RESEARCH STUDY

ARE YOU A REGULAR GYM USER

OR

A NON-GYM USER?

Individuals are needed to participate in a study examining body image attitudes among regular gym users and non-gym users in New Zealand.

To participate in this research you must:

- Be a regular gym user (engage in 3 or more 30-minute long sessions per week) **OR** a non-gym user (does not attend a gym)
- Be aged 18 years or older

Participation in this study involves:

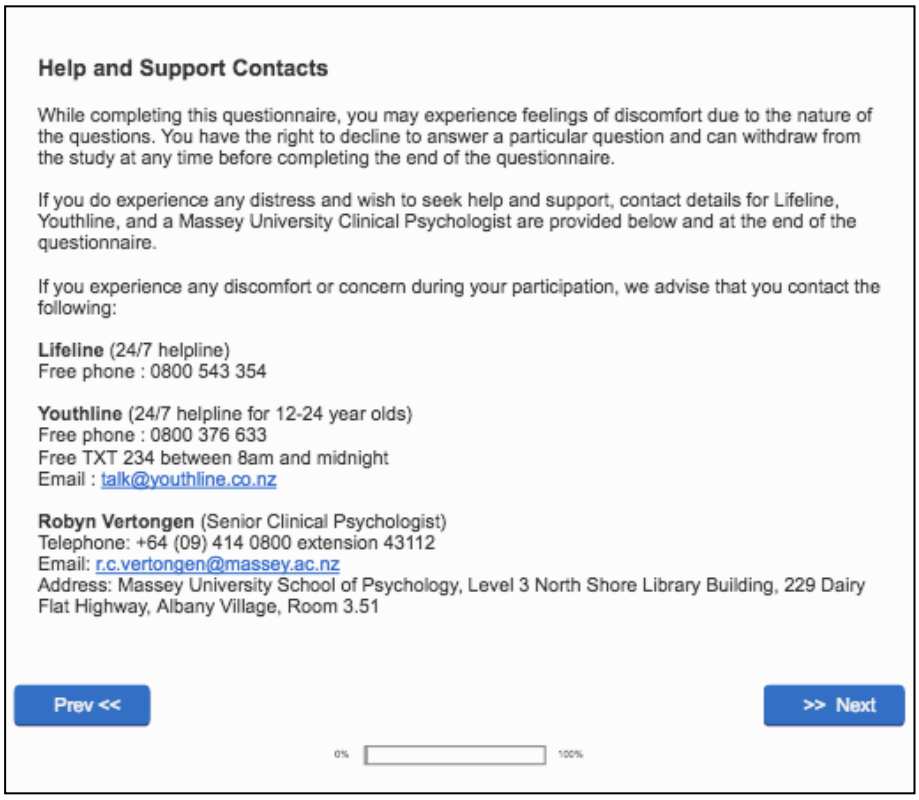
- Completion of a 30-minute online survey
- As a thank you for your time and participation, you will be offered the chance to win a $200 JB Hi-Fi gift card

Contact information:

- If you have any questions about this study, please contact:

  Kim Ironside
  kim.ironside.1@uni.massey.ac.nz

APPENDIX B: Self-Report Online Questionnaire (Version Two)



Help and Support Contacts

While completing this questionnaire, you may experience feelings of discomfort due to the nature of the questions. You have the right to decline to answer a particular question and can withdraw from the study at any time before completing the end of the questionnaire.

If you do experience any distress and wish to seek help and support, contact details for Lifeline, Youthline, and a Massey University Clinical Psychologist are provided below and at the end of the questionnaire.

If you experience any discomfort or concern during your participation, we advise that you contact the following:

Lifeline (24/7 helpline)
Free phone : 0800 543 354

Youthline (24/7 helpline for 12-24 year olds)
Free phone : 0800 376 633
Free TXT 234 between 8am and midnight
Email : talk@youthline.co.nz

Robyn Vertongen (Senior Clinical Psychologist)
Telephone: +64 (09) 414 0800 extension 43112
Email: r.c.vertongen@massey.ac.nz
Address: Massey University School of Psychology, Level 3 North Shore Library Building, 229 Dairy Flat Highway, Albany Village, Room 3.51

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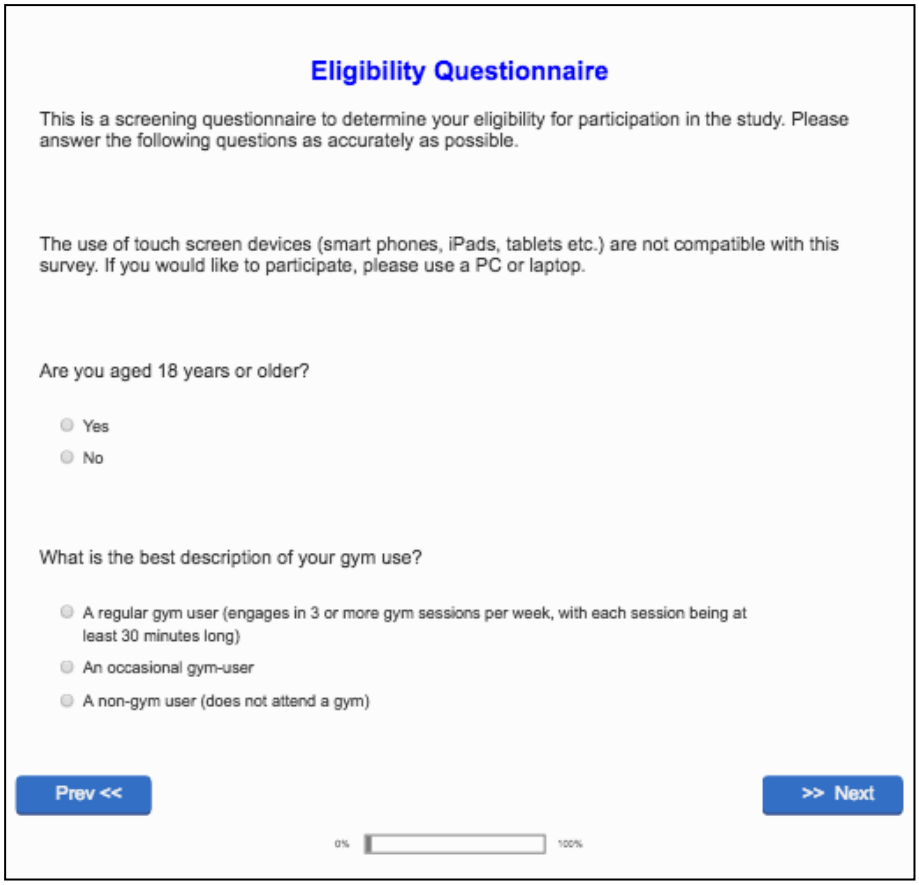

Eligibility Questionnaire

This is a screening questionnaire to determine your eligibility for participation in the study. Please answer the following questions as accurately as possible.

The use of touch screen devices (smart phones, iPads, tablets etc.) are not compatible with this survey. If you would like to participate, please use a PC or laptop.

Are you aged 18 years or older?

- Yes
- No

What is the best description of your gym use?

- A regular gym user (engages in 3 or more gym sessions per week, with each session being at least 30 minutes long)
- An occasional gym-user
- A non-gym user (does not attend a gym)

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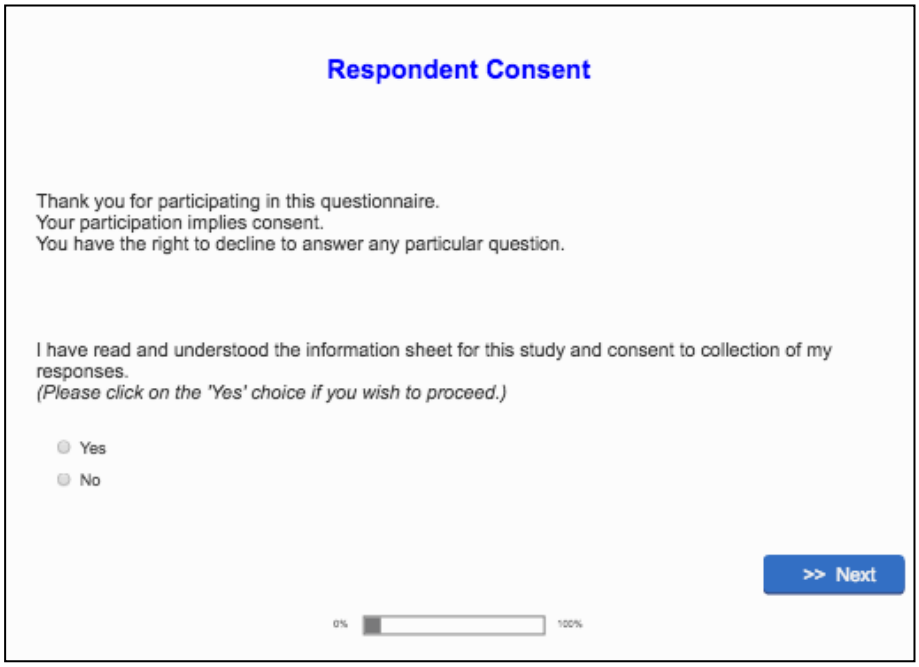
Respondent Consent
Thank you for participating in this questionnaire.
Your participation implies consent.
You have the right to decline to answer any particular question.
I have read and understood the information sheet for this study and consent to collection of my responses.
(Please click on the 'Yes' choice if you wish to proceed.)
Yes
No
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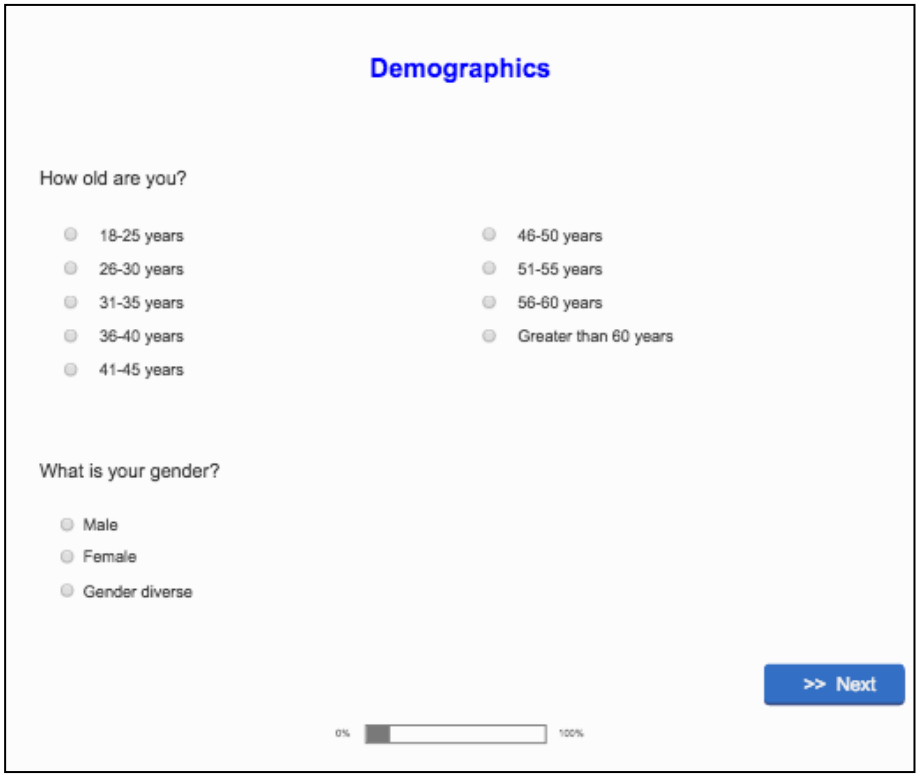
Demographics
How old are you?
18-25 years
26-30 years
31-35 years
36-40 years
41-45 years
46-50 years
51-55 years
56-60 years
Greater than 60 years
What is your gender?
Male
Female
Gender diverse
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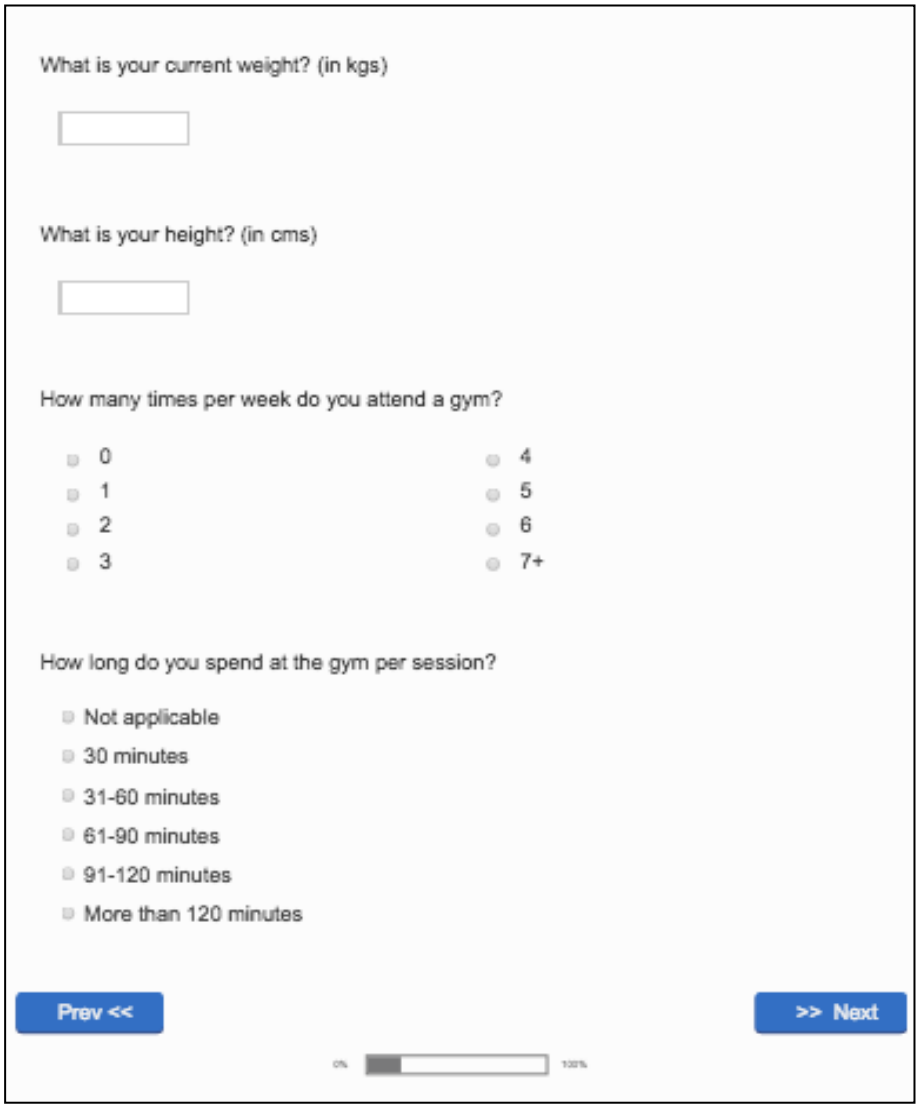
What is your current weight? (in kgs)
What is your height? (in cms)
How many times per week do you attend a gym?
0
1
2
3
4
5
6
7+
How long do you spend at the gym per session?
Not applicable
30 minutes
31-60 minutes
61-90 minutes
91-120 minutes
More than 120 minutes
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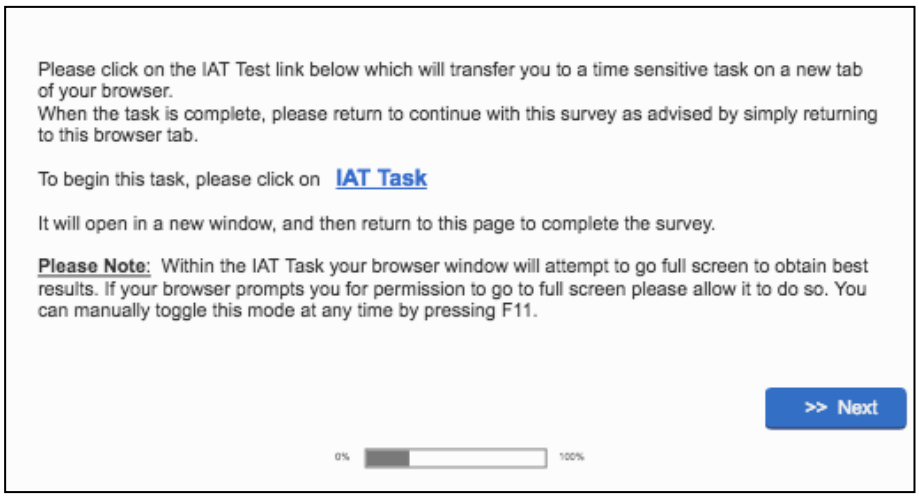
Please click on the IAT Test link below which will transfer you to a time sensitive task on a new tab of your browser.
When the task is complete, please return to continue with this survey as advised by simply returning to this browser tab.
To begin this task, please click on IAT Task
It will open in a new window, and then return to this page to complete the survey.
Please Note: Within the IAT Task your browser window will attempt to go full screen to obtain best results. If your browser prompts you for permission to go to full screen please allow it to do so. You can manually toggle this mode at any time by pressing F11.
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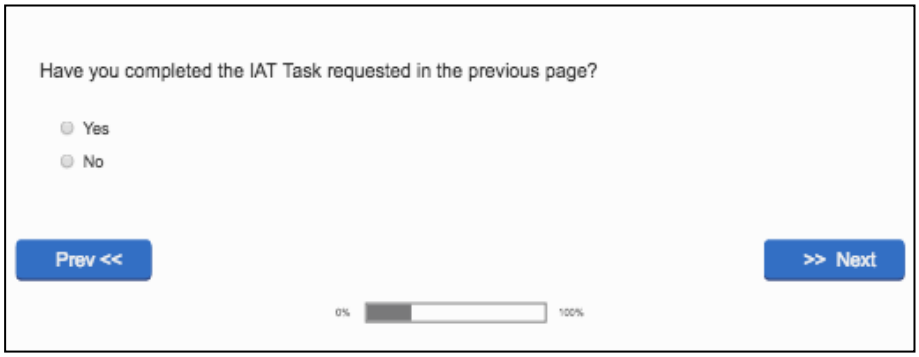
Have you completed the IAT Task requested in the previous page?
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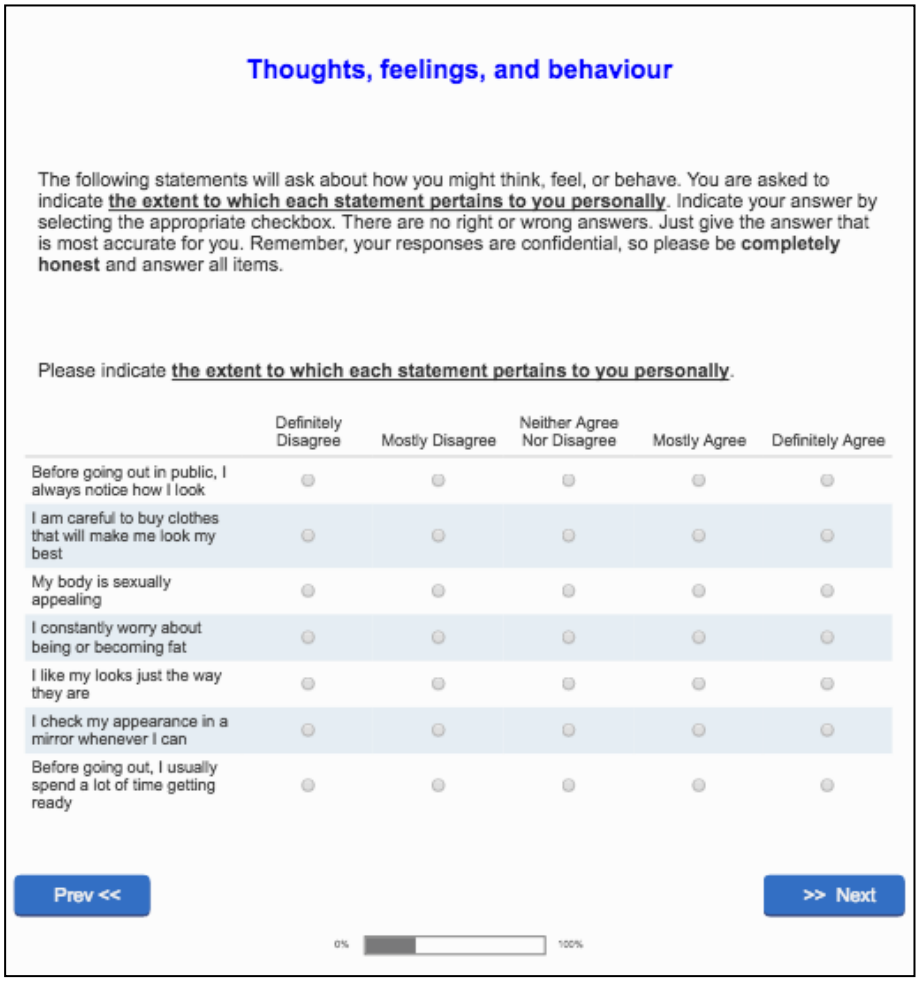
Thoughts, feelings, and behaviour
The following statements will ask about how you might think, feel, or behave. You are asked to indicate the extent to which each statement pertains to you personally. Indicate your answer by selecting the appropriate checkbox. There are no right or wrong answers. Just give the answer that is most accurate for you. Remember, your responses are confidential, so please be completely honest and answer all items.
Please indicate the extent to which each statement pertains to you personally.
Definitely Disagree
Mostly Disagree
Neither Agree Nor Disagree
Mostly Agree
Definitely Agree
Before going out in public, I always notice how I look
I am careful to buy clothes that will make me look my best
My body is sexually appealing
I constantly worry about being or becoming fat
I like my looks just the way they are
I check my appearance in a mirror whenever I can
Before going out, I usually spend a lot of time getting ready
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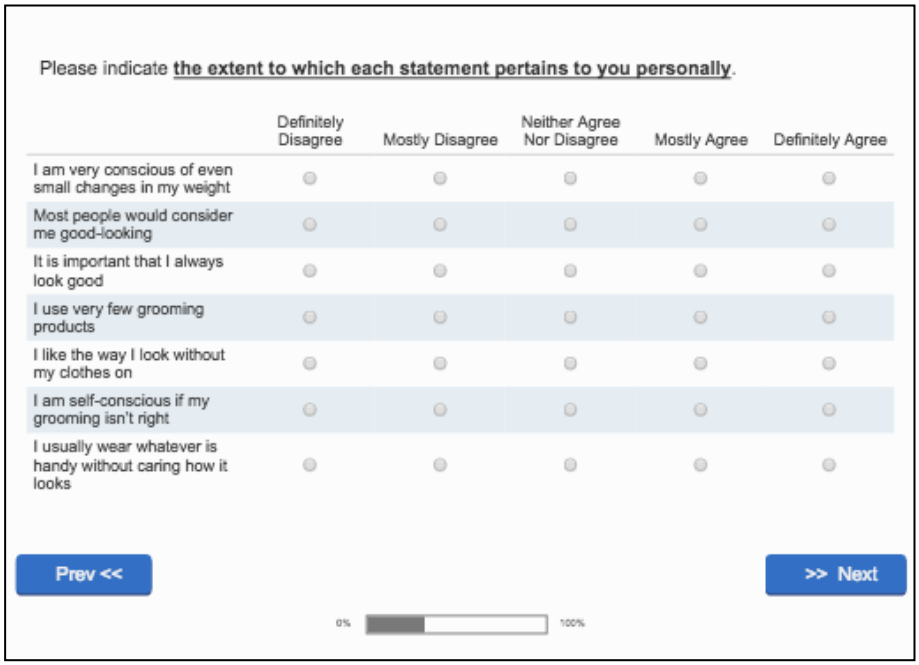

Please indicate **the extent to which each statement pertains to you personally**.

	Definitely Disagree	Mostly Disagree	Neither Agree Nor Disagree	Mostly Agree	Definitely Agree
I am very conscious of even small changes in my weight					
Most people would consider me good-looking					
It is important that I always look good					
I use very few grooming products					
I like the way I look without my clothes on					
I am self-conscious if my grooming isn't right					
I usually wear whatever is handy without caring how it looks					

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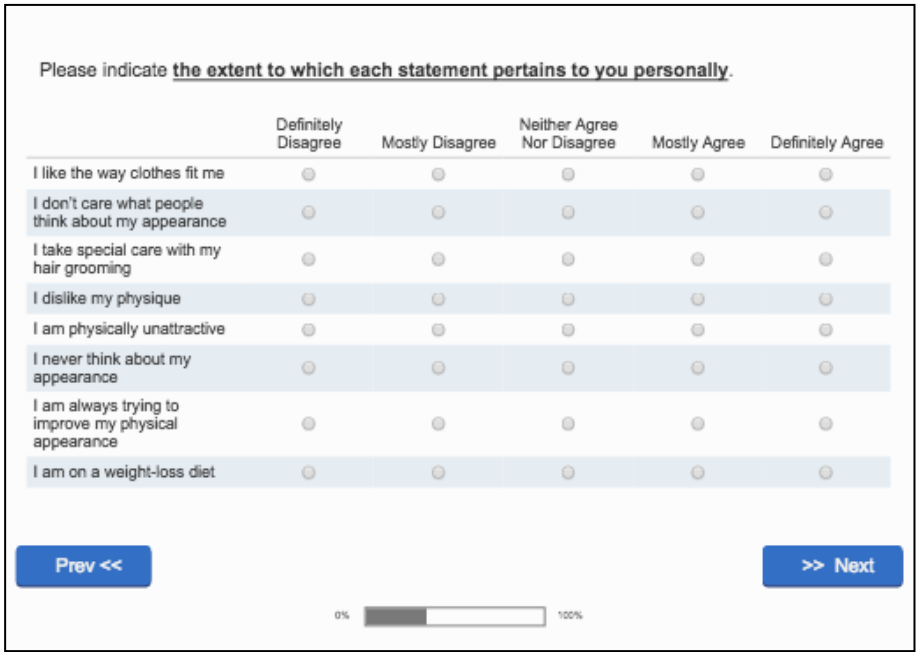

Please indicate **the extent to which each statement pertains to you personally**.

	Definitely Disagree	Mostly Disagree	Neither Agree Nor Disagree	Mostly Agree	Definitely Agree
I like the way clothes fit me					
I don't care what people think about my appearance					
I take special care with my hair grooming					
I dislike my physique					
I am physically unattractive					
I never think about my appearance					
I am always trying to improve my physical appearance					
I am on a weight-loss diet					

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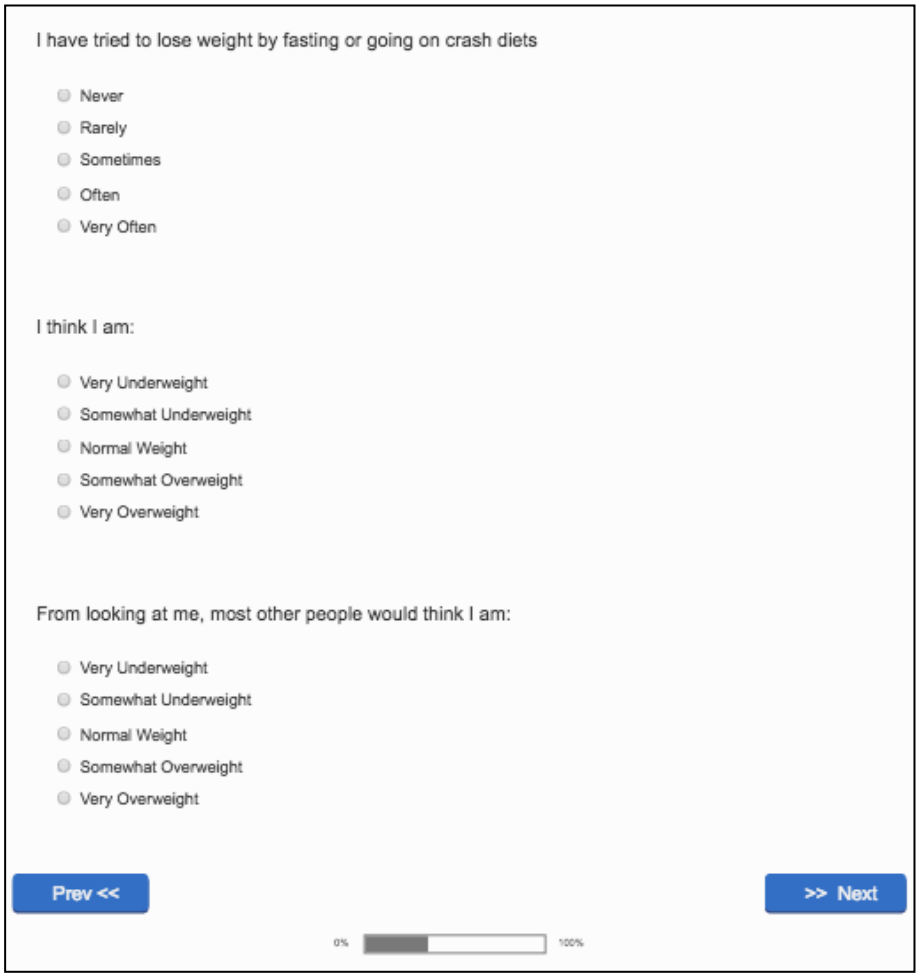

I have tried to lose weight by fasting or going on crash diets

- Never
- Rarely
- Sometimes
- Often
- Very Often

I think I am:

- Very Underweight
- Somewhat Underweight
- Normal Weight
- Somewhat Overweight
- Very Overweight

From looking at me, most other people would think I am:

- Very Underweight
- Somewhat Underweight
- Normal Weight
- Somewhat Overweight
- Very Overweight

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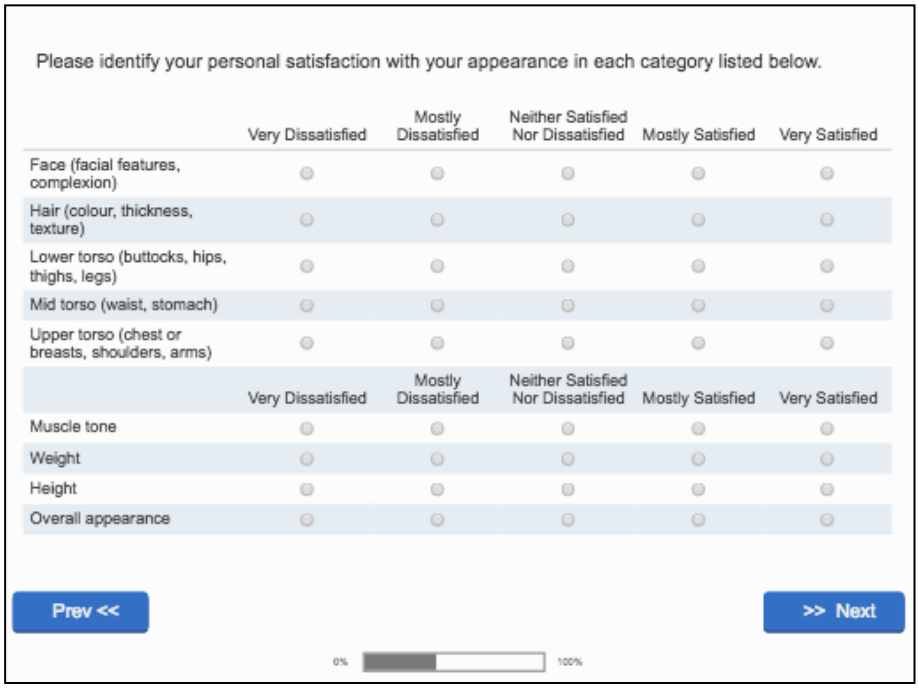

Please identify your personal satisfaction with your appearance in each category listed below.

	Very Dissatisfied	Mostly Dissatisfied	Neither Satisfied Nor Dissatisfied	Mostly Satisfied	Very Satisfied
Face (facial features, complexion)					
Hair (colour, thickness, texture)					
Lower torso (buttocks, hips, thighs, legs)					
Mid torso (waist, stomach)					
Upper torso (chest or breasts, shoulders, arms)					
	Very Dissatisfied	Mostly Dissatisfied	Neither Satisfied Nor Dissatisfied	Mostly Satisfied	Very Satisfied
Muscle tone					
Weight					
Height					
Overall appearance					

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Attitudes

The following items are designed to measure attitudes people have toward themselves, their performance, and toward others. There are no right or wrong answers. Please respond to all of the items. Use your first impression and do not spend too much time on individual items in responding.

Respond to each of the items using the scale below to describe your degree of agreement with each item. Indicate your answer by selecting the appropriate checkbox.

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
I have high standards for my performance at work or at school	○	○	○	○	○	○	○
I am an orderly person	○	○	○	○	○	○	○
I often feel frustrated because I can't meet my goals	○	○	○	○	○	○	○
Neatness is important to me	○	○	○	○	○	○	○
If you don't expect much out of yourself, you will never succeed	○	○	○	○	○	○	○
My best just never seems to be good enough for me	○	○	○	○	○	○	○
I think things should be put away in their place	○	○	○	○	○	○	○
I have high expectations for myself	○	○	○	○	○	○	○

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Respond to each of the items using the scale below to describe your degree of agreement with each item. Indicate your answer by selecting the appropriate checkbox.

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
I rarely live up to my high standards	○	○	○	○	○	○	○
I like to always be organised and disciplined	○	○	○	○	○	○	○
Doing my best never seems to be enough	○	○	○	○	○	○	○
I set very high standards for myself	○	○	○	○	○	○	○
I am never satisfied with my accomplishments	○	○	○	○	○	○	○
I expect the best from myself	○	○	○	○	○	○	○
I often worry about not measuring up to my own expectations	○	○	○	○	○	○	○
My performance rarely measures up to my standards	○	○	○	○	○	○	○

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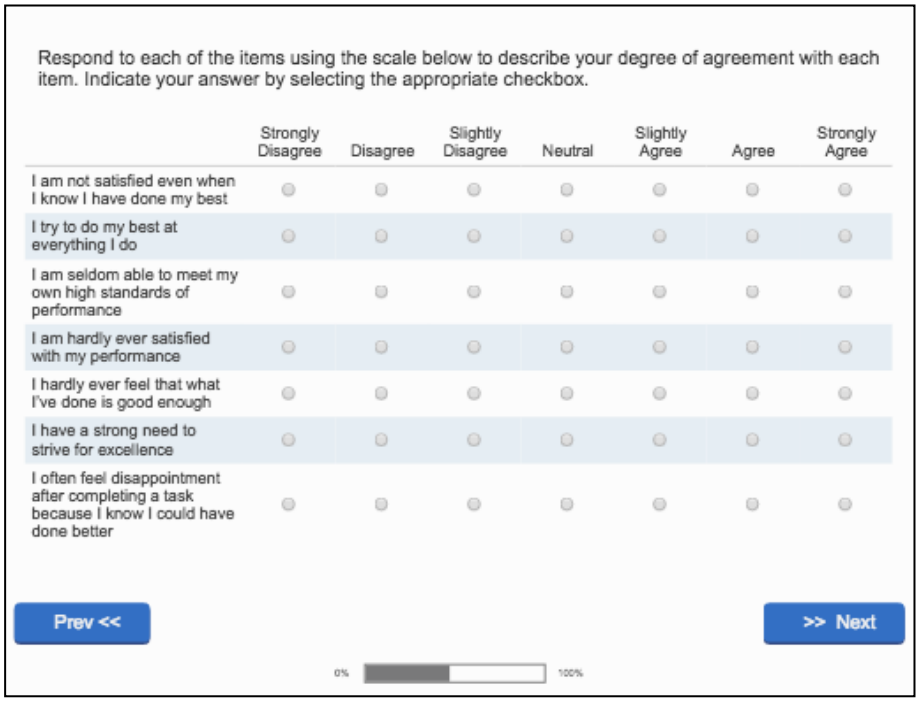

Respond to each of the items using the scale below to describe your degree of agreement with each item. Indicate your answer by selecting the appropriate checkbox.

	Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
I am not satisfied even when I know I have done my best							
I try to do my best at everything I do							
I am seldom able to meet my own high standards of performance							
I am hardly ever satisfied with my performance							
I hardly ever feel that what I've done is good enough							
I have a strong need to strive for excellence							
I often feel disappointment after completing a task because I know I could have done better							

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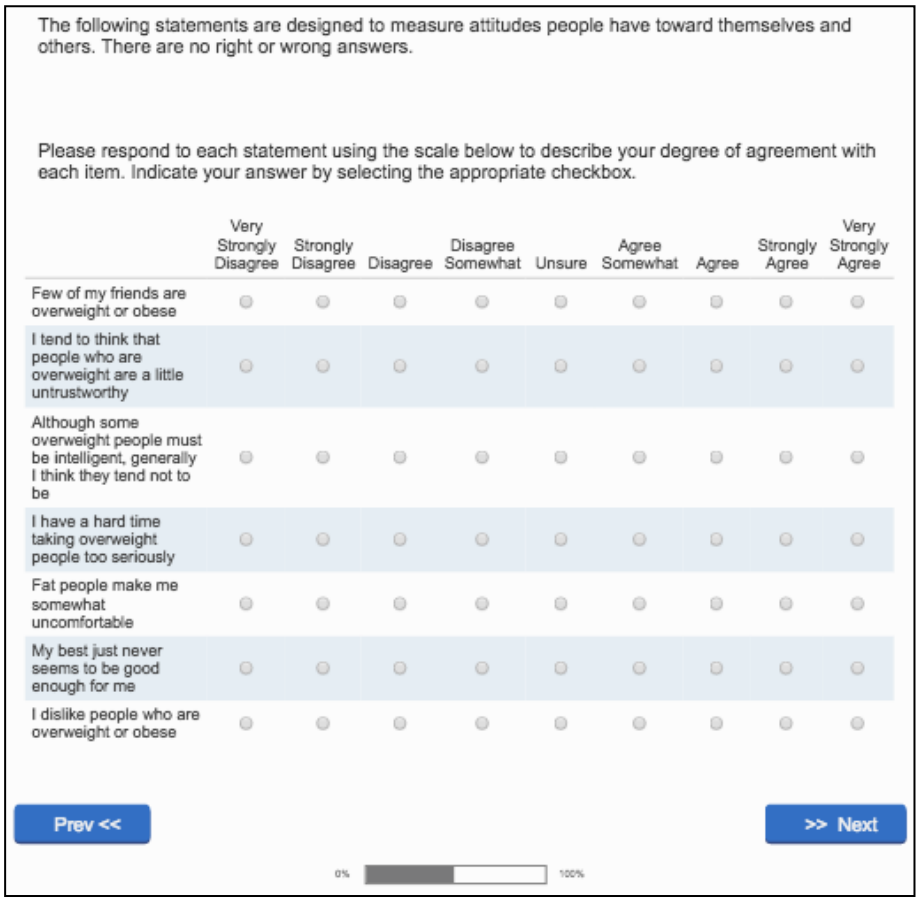

The following statements are designed to measure attitudes people have toward themselves and others. There are no right or wrong answers.

Please respond to each statement using the scale below to describe your degree of agreement with each item. Indicate your answer by selecting the appropriate checkbox.

	Very Strongly Disagree	Strongly Disagree	Disagree	Disagree Somewhat	Unsure	Agree Somewhat	Agree	Strongly Agree	Very Strongly Agree
Few of my friends are overweight or obese									
I tend to think that people who are overweight are a little untrustworthy									
Although some overweight people must be intelligent, generally I think they tend not to be									
I have a hard time taking overweight people too seriously									
Fat people make me somewhat uncomfortable									
My best just never seems to be good enough for me									
I dislike people who are overweight or obese									

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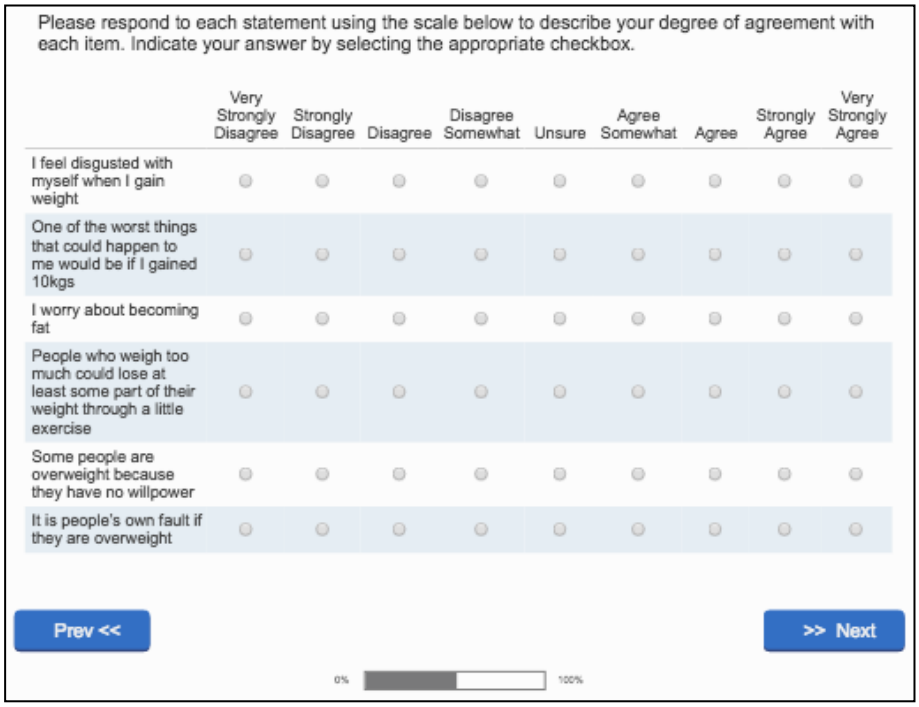

Please respond to each statement using the scale below to describe your degree of agreement with each item. Indicate your answer by selecting the appropriate checkbox.

	Very Strongly Disagree	Strongly Disagree	Disagree	Disagree Somewhat	Unsure	Agree Somewhat	Agree	Strongly Agree	Very Strongly Agree
I feel disgusted with myself when I gain weight	○	○	○	○	○	○	○	○	○
One of the worst things that could happen to me would be if I gained 10kgs	○	○	○	○	○	○	○	○	○
I worry about becoming fat	○	○	○	○	○	○	○	○	○
People who weigh too much could lose at least some part of their weight through a little exercise	○	○	○	○	○	○	○	○	○
Some people are overweight because they have no willpower	○	○	○	○	○	○	○	○	○
It is people's own fault if they are overweight	○	○	○	○	○	○	○	○	○

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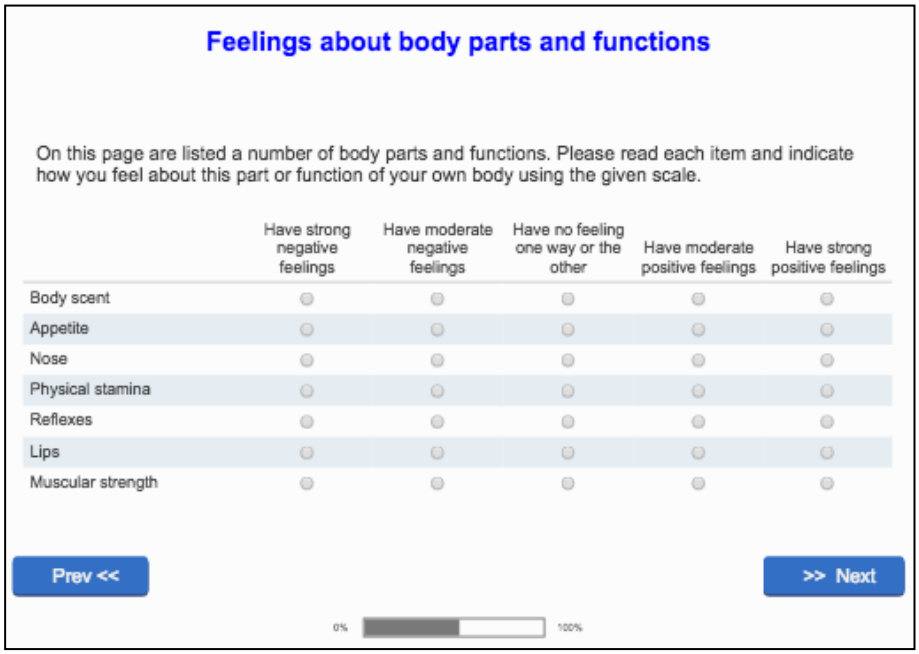

Feelings about body parts and functions

On this page are listed a number of body parts and functions. Please read each item and indicate how you feel about this part or function of your own body using the given scale.

	Have strong negative feelings	Have moderate negative feelings	Have no feeling one way or the other	Have moderate positive feelings	Have strong positive feelings
Body scent	○	○	○	○	○
Appetite	○	○	○	○	○
Nose	○	○	○	○	○
Physical stamina	○	○	○	○	○
Reflexes	○	○	○	○	○
Lips	○	○	○	○	○
Muscular strength	○	○	○	○	○

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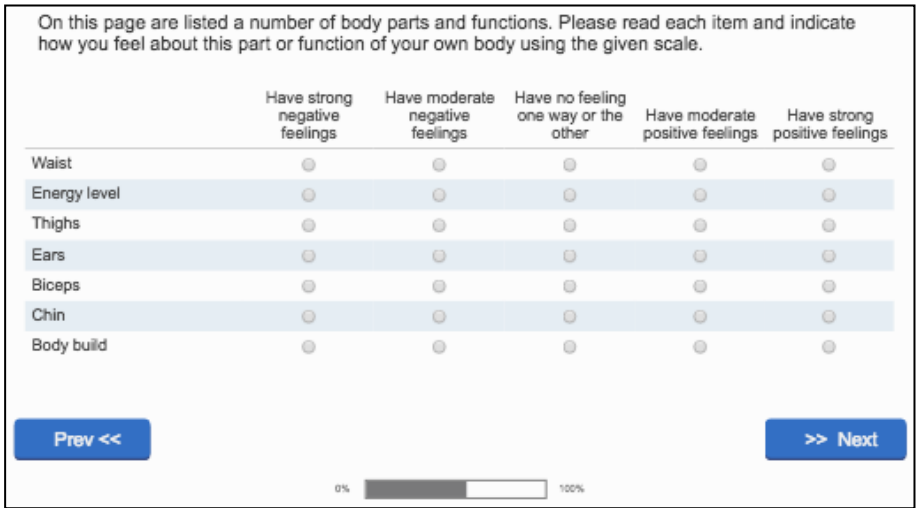

On this page are listed a number of body parts and functions. Please read each item and indicate how you feel about this part or function of your own body using the given scale.

	Have strong negative feelings	Have moderate negative feelings	Have no feeling one way or the other	Have moderate positive feelings	Have strong positive feelings
Waist					
Energy level					
Thighs					
Ears					
Biceps					
Chin					
Body build					

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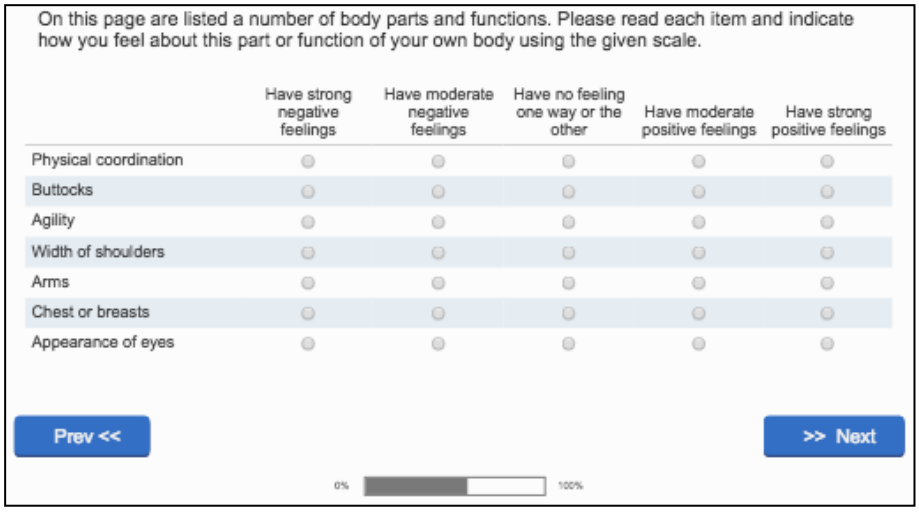

On this page are listed a number of body parts and functions. Please read each item and indicate how you feel about this part or function of your own body using the given scale.

	Have strong negative feelings	Have moderate negative feelings	Have no feeling one way or the other	Have moderate positive feelings	Have strong positive feelings
Physical coordination					
Buttocks					
Agility					
Width of shoulders					
Arms					
Chest or breasts					
Appearance of eyes					

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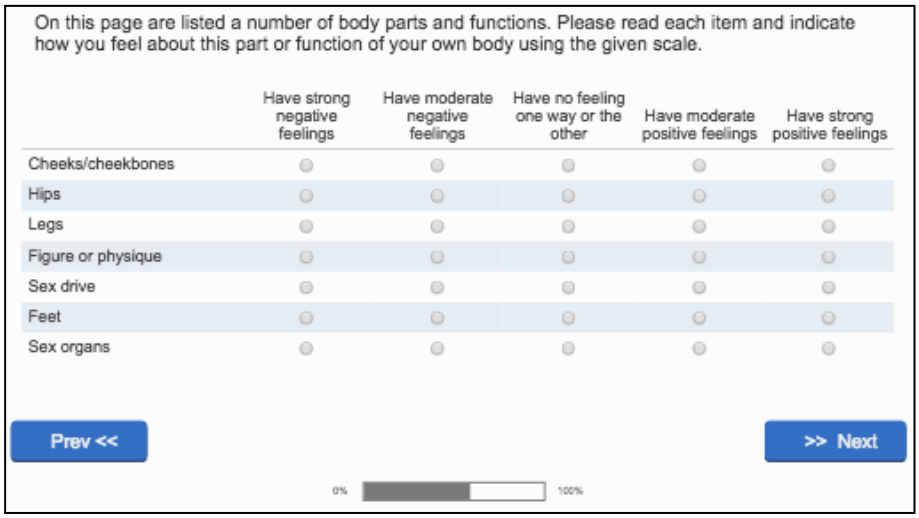

On this page are listed a number of body parts and functions. Please read each item and indicate how you feel about this part or function of your own body using the given scale.

	Have strong negative feelings	Have moderate negative feelings	Have no feeling one way or the other	Have moderate positive feelings	Have strong positive feelings
Cheeks/cheekbones					
Hips					
Legs					
Figure or physique					
Sex drive					
Feet					
Sex organs					

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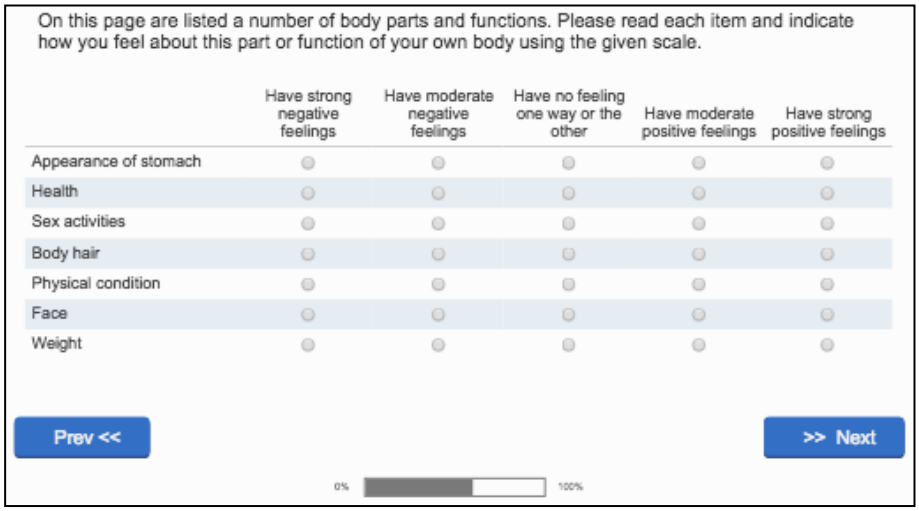

On this page are listed a number of body parts and functions. Please read each item and indicate how you feel about this part or function of your own body using the given scale.

	Have strong negative feelings	Have moderate negative feelings	Have no feeling one way or the other	Have moderate positive feelings	Have strong positive feelings
Appearance of stomach	○	○	○	○	○
Health	○	○	○	○	○
Sex activities	○	○	○	○	○
Body hair	○	○	○	○	○
Physical condition	○	○	○	○	○
Face	○	○	○	○	○
Weight	○	○	○	○	○

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MASSEY UNIVERSITY
COLLEGE OF HUMANITIES AND SOCIAL SCIENCES
TE KURA POKENGA TANGATA

Examining body image attitudes among regular gymnasium users and non-gymnasium users

Continued...

We greatly appreciate your participation in this study. Data will be used for analysis, stored in a password protected file and then destroyed after a period of time. You may request a summary of the study findings when it is concluded.

This part of the survey will ask you to provide a contact email address if you wish to receive the results of the research or go into the draw to win a NZ$200 JB Hi-Fi gift card. It is separate from the previous part of the survey so your answers to the previous questions will not be identifiable.

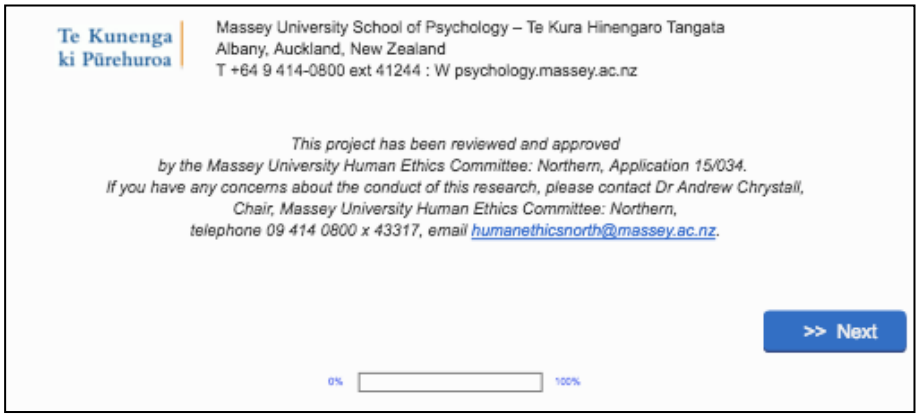
Many thanks,
Kim Ironside

Contact information

If you have any questions or queries regarding this project, please don't hesitate to contact the following:

Researcher
Kim Ironside
School of Psychology
Massey University
Albany, Auyckland
New Zealand
Email: kim.ironside.1@uni.massey.ac.nz

Supervisor
Dr Richard Fletcher
Massey University School of Psychology
Massey University
Albany, Auckland
New Zealand
Telephone: +64 (09) 414 0800 ext. 43096
Email: r.b.fletcher@massey.ac.nz


Te Kunenga ki Pūrehuroa
Massey University School of Psychology – Te Kura Hinengaro Tangata
Albany, Auckland, New Zealand
T +64 9 414-0800 ext 41244 : W psychology.massey.ac.nz
This project has been reviewed and approved
by the Massey University Human Ethics Committee: Northern, Application 15/034.
If you have any concerns about the conduct of this research, please contact Dr Andrew Chrystall,
Chair, Massey University Human Ethics Committee: Northern,
telephone 09 414 0800 x 43317, email humanethicsnorth@massey.ac.nz.
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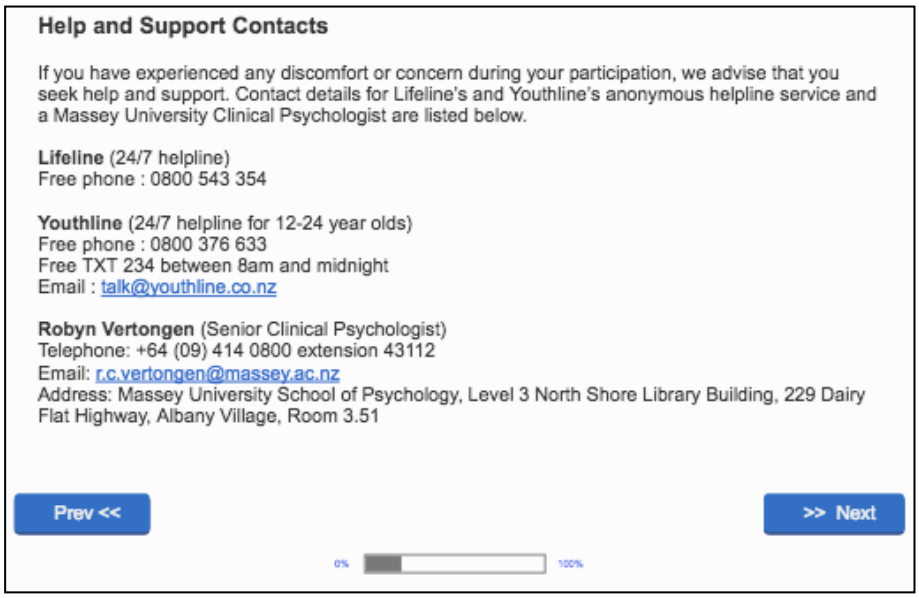
Help and Support Contacts
If you have experienced any discomfort or concern during your participation, we advise that you seek help and support. Contact details for Lifeline's and Youthline's anonymous helpline service and a Massey University Clinical Psychologist are listed below.
Lifeline (24/7 helpline)
Free phone : 0800 543 354
Youthline (24/7 helpline for 12-24 year olds)
Free phone : 0800 376 633
Free TXT 234 between 8am and midnight
Email : talk@youthline.co.nz
Robyn Vertongen (Senior Clinical Psychologist)
Telephone: +64 (09) 414 0800 extension 43112
Email: r.c.vertongen@massey.ac.nz
Address: Massey University School of Psychology, Level 3 North Shore Library Building, 229 Dairy Flat Highway, Albany Village, Room 3.51
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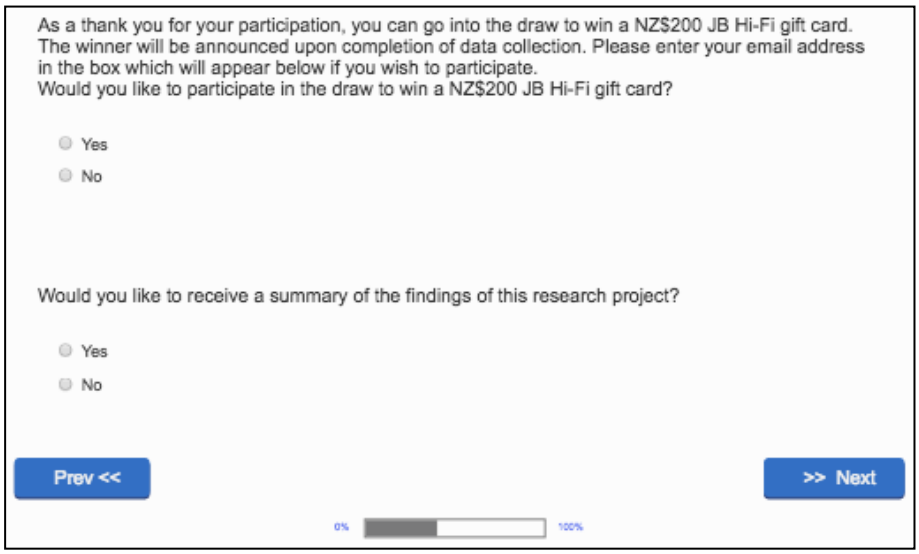
As a thank you for your participation, you can go into the draw to win a NZ$200 JB Hi-Fi gift card. The winner will be announced upon completion of data collection. Please enter your email address in the box which will appear below if you wish to participate.
Would you like to participate in the draw to win a NZ$200 JB Hi-Fi gift card?
Yes
No
Would you like to receive a summary of the findings of this research project?
Yes
No
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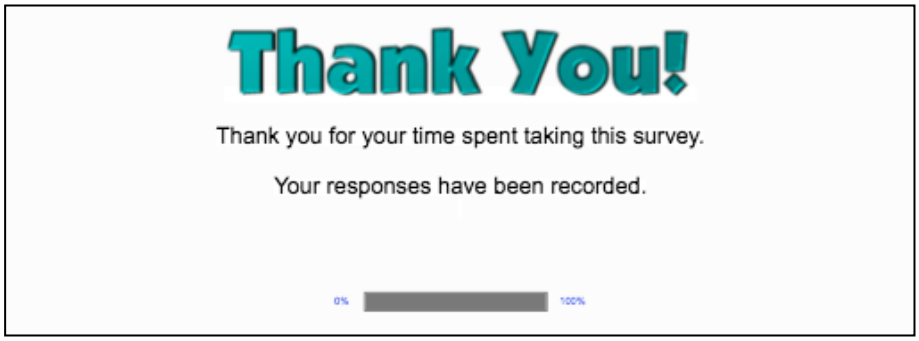
Thank You!
Thank you for your time spent taking this survey.
Your responses have been recorded.
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APPENDIX C: Information Sheet

Examining body image attitudes among regular gymnasium users and non-gymnasium users

Information Sheet

Researcher's Introduction

My name is Kim Ironside and I am a Master of Science (Psychology) student at Massey University. I am interested in examining body image attitudes among regular gym users and non-gym users. This study is being conducted alongside Dr Richard Fletcher (supervisor) as part of my Master of Science in Psychology Thesis.

Project Description and Invitation

You are invited to participate in this research study, which will investigate how body image attitudes differ among regular gym users compared to non-gym users. This study will ask questions about your personal views and attitudes related to body image. If you choose to participate, your participation will be greatly appreciated and completely anonymous.

Participant Identification and Recruitment

Participants will be recruited via flyers advertised in gyms around Auckland and through Facebook. To ensure anonymity, no names will be collected in this questionnaire. In order to participate, you must be 18 years or older and you must be either a regular gym user (attend three or more 30-minute long sessions per week) or a non-gym user (does not attend a gym). An eligibility questionnaire will be used to select for such participants. A total of 62 participants or more is needed to produce useful findings. Participants will be given the option to enter themselves in the draw to win a NZ$200 JB Hi-Fi gift card by providing their email address at the end of the questionnaire.

While completing the questionnaire, you may experience feelings of discomfort due to the nature of the questions. You have the right to decline to answer a particular question and can withdraw from the study at any time before completing the end of the questionnaire. If you do experience any distress and wish to seek help and support, contact details for Lifeline, Youthline, and a Clinical Psychologist are provided at the bottom of this Information page and at the beginning and end of the questionnaire.

Project Procedures

If you choose to participate, you will be asked to complete a short eligibility questionnaire. Those who meet the selection criteria will be asked to provide consent by selecting the checkbox before beginning the study questionnaire. The study questionnaire consists of around

110 questions and an implicit association test, which will take approximately 30 minutes to complete.

Data Management

Obtained data will be entered into a datasheet and analysed using statistical software. Entered data will be stored on a password-protected file and datasheet will be securely stored in the supervisor's office. Data will be disposed of after 5 years. Findings from the analysed data will be used for my Masters Thesis and may be published in scientific journals. If you wish to access a summary of the project findings, please provide your email address after completing the questionnaire.

Participant's Rights

You are under no obligation to accept this invitation. If you decide to participate, you have the right to:

- Decline to answer any particular question;
- Withdraw your data from the study anytime before completing the end of the questionnaire;
- Ask any questions about the study at any time during participation;
- Provide information on the understanding that your name will not be used unless you give permission to the researcher;
- Be given access to a summary of the project findings when it is concluded.
- Completion and return of the questionnaire implies consent. You have the right to decline to answer any particular question

Many thanks,
Kim Ironside

Contact information

If you have any questions or queries regarding this project, please don't hesitate to contact the following:

Researcher
Kim Ironside
School of Psychology
Massey University
Albany, Auckland
New Zealand
Email: kim.ironside.1@uni.massey.ac.nz

Supervisor
Dr Richard Fletcher
Massey University School of Psychology
Massey University
Albany, Auckland
New Zealand
Telephone: +64 (09) 414 0800 ext. 43096
Email: r.b.fletcher@massey.ac.nz

Help and Support Contacts

While completing this questionnaire, you may experience feelings of discomfort due to the nature of the questions. You have the right to decline to answer a particular question and can withdraw from the study at any time before completing the end of the questionnaire.

If you do experience any distress and wish to seek help and support, contact details for Lifeline, Youthline, and a Massey University Clinical Psychologist are provided below and at the end of the questionnaire.

If you experience any discomfort or concern during your participation, we advise that you contact the following:

Lifeline (24/7 helpline)
Free phone : 0800 543 354

Youthline (24/7 helpline for 12-24 year olds)
Free phone : 0800 376 633
Free TXT 234 between 8am and midnight
Email : talk@youthline.co.nz

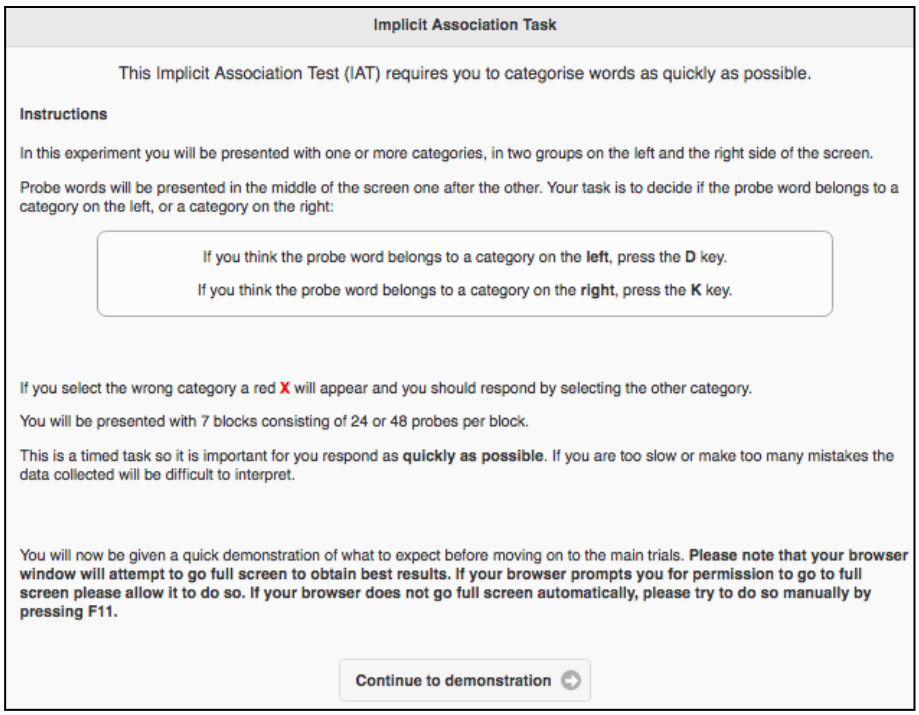
Robyn Vertongen (Senior Clinical Psychologist)
Telephone: +64 (09) 414 0800 extension 43112
Email: r.c.vertongen@massey.ac.nz
Address: Massey University School of Psychology, Level 3 North Shore Library Building, 229 Dairy Flat Highway, Albany Village, Room 3.51

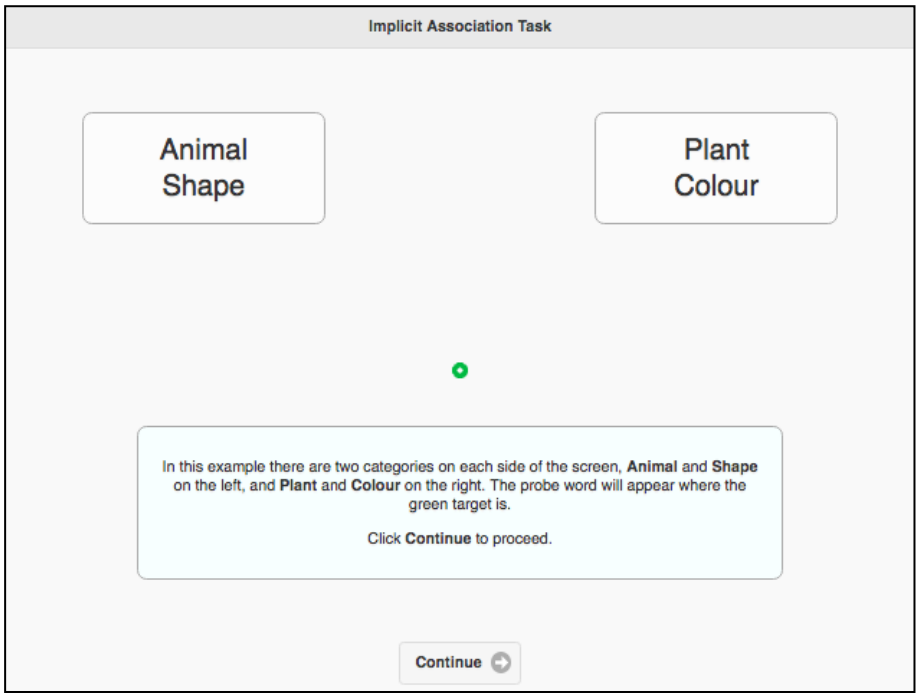
Te Kunenga ki Pūrehuroa

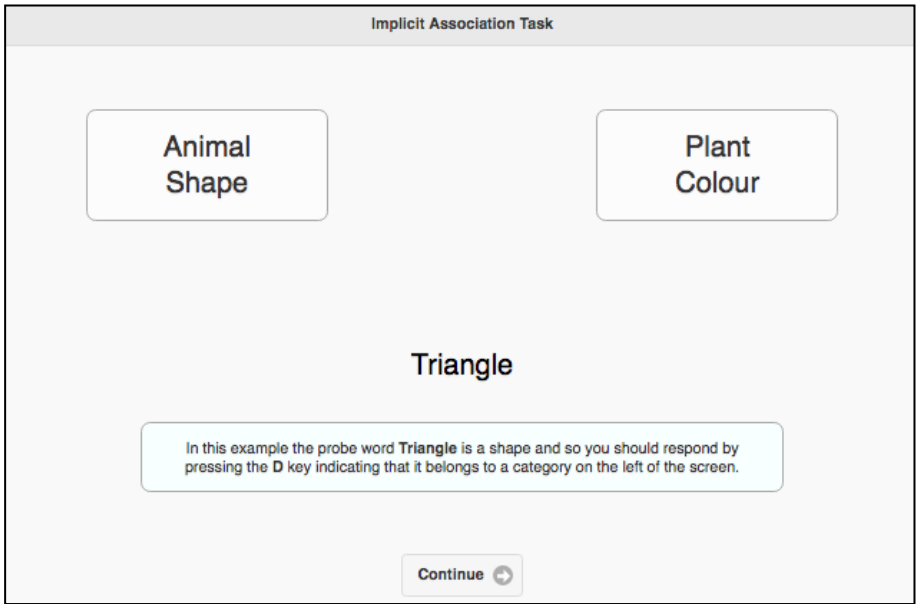
Massey University School of Psychology – Te Kura Hinengaro Tangata
Albany, Auckland, New Zealand
T +64 9 414-0800 ext 41244 : W psychology.massey.ac.nz

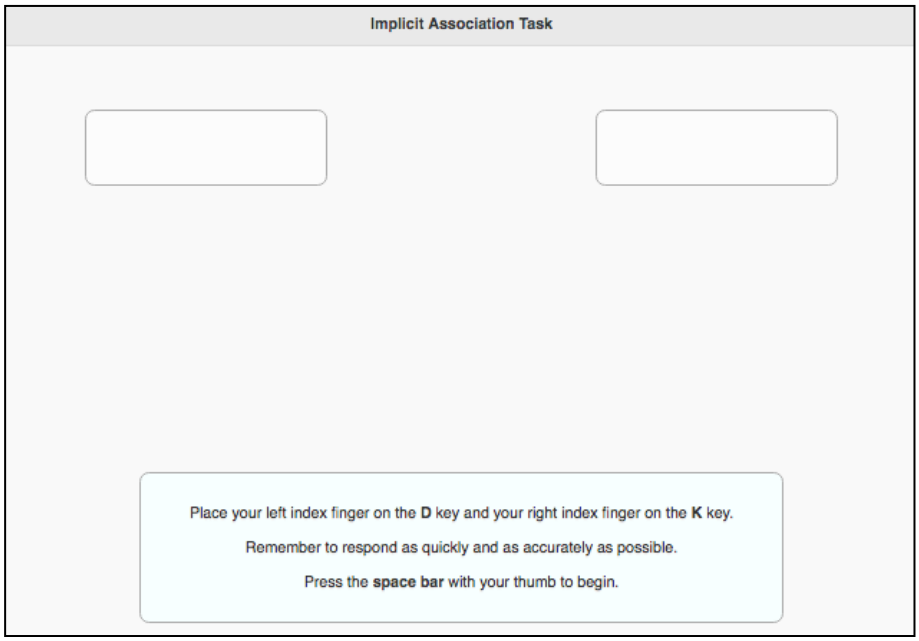
This project has been reviewed and approved by the Massey University Human Ethics Committee: Northern, Application 15/034. If you have any concerns about the conduct of this research, please contact Dr Andrew Chrystall, Chair, Massey University Human Ethics Committee: Northern, telephone 09 414 0800 x 43317, email humanethicsnorth@massey.ac.nz.

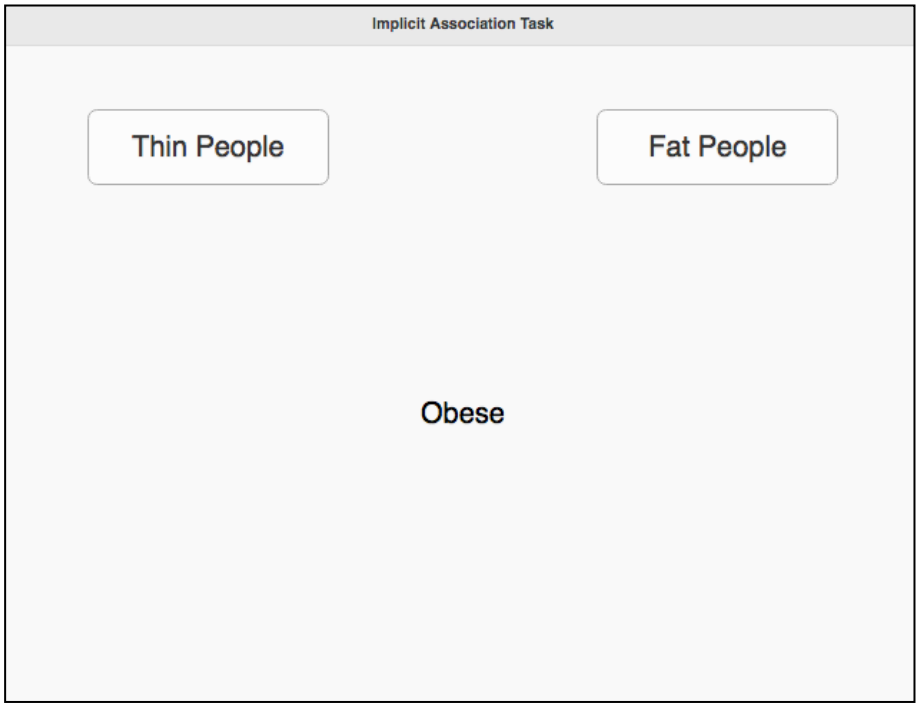
APPENDIX D: Implicit Association Test (Version One)

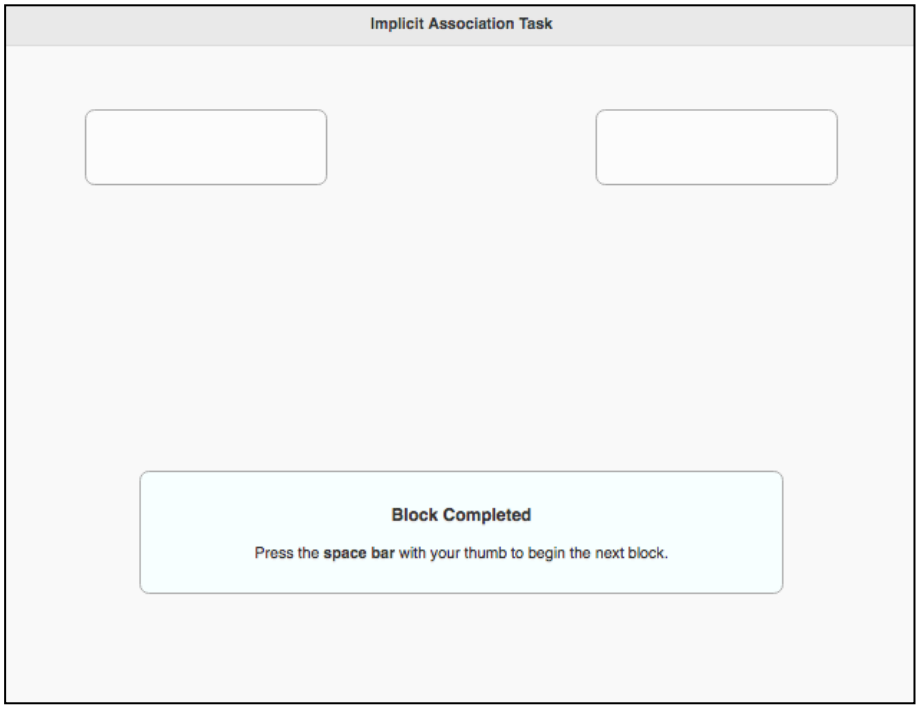


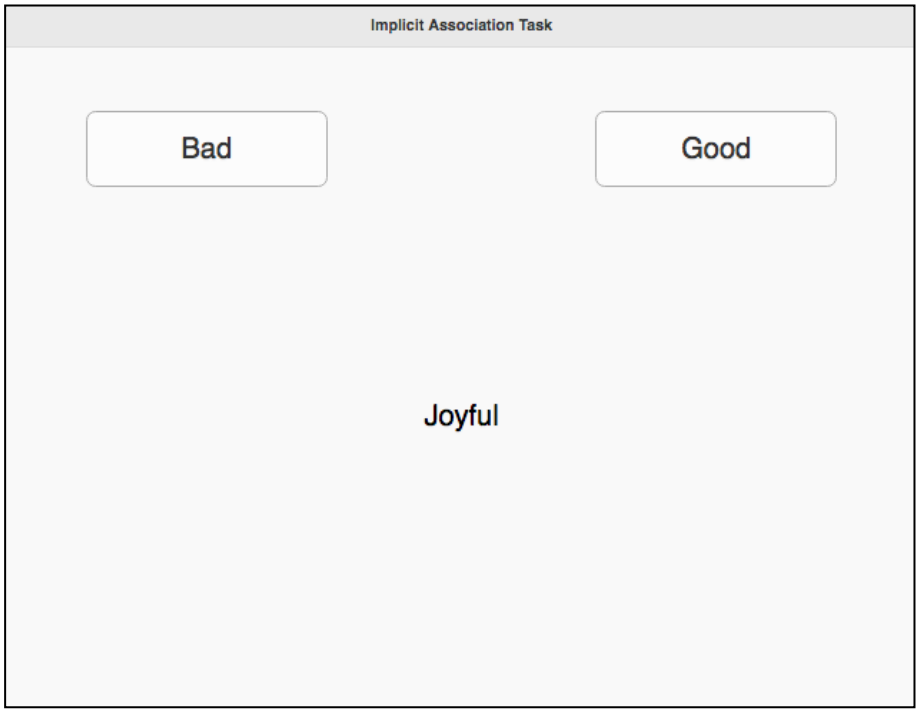


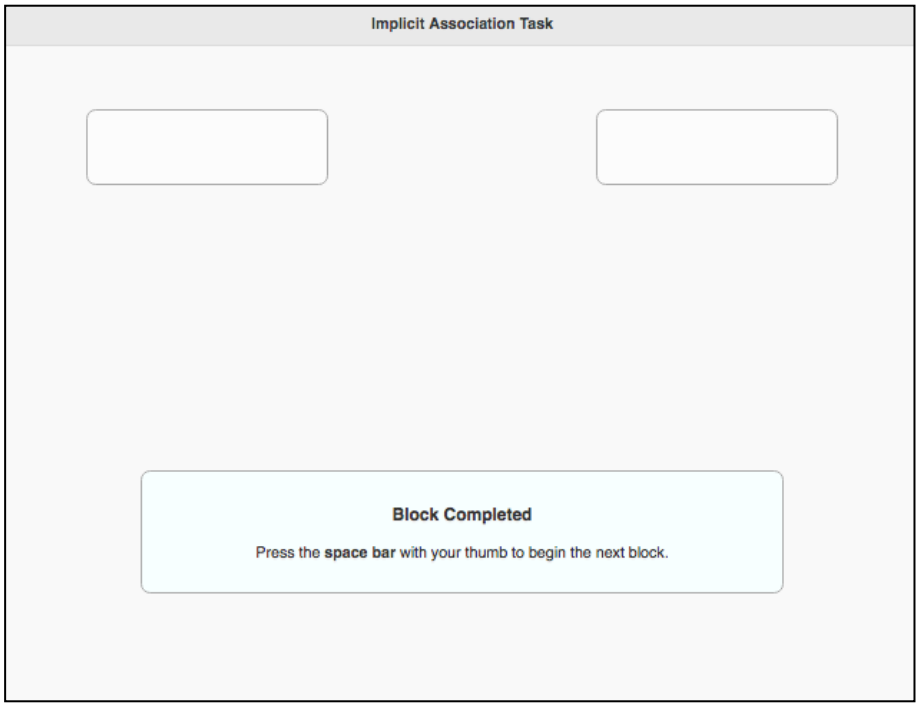

Implicit Association Task
Animal
Shape
Plant
Colour
Triangle
In this example the probe word Triangle is a shape and so you should respond by pressing the D key indicating that it belongs to a category on the left of the screen.
Continue

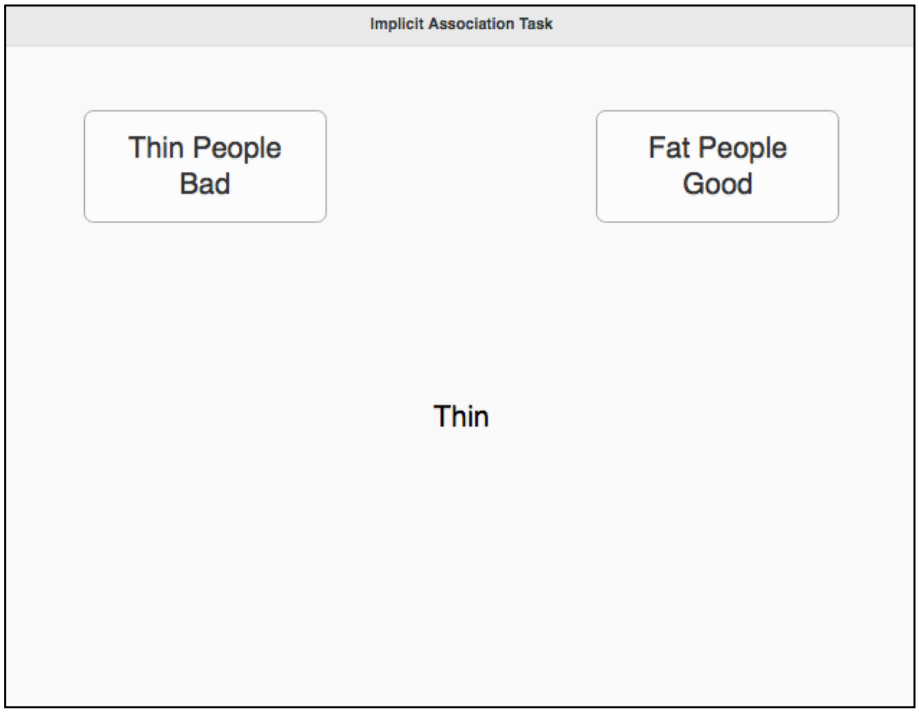

Implicit Association Task
Place your left index finger on the D key and your right index finger on the K key.
Remember to respond as quickly and as accurately as possible.
Press the space bar with your thumb to begin.

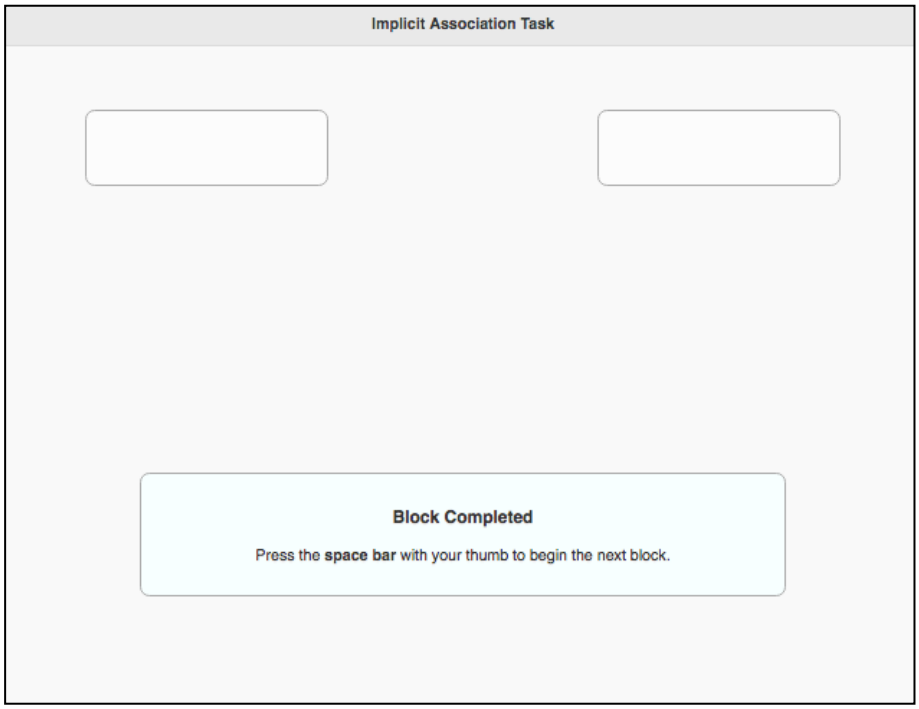

Implicit Association Task
Thin People
Fat People
Obese

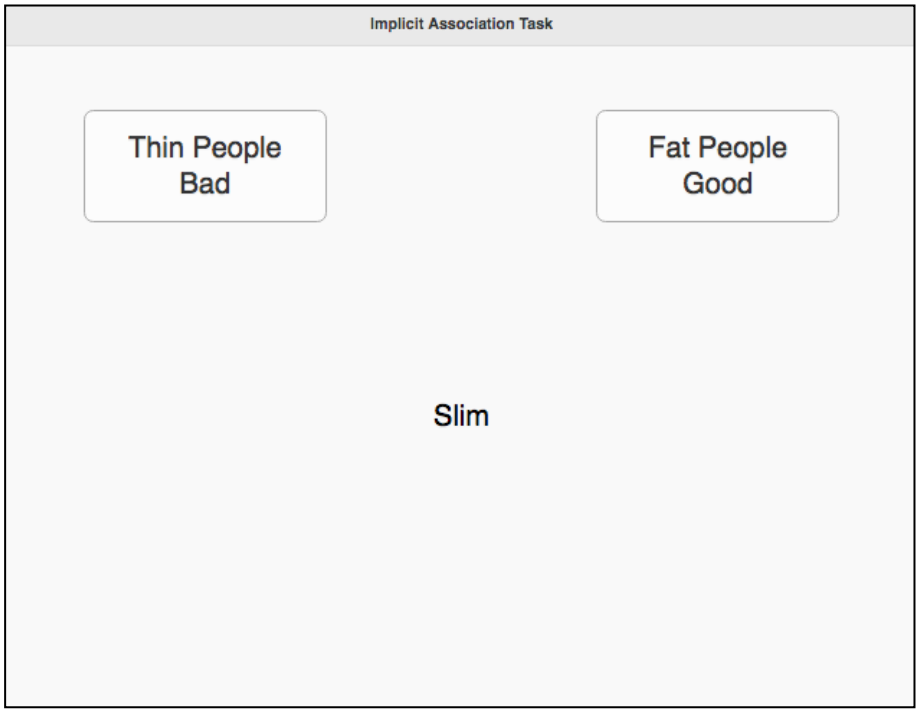

Implicit Association Task
Block Completed
Press the space bar with your thumb to begin the next block.

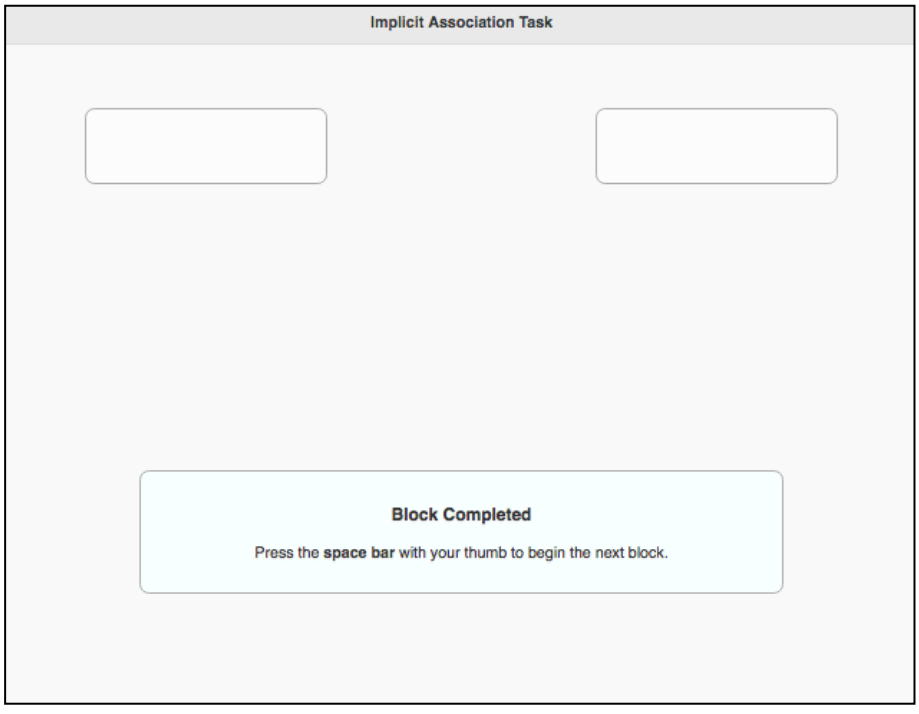

Implicit Association Task
Bad
Good
Joyful

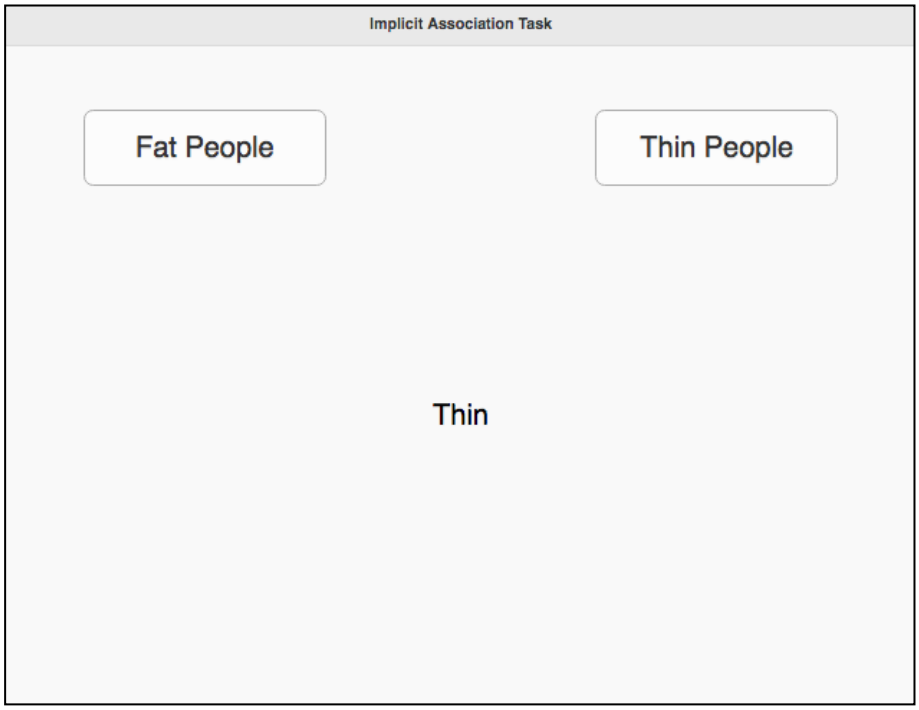

Implicit Association Task
Block Completed
Press the space bar with your thumb to begin the next block.

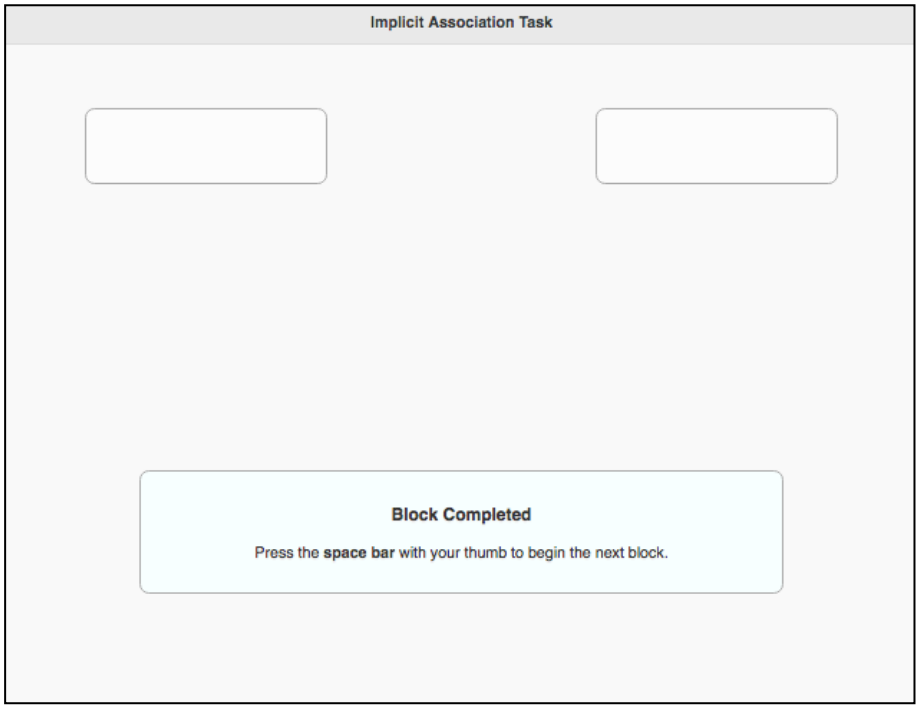

Implicit Association Task
Thin People
Bad
Fat People
Good
Thin

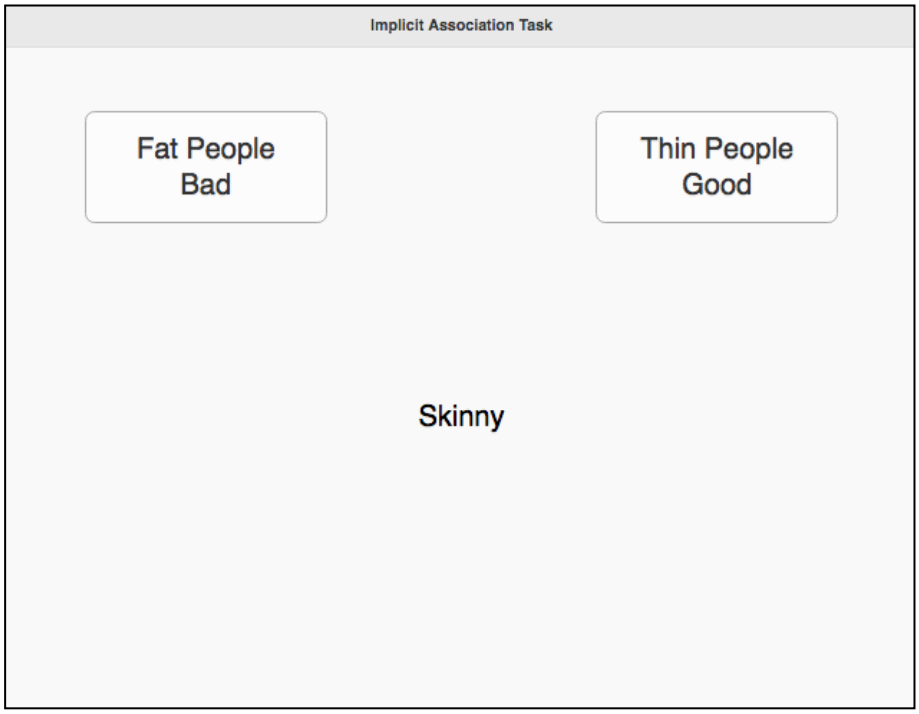

Implicit Association Task
Block Completed
Press the space bar with your thumb to begin the next block.

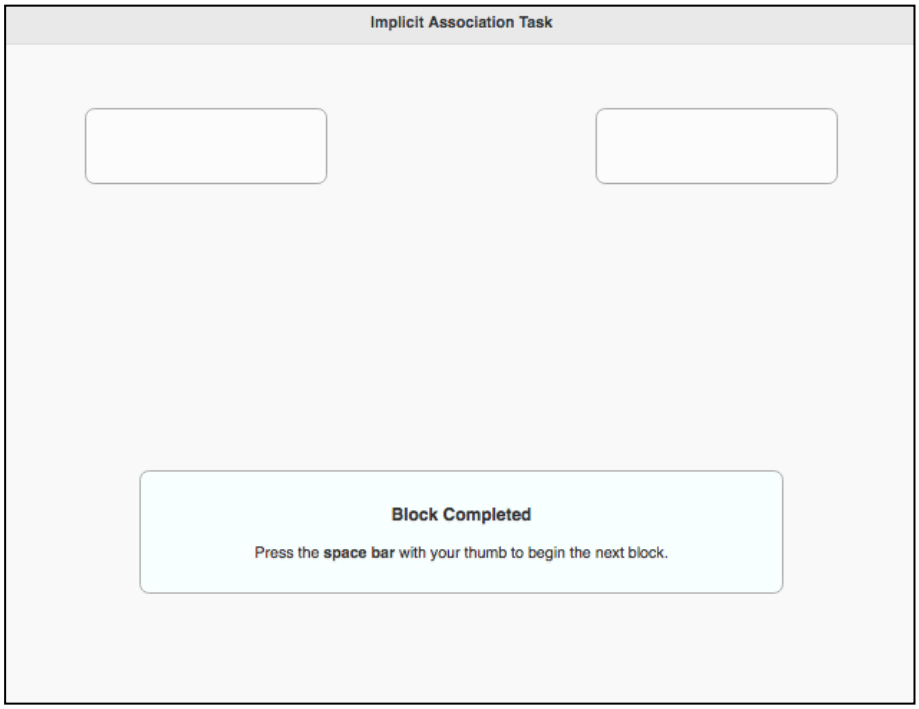

Implicit Association Task
Thin People
Bad
Fat People
Good
Slim

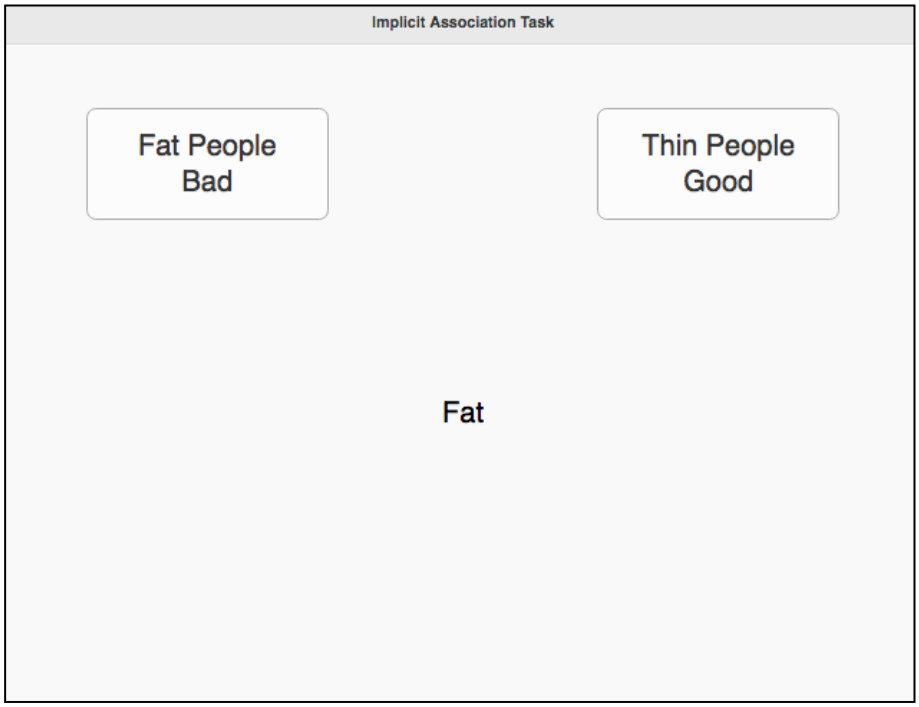

Implicit Association Task
Block Completed
Press the space bar with your thumb to begin the next block.

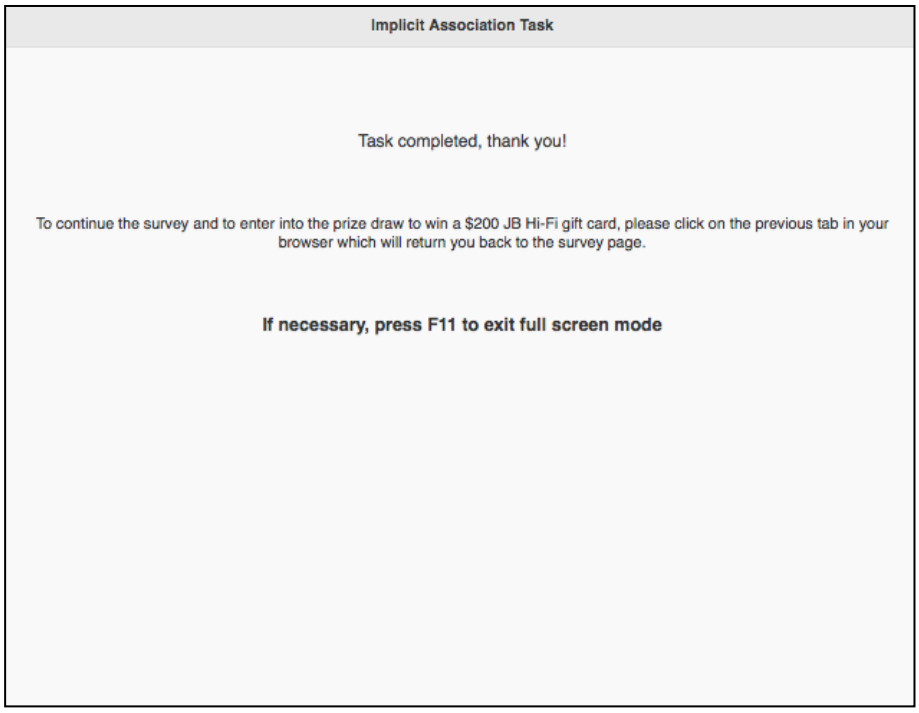

Implicit Association Task
Fat People
Thin People
Thin


Implicit Association Task
Block Completed
Press the space bar with your thumb to begin the next block.

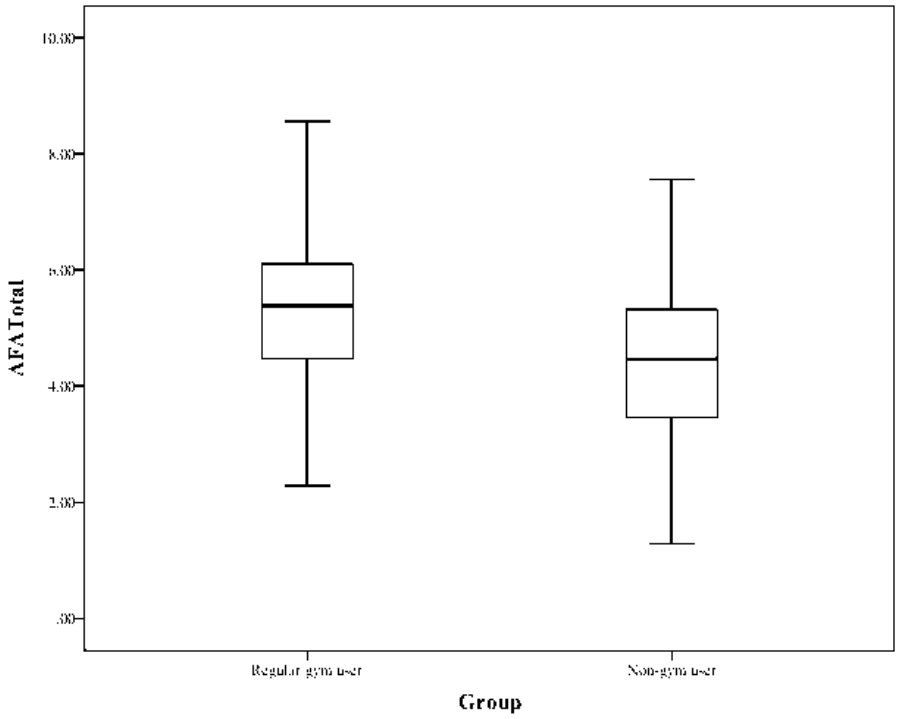

Implicit Association Task
Fat People
Bad
Thin People
Good
Skinny


Implicit Association Task
Block Completed
Press the space bar with your thumb to begin the next block.

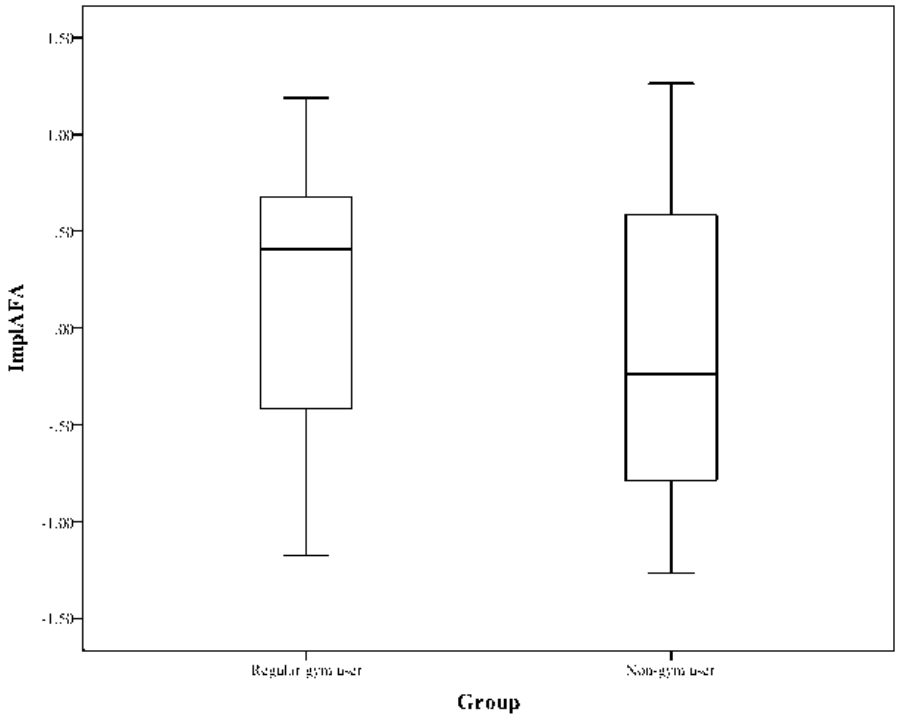

Implicit Association Task
Fat People Bad
Thin People Good
Fat


Implicit Association Task
Task completed, thank you!
To continue the survey and to enter into the prize draw to win a $200 JB Hi-Fi gift card, please click on the previous tab in your browser which will return you back to the survey page.
If necessary, press F11 to exit full screen mode

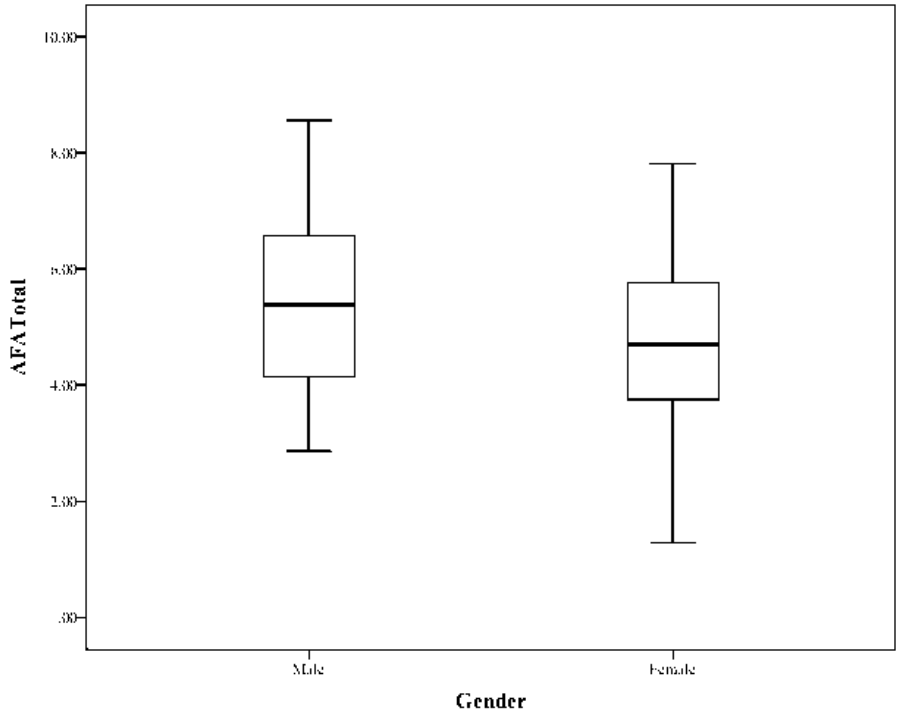
APPENDIX E: Boxplots of explicit anti-fat attitudes between regular gym users and non-gym users



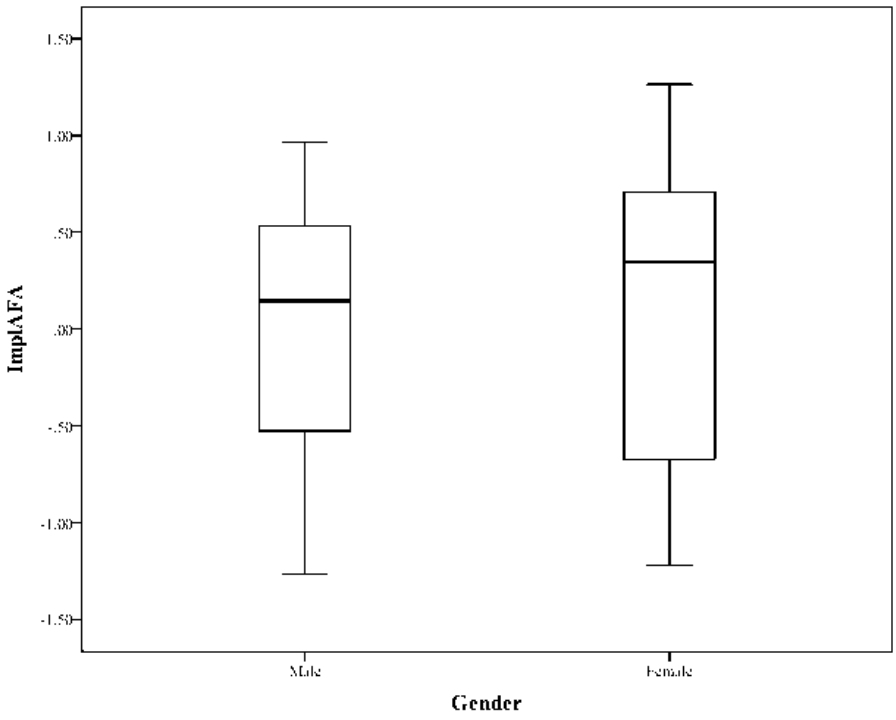
APPENDIX F: Boxplots of implicit anti-fat attitudes between regular gym users and non-gym users



APPENDIX G: Boxplots of explicit anti-fat attitudes between males and females



APPENDIX H: Boxplots of implicit anti-fat attitudes between males and females



APPENDIX I: PROCESS output for mediation effect of perfectionism on the relationship between appearance orientation and explicit anti-fat attitudes

```
Run MATRIX procedure:

************** PROCESS Procedure for SPSS Release 2.15 *******************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2013). www.guilford.com/p/hayes3

**************************************************************************
Model = 4
    Y = AFATotal
    X = APPOR
    M = APSTotal

Sample size
         72

**************************************************************************
Outcome: APSTotal

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3869      .1497   384.4023    12.3246     1.0000    70.0000
.0008

Model
              coeff         se          t          p       LLCI       ULCI
constant    63.4202    12.8914     4.9196      .0000    37.7090    89.1314
APPOR        1.0830      .3085     3.5106      .0008      .4677     1.6983

**************************************************************************
Outcome: AFATotal

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .4766      .2271     1.7412    10.1391     2.0000    69.0000
.0001

Model
              coeff         se          t          p       LLCI       ULCI
constant      .4440     1.0065      .4411      .6605    -1.5640     2.4519
APSTotal      .0200      .0080     2.4880      .0153      .0040      .0361
APPOR         .0563      .0225     2.4984      .0149      .0113      .1012

************************** TOTAL EFFECT MODEL ****************************
Outcome: AFATotal

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3972      .1578     1.8703    13.1157     1.0000    70.0000
.0006

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.7133      .8992     1.9053      .0609     -.0802     3.5067
APPOR         .0779      .0215     3.6216      .0006      .0350      .1208
```

```
****************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .0779      .0215     3.6216      .0006      .0350      .1208

Direct effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .0563      .0225     2.4984      .0149      .0113      .1012

Indirect effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .0217      .0142      .0008      .0560

Partially standardized indirect effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .0146      .0094      .0004      .0370

Completely standardized indirect effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .1105      .0715      .0065      .2854

Ratio of indirect to total effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .2781      .2603      .0040      .9011

Ratio of indirect to direct effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .3853     6.2422     -.0138     4.6311

R-squared mediation effect size (R-sq_med)
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .0879      .0462      .0221      .2128

Preacher and Kelley (2011) Kappa-squared
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .1110      .0662      .0147      .2712

Normal theory tests for indirect effect
     Effect         se          Z          p
      .0217      .0110     1.9772      .0480

****************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence
intervals:
     5000

Level of confidence for all confidence intervals in output:
    95.00

------ END MATRIX -----
```

APPENDIX J: PROCESS output for mediation effect of perfectionism on the relationship between appearance orientation and dislike

```
Run MATRIX procedure:

************** PROCESS Procedure for SPSS Release 2.15 *******************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2013). www.guilford.com/p/hayes3

**************************************************************************
Model = 4
    Y = DISL
    X = APPOR
    M = APSTotal

Sample size
         72

**************************************************************************
Outcome: APSTotal

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3869      .1497   384.4023    12.3246     1.0000    70.0000
.0008

Model
              coeff         se          t          p       LLCI       ULCI
constant    63.4202    12.8914     4.9196      .0000    37.7090    89.1314
APPOR        1.0830      .3085     3.5106      .0008      .4677     1.6983

**************************************************************************
Outcome: DISL

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3927      .1542     2.1183     6.2905     2.0000    69.0000
.0031

Model
              coeff         se          t          p       LLCI       ULCI
constant      .0156     1.1101      .0140      .9889    -2.1991     2.2302
APSTotal      .0252      .0089     2.8359      .0060      .0075      .0429
APPOR         .0215      .0248      .8673      .3888     -.0280      .0711

************************** TOTAL EFFECT MODEL ****************************
Outcome: DISL

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .2359      .0556     2.3314     4.1240     1.0000    70.0000
.0461

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.6113     1.0039     1.6050      .1130     -.3910     3.6136
APPOR         .0488      .0240     2.0308      .0461      .0009      .0967
```

```
****************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .0488      .0240     2.0308      .0461      .0009      .0967

Direct effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .0215      .0248      .8673      .3888     -.0280      .0711

Indirect effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .0273      .0169      .0026      .0708

Partially standardized indirect effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .0175      .0099      .0014      .0410

Completely standardized indirect effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .1317      .0758      .0134      .3185

Ratio of indirect to total effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .5585     7.9822      .0175     2.7280

Ratio of indirect to direct effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal     1.2652    47.2651     -.7496   373.6377

R-squared mediation effect size (R-sq_med)
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .0464      .0325      .0031      .1410

Preacher and Kelley (2011) Kappa-squared
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .1265      .0696      .0187      .2957

Normal theory tests for indirect effect
     Effect         se          Z          p
      .0273      .0127     2.1538      .0313

****************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence
intervals:
     5000

Level of confidence for all confidence intervals in output:
    95.00

------ END MATRIX -----
```

APPENDIX K: PROCESS output for mediation effect of perfectionism on the relationship between appearance orientation and fear

```
Run MATRIX procedure:

************** PROCESS Procedure for SPSS Release 2.15 *******************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2013). www.guilford.com/p/hayes3

**************************************************************************
Model = 4
    Y = FEAR
    X = APPOR
    M = APSTotal

Sample size
         72

**************************************************************************
Outcome: APSTotal

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3869      .1497   384.4023    12.3246     1.0000    70.0000
.0008

Model
              coeff         se          t          p       LLCI       ULCI
constant    63.4202    12.8914     4.9196      .0000    37.7090    89.1314
APPOR        1.0830      .3085     3.5106      .0008      .4677     1.6983

**************************************************************************
Outcome: FEAR

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .5158      .2661     4.0134    12.5090     2.0000    69.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant    -2.0399     1.5281    -1.3349      .1863    -5.0883     1.0085
APSTotal      .0301      .0122     2.4631      .0163      .0057      .0544
APPOR         .1046      .0342     3.0612      .0031      .0364      .1728

************************ TOTAL EFFECT MODEL ****************************
Outcome: FEAR

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .4490      .2016     4.3039    17.6719     1.0000    70.0000
.0001

Model
              coeff         se          t          p       LLCI       ULCI
constant     -.1321     1.3641     -.0969      .9231    -2.8527     2.5884
APPOR         .1372      .0326     4.2038      .0001      .0721      .2023
```

```
****************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .1372      .0326     4.2038      .0001      .0721      .2023

Direct effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .1046      .0342     3.0612      .0031      .0364      .1728

Indirect effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .0326      .0188      .0054      .0796

Partially standardized indirect effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .0141      .0080      .0023      .0339

Completely standardized indirect effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .1066      .0609      .0177      .2569

Ratio of indirect to total effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .2374      .1908      .0384      .7089

Ratio of indirect to direct effect of X on Y
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .3113     5.0167      .0365     2.2088

R-squared mediation effect size (R-sq_med)
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .1019      .0543      .0219      .2366

Preacher and Kelley (2011) Kappa-squared
             Effect    Boot SE   BootLLCI   BootULCI
APSTotal      .1101      .0584      .0208      .2499

Normal theory tests for indirect effect
     Effect         se          Z          p
      .0326      .0166     1.9636      .0496

****************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence
intervals:
     5000

Level of confidence for all confidence intervals in output:
    95.00

------ END MATRIX -----
```

APPENDIX L: PROCESS output for mediation effect of maladaptive perfectionism (discrepancy) on the relationship between appearance orientation and explicit anti-fat attitudes

```
Run MATRIX procedure:

************** PROCESS Procedure for SPSS Release 2.15 *******************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2013). www.guilford.com/p/hayes3

**************************************************************************
Model = 4
    Y = AFATotal
    X = APPOR
    M = DISCREP

Sample size
         72

**************************************************************************
Outcome: DISCREP

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3688      .1360   270.0500    11.0220     1.0000    70.0000
.0014

Model
              coeff         se          t          p       LLCI       ULCI
constant    12.0419    10.8051     1.1145      .2689    -9.5083    33.5921
APPOR         .8584      .2586     3.3199      .0014      .3427     1.3741

**************************************************************************
Outcome: AFATotal

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .5636      .3176     1.5374    16.0569     2.0000    69.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.2767      .8225     1.5523      .1252     -.3641     2.9175
DISCREP       .0363      .0090     4.0197      .0001      .0183      .0542
APPOR         .0468      .0210     2.2303      .0290      .0049      .0887

************************** TOTAL EFFECT MODEL ****************************
Outcome: AFATotal

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3972      .1578     1.8703    13.1157     1.0000    70.0000
.0006

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.7133      .8992     1.9053      .0609     -.0802     3.5067
APPOR         .0779      .0215     3.6216      .0006      .0350      .1208
```

```
****************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .0779      .0215     3.6216      .0006      .0350      .1208

Direct effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .0468      .0210     2.2303      .0290      .0049      .0887

Indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .0311      .0123      .0122      .0621

Partially standardized indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .0210      .0080      .0080      .0393

Completely standardized indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1586      .0604      .0610      .3038

Ratio of indirect to total effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .3993      .2303      .1428     1.0242

Ratio of indirect to direct effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .6648    12.8097      .1415     8.4677

R-squared mediation effect size (R-sq_med)
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1086      .0464      .0349      .2217

Preacher and Kelley (2011) Kappa-squared
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1622      .0588      .0636      .2987

Normal theory tests for indirect effect
     Effect         se          Z          p
      .0311      .0124     2.5139      .0119

****************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence
intervals:
     5000

Level of confidence for all confidence intervals in output:
    95.00

------ END MATRIX -----
```

APPENDIX M: PROCESS output for mediation effect of maladaptive perfectionism (discrepancy) on the relationship between appearance orientation and dislike

```
Run MATRIX procedure:

************** PROCESS Procedure for SPSS Release 2.15 *******************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2013). www.guilford.com/p/hayes3

**************************************************************************
Model = 4
    Y = DISL
    X = APPOR
    M = DISCREP

Sample size
         72

**************************************************************************
Outcome: DISCREP

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3688      .1360   270.0500    11.0220     1.0000    70.0000
.0014

Model
              coeff         se          t          p       LLCI       ULCI
constant    12.0419    10.8051     1.1145      .2689    -9.5083    33.5921
APPOR         .8584      .2586     3.3199      .0014      .3427     1.3741

**************************************************************************
Outcome: DISL

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .4817      .2321     1.9233    10.4256     2.0000    69.0000
.0001

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.1277      .9199     1.2259      .2244     -.7075     2.9629
DISCREP       .0402      .0101     3.9815      .0002      .0200      .0603
APPOR         .0143      .0235      .6097      .5441     -.0325      .0611

************************ TOTAL EFFECT MODEL ****************************
Outcome: DISL

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .2359      .0556     2.3314     4.1240     1.0000    70.0000
.0461

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.6113     1.0039     1.6050      .1130     -.3910     3.6136
APPOR         .0488      .0240     2.0308      .0461      .0009      .0967
```

```
****************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .0488      .0240     2.0308      .0461      .0009      .0967

Direct effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .0143      .0235      .6097      .5441     -.0325      .0611

Indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .0345      .0142      .0138      .0735

Partially standardized indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .0221      .0079      .0097      .0413

Completely standardized indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1667      .0607      .0701      .3156

Ratio of indirect to total effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .7066     1.7681      .2486     2.8862

Ratio of indirect to direct effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP     2.4085    63.1303      .4559  1757.7554

R-squared mediation effect size (R-sq_med)
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .0515      .0356      .0006      .1448

Preacher and Kelley (2011) Kappa-squared
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1649      .0585      .0704      .3055

Normal theory tests for indirect effect
     Effect         se          Z          p
      .0345      .0138     2.5037      .0123

****************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence
intervals:
     5000

Level of confidence for all confidence intervals in output:
    95.00

------ END MATRIX -----
```

APPENDIX N: PROCESS output for mediation effect of maladaptive perfectionism (discrepancy) on the relationship between appearance orientation and fear

```
Run MATRIX procedure:

************** PROCESS Procedure for SPSS Release 2.15 *******************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2013). www.guilford.com/p/hayes3

**************************************************************************
Model = 4
    Y = FEAR
    X = APPOR
    M = DISCREP

Sample size
         72

**************************************************************************
Outcome: DISCREP

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .3688      .1360   270.0500    11.0220     1.0000    70.0000
.0014

Model
              coeff         se          t          p       LLCI       ULCI
constant    12.0419    10.8051     1.1145      .2689    -9.5083    33.5921
APPOR         .8584      .2586     3.3199      .0014      .3427     1.3741

**************************************************************************
Outcome: FEAR

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .5723      .3276     3.6773    16.8056     2.0000    69.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     -.7360     1.2720     -.5786      .5647    -3.2736     1.8016
DISCREP       .0501      .0139     3.5956      .0006      .0223      .0780
APPOR         .0942      .0325     2.9011      .0050      .0294      .1589

************************ TOTAL EFFECT MODEL ****************************
Outcome: FEAR

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .4490      .2016     4.3039    17.6719     1.0000    70.0000
.0001

Model
              coeff         se          t          p       LLCI       ULCI
constant     -.1321     1.3641     -.0969      .9231    -2.8527     2.5884
APPOR         .1372      .0326     4.2038      .0001      .0721      .2023
```

```
****************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .1372      .0326     4.2038      .0001      .0721      .2023

Direct effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .0942      .0325     2.9011      .0050      .0294      .1589

Indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .0430      .0184      .0132      .0864

Partially standardized indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .0187      .0078      .0054      .0362

Completely standardized indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1408      .0595      .0423      .2751

Ratio of indirect to total effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .3137      .1731      .0933      .7676

Ratio of indirect to direct effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .4571    17.7028      .0973     2.9265

R-squared mediation effect size (R-sq_med)
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1195      .0568      .0326      .2597

Preacher and Kelley (2011) Kappa-squared
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1467      .0596      .0440      .2774

Normal theory tests for indirect effect
     Effect         se          Z          p
      .0430      .0180     2.3898      .0169

****************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence
intervals:
     5000

Level of confidence for all confidence intervals in output:
    95.00

------ END MATRIX -----
```

APPENDIX O: PROCESS output for mediation effect of maladaptive perfectionism (discrepancy) on the relationship between overweight preoccupation and explicit anti-fat attitudes

```
Run MATRIX procedure:

************** PROCESS Procedure for SPSS Release 2.15 *******************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2013). www.guilford.com/p/hayes3

**************************************************************************
Model = 4
    Y = AFATotal
    X = OVERP
    M = DISCREP

Sample size
         72

**************************************************************************
Outcome: DISCREP

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .2555      .0653   292.1648     4.8892     1.0000    70.0000
.0303

Model
              coeff         se          t          p       LLCI       ULCI
constant    33.9889     6.3624     5.3422      .0000    21.2995    46.6782
OVERP        1.2527      .5665     2.2112      .0303      .1228     2.3826

**************************************************************************
Outcome: AFATotal

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .6667      .4445     1.2515    27.6071     2.0000    69.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     1.3818      .4941     2.7969      .0067      .3962     2.3674
DISCREP       .0343      .0078     4.3874      .0000      .0187      .0499
OVERP         .1794      .0384     4.6770      .0000      .1029      .2559

************************** TOTAL EFFECT MODEL ****************************
Outcome: AFATotal

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .5381      .2895     1.5778    28.5278     1.0000    70.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant     2.5483      .4675     5.4504      .0000     1.6158     3.4808
OVERP         .2224      .0416     5.3411      .0000      .1393      .3054
```

```
****************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .2224      .0416     5.3411      .0000      .1393      .3054

Direct effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .1794      .0384     4.6770      .0000      .1029      .2559

Indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .0430      .0216      .0098      .1000

Partially standardized indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .0291      .0141      .0065      .0647

Completely standardized indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1040      .0498      .0239      .2277

Ratio of indirect to total effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1933      .0975      .0460      .4533

Ratio of indirect to direct effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .2397      .1731      .0482      .8292

R-squared mediation effect size (R-sq_med)
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1134      .0583      .0174      .2496

Preacher and Kelley (2011) Kappa-squared
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1194      .0532      .0278      .2423

Normal theory tests for indirect effect
     Effect         se          Z          p
      .0430      .0222     1.9349      .0530

****************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence
intervals:
     5000

Level of confidence for all confidence intervals in output:
    95.00

------ END MATRIX -----
```

APPENDIX P: PROCESS output for mediation effect of maladaptive perfectionism (discrepancy) on the relationship between overweight preoccupation and fear

```
Run MATRIX procedure:

************** PROCESS Procedure for SPSS Release 2.15 *******************

          Written by Andrew F. Hayes, Ph.D.       www.afhayes.com
    Documentation available in Hayes (2013). www.guilford.com/p/hayes3

**************************************************************************
Model = 4
    Y = FEAR
    X = OVERP
    M = DISCREP

Sample size
         72

**************************************************************************
Outcome: DISCREP

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .2555      .0653   292.1648     4.8892     1.0000    70.0000
.0303

Model
              coeff         se          t          p       LLCI       ULCI
constant    33.9889     6.3624     5.3422      .0000    21.2995    46.6782
OVERP        1.2527      .5665     2.2112      .0303      .1228     2.3826

**************************************************************************
Outcome: FEAR

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .8167      .6670     1.8209    69.1092     2.0000    69.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant    -1.1098      .5959    -1.8622      .0668    -2.2987      .0791
DISCREP       .0425      .0094     4.5084      .0000      .0237      .0614
OVERP         .4323      .0463     9.3455      .0000      .3400      .5246

************************ TOTAL EFFECT MODEL ****************************
Outcome: FEAR

Model Summary
          R       R-sq        MSE          F        df1        df2
p
      .7543      .5689     2.3236    92.3872     1.0000    70.0000
.0000

Model
              coeff         se          t          p       LLCI       ULCI
constant      .3361      .5674      .5924      .5555     -.7955     1.4678
OVERP         .4856      .0505     9.6118      .0000      .3849      .5864
```

```
****************** TOTAL, DIRECT, AND INDIRECT EFFECTS ********************

Total effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .4856      .0505     9.6118      .0000      .3849      .5864

Direct effect of X on Y
     Effect         SE          t          p       LLCI       ULCI
      .4323      .0463     9.3455      .0000      .3400      .5246

Indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .0533      .0291      .0072      .1254

Partially standardized indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .0231      .0125      .0030      .0538

Completely standardized indirect effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .0828      .0442      .0121      .1895

Ratio of indirect to total effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1097      .0588      .0158      .2494

Ratio of indirect to direct effect of X on Y
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1233      .0781      .0161      .3324

R-squared mediation effect size (R-sq_med)
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1475      .0803      .0115      .3219

Preacher and Kelley (2011) Kappa-squared
            Effect    Boot SE   BootLLCI   BootULCI
DISCREP      .1291      .0607      .0237      .2639

Normal theory tests for indirect effect
     Effect         se          Z          p
      .0533      .0274     1.9470      .0515

****************** ANALYSIS NOTES AND WARNINGS ************************

Number of bootstrap samples for bias corrected bootstrap confidence
intervals:
     5000

Level of confidence for all confidence intervals in output:
    95.00

------ END MATRIX -----
```