Beyond Comparison: The Impact of Viewing Different Male Body Types on Mood, Body Satisfaction and Intention to Diet and Exercise in Young Men

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The candidate confirms that the work submitted is her own and that appropriate credit has been given where reference has been made to the work of others.

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Abstract

Introduction: With the increase in social media focus on male strength and fitness, there is growing concern about the consequences of persistent exposure to idealised muscular imagery in young men and its influence on body dissatisfaction as well as unhealthy attitudes towards diet and exercise.

Method: In a randomised experimental design, 197 men aged 18-34 completed measures of state body satisfaction, mood, appearance self-esteem, diet and exercise intentions before and after viewing images of men with either the idealised muscular physique, slim physique, overweight physique or landscape (control) images. State social comparison (appearance comparison) was examined as a potential mediator of the impact of the images on study outcomes.

Results: Men's muscularity satisfaction and satisfaction with the overall body was significantly reduced after viewing the muscular images, but not after viewing the slim, overweight or landscape images. Men reported a significant increase in intentions to follow a strict diet plan after exposure to the muscular images, but this did not differ from landscape images. Findings showed no direct impact of image exposure on exercise intentions or mood. Viewing muscular images compared to landscape images led to more appearance comparison, which partly explained a reduction in mood and increased intentions to exercise. Likewise, men who viewed slim images compared to the landscape images engaged in more appearance comparison, which resulted in increased intentions to exercise. Viewing overweight images compared to landscape images led to more appearance comparison, which subsequently lowered mood. State appearance comparison did not mediate the relationship between image exposure and body satisfaction, appearance self-esteem or dieting intentions.

Discussion: Exposure to Instagram images of the idealised muscular physique has a negative impact on body satisfaction in young men. Appearance comparison contributes to lowered mood and increased intention to exercise when exposed to muscular images.

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List of Abbreviations

BDD: Body Dysmorphic Disorder

UK: United Kingdom

LGBTQIA: Lesbian, Gay, Bisexual, Transgender, Queer or Questioning, Intersex and Asexual

MBAS: Male Body Attitude Scale

DEI-Q: Diet and Exercise Intentions Questionnaire

DIS: Dieting Intentions Scale

SSES: State Self-Esteem Scale

ANOVA: Analysis of Variance

Introduction

Historically, body image research has focused on and widely documented women's body image concerns (Tiggemann & Zaccardo, 2015). Body image refers to an individual's perception, thoughts, feelings and behaviours in relation to their body (Banfield & McCabe, 2002). If body image is negative, individuals experience body dissatisfaction, which is an intense dislike or hatred of the body (Tiggemann & Zaccardo, 2015). For women, shape and weight are the main source of body dissatisfaction, driven by a desire to be thinner (Montayne, 2017). Women's body dissatisfaction has been linked to negative outcomes such as depression (Stice et al., 2000; Tiggemann & Kuring, 2004), stress, (Johnson & Wardle, 2005), excessive dieting (Ricciardelli & McCabe, 2001), binge eating (Johnson & Wardle, 2005), compulsive exercise (Steffen & Brehm, 1999; Holland & Tiggemann, 2017) and lowered self-esteem (Van Den Berg et al., 2010). Body dissatisfaction has also been recognised as significant risk and maintenance factors for eating disorders and body dysmorphic disorder (BDD) in women (Stice & Shaw, 1994; Stice & Shaw, 2002).

Whilst the negative outcomes of body dissatisfaction have been extensively researched in women, less research has been carried out in men, as body image concerns were traditionally only thought to be an issue for women (Cafri et al., 2005; Fatt et al., 2019; Jones & Morgan, 2010). However, over the last few decades, more researchers have given attention to exploring body dissatisfaction and its negative consequences in men (Cafri et al., 2005).

The reason why researchers started to pay more attention to body dissatisfaction in men is the increased presence of the idealised male body in popular culture, as more magazines and television advertisements focused on men's appearance (Blond, 2008). Concurrent to this, body dissatisfaction is on the increase

in men, as demonstrated by a series of studies published in the 1970s, 1980s and 1990s which surveyed readers of the Psychology Today magazine in the United Kingdom (UK) (Berscheid et al., 1973; Cash et al., 1986; Garner, 1997). In the first study (n = 2000) 15% of male respondents reported experiencing dissatisfaction with their appearance (Berscheid et al., 1973). In the second study the prevalence was increased by 19% (Cash et al., 1986). This increased again by a further 9% in the final study, such that 47% of men reported body dissatisfaction (Garner, 1997). Today, research has stated that the prevalence of body dissatisfaction in men has increased so much it is now considered normative i.e. it is recognised as a common issue in men (Blashill, 2011; Dakanalis & Riva, 2013; Jankowski, 2016). Furthermore, research has suggested that men are equally as conscious as women of the value society assigns to physical attractiveness (Miller & Halberstadt, 2005).

Although it is unclear whether the rise in reports of male body dissatisfaction is a result of an actual increase in those experiencing dissatisfaction or whether it is due to increased reporting, the rising numbers led to men's body image concerns being taken more seriously and subsequently, more research. However, the gender imbalance within research remains (Fatt et al., 2019).

Body Dissatisfaction in Men

Early literature surrounding male body dissatisfaction highlighted that there is a difference between Western men and women's body dissatisfaction in that women usually wish to be thinner, whereas men's body dissatisfaction is usually in relation to their muscle size and tone (Hargreaves & Tiggemann, 2009; Montayne, 2017). This was demonstrated by Frederick et al. (2007) who found that 90% of men in their sample of undergraduate men were dissatisfied with their muscularity and, across studies, 51-71% were dissatisfied with their level of body fat. Tiggemann et al. (2008)

also supported the idea that men's body dissatisfaction is related to level of muscularity as they found that 83% of men in their study in Australia reported a desire to be more muscular. This desire has been labelled the 'drive for muscularity' (Murray et al., 2010).

Building upon this knowledge, some researchers have investigated the effect that body dissatisfaction, in relation to the drive for muscularity, has on men (Fatt et al., 2019). The Mental Health Foundation in the UK carried out an online survey of 4,505 adults to understand the impact of a negative body image and demonstrated that of the 2,103 men who took part, 15% felt shame, 25% had low mood and 12% felt disgusted because of their body (Government Equalities Office, 2014). Furthermore, the survey found that 28% of the men reported feeling anxious, 4% had deliberately self-harmed, 11% experienced suicidal thoughts, and 21% dressed in a way to hide their body as a result of their body image concerns.

Men's body dissatisfaction has also been linked to other negative outcomes such as depression (Holsen et al., 2001; Olivardia et al., 2004), anxiety (Cohane & Pope, 2001), reduced self-esteem (Cafri et al., 2002), social anxiety (Di Blasi et al., 2015), deliberate self-harm (Greydanus & Apple, 2011), excessive exercise (Dakanalis & Riva, 2013), exercise dependence (Olivardia et al., 2004), steroid use (Greenway & Price, 2018), excessive weight training (Edwards et al., 2014), extreme dietary regimes/clinical levels of anxiety if unable to follow dietary regimes (Gruber & Pope, 1998) and impaired occupational functioning (Pope et al., 1997).

Additionally, as with women's body dissatisfaction, research has linked men's body dissatisfaction with eating disorders and BDD (Olivardia et al., 2004). This is not surprising given that many of the consequences of body dissatisfaction are symptoms of eating disorders or BDD. Furthermore, Murray et al (2010) suggested

that as men's body dissatisfaction is in relation to their level of muscularity, it can result in the development of muscle dysmorphia, a subtype of BDD.

Muscle Dysmorphia

Muscle dysmorphia is currently classified under the obsessive-compulsive and related disorders in the Diagnostic and Statistical Manual 5th edition (DSM-V) and is diagnosed if symptoms are not better explained by an eating disorder (American Psychiatric Association, 2013). However, it is not uncommon for people with an eating disorder to also have some form of BDD.

Muscle dysmorphia is characterised by perfectionism, obsessions, compulsions, low mood, preoccupation with shape, weight, diet, exercise and guilt/extreme anxiety if plans are not adhered to (Davis & Scott-Robertson, 2000; Murray et al., 2010). Men with muscle dysmorphia also experience a body image distortion whereby they believe that they look small and skinny and therefore become preoccupied with the idea that they are not lean or muscular enough, despite being of above average muscularity (Murray et al., 2010).

To gain a diagnosis of muscle dysmorphia, two of the following four criteria should be met: 1. Avoidance of social and occupational activities due to a compulsive need to adhere to a diet or exercise plan. 2. Avoidance of situations where the body is on display to others or the experience of extreme anxiety if this is unavoidable. 3. Impairment in social or occupational functioning due to preoccupation with the defectiveness of the body or musculature. 4. Persistence with exercise, diet or use of supplements or performance enhancing substances, despite knowing that this could cause physical or psychological harm e.g. continuing to exercise despite being injured (American Psychiatric Association, 2013).

This can result in men following restrictive and harmful diet plans where macronutrient levels have been calculated so that a high protein and low-fat diet can be adhered to (Murray et al., 2010; Olivardia et al., 2004; Cafri et al., 2005) and extreme anxiety followed by compensation through additional exercise if a diet plan is not followed (Pope et al., 1997). Muscle dysmorphia can also lead to excessive strength training, having difficulty eating at restaurants if nutritional information is not provided, use of performance enhancing supplements or drugs such as anabolic steroids and creatine (Andersen et al., 1995; Olivardia et al., 2004) and eating every few hours irrespective of hunger (Mosley, 2009). Thus, body dissatisfaction can have significant physical and psychological effects on men (Hobza et al., 2007).

As eating disorders and muscle dysmorphia are thought to be negative outcomes of body dissatisfaction, it is not surprising that there has been a parallel rise in the prevalence of eating disorders, muscle dysmorphia and steroid use over the past 25 years (Leit et al., 2001; Olivardia et al., 2004; Fatt et al., 2019). Given this, researchers have attached importance to understanding where body dissatisfaction and the drive for muscularity comes from. One strong narrative in the literature is that body dissatisfaction can be attributed to sociocultural influences (Hargreaves & Tiggemann, 2009), as discussed in the next section.

Sociocultural Model of Body Dissatisfaction

The most common and well validated sociocultural model of body dissatisfaction cited in the literature is the Tripartite Influence Model (Thompson et al., 1999; Tylka, 2011). This model states that an individual's perception of the idealised physique originates from peers, family and the mass media and can subsequently lead to body dissatisfaction. Exposure to the mass media is thought to have the most pervasive influence because of its ability to reach many people daily

through magazines, newspapers, television and more recently the internet (Lorenzen et al., 2004; Tiggemann & Hargreaves, 2009; Tiggemann & Zaccardo, 2015). The Tripartite Influence Model suggests that the idealised physique depicted in the media is socially constructed and is an embodiment of the dominant cultural views at any one time (Thompson et al., 1999). Therefore, people are consistently exposed to their culture's idea of what is considered ideal (Mishkind et al., 1986).

In Western society (broadly defined as economically stable cultures) physical appearance and attraction are currently highly regarded, as they are thought to reflect a person's success and social status (Mishkind et al., 1986; Warren, 2008). Within this culture, the idealised male physique is depicted as muscular, lean (low body fat) and tall (Hobza et al., 2007; Warren, 2008). This has been communicated through male models in television advertisements, magazines, films, music videos and billboards and means that the idealised male physique can be easily recognisable (Arbour & Ginis, 2006; Lorenzen et al., 2004). Leit et al. (2001) noted the emergence of the idealised physique in Western society in their review of male models in the Playgirl magazine. They found that the models had gained 27 pounds of muscle and lost 12 pounds of body fat over time. The emergence of the idealised male physique is also evident in the increasing muscularity of male action figures over the past 30 years (Pope et al., 1999).

One possible explanation of why the muscular physique is presented as the ideal in Western society comes from the masculinity literature. One view of masculinity suggests that it is related to gender orientation and reflects traits of a man that are different to that of women (Thompson & Pleck, 1995). However, the most popular view of masculinity in the current literature is that it is a socially constructed concept (Thompson & Bennett, 2015). This literature states that there is no single

standard of masculinity, but the dominant narrative of what constitutes masculinity depends upon the most widely accepted attitudes and beliefs, which are dependent on the culture and era (Thompson & Bennett, 2015). Therefore, whatever the dominant view of masculinity is at the time, gives men that meet this standard increased privilege (Thompson & Bennett, 2015). In the 1980s, the dominant view of masculinity was that masculine men were powerful, strong, unemotional, successful and should avoid femininity (Mishkind et al., 1986). It was suggested that through these beliefs the muscular physique became popular because it was thought to represent these features of masculinity, since men would have to exhibit an increased amount of control and toughness to achieve it (Levant et al., 2010).

However, now in the 21st century these traditional views of masculinity are potentially challenged by society due to increased acceptance of and active movement towards gender equality, gender fluidity, increased acceptance of the LGBTQIA community (lesbian, gay, bisexual, transgender, queer or questioning, intersex and asexual), the idea that stoicism (which is closely aligned with traditional views of masculinity) can leave men more vulnerable to mental health difficulties, and the increased acceptance of men talking about their emotions (Mishra, 2018). Furthermore, it has been argued that increased industrialisation and mechanisation has reduced the requirement for labour work which can be associated with more traditional forms of masculinity as it relies on physical fitness and toughness. Therefore, it has been suggested that these challenges to the dominant narrative of masculinity has led men who value this view to feel emasculated and under threat (Mishra, 2018). Subsequently, it is possible that the current drive for muscularity is an attempt to eradicate this threat and re-assert traditional male roles through the embodiment of this view of masculinity (Mishra, 2018).

Furthermore, as suggested by the masculinity literature, achieving the muscular physique can be associated with added benefits in today's society, for example social status amongst peers or gaining an attractive partner, as pictures of couples with idealised physiques are frequently shared in the media (Hobza et al., 2007). This reiterates the importance of appearance in Western society and reinforces the message that if you achieve this physique then you will be viewed as attractive and will obtain an ideal partner (Hobza et al., 2007; Mishkind et al., 1986). This also sends the message that if you do not achieve the ideal physique then your social relationships and social status may be negatively impacted. In support of this, it has been found that peer pressure and the desire for increased social status increase the drive for muscularity (Swami, 2016). Given this, it is not surprising that achieving the idealised physique is important to some men in Western society. However, it is important to note that the dominant cultural ideal is not necessarily everyone's ideal either within Western culture or other cultures, or the reason for this cultural ideal may not be the same.

Indeed, there is some evidence demonstrating that within the UK, black men have a higher drive for muscularity than white men (Swami, 2016). There is also evidence that a muscular physique is important in some non-Western cultures such as Fijian, Tongan and New Zealand Tongan and Ghanaian cultures (Frederick et al., 2007; McCabe et al., 2011). However, the reason that muscularity is valued in these cultures is different to the Western view presented above and is because it is associated with better sporting performance, increased strength and fitness, good health and ability to carry out physical work (McCabe et al., 2011). More recent research has suggested that Western appearance standards are reaching non-Western countries, such as Israel, through the media and that these populations have started to aspire to the idealised muscular physique (Thornborrow et al., 2020). However, there

are also non-Westernised non-white populations, for example Uganda, where it has been found that the muscular physique is less desirable and the drive for muscularity is lower than it is in the UK (Thornborrow et al., 2020). One reason for this was that non-Western populations are exposed to the media less.

In addition to suggesting that the idealised physique is socially constructed through the dominant cultural beliefs, the Tripartite model also proposes that body dissatisfaction is developed and maintained via two mechanisms: internalisation of the cultural ideal and appearance comparison (Van Den Berg et al., 2002). Thompson et al. (1999) stated that internalisation refers to adopting and conforming to sociocultural norms (such as the idealised physique) and that sociocultural pressure to conform to norms results in them being internalised. According to the social comparison theory (Festinger, 1954), humans compare themselves to others on these sociocultural norms because they are attached to social importance. Therefore, the Tripartite model suggests that once norms have been internalised, social comparison is a means by which individuals can check whether they are living up to standard (Holland & Tiggemann, 2016). These social comparisons can be upward (where individuals compare themselves to someone thought to be superior) or downward (where individuals compare themselves to someone deemed as inferior) (Festinger, 1954).

In the context of body image, it has been suggested that upward comparisons can result in body dissatisfaction because they create a discrepancy between a person's actual and ideal body (Hobza et al., 2007; Holland & Tiggemann, 2016). This is problematic because the idealised physique portrayed in the media can be unrealistic and unattainable or comes at a physical, emotional, social and financial cost to develop and maintain for both men and women, (Farquhar & Wasylkiw, 2007).

As the media is thought to be the most pervasive source of this unrealistic ideal, researchers have sought to demonstrate the consequences of exposing men to magazine images and television advertisements (Blond, 2008).

Exposure to the Idealised Physique in the Media and Negative Outcomes

The relationship between media exposure and negative outcomes has been demonstrated repeatedly in women (Tiggemann & Zaccardo, 2015). Correlational and experimental research has demonstrated a link between media exposure and body dissatisfaction, low mood, reduced appearance self-esteem, restrictive eating and excessive exercise (Cahill & Mussap, 2007; Grabe et al., 2008; Groesz et al., 2002; Harrison & Cantor, 1997; Tiggemann & Zaccardo, 2015). Evidence also supports the mediating effects of internalisation (Cafri et al., 2005) and social comparison (Myers & Crowther, 2009) which provides evidence for the Tripartite Influence Model of body dissatisfaction in women (Thompson et al., 1999). However, significantly less research has explored the relationship between media exposure and negative outcomes such as body dissatisfaction and low mood in men (Blond, 2008). Owing to the rise in men's body dissatisfaction and the increased presence of the idealised male body in the media, there is now a growing body of research in this area (Blond, 2008). This research has demonstrated an association between media exposure and negative outcomes in men through correlational and experimental studies (Hargreaves & Tiggemann, 2009).

Correlational Studies

Schooler and Ward (2006) carried out a correlational study by recruiting 184 male undergraduate students aged 17-26 to take part in a survey on body esteem, body comfort and use of media such as television and magazines. Data demonstrated that

participants who frequently viewed music videos and prime time television reported significantly lower comfort with their body. Men who frequently viewed prime time television also reported significantly less satisfaction with their physical condition which related to items such as agility, coordination and health related characteristics. Duggan and McCreary (2004) also carried out a correlational study of gay and heterosexual men and showed a positive correlation between frequency of viewing and purchasing fitness magazines and body dissatisfaction in both groups.

Whilst these studies are useful in identifying associations between exposure to the idealised physique and body dissatisfaction, correlational studies can only draw limited conclusions as they cannot determine cause and effect (Holland & Tiggemann, 2016). This means that even though both the above studies can conclude that media exposure and body dissatisfaction are linked, they cannot conclude for certain that media exposure causes body dissatisfaction. Therefore, experimental research has built upon the knowledge established by correlational research, whilst accounting for its limitation of being unable to determine cause and effect. Particular focus has been on outcomes in relation to eating disorder and muscle dysmorphia symptomatology.

Experimental Studies

Agliata and Tantleff-Dunn (2004) employed an experimental method to investigate the effect of media exposure on body dissatisfaction and mood in men. They recruited 158 undergraduate men aged 17-27 and exposed them to television advertisements containing images of either the idealised muscular physique or neutral non-appearance related images. Pre and post exposure body dissatisfaction and mood were measured. Findings indicated that men who were exposed to the advertisements containing the idealised physique were significantly more depressed and were more

dissatisfied with their own muscularity than those who were exposed to the neutral advertisements.

Lorenzen et al. (2004) also demonstrated the effect of exposure to the idealised physique on self-reported body satisfaction. They exposed 104 college men aged 18-32 to 12 images taken from magazine advertisements of either muscular or average (non-muscular) men and measured body satisfaction at pre and post exposure. Self-reported body satisfaction decreased significantly at post exposure in those who viewed the muscular images, but body satisfaction did not change in those who viewed the average images. This demonstrated that only brief exposure to a small number of idealised images is required to lower men's body satisfaction and supports an earlier study by Hausenblas et al. (2003) who carried out a similar study and demonstrated increased body dissatisfaction.

Whilst Lorenzen et al's. (2004) findings are useful in providing additional evidence that exposure to the muscular ideal can reduce body satisfaction, the suggestion that body satisfaction did not change in response to average images is invalid because they grouped together thin, normal weight and overweight images in this condition. The range of physiques in this condition may have resulted in various upward and downward social comparisons depending on how the participant viewed their own body, thus making it impossible to make a conclusion about the effect of comparison to an average physique. Therefore, it is important for research wishing to compare the effects of exposure to muscular vs other physiques to compare them individually rather than grouping them together as one.

Galioto and Crowther (2013) employed this idea of experimentally comparing the effect exposure to muscular physiques to the effect of exposure to other physiques in their study by exposing men to muscular and slender images. The reason for this

was that they were aware that a drive for leanness/low body fat is also a feature of the idealised physique in men. They found that body dissatisfaction increased in both conditions after exposure, however, there was no difference between the two groups. This finding is inconsistent with their hypothesis that exposure to muscular images would demonstrate a greater change in body dissatisfaction as an emphasis on muscularity is more common in the media (Galioto & Crowther, 2013). To the author's knowledge, no other research has compared the effect of exposure to muscular images with slender or other physiques, so more research is needed to determine the consistency of this finding. Furthermore, if the effect is similar in other physiques, then this poses the question of why exposure to other physiques such as slender may also lead to body dissatisfaction.

Other experimental research which has documented the effects of exposing men to images of the idealised physique has demonstrated that exposure amplifies the drive for muscularity (McCray, 2005), muscle dissatisfaction (Hargreaves & Tiggemann, 2009), state anxiety, anger and depression (Cahill & Mussap, 2007), guilt in relation to exercise (Montayne, 2017) and can also lead men to think that they are less physically attractive (Hobza et al., 2007). Leit, et al. (2002) also demonstrated that men exposed to advertisements containing a muscular ideal demonstrated a significant discrepancy between their perceived muscularity and their ideal level of muscularity. They achieved this by exposing college men to either muscular men or neutral advertisements and asked them to complete the Somatoform matrix (a measure of body perception) immediately after. This finding is important because a discrepancy between actual and ideal muscularity is a feature of muscle dysmorphia.

Meta-analyses

In an attempt to collate the findings from experimental studies and draw conclusions, two meta-analyses were conducted (Blond, 2008; Hausenblas et al., 2013). In Blond's (2008) earlier meta-analysis of 15 experimental studies, they concluded that exposure to images of idealised male physiques had a small but significant negative effect on male body satisfaction. They also suggested that pre-existing body dissatisfaction increased the likelihood that exposure had negative effects and that men who were satisfied with their body prior to exposure were protected against the negative impact of viewing the images (Blond, 2008). This was demonstrated by Arbour and Ginis (2006) who found that higher pre-existing body and muscularity dissatisfaction were associated with greater body and muscularity dissatisfaction after viewing images of the idealised physique. This may be because people with pre-existing body dissatisfaction are more likely to seek upward social comparisons which causes more distress, which was an effect found in women (Want, 2009).

In their later meta-analysis of 33 experimental studies, Hausenblas et al. (2013) demonstrated that exposure to the idealised physique resulted in increased depression, anger, body dissatisfaction and anxiety, and decreased self-esteem and positive affect. They concluded that exposure to the idealised image increases eating disorder symptoms. However, whilst the documented outcomes are symptoms of eating disorders, none of the studies measured eating or exercise intentions/behaviour which are two key features of eating disorders and muscle dysmorphia.

Evidence for Social Comparison and Internalisation

Correlational and experimental research has also provided evidence for the processes of social comparison and internalisation in men. Myers and Crowther (2009) conducted a meta-analysis of research into the relationship between social

comparison and body dissatisfaction. Data demonstrated that increased social comparison was associated with higher body dissatisfaction in men as well as women, although the effect was stronger in women. They found that this effect was also stronger in studies where social comparison was directly measured rather than just inferred. Additionally, Myers and Crowther (2009) found that social comparison is inversely related to age, meaning that younger people are more likely to socially compare their bodies. This could be attributed to their increased exposure to idealised images via social media (outlined later) and sociocultural pressures to conform to the cultural norm (Thompson et al., 1999).

Farquhar and Wasylkiw (2007) were amongst the first experimental studies to suggest that social comparison in relation to body image also occurred in men. In their study, men were exposed to images that either emphasised the importance of the body's appearance (body-as-object) or functionality (body-as-process) (Farquhar & Wasylkiw, 2007). In the functionality condition, where images demonstrated a higher level of physical activity and a lower level of posing than in the appearance condition, participants experienced more positive self-evaluations. In the condition where appearance was emphasised, participants had more negative self-evaluations. The authors suggested that when appearance was emphasised, this encouraged more appearance comparison and resulted in body dissatisfaction, but when functionality was emphasised, this distracted away from social comparison. So, it was concluded that exposure to the idealised physique alone was not enough to result in body dissatisfaction, but images that emphasise appearance do result in body dissatisfaction via social comparison (Farquhar & Wasylkiw, 2007). However, this was not directly tested.

Hargreaves and Tiggemann (2009) did directly test the influence of social comparison. They exposed male university students to television commercials that

emphasised the muscular ideal or non-appearance related commercials. They measured body satisfaction before and after exposure and directly measured self-reported state appearance comparison and appearance orientation (the cognitive and behavioural importance of appearance) (Cash, 2002). Consistent with previous findings, Hargreaves and Tiggemann (2009) demonstrated that exposure to the muscular ideal decreased muscularity satisfaction. However, in contrast to studies testing the mediating effect of social comparison in women (Tiggemann & McGill, 2004), they found that the amount of state appearance comparison was low in men. They did find that men with high appearance orientation engaged in more upward social comparison, which led to increased body dissatisfaction (Hargreaves & Tiggemann, 2009). Therefore, they concluded that the amount of state appearance comparison is not important, but that the direction of the appearance comparison is. As this was a novel finding, they suggested that it requires replication and other studies should investigate the mediating effect of social comparison.

Griffiths et al. (2015) provided evidence for internalisation in men. Multiple regressions demonstrated that conformity to masculine norms (a measure of internalisation) predicted increased muscle dissatisfaction and muscularity-orientated disordered eating. Smolak et al. (2001) also found that internalisation of sociocultural appearance norms significantly predicted the use of supplements and weightlifting to build muscle.

Overall, the above research is valuable in demonstrating that exposure to the idealised male physique can lead to body dissatisfaction, muscularity dissatisfaction, low mood/depression, anxiety and low self-esteem in men. There is also some research to suggest that internalisation and social comparison contribute to this process in men. However, there are some problems with the literature, for example,

with the measures used to evaluate eating disorder/muscle dysmorphia symptomatology in men and the lack of focus on core features of these disorders within research. This is detailed below.

Limitations of the Research

Despite research suggesting that exposure to the idealised physique increases eating disorder and muscle dysmorphia symptomatology, these studies are limited (Olivardia et al., 2004). One reason for this is that standardised measures used in studies, such as the Eating Disorder Inventory (Garner et al., 1984) and the Eating Attitudes Test (Garner & Garfinkel., 1979), only measure the desire to be thinner, therefore they lack face validity for men whose body image concerns may be distinct from women's (Harrison & Cantor, 1997). Murray et al. (2010) suggested that use of these measures in research may have led to invalid conclusions because they are insensitive in detecting men's body image concerns. This notion is supported by Galli and Reel (2009) who stated that the finding that men have higher body satisfaction than women can be attributed to the measures used to capture this, rather than an actual difference between male and female body satisfaction. They suggested that this is because measures are biased towards a desire to lose weight, when men's body dissatisfaction can be more associated with feeling too small. Hence, measures in future studies should incorporate muscularity and other dimensions of body image which have been identified as important to men (Olivardia et al., 2004; Ridgeway & Tylka, 2005).

Additionally, investigations into the impact of exposure on eating disorder and muscle dysmorphia symptomology are limited as they neglect to measure diet and exercise as outcomes, which is surprising given that these concepts are central to the disorders (American Psychiatric Association, 2013). Another limitation is that the

above research draws upon exposure to more traditional forms of media such as magazine images and television commercials. Although these traditional forms of media are still consumed, this research is slightly outdated as more and more people are repeatedly exposed to the ideal physique through newer forms of media such as the internet (Holland & Tiggemann, 2016).

The Rise of Social Media

In 2019, there were 4.39 billion users of the internet worldwide out of a population of 7.68 billion (Chaffey, 2020). One area of the internet that has become increasingly popular is social networking sites or applications, also known as social media (Holland & Tiggemann, 2016). In January 2019 the number of social media users was 3.48 billion worldwide, which was an increase of 9% from 2018 (Chaffey, 2020).

The most popular social media platform worldwide in 2018 was Facebook, followed by YouTube, WhatsApp, Facebook Messenger, WeChat and then Instagram (Chaffey, 2020). In the UK, Facebook is the most popular followed by Twitter and then Instagram (Chaffey, 2020). However, Instagram's popularity is growing as the number of Instagram profiles amongst young people in the UK has increased by 9% and the number of Facebook profiles has declined (Chaffey, 2020). Approximately 75% of Instagram users worldwide are aged 16-34 (Chaffey, 2020).

Not only has the number of social media users increased over the years, but the amount of time on social media has too. The average global daily use of social media has increased annually from 90 minutes in 2012 to 2 hours and 24 minutes in 2019 (Statista, 2020). This increase has been attributed to the rise of smartphones and enhanced internet connectivity, which have enabled constant access and made social

media use integral to people's lives (Ho et al., 2017). It has been suggested that this ease of access to social media gives people faster and more opportunity for social comparison 24 hours a day (Tiggemann et al., 2018). As the largest proportion of social media users are aged 18-34, this age group is most at risk to the effects of social comparison (Chaffey, 2018). Interestingly, this age group also overlaps with the key age group for the development of an eating disorder which is 14-25 (Priory Group, 2018) and muscle dysmorphia which is 18-32 (Olivardia, 2001). It is important to understand the impact social media has on body image, especially in these age groups, as it is different to traditional media sources.

Social Media and Social Comparison

In addition to being more accessible, social media has other unique features that differentiate it from traditional forms of media which increases the likelihood of social comparison (Tiggemann & Zaccardo, 2015; Tiggemann et al., 2018). One of these features is the ability of users to create a profile and post curated pictures for others to view (Fardouly & Vartanian, 2016). Additionally, the social comparison theory (Festinger, 1954) suggests that people are more likely to compare themselves to people more similar to them, so people are more likely to compare themselves to social media images that feature peers rather than traditional media which mainly features celebrities or models (Heinberg & Thompson, 1995; Tiggemann et al., 2018).

Furthermore, social comparison is likely to be enhanced on Instagram as it is unique in that it is purely dedicated to the sharing of images and videos, whereas other forms of social media, such as Facebook, contain other key features (Montayne, 2017; Tiggemann et al., 2018). Instagram also permits users to apply a huge range of specialised filters and edits designed to enhance how an image looks (Montayne, 2017). This feature could convey the message that aesthetics is more important than

social interaction, despite social interaction initially being the primary purpose of social media (Montayne, 2017). The filter and edit features of Instagram gives users the scope to present the idealised or most attractive version of themselves and their lives, which is not necessarily a realistic or full depiction (Fardouly & Vartanian, 2016).

Common images that Instagram users document are related to or are of the idealised physique, due to a recent trend termed 'fitspiration' (Fatt et al., 2019). Fitspiration is an amalgamation of the words fitness and inspiration and was intended as a movement to oppose pro-anorexia groups online, encouraging individuals to engage in healthier lifestyles and improve their relationship with their bodies (Carrotte et al., 2017). However, the images and messages associated with fitspiration are thought to mirror those on pro-anorexia websites (Fatt et al., 2019). These images emphasise the aesthetics of an individual's body rather than its functionality and has likely perpetuated the importance of achieving the idealised physique (Carrotte et al., 2017). Consequently, social media has been identified as the main source of conveying an idealised, gender specific physique which emphasises the importance of appearance rather than functionality i.e. the body as an object rather than the body as having a functional purpose (Arbour & Ginis, 2006). The emphasis on appearance rather than functionality has already been shown to result in harmful consequences such as increased negative self-evaluation (Farquhar & Wasylkiw, 2007).

Therefore, it has been suggested that the growing presence of the idealised physique in social media is likely to be reason for the rise in body dissatisfaction amongst men (Hargreaves & Tiggemann, 2009). Despite this, little is known about the impact of exposure to the idealised physique through social media on body dissatisfaction (Fardouly & Vartanian, 2016). However, there is a small but growing

body of research that has started to document the effects (Fardouly & Vartanian, 2016). This will be outlined in the next section.

Exposure to the Idealised Physique on Social Media and Negative Outcomes

A recent survey documented that 22% of adults aged 18+ and 40% of adolescents (26% of boys and 54% of girls) aged 13-19 reported that images on social media caused them to worry about their body image (Mental Health Foundation, 2019). Research has started to investigate the impact that exposure to social media has on body satisfaction and other outcomes. Similar to traditional media, research into the effects of exposure to idealised images on social media has been more focused on women (Fatt et al., 2019). Holland and Tiggemann (2016) conducted a systematic review of correlational and experimental studies and concluded that use of social media is associated with body image concerns and disordered eating in women. Correlational studies within the review demonstrated that spending more time on Facebook is linked to increased body dissatisfaction, drive for thinness, internalisation of the idealised physique, body surveillance and dieting in young girls, high school girls and undergraduate women (Tiggemann & Slater, 2014; Tiggemann & Miller, 2010; Tiggemann & Slater, 2013; Cohen & Blaszczynski, 2015). Later, Fardouly et al. (2017) also demonstrated that increased frequency of viewing fitspirational images on Instagram was associated with women's concerns regarding their weight and shape. However, one study concluded that it was not necessarily time spent on social media that led to negative outcomes, but specifically photo activity such as viewing, posting, liking and commenting on photos (Meier and Gray, 2014). They found a correlation between viewing other's posts and weight dissatisfaction, drive for thinness, internalisation of the thin ideal and self-objectification. As such, they

suggested that image based social media platforms such as Instagram may be more detrimental to body satisfaction and should be researched further (Meier and Gray, 2014).

Holland and Tiggemann's (2016) review also suggested that experimental research is limited, however, it is a growing area. Experimental studies have demonstrated that exposure to idealised images on social media can result in body dissatisfaction, increased concerns about shape and weight, negative mood and increased motivation to exercise in women (Mabe et al., 2014; Prichard et al., 2018; Robinson et al., 2017), but did not increase exercise behaviour (Robinson et al., 2017). Fatt et al. (2019) suggested that exercise intentions may not always translate into exercise behaviours because fitspiration-related posts generate extrinsic motivation based on appearance, which has been shown to reduce exercise participation in men and women.

One experimental study responded to Meier and Gray's suggestion that Instagram should be investigated further and exposed 130 female undergraduates aged 17-30 to travel images or images of the thin-ideal taken from Instagram (Tiggemann & Zaccardo, 2015). The study found that exposure to the idealised images led to increased negative mood and body dissatisfaction and decreased state appearance self-esteem compared to neutral images. This relationship was mediated by state appearance comparison and led Holland and Tiggemann (2016) to conclude that there was some evidence demonstrating that appearance based social comparison mediated the relationship between the use of social media and body dissatisfaction. Since the review, Brown and Tiggemann (2016) showed that exposure to images of peers and celebrities lowered mood and increased body dissatisfaction and that this was

mediated by state appearance comparison. Thus, there is evidence that the Tripartite Influence Model also applies to social media.

Again, significantly less research has investigated the impact of exposure to images of the idealised physique on social media in men, despite nearly 30% of fitspirational images on social media portraying male only images (Carrotte et al., 2017; Fatt et al., 2019). Furthermore, to the author's knowledge, only one study has examined the effects of this exposure on Instagram (Fatt et al., 2019), despite content analyses of social media platforms demonstrating that Instagram has the largest proportion of male fitspiration images compared to other platforms (Tiggemann & Zaccardo, 2016).

Fatt et al. (2019) recruited 118 undergraduate men aged 17-30 and asked them to fill out an online questionnaire. They measured a participant's body satisfaction, exercise motivation, time spent on Instagram per day, appearance comparison tendency and internalisation of the muscular ideal. To disguise the purpose of the study they asked participants to indicate how frequently they saw a range of hashtags on Instagram, one of which was the fitspiration hashtag. Results demonstrated that frequency of viewing fitspiration imagery was significantly associated with increased internalisation of the muscular ideal and greater appearance comparison. There was no significant association between frequency of viewing fitspiration on body satisfaction or exercise motivation. However, when appearance comparison was added as a mediator, viewing more fitspiration was associated with higher appearance comparison which resulted in less body satisfaction, more appearance-based exercise motivation and less health-based exercise motivation.

Accordingly, this provides the first evidence for the process underlying the relationship between viewing fitspiration images on Instagram and body

dissatisfaction in men. It demonstrates that the amount of social comparison can mediate the effect, despite Hargreaves and Tiggemann (2009) suggesting that it may not. However, the difference in findings could be attributed to the type of media used since Hargreaves and Tiggemann (2009) used traditional media and social media is thought to elicit more social comparison (Tiggemann & Zaccardo, 2015). Whilst the findings from Fatt et al. (2019) are a useful foundation demonstrating the mediating effect of social comparison in men, they suggested that more experimental research is needed, especially as their study relied on participants being able to remember hashtags they had seen. Whilst exposing men to their own Instagram accounts is more ecologically valid, it does not allow other variables to be controlled and is therefore less robust than experimental research (Fardouly & Vartanian, 2016).

Summary

Research on body dissatisfaction has traditionally focused on women, however, body dissatisfaction has been increasingly recognised as an issue in men. As a result, literature on men's body dissatisfaction is growing. The Tripartite Influence Model, originally developed in women but now applied to men, states that an individual's perception of the idealised physique originates from peers, family and the mass media, with the media being the most pervasive source (Thompson et al., 1999). The model suggests that the idealised physique is an embodiment of the cultural norms at that time which, for Western men, is currently a muscular, lean and tall ideal. According to the Tripartite Influence Model, body dissatisfaction occurs through two mechanisms: internalisation of the sociocultural norm and social comparison (Thompson et al., 1999).

Initial findings from correlational research suggest that frequency of viewing the idealised physique is associated with body dissatisfaction in men (Duggan &

McCreary, 2004; Schooler & Ward, 2006). Since this association was established, experimental research has exposed men to images of the idealised physique using magazine images/television commercials and measured outcomes in order to determine the direction of the relationship (Agliata & Tantleff-Dunn, 2004; Blond, 2008; Hausenblas et al., 2013; Lorenzen et al., 2004). These findings have demonstrated that exposure to the muscular ideal can have detrimental effects on body satisfaction, muscularity satisfaction, mood, appearance self-esteem and other eating disorder symptomatology. However, these studies have not effectively measured the effect of exposure on key eating disorder/muscle dysmorphia symptomatology, such as men's diet and exercise intentions, since measures used to investigate these constructs are focused on women and are less applicable in men (Murray et al., 2010). Furthermore, less is known about the effects of exposure to other physiques in comparison to exposure to the muscular ideal (Galioto & Crowther, 2013).

The modern ubiquity of social media, its ease of access and unique features create more opportunity for social comparison than traditional media (Tiggemann et al., 2018). This is thought to be linked to the rise in body dissatisfaction, eating disorders and muscle dysmorphia in young men, so research has shifted to studying the effects of exposure to the cultural ideal on social media.

It has been suggested that Instagram may have the most detrimental effect on body satisfaction due to its emphasis on images/videos and wide range of image filter and edit features (Meier & Gray, 2014). Therefore, some research has investigated the effect of exposure to idealised images taken from Instagram in women and demonstrated that this results in body dissatisfaction, negative mood and lowered appearance self-esteem (Tiggemann & Zaccardo, 2015). To the author's knowledge, only one study has investigated the effect of exposure to the idealised images on

Instagram in men, despite nearly 30% of fitspiration images on social media portraying men (Fatt et al., 2019). The study found no significant association between frequency of viewing the idealised image on body satisfaction or exercise motivation. However, when appearance comparison was added as a mediator, increased viewing of the idealised image on Instagram was associated with higher appearance comparison, which led to less body satisfaction and more appearance-based exercise motivation. Thus, providing evidence for social comparison as a mediator and therefore, the Tripartite Influence Model. As there has only been one study investigating the effect of Instagram on outcomes in men and this was correlational, more experimental research is crucial to allow conclusions to be drawn.

The Present Study

The present study utilised an experimental design to investigate the effect of exposing men to images of the idealised physique (taken from Instagram) on body satisfaction, mood, appearance self-esteem and intentions to diet and exercise. Additionally, since limited research has investigated the effect of exposure to the muscular ideal compared to other physiques, overweight and slim conditions were included in the study as well as control images.

Intentions to diet and exercise were measured rather than behaviour, since research has suggested that intentions to exercise do not always translate into exercise behaviours (Fatt et al., 2019). Additionally, as measures typically used to explore diet and exercise outcomes are less relevant in men because the constructs measured are related to achieving the idealised female physique, the author created an exploratory measure of diet and exercise intentions, which related to achieving the muscular ideal.

The study also sought to provide more evidence for the Tripartite Influence Model in men by exploring social comparison as a mediator. As recommended by Myers and Crowther (2009), social comparison was measured directly rather than inferred. Furthermore, the inclusion of the overweight and slim conditions sought to explore whether upward or downward comparisons would be made in relation to these images.

Aims

The study had two main aims:

1. To examine the impact of exposure to the idealised muscular physique on body satisfaction, mood, appearance self-esteem and intentions to diet and exercise.
2. To explore the mediating role of social comparison in the relationship between image exposure and outcomes.

Hypotheses

It was hypothesised that exposure to muscular images, but not the slim, overweight and neutral (landscape) images, would lead to a significant reduction in body satisfaction, mood and appearance self-esteem and a significant increase in intentions to diet and exercise. Furthermore, it was hypothesised that state social comparison would mediate the relationship between exposure to the muscular images and post exposure outcomes.

Method

Design

The study was a 2 x 4 mixed experimental design as there were within-subjects (e.g. pre and post exposure) and between-subjects (e.g. image exposure condition) variables. The primary outcome variable was state body satisfaction and secondary outcomes were mood, intentions to diet, intentions to exercise and state appearance self-esteem. Mediation models were also explored to examine the effect of a potential mediator variable (state social comparison) on the study outcomes. The study was prospectively registered on clinicaltrials.gov number NCT03991351.

Ethical Clearance

Ethical approval was provided by the University of Leeds School of Psychology ethics review committee in February 2019 (Appendix A). Reference number: PSC-605.

Recruitment

Image Selection and Validation

Participants were recruited to assist with selecting and validating the images to be used in each exposure condition. An advertisement, which clearly stated the inclusion criteria and displayed the information sheet, was posted to the researcher's Facebook page on 7th March 2019. Volunteers were encouraged to contact the researcher by email to arrange a time to meet.

The inclusion criteria for the image selection/validation and the online questionnaire was any male between the ages of 18-34. This age range was chosen as

it makes up the biggest proportion of social media users (Chaffey, 2018), overlaps with the largest age range for the acquisition of eating disorders (Priory Group, 2018), is the prime age range for the development of muscle dysmorphia (Olivardia, 2001) and is the age range where social comparison is often at its highest in adults (Myers and Crowther, 2009).

Online Questionnaire

Recruitment for the online questionnaire took place between 28th March 2019 and 30th July 2019 via adverts on several platforms outlined below. All participants voluntarily opted into the study by clicking the link provided in the advert they viewed. Participants were incentivised to participate as they were informed that upon completion of the study, they could leave their email address so they could be entered into a prize draw to win one of five £20 Amazon vouchers.

In the first stage of recruitment, adverts for the questionnaire were posted to the researcher's Facebook page, Instagram account and WhatsApp groups. The Facebook and Instagram posts were made public to enable the researcher's friends to share the link with their friends and followers. Recipients on WhatsApp were encouraged to post the link into the other WhatsApp groups they were part of. The aim of encouraging friends to post the information and link elsewhere was to create a 'snowball effect', ensuring that the questionnaire could reach a wider range of participants.

In the next stage of recruitment, the researcher also sought to ensure that all undergraduates at the University of Leeds had the opportunity to see the advert and share it with their friends. Therefore, the researcher accessed the university's website as it contains information for each of the seven faculties that the university is divided into and each school/institute within each faculty. Staff listed as contacts for each

school/institute were contacted and asked to copy, paste and send an email advert written by the researcher to all their students.

The researcher also utilised the Leeds University Union's full list of student societies and systematically emailed the listed contacts for each society, asking them to copy, paste and send an email written by the researcher to all their members. The researcher also shared the same recruitment email with the Leeds University School of Psychology participant database. This database is a means of recruiting staff and students at the university who have signed up to receive emails advertising paid research.

Finally, following an ethics amendment, the advert for the study was also posted on The Student Room's 'The Survey Exchange' and 'Post your surveys here' threads in the 'Student surveys and research' forum. The Student Room is an online student community in the UK for school and university students. It aims to connect students so that they can support each other in all aspects of student life, including research.

Participants

Two hundred and eighty participants were recruited and consented to the study in the online survey (Figure 1). Sixty-six participants did not continue to the end of the survey, indicating dropout. Thus, 214 participants completed the questionnaire (muscular images n=52, slim images n=58, overweight images n=50, control/landscape images n=54). Fifteen participant's data were removed from the sample as they did not meet the inclusion criteria (i.e. older than 34) and two participant's data were removed as they met the exclusion criteria as they identified as either currently or previously having a diagnosis of an eating disorder. Therefore,

197 participants were included in the final sample. Full participant characteristics are outlined at the beginning of the results section.

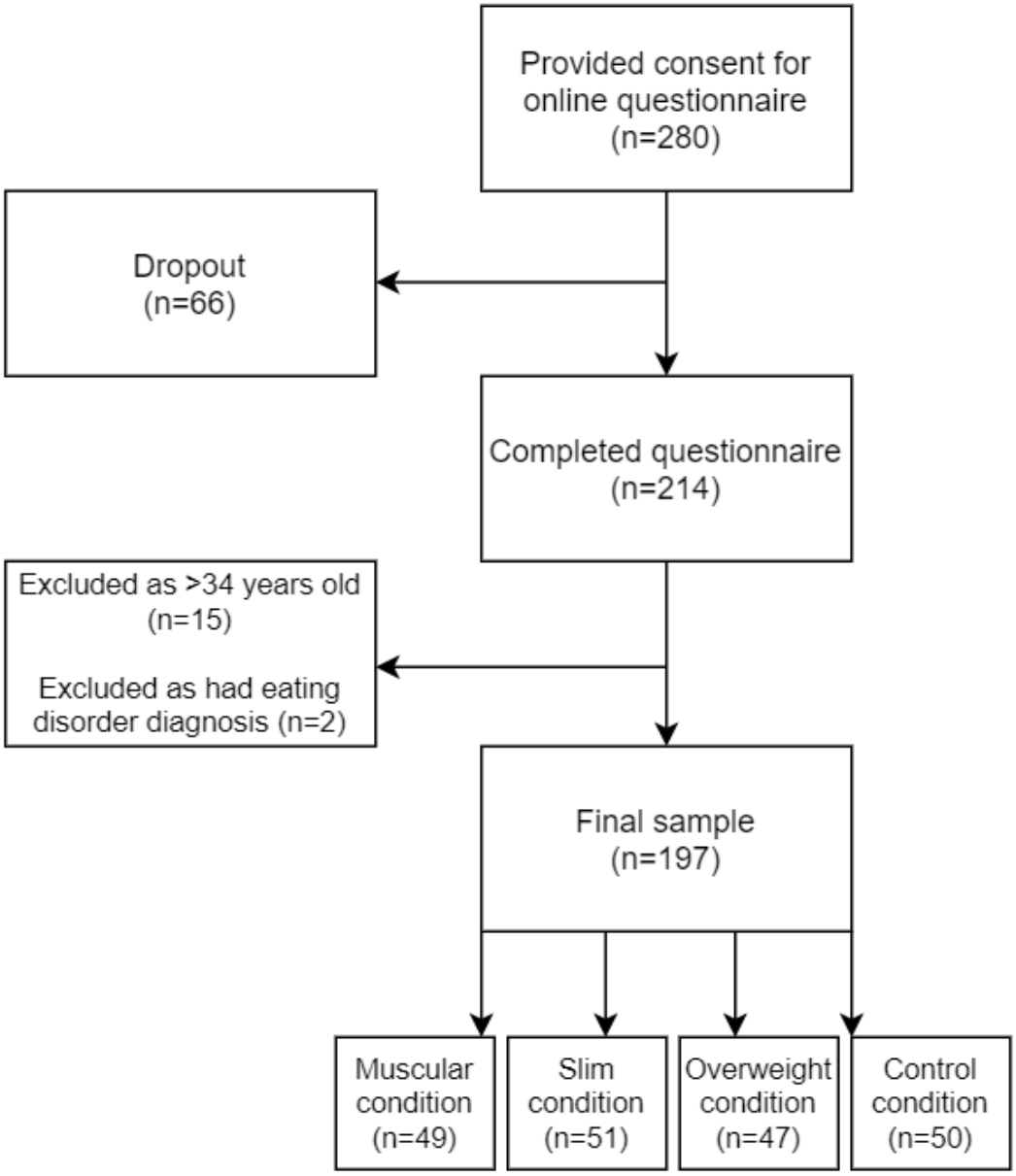

Figure 1. ***Participant uptake and retention in the study.***

Materials

The study was administered to participants using SurveyMonkey. Each exposure condition contained an information and consent page (Appendix B), the measures detailed below and a debrief (Appendix C). Each condition was delivered in the same way except for the images they contained. The first condition contained

images of men with muscular physiques, the second of men with slim physiques, the third of men with overweight physiques and the fourth contained landscape images for control (Appendix D).

A hyperlink for the questionnaires was coded so that when participants clicked it, they were randomly allocated to one of the four conditions. The link was coded so that 25% of participants were allocated to each of the four conditions. One factor that the coded link could not control for was when participants opened the link but did not complete the questionnaire. Therefore, the sample size in each condition was similar but not exactly matched at the end of data collection.

Measures

Images for Exposure Conditions

The procedure of selecting and validating the images was adapted from Tiggemann and Zaccardo (2015) and is outlined below.

Three men aged 18-34 (M=28.7 years) were recruited to assist with the image selection/validation. Four sets of 30 images were created prior to meeting the participants. The different image sets represented each exposure condition detailed above (muscular, slim, overweight and landscapes). The image sets were created by systematically searching public Instagram profiles using relevant hashtags (Table 1). The first 30 images that met the inclusion criteria and avoided the exclusion criteria under the relevant hashtag were selected. Images were gathered in this way to avoid researcher bias when selecting the images.

The inclusion criteria for the images gathered for the three physique conditions were Caucasian man, at least shoulders to waist visible (shirtless or clothed), publicly available and posted within the last year. The criteria included Caucasian men because

according to the 2011 census ‘White British’ made up over 80% of the population in the UK (Sweet, 2011) and therefore it was likely that this percentage would be reflected in the study’s sample. This is important because of the notion that the idealised physique reflects the dominant cultural views (Mishkind et al., 1986) and that participants are more likely to socially compare themselves to images that are similar to them (Heinberg & Thompson, 1995).

The exclusion criteria for the images gathered for the three physique conditions were: images that did not emphasise the importance of appearance/emphasised functionality, an image had already been taken from that user’s profile, any other person in the picture, pictures containing models or celebrities, food or drink in the picture, advertisements/logos/inspirational words in the picture, drawings, paintings and transformation pictures (before and after weight loss or bulking). These images were excluded because of the presences of variables that could confound the manipulation. Additionally, images of models or celebrities were excluded, given the suggestion that people are more likely to socially compare themselves to peers (Heinberg et al., 1995).

The inclusion criteria for the landscape images were: posted within the last year and on a public Instagram profile. The exclusion criteria were: images containing people, advertisements/logos/inspirational words in picture and drawings or paintings. Again, these images were excluded as they contained confounding variables.

As seen in Table 1, the pool of eligible images was far greater in the muscular condition compared to the overweight and slim images.

Table 1. ***Hashtags used to obtain images from Instagram.***

	Muscular Images	**Overweight Images**	**Slim Images**	**Landscapes (Control Images)**
Date Retrieved	24/11/18	23/11/18 - 24/11/18	23/11/18 - 24/11/18	23/11/18
Hashtag (number of image results)	#muscles (17,038,331)	#bigandtallmen (3,350) #fat (11,848,345) #bigguys (41,879) #dadbod (680,816) #chubbymen (6,027) #morbidlyobese (7,994) #overweight **(**326,857)	#slimmen (426) #slimguy (3,945) #skinnyman (7,955)	#landscape (101,380,092)

The three participants recruited attended The University of Leeds for a 1:1 meeting. The purpose of the meeting was to collect data that would help to narrow the pool of 30 images in each condition down to 15 images to be included in the questionnaire, whilst checking for face validity of the images. Each participant was shown 120 images (30 images from each of the muscular, slim, overweight and landscape/control conditions). Images were presented one at a time in a PowerPoint presentation on the researcher's laptop. Each participant was asked to rate the quality of each image using a 5-point Likert scale ranging from 1= very poor to 5=excellent. To test the face validity of each image in relation to the condition it intended to represent, participants were also given the word to describe the condition being viewed e.g. muscular, slim, overweight or landscapes and were asked to rate how representative they thought the image was of the word. Participants rated each image on a 5-point Likert scale ranging from 1=not very representative to 5=very representative.

Furthermore, to ensure discriminant validity of the images between conditions, participants were given the word 'muscular' when viewing the slim and overweight images and were asked to rate how representative each image was of the word. Participants were also given the words 'slim' and 'overweight' when viewing the muscular images and were asked to rate how representative each image was of these words. Each of these ratings were scored on a 5-point Likert scale ranging from 1=not very representative to 5=very representative. Each meeting lasted between 30 and 60 minutes. Data was then analysed by the researcher.

Analysis and Selection. Scores for each image by each participant were entered into Excel. Any images rated as 1 (very poor) on visual quality by any of the three participants were discarded immediately to ensure that the quality of the images

included in the survey was acceptable. Any images that were rated as 3 or more on visual representation of the category that the image was not meant to belong to were discarded, for example, if an image in the muscular condition was rated as 3 or more on slimness or overweightness, then the image was discarded as it may have been unclear what body type the person represented. At this stage, each condition had more than 15 images left.

Following this, all three participants' scores on visual representation of the image's condition it should belong to (i.e. rating for muscularity for an image in the muscular condition) were summed and the 15 images with the highest score on visual representation of the condition were chosen. On the occasions where the total visual representation scores of the images was equal and would have resulted in more than 15 images being selected, the final few images were differentiated by comparing the total visual quality of that image. The images with the highest visual quality were included, leaving 15 images in each exposure condition. This analysis was conducted for each of the muscular, overweight, slim and landscape conditions.

Image Quality

During exposure to the images in the survey, participants were asked to rate the visual quality of each image viewed on a 5-point Likert scale (0 = very poor and 5 = excellent). Scores on these questions were not analysed as the purpose of rating the visual quality was solely to ensure that they had engaged with the images rather than skipping through the page. Duration of exposure to the images was not timed or controlled.

The following measures were completed before and after viewing the 15 images.

State Mood

100mm Visual Analogue Scales (VAS), first introduced by Hayes and Patterson (1921), were utilised to capture state mood. In response to questions such as "How happy are you feeling right now?", "How anxious are you feeling right now?", "How depressed are you feeling right now?", "How angry are you feeling right now?" and "How confident are you feeling right now?", the VAS were completed by sliding a dial along a horizontal line between 0 and 100 where 0 represented 'not at all' and 100 represented 'very'. For clarity, a numerical figure also appeared next to the VAS to show participants which number along the line they had selected. Five separate VAS were used to measure state happiness, anxiety, depression, anger and confidence. Participant's scores on each individual VAS were averaged to create a mean score for state negative mood between 0 and 100 (positive mood items were reverse coded), with higher scores representing more negative mood. This was carried out separately for the pre and post scores.

VAS are sensitive to small changes in scores which is ideal in experimental research and answers are difficult to recall when completing them more than once which prevents people from repeating their answers (Tiggemann & Zaccardo, 2015). VAS have also been shown to have good concurrent validity with Beck's Depression Inventory (.58) and the State Trait Anxiety Inventory (.78), suggesting that a single item is an adequate replacement for full measures (Cella & Perry, 1986; Davey et al., 2007). VAS have also been shown to have good test-retest reliability (Cella & Perry, 1986). Internal validity of the VAS for state mood as measured by Cronbach's alpha was good (α=.92) for this study.

State Body Satisfaction

State body satisfaction was also measured using VAS following Tiggemann et al. (2018). In the present study, the questions were adapted to ensure that satisfaction with the elements of the idealised male physique were measured. Participants were asked to rate on a scale of 0-100 how they felt 'right now' about their height, level of body fat, level of muscularity and their overall body, where 0 = 'not at all satisfied' and 100 = very satisfied.

These elements of body satisfaction were selected for measurement as they are also the three subscales measured by the Male Body Attitude Scale (MBAS), which was created to measure trait body satisfaction (Tylka et al., 2005). The MBAS was derived from literature which consistently demonstrated that men commonly desire to develop more muscularity (Cafri et al., 2005) and lower body fat (Cohane & Pope, 2001). Height was also a dimension of men's body attitudes identified as important (Ridgeway & Tylka, 2005). Therefore, the VAS chosen to measure state body satisfaction here have roots in the literature.

Internal consistency for the four VAS items was good (α=.76). Participant's scores on the four individual items were averaged to create a mean score (pre and post) for body satisfaction, with higher scores indicating greater body satisfaction.

Diet and Exercise Intentions

The Diet and Exercise Intentions questionnaire (DEI-Q) was created for the purpose of this study and was included as an exploratory measure. The questionnaire was developed for reasons outlined in the introduction, for example the failure of current measures in distinguishing men's body image concerns from women's. Items on questionnaires such as the Eating Disorder Examination Questionnaire and the Eating Attitudes Test are purely related to dieting to lose weight e.g. "Over the next 3

months I intend to reduce my calorie intake", whereas, the literature highlights that achieving the idealised male physique would not necessarily just involve losing weight or reducing calorie intake. Indeed, achieving the idealised male physique can also involve increasing protein intake to help build muscle (Cafri et al., 2005). Therefore, items in the DEI-Q were chosen to reflect what literature says men change in their diet and exercise to achieve the current idealised physique.

The Dieting Intentions Scale (DIS) by Cruwys et al. (2013) was considered because it has good predictive validity. However, it only measures dieting intentions which is inadequate as the literature is clear in that both diet and exercise are both ways in which men attempt to alter the size and shape of their body. To the author's knowledge, no other questionnaire captures acute changes to both diet and exercise intentions. Also, the DIS measures changes to intentions over the next three months, whereas the present study aimed to measure the effect of exposure on more immediate/acute dieting intentions as a result of the experimental manipulation, so intentions over the next 2-3 days were measured.

The DEI-Q intentionally followed a similar structure to the DIS. The DEI-Q presented a statement such as 'Over the next 2-3 days I intend to reduce my carbohydrate intake' and asked participants to respond to each statement based on their intentions 'right now'. Responses were measured on a 7-point Likert scale ranging from 'strongly disagree' to 'strongly agree'. The questionnaire contains seven statements related to dieting intentions, one question related to supplements and five questions related to exercise intentions (Appendix E). Statements were selected based on common diet and exercise behaviours associated with men's attempts to gain the idealised muscular physique (Cafri et al., 2005). Responses on each subscale were

averaged to produce a separate mean score for diet intentions and exercise intentions (pre and post). Higher scores demonstrate greater intention to change diet or exercise.

Questions were intended to be exploratory, but some preliminary psychometric properties of the questionnaire were investigated. Face validity of the questions was checked by the researcher's supervisors and was judged to be good. Overall internal consistency for the questionnaire was: α=.91 (pre-exposure) and α=.94 (post-exposure), which demonstrates good internal consistency (Field, 2009). Internal consistency was also measured separately for diet intentions and exercise intentions as these two subscales were investigated individually within data analysis. Internal consistency for diet intentions was good: α = .88 (pre-exposure) and α = .91 (post-exposure), likewise with exercise intentions: α = .90 (pre-exposure) and α = .92 (post-exposure).

State Appearance Self-Esteem

State appearance self-esteem was measured using Heatherton and Polivy's (1991) State Self-Esteem Scale (SSES). This measure was chosen as it is specifically designed to be sensitive to acute and temporary changes in self-esteem during experiments. Although the Rosenberg's self-esteem scale (Rosenberg, 1965) is considered the 'gold-standard', it is a measure of trait self-esteem and is therefore unsuccessful in detecting brief fluctuations in self-esteem which can be captured by the SSES.

The SSES consists of three subscales: performance, social and appearance self-esteem. Only the appearance self-esteem subscale was utilised as it was of most interest in this study. The other two subscales were omitted in order to minimise the length of the overall questionnaire and reduce the likelihood of demand characteristics such as fatigue effect.

Participants were asked to rate how true each statement was for them 'right now' on a five-point Likert scale where 1 = not at all true and 5 = extremely true. Mean scores for pre and post exposure appearance self-esteem were calculated (positive items were reverse coded). High scores reflect higher state appearance self-esteem. The measure possesses high internal consistency (α = .92), discriminant validity and construct validity (Heatherton & Polivy, 1991).

The following questions were asked once (post exposure to the images).

State Appearance Comparison

The method of measuring a participant's level of social comparison throughout the study (specifically state appearance comparison), was based on Tiggemann and McGill (2004) who measured appearance comparison in women shortly after exposure to magazine images. Participants were asked to answer three questions about their state appearance comparison shortly after viewing the images. Each response was captured using a 7-point Likert scale. The first question asked participants to rate the extent to which they thought about their appearance when viewing the images (1 = no thought about my appearance and 7 = a lot of thought about my appearance). The second and third questions asked participants to rate how much they compared their overall appearance and specific body parts to the images where 1 = no comparison and 7 = a lot of comparison. Scores on all three questions were summed to produce a total appearance comparison score, with higher scores demonstrating higher levels of social comparison. Internal consistency in the current study was high (α = .91).

Demographics

Demographic information was collected at the end of the questionnaire (Appendix F). Information collected included: age, ethnicity, previous or current

diagnosis of an eating disorder and self-reported body type. The following information was also collected so that the data may be explored further: frequency of gym use, type of exercise participated in at the gym, frequency of exercise other than the gym, frequency of social media use, type of social media used, and type of engagement on social media (e.g. talking to friends, posting photos etc). Participants were also asked if they were currently taking supplements or classed themselves as being on a diet. This information was collected at the end of the questionnaire so that it did not prime participants or reveal information regarding the purpose of the study.

Procedure

Participants were asked to opt in to complete the study by clicking the hyperlink connected to the advert viewed. The hyperlink led participants to the SurveyMonkey questionnaire where they were asked to read the information page. Participants were then instructed to read the information sheet prior to providing informed consent (Appendix B). The information page clearly stated that if participants did not consent then they should close the browser.

At the start of the questionnaire and at the top of each new page, participants were provided with instructions to enable them to complete the questions. The questionnaire included all the measures described above. Participants were instructed to move through each page and were informed that once they click ‘Next’, they would be unable to revisit the page and edit their responses. This restriction was added to prevent people from changing their answers as they move through the study, especially after they had read the debrief which contained more detail regarding the purpose of the research.

On the final page of the questionnaire, participants were provided with a debrief to read (Appendix C) and were asked to click the 'submit' button. Participants were also provided with the contact details of the research team in case they had any questions or concerns. Participants were also encouraged to leave their email address if they wanted to be entered into the prize draw. The questionnaire took an average of 15-20 minutes to complete.

Ethical Amendment

A minor amendment to the ethics application was made (after the initial few weeks of data collection) to permit the use of The Student Room and the addition of an item in the questionnaire which asked participants where they had found out about the questionnaire before completing it. The amendment was approved in April 2019 (Ref: PSC-670).

Analysis

Details of how each individual measure was scored can be found in the measures section. Data was analysed using IBM SPSS 25 and PROCESS v3.3 by Andrew F Hayes (Hayes & Preacher, 2014). First, data was summarised using descriptive statistics which described characteristics of the overall sample and each group/condition. Groups were also assessed to ensure that they were comparable.

Primary Analysis

The study's primary aim was to examine the effect of exposing men to images of the idealised muscular physique on body satisfaction (primary outcome), mood (secondary outcome), state appearance self-esteem and intentions to exercise or go on a diet (exploratory). In order to address these questions, mixed ANOVAs (analysis of variance) were conducted to allow both the within-group (pre vs post exposure) and

between-group (each condition) comparisons to be made. Significant results were captured by a *p* value of $p \leq .05$ and trends were captured by a value of $p \leq .09$.

Data Screening. Before the analysis was carried out, all data from participants who met the exclusion criteria were removed and items were checked to ensure that scores recorded fell within the correct ranges for that measure. After this, individual items which were part of an overall measure were combined according to their scoring manual (see individual measures for details) using the 'compute variable' function in SPSS. This was carried out for pre and post scores so provided a global score for each participant on the measure before and after exposure.

Assumptions. Normality was checked by assessing the spread of the global scores using Histograms. Mean state mood and mean trait body satisfaction were both slightly positively skewed, however, this did not appear extreme. Global scores were also checked for homogeneity of variance using Levene's test, sphericity using Mauchly's test of sphericity and equality of covariance using Box's M test of equality of covariances. These assumptions were all met, except for state body satisfaction where the box test was significant, meaning that equality of covariance was violated.

Global scores were also checked for outliers using box plots. Where outliers were identified, they were removed, and the mixed ANOVAs were run again. The same pattern of results was demonstrated, however, data without outliers are reported in the results section so that the statistics better meet the assumptions.

Mixed ANOVAs were also run for each individual item in order to provide more detail and to understand whether significant results using the global scores were a result of significance in specific items of the questionnaire or whether there were significant results for specific items even when the ANOVAs using global scores were non-significant. Therefore, assumptions were also checked for each item.

Levene's test suggested that homogeneity of variance could be assumed for all items except for the height and muscularity items of the body satisfaction VAS (the latter was only just significant). Mauchly's test suggested that sphericity could be assumed for all items. The box test suggested that equality of covariance could be assumed for all items except for the anxiety item in the state mood VAS, the intention to reduce sugar intake, intention to increase use of supplements, intention to increase the intensity of exercise within the DEI-Q and the 'I feel good about myself' item of the SSES.

Outliers were assessed using box plots and as before, where outliers were detected, the ANOVAs were run again after they were removed. As with the global scores, removing outliers did not change the pattern of results. One result demonstrated increased significance without the outliers, therefore, for this reason and for consistency, results without outliers are reported in the results section.

Secondary Analysis

The study's secondary aim was to explore the mediating role of social comparison in the relationship between image exposure condition (*X*) and outcomes (*Y*) (state body satisfaction, mood, state appearance self-esteem and intention to go on a diet or exercise). Mediation analysis was chosen as it is a method which can investigate how an *X* variable (independent variable) produces changes in a *Y* variable (dependent variable) and suggests that X influences *Y* through an intervening variable *M* i.e. a mediator (Hayes 2017). Therefore, the question being investigated was could social comparison, specifically state appearance comparison, explain a relationship between viewing different images and various outcomes?

The present study was more complex than using a simple mediation model described above because the X variable had four categorical groups i.e. the four different image types (Figure 2).

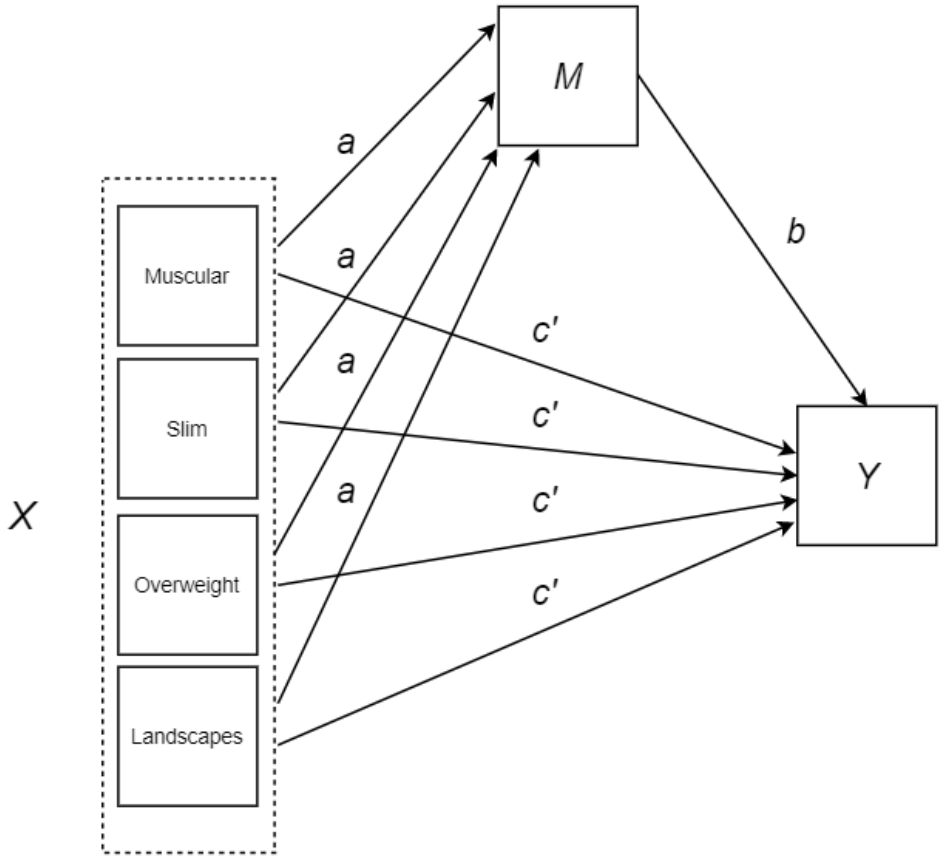

Figure 2. ***Statistical model of mediation with a multi-categorical x variable.***

Note. *X = Independent Variable, Y = Dependent Variable, M = Mediator, a = coefficient for X predicting M, b = coefficient for M predicting Y, c ' = coefficient for the direct effect of X on Y.*

Historical methods of data analysis would have suggested to compare two groups at a time until all comparisons were complete, as though X were dichotomous. However, Hayes (2017) suggests that this lowers the statistical power of the analysis

and increases uncertainty in the estimation of the effects. This is because each analysis would contain less data than if the whole sample were analysed together.

Therefore, the method of data analysis chosen was a mediation analysis with a multi-categorical antecedent variable. This was conducted in PROCESS v3.3 (Hayes & Preacher, 2014) using model 4 and the indicator coding system to compare groups. In the indicator coding system, the first X variable inputted is used as a reference group which is compared to the other groups, for example in this study, the muscular condition was inputted first and so this was compared to the slim, overweight and landscapes conditions. However, this did not give all of the possible comparisons between conditions, so the analysis was run for a second time with slim as the reference group and for a third time with overweight as the reference group. This allowed all possible comparisons of conditions to be run in the mediation analyses.

Data Screening. Frequency tables were created to check for missing data in any of the dependent variables. There was one piece of missing data in the post state body satisfaction mean which was taken into account in the analysis by the degrees of freedom (*df*).

Power. An a priori power calculation using the program G*Power 3.1 was carried out, using the linear multiple regression fixed model r^2 deviation from zero test, to ensure that there were enough participants so that the regression would be appropriately powered (Faul et al., 2009). The calculation suggested that for a power of .80 and alpha .05 the total number of participants required was n=79 for a large effect size ($r^2 = .14$).

Assumptions. Before going ahead with the mediation analysis, assumptions were checked. Data had already been checked to ensure values fell within the correct ranges

for each measure and to ensure that equal numbers of participants were in each condition.

Hayes (2017) outlined that for regression analyses using a general linear model data should be normally distributed, the relationship between the data should be linear, data should be homoscedastic and there should be no significant outliers.

Normality was assessed by observing P-P plots and the distribution curves on Histograms for each outcome variable post-exposure to the images as the post-scores were used in the mediation analysis. All appeared to be normally distributed, except for the mean scores for state mood which appeared to have a slight positive skew.

Homoscedasticity and linearity were checked for using scatter plots of the residuals. Linearity could be assumed, but all scatter plots indicated that there was some deviation towards heteroscedasticity.

Bootstrapping was used in the mediation analysis as suggested by Hayes (2017) and Field (2013) as it should reduce the impact of any violation of assumptions as it is more robust. Bootstrapping estimates the parameters of the sample distribution from the data collected (Field, 2017).

Finally, outliers were screened for using Mahalanobis distance, Cooks distance and Leverage. Where outliers occurred, they were removed, and the mediation was run again to see if removing them had an effect. Removing the outliers did change the pattern of some of the results. Therefore, the statistics reported in the results section are those without outliers to ensure that any mediation found was not due to outliers.

Mediation Interpretation. Historically, mediation was tested and interpreted using Baron and Kenny's (1986) causal steps approach. This model uses three linear

models that test four conditions that Baron and Kenny (1986) suggested must be met to demonstrate mediation. The three models are:

1. The predictor variable predicts the outcome variable (path *c*). The *b* coefficient value gives a value for path *c.*
2. The predictor variable predicts the mediator variable (path *a*). The *b* coefficient value gives a value for path *a*.
3. Both the predictor and mediator variables predict the outcome variable (path *b*). The *b* coefficient value for the mediator gives a value for path *b* and the *b* coefficient value of the predictor assigns a value to c' (direct effect).

The four conditions: models 1, 2 and 3 must be significant and that "the predictor variable should predict the outcome variable less strongly in model 3 (path c') than in model 1 (path *c*)" (Field, 2017. p.499).

However, Hayes (2017) and Field (2017) outline a limitation of the latter condition. The idea that the predictor variable should predict the outcome variable less strongly in model 3 than in model 1 suggests that full mediation has occurred when the relationship between the predictor and outcome variables changes to 0 i.e. $c' = 0$. However, this complete reduction rarely occurs, meaning that it is often concluded that mediation has not occurred. More often, a smaller reduction in the relationship is observed rather than it being wiped out completely. This poses the question of how much reduction in the relationship is needed to infer mediation.

Baron and Kenny suggested looking at the *b* values, however, in practice people look for a change in significance i.e. a change from significant in model 1 to non-significant when the mediator is added. However, Field (2017) highlights that with this approach, a *b* value could change a very small amount, but the significant value could move just either side of the significance threshold e.g. from $p = .049$ to p

= .055. In this situation, the relationship between predictor and outcome might not have changed much even though the significance changed. Field (2017) also highlighted that the *b* value for the relationship between the predictor and outcome could reduce drastically when the mediator is added, but could still remain significant. Therefore, Field (2017) concluded that condition 4 creates a black and white thinking approach.

Hayes (2017) agreed with Field that a predictor can influence an outcome through the mediator even if there is not a direct relationship between the predictor and outcome. He argued that "the size of a total effect does not constrain or determine the size of an indirect effect. An indirect effect can be different from zero even when the total effect is not." (Hayes, 2017, p.117).

For these reasons, the mediation interpretation in this study did not follow Barron and Kenny's (1986) causal steps approach. Field and Hayes suggested an alternative method, which was to look at the significance of the indirect effects, which combine path *a* and path *b*. The Sobel test (Sobel, 1982) has frequently been used for this, however, Field (2017) suggests that using bootstrapping methods are better because they calculate the confidence intervals for the indirect effects which can highlight the size of the mediation. Hayes also suggests using bootstrapping because it takes into account the irregularity of the distribution of the sample for the indirect effect. This is the method utilised in this study.

Effect Size Within Mediation Analysis. There have also been several suggestions of how to calculate the size of the indirect effect. Preacher and Kelley (2011) proposed kappa squared, however the workings out were incorrect. Field (2017) suggests that the *b* value for the indirect effect could be used in an equation to calculate the effect size, however, Mackinnon suggested that this was inappropriate

for samples smaller than 500. Therefore, Wen and Fan (2015) suggested that effect sizes should not be used at all in mediation and is the stance taken by the researcher in this study.

Post Exposure Scores as the Y Variable. Additionally, one method for the mediation is to use difference scores for the *Y* variable in the mediation model by subtracting pre scores from the post scores. However, Hayes (2017) does not advocate this unless the research question is to observe change over time e.g. “does the mean change in the outcome from pre to post differ between groups?”.

As the secondary research question was to investigate whether social comparison could explain a relationship between viewing different images of the idealised physique and outcomes after viewing the images, it was less appropriate to use difference scores as change over time was not the focus of the mediation analysis. Of interest in the mediation analysis was whether the post exposure scores were different between groups and whether the mediator variable could explain this difference.

Furthermore, Hayes (2017) stated that mediation models using difference scores are sub-optimal because they change the weight of the variables instead of allowing the ordinary least squares criterion to work out how to weight the variables. Instead, Hayes (2017) recommends using later measurements as the *Y* variable i.e. post scores and using earlier measurements i.e. pre-scores as covariates. This allows researchers to understand whether the post exposure scores (adjusted for pre-exposure scores) differ between conditions and is more robust as it accounts for variation in pre-exposure scores between groups.

Therefore, the mediation analysis in this study used the pre-exposure scores as a covariate (*C*) and post-exposure scores as the Y variables (Figure 3).

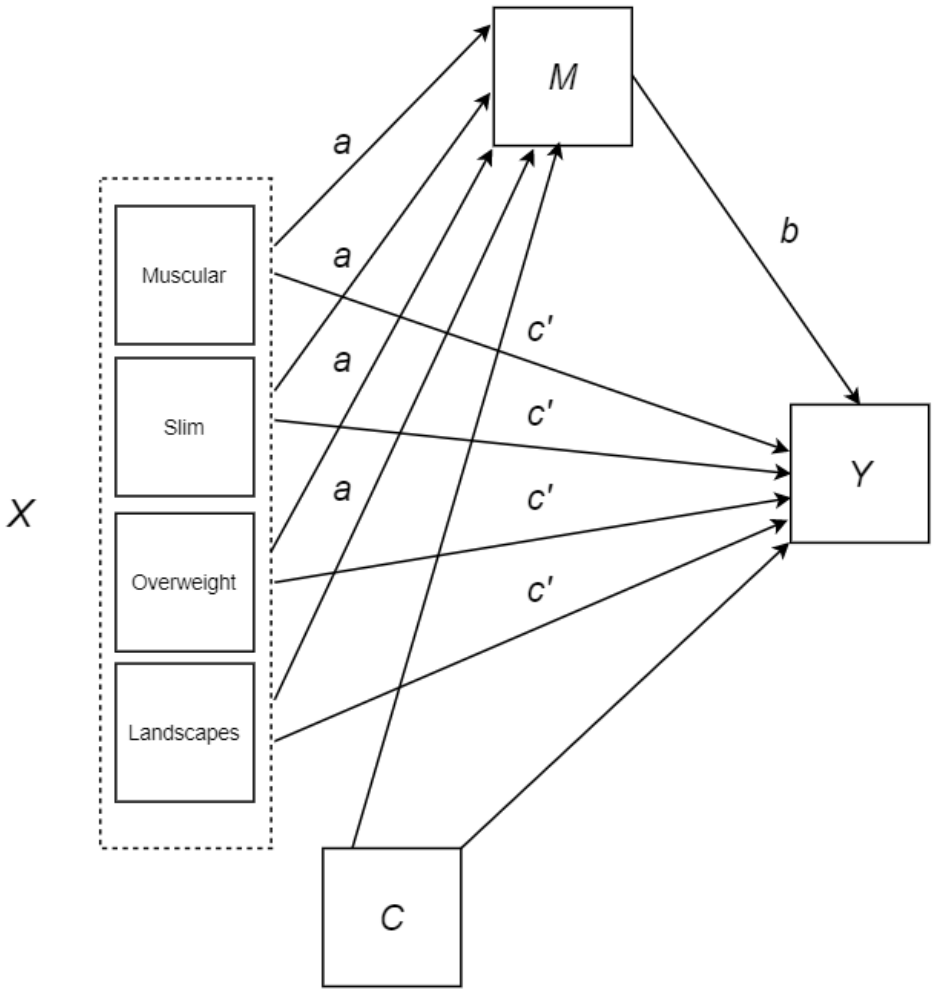

Figure 3. ***Statistical model of mediation with a multi-categorical x variable and a covariate.***

Note. *X = Multi-categorical Independent Variable, Y = Dependent Variable, M = Mediator, C = Covariate, a = coefficient for X predicting M, b = coefficient for M predicting Y, c '= coefficient for the direct effect of X on Y.*

Results

Participant Characteristics

One hundred and ninety-seven men completed the online questionnaire. Forty-nine participants were randomised to the muscular condition (24.87%), 51 to the slim condition (25.89%), 47 to the overweight condition (23.86%) and 50 to the landscapes (control) condition (25.38%). Key demographic information and self-reported physique for the overall sample and each condition are displayed in Table 2.

Table 2 demonstrates that most of the overall sample (87.1%) and each group were White British. Additionally, the most common physique that participants in the overall sample (45.7%) and each group reported having was an 'average' physique. Appendix G contains information for the overall sample and each condition on whether participants were on a diet or taking supplements. Most of the overall sample and each condition were not already on a diet (82.2%) or taking supplements (80.7%).

Table 2. Demographics and self-reported physique for the overall sample and each condition.

	Total sample *N* = 197	**Muscular condition** *n* = 49	**Slim condition** *n* = 51	**Overweight condition** *n* = 47	**Landscapes condition** *n* = 50
Mean age in years (*SD*)	26.6 (4.2)	26.7 (4.1)	26.6 (4.4)	25.9 (4.2)	27.2 (4.0)
Ethnicity *n* (%)					
White British	161 (81.7%)	44 (89.8%)	42 (82.4%)	33 (70.2%)	42 (84.0%)
White Irish	3 (1.5%)	0 (0.0%)	1 (2.0%)	0 (0.0%)	2 (4.0%)
Any other white	6 (3.0%)	2 (4.1%)	0 (0.0%)	3 (6.4%)	1 (2.0%)
Mixed Caribbean	1 (0.5%)	0 (0.0%)	1 (2.0%)	0 (0.0%)	0 (0.0%)
White/Asian	1 (0.5%)	0 (0.0%)	0 (0.0%)	1 (2.1%)	0 (0.0%)
Mixed other	2 (2.0%)	0 (0.0%)	0 (0.0%)	1 (2.1%)	1 (2.0%)
Indian	5 (2.5%)	0 (0.0%)	2 (3.9%)	2 (4.3%)	1 (2.0%)
Pakistani	3 (1.5%)	1 (2.0%)	0 (0.0%)	2 (4.3%)	0 (0.0%)
Chinese	6 (3.0%)	1 (2.0%)	2 (3.9%)	0 (0.0%)	3 (6.0%)

Table 2 (continued). ***Demographics and self-reported physique for the overall sample and each condition.***

Asian other	2 (1.0%)	1 (2.0%)	1 (2.0%)	0 (0.0%)	0 (0.0%)
Arab	2 (1.0%)	0 (0.0%)	0 (0.0%)	2 (4.3%)	0 (0.0%)
Other	3 (1.5%)	0 (0.0%)	2 (3.9%)	1 (2.1%)	0 (0.0%)
Missing data	2 (1.0%)	0 (0.0%)	0 (0.0%)	2 (4.3%)	0 (0.0%)
Self-reported physique *n* (%)					
Muscular	34 (17.3%)	9 (18.4%)	8 (15.7%)	9 (19.1%)	8 (16.0%)
Slim	39 (19.8%)	13 (26.5%)	12 (23.5%)	7 (14.9%)	7 (14.0%)
Average	90 (45.7%)	21 (42.9%)	22 (43.1%)	21 (44.7%)	26 (52.0%)
Overweight	33 (16.8%)	6 (12.2%)	9 (17.6%)	9 (19.1%)	9 (18.0%)
Missing Data	1 (0.5%)	0 (0.0%)	0 (0.0%)	1 (2.1%)	0 (0.0%)

Social Media Use

Figure 4 displays the social media platforms used by participants in the overall sample. Participants selected all platforms they used. The most commonly used social media platform was WhatsApp followed by Facebook, YouTube, Facebook Messenger and Instagram respectively. The least used social media platform was Pinterest. This pattern varied slightly between conditions, for example the slim and landscapes conditions followed this pattern, but in the muscular condition WhatsApp was the most popular, followed by Facebook Messenger and in the overweight condition Facebook was the most popular, followed by WhatsApp and YouTube.

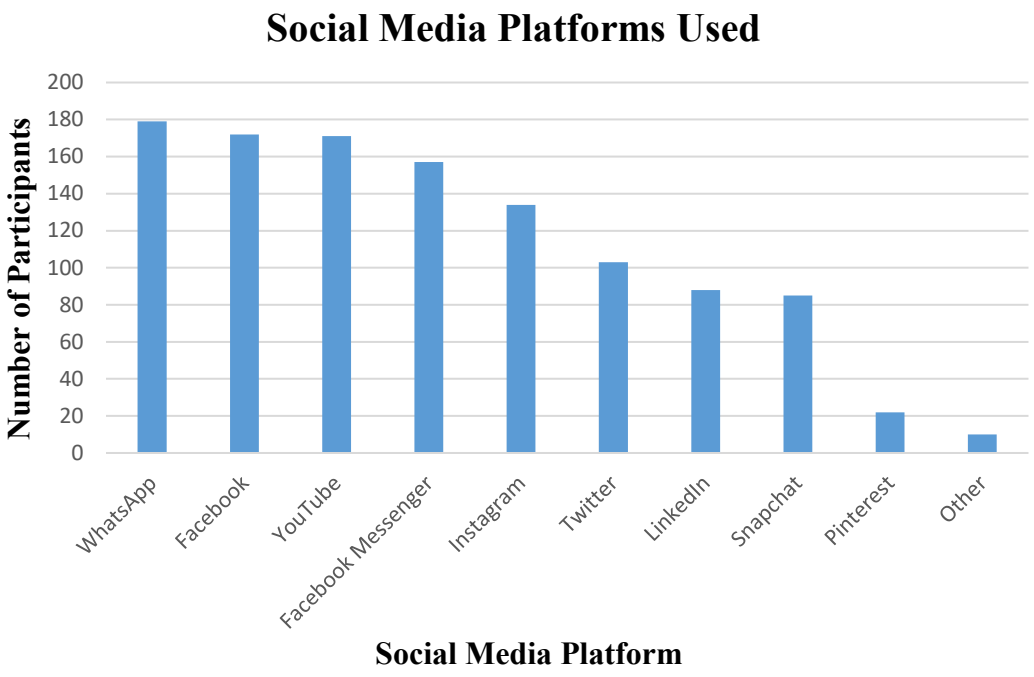

Figure 4. ***Frequencies for social media platforms used in the overall sample.***

Figure 5 shows the type of activity participants used social media for. Again, participants selected all activities they engaged in. The most frequent type of activity on social media in the overall sample was talking with friends, followed by viewing other's posts and liking other's posts. The least frequent type of social media activity was 'other' which included arranging events for work, networking and for news

purposes. This pattern varied slightly between conditions, for example in the muscular and slim groups, viewing other's posts was slightly more popular than talking with friends.

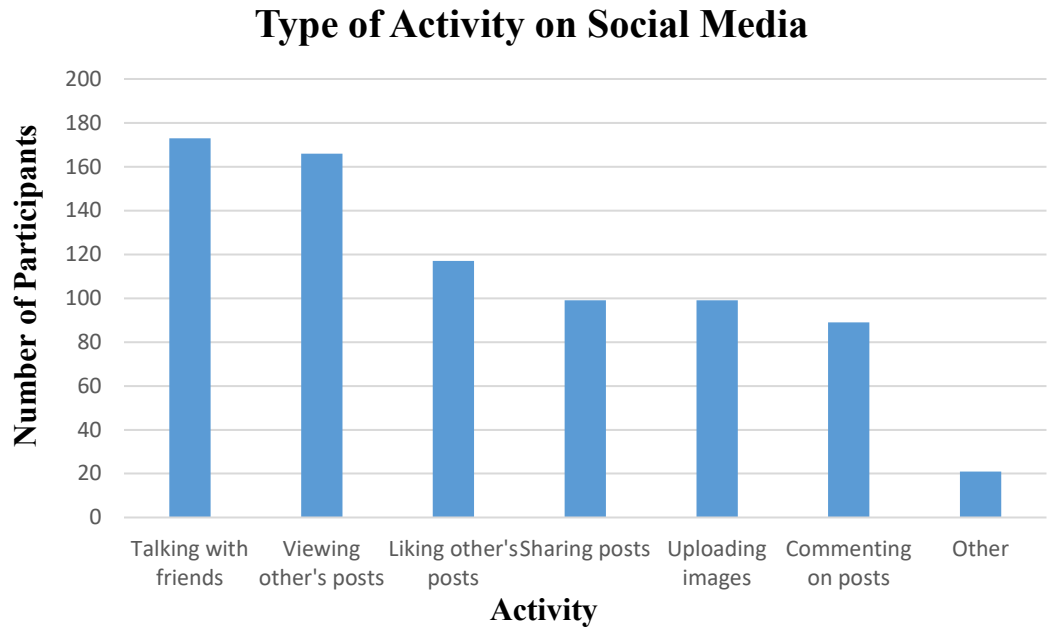

Figure 5. ***Frequencies for type of activity on social media in the overall sample.***

Table 3 contains information on the overall sample and each condition for length of time on social media per day. In the overall sample, the most common amount of time spent on social media was 30-60 minutes per day (n = 58), with the second most common amount of time being 1-2 hours (n = 52). This pattern varied slightly between conditions (see Table 3). The least common amount of time spent on social media per day in the overall sample and in each condition was <10 minutes (n = 3).

Table 3. ***Length of time on social media per day in the overall sample and each condition.***

	Total sample	**Muscular condition**	**Slim condition**	**Overweight condition**	**Control condition**
	N = 197	*n* = 49	*n* = 51	*n* = 47	*n* = 50
How long on social media per day *n* (%)					
<10 minutes	3 (1.5%)	1 (2.0%)	1 (2.0%)	0 (0.0%)	1 (2.0%)
10-30 minutes	44 (22.4%)	9 (18.4%)	12 (23.5%)	15 (31.9%)	8 (16.0%)
30-60 minutes	58 (29.6%)	16 (32.7%)	14 (27.5%)	10 (21.3%)	18 (36.0%)
1-2 hours	52 (26.5%)	12 (24.5%)	13 (25.5%)	11 (23.4%)	16 (32.0%)
> 2 hours	39 (19.9%)	11 (22.4%)	11 (21.6%)	10 (21.3%)	7 (14.0%)
Missing data	1 (.01%)	0 (0.0%)	0 (0.0%)	1 (2.1%)	0 (0.0%)

Gym Use

Table 4 displays how often participants in the overall sample and each condition use the gym per week (on average). Data from the overall sample demonstrated that over half of the participants did not go to the gym (*n* = 105). Of those who did go, most attended twice a week (*n* = 23) and no one attended seven times a week or more than once a day.

Table 4. ***Frequency of gym use per week in the overall sample and each condition.***

	Total sample	**Muscular condition**	**Slim condition**	**Overweight condition**	**Control condition**
	N = 197	*n* = 49	*n* = 51	*n* = 47	*n* = 50
Frequency of gym use per week					
***n* (%)**					
Don't go	105 (53.3%)	24 (49.0%)	27 (52.9%)	24 (51.1%)	30 (60.0%)
Once	14 (7.1%)	3 (6.1%)	2 (3.9%)	4 (8.5%)	5 (10.0%)
Twice	23 (11.7%)	8 (16.3%)	6 (11.8%)	3 (6.4%)	6 (12.0%)
Three times	18 (9.1%)	5 (10.2%)	5 (9.8%)	3 (6.4%)	5 (10.0%)
Four times	22 (11.2%)	6 (12.2%)	10 (19.6%)	4 (8.5%)	2 (4.0%)
Five times	10 (5.1%)	2 (4.1%)	1 (2.0%)	5 (10.6%)	2 (4.0%)
Six times	4 (2.0%)	1 (2.0%)	0 (0.0%)	3 (6.4%)	0 (0.0%)
Seven times	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
More than once a day	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Missing data	1 (0.5%)	0 (0.0%)	0 (0.0%)	1 (2.1%)	0 (0.0%)

Comparison of Groups

Analyses were carried out to check whether the participants randomised to each condition differed significantly on any recorded characteristics. This was important because if groups differed significantly on relevant characteristics, any

differences between groups after exposure to the images could be attributed to the differences rather than the type of images viewed.

Chi-square tests were run for categorical data and demonstrated that there was no significant difference between groups for self-reported physique (χ^2 (9) = 4.56, p = .87), ethnicity (χ^2 (33) = 37.93, p = .26), whether participants were on a diet (χ^2 (3) = 2.43, p = .49) or whether participants were taking supplements (χ^2 (6) = 7.08, p = .31).

One-way ANOVAs were carried out to compare groups for interval data and demonstrated that there was no significant difference between groups for age (F(3, 190) = .73, p = .54), frequency of gym use (F(3, 192) = 1.33, p = .27), time spent on social media per day (F(3, 192) = .08, p = .97) or frequency of exercise other than the gym (F(3, 191) = .60, p = .62).

As groups were not significantly different on relevant characteristics, it is more likely that any differences found between groups was a result of the condition (types of images viewed).

Primary Analysis

The study's primary aim was to determine the effect of exposure to the idealised muscular physique on state body satisfaction, state mood, state appearance self-esteem and intentions to go on a diet or exercise. Mixed ANOVAs were carried out to see if there was a significant effect of time within groups (pre vs post exposure) and to see if there was a significant difference in outcomes between each group as a result of the image exposure condition. Results of the mixed ANOVAs for each outcome variable are presented below. Results of the global scores are presented first, followed by results for each item in the measure.

State Body Satisfaction

Table 5 displays mean state body satisfaction in each condition before and after exposure to the images. It also contains information from post hoc tests using the Bonferroni correction on whether these differences were significant. Mean state body satisfaction decreased significantly from pre exposure to post exposure in the muscular condition, but did not change significantly from pre exposure to post exposure in the slim, overweight or landscape conditions.

Table 5. ***Mean state body satisfaction at pre and post exposure for each condition.***

Condition	**Pre exposure mean (*SD*)**	**Post exposure mean (*SD*)**	**Difference (Pre – Post)**	***p***
Muscular	60.41 (18.53)	57.05 (18.63)	3.36	.01*
Slim	57.91 (19.59)	58.12 (21.32)	-.21	.87
Overweight	62.53 (18.60)	62.99 (16.57)	-.46	.73
Landscapes	61.46 (16.64)	60.74 (15.95)	.72	.67

* $p \leq .01$

The mixed ANOVA demonstrated that there was no significant interaction between the condition and time on global state body satisfaction, $F(3, 191) = 1.65$, $p = .18$, partial $\eta^2 = .03$. The main effect of time showed no significant difference in state body satisfaction at the different time points, $F(1, 191) = 1.60$, $p = .21$, partial $\eta^2 = .01$. The main effect of condition showed no significant difference in state body satisfaction between groups, $F(3, 191) = .74$, $p = .53$, partial $\eta^2 = .01$.

Satisfaction with Height. There was no significant interaction between condition and time on height satisfaction, $F(3, 187) = .36$, $p = .78$, partial $\eta^2 = .01$. The main effect of time showed a significant difference in height satisfaction at the

different time points $F(1, 187) = 22.46$, $p < .001$, partial $\eta^2 = .11$. To be able to explain this difference, post hoc tests using the Bonferroni correction were run. For post hoc tests in this section and throughout, data are mean ± standard error, unless otherwise stated. The post hoc test demonstrated that image exposure elicited a significant reduction in height satisfaction from pre-exposure (81.69 ± 1.45) to post-exposure (78.46 ± 1.58) (p <.001). The main effect of condition showed no difference in height satisfaction between groups $F(3, 187) = .18$, $p = .91$, partial $\eta^2 = .00$, suggesting this effect was not due to the type of images being viewed.

Satisfaction with Muscularity. There was a significant interaction between condition and time on muscularity satisfaction, $F(3, 189) = 3.59$, $p = .02$, partial $\eta^2 = .05$. When the simple main effects were explored, they demonstrated that there was no significant difference in muscularity satisfaction between groups at pre-exposure ($F(3, 192) = 1.13$, $p = 1.13$, partial $\eta^2 = .02$) or at post exposure ($F(3, 190) = 1.07$, p = .36, partial $\eta^2 = .02$). However, there was a significant effect of time on muscularity satisfaction in the muscular condition, $F(1, 48) = 7.68$, $p = .01$, partial $\eta^2 = .14$. Pairwise comparisons demonstrated that muscularity satisfaction was significantly reduced from pre exposure (55.86 ± 3.38) to post exposure (49.35 ± 3.24) in the muscular condition (p=.01). There was no significant difference in muscularity satisfaction between pre and post exposure in the slim, overweight or landscapes conditions.

Body Fat Satisfaction. There was no significant interaction or any main effects for the body fat item.

Satisfaction with the Overall Body. There was a significant interaction between condition and time on overall body satisfaction, $F(3, 190) = 3.08$, $p = .03$, partial $\eta^2 = .05$. When the simple main effects were explored, they showed that there

was no significant difference in overall body satisfaction between groups at pre-exposure ($F(3, 192) = .62$, $p = .60$ partial $\eta^2 = .01$) or at post exposure ($F(3, 190) = 1.49$, $p = .22$ partial $\eta^2 = .02$). However, pairwise comparisons demonstrated that satisfaction with the overall body was significantly reduced from pre exposure (56.56 ± 3.25) to post exposure (51.86 ± 3.18) in the muscular condition ($p = .02$). There was no significant difference in overall body satisfaction between pre and post exposure in the slim, overweight or landscapes conditions.

State Mood

Table 6 displays mean state mood in each condition before and after exposure to the images. It also contains information from Bonferroni pairwise comparisons on whether these differences were significant. State mood decreased slightly from pre exposure to post exposure in the muscular and landscapes conditions and increased slightly in the slim and overweight conditions, however, these differences were not significant.

Table 6. ***Mean state mood at pre and post exposure for each condition.***

Condition	**Pre exposure mean (*SD*)**	**Post exposure mean (*SD*)**	**Difference (Pre -post)**	***p***
Muscular	31.93 (14.36)	30.73 (14.78)	1.2	.20
Slim	28.02 (16.10)	28.94 (16.48)	-.92	.36
Overweight	26.77 (11.10)	26.95 (13.01)	-.18	.90
Landscapes	28.65 (13.60)	27.48 (14.37)	1.17	.21

There was no significant interaction between the condition and time on overall state mood, $F(3, 189) = .94$, $p = .42$, partial $\eta^2 = .02$. The main effect of time showed

no significant difference in state mood at the different time points, $F(1, 189) = .34$, $p = .56$, partial $\eta^2 = .00$. The main effect of condition showed no significant difference in global state mood between groups, $F(3, 189) = .87$, $p = .46$, partial $\eta^2 = .01$.

Happiness. There was no significant interaction between the condition and time on happiness, $F(3, 184) = .21$, $p = .89$, partial $\eta^2 = .00$. The main effect of time showed a significant difference in happiness at the different time points $F(1, 184) = 4.02$, $p = .05$, partial $\eta^2 = .02$. Post hoc tests using the Bonferroni correction demonstrated that image exposure elicited a significant reduction in happiness from pre-exposure (69.23 ± 1.08) to post-exposure (67.57 ± 1.27) ($p = .05$). The main effect of condition showed no significant difference in happiness between groups, $F(3, 184) = .79$, $p = .50$, partial $\eta^2 = .01$.

Anxiety. There was no significant interaction between the condition and time on anxiety, $F(3, 176) = 1.85$, $p = .14$, partial $\eta^2 = .03$. The main effect of time showed a significant difference in anxiety at the different time points $F(1, 176) = 27.83$, $p = <.001$, partial $\eta^2 = .14$. Post hoc tests using the Bonferroni correction demonstrated that image exposure elicited a significant reduction in anxiety from pre-exposure (32.30 ± 1.61) to post-exposure (27.56 ± 1.48) ($p <.001$). The main effect of condition showed no significant difference in anxiety between groups, $F(3, 176) = .81$, $p = .49$, partial $\eta^2 = .01$.

There were no significant interactions or main effects for the depression, anger or confidence items.

State Appearance Self-Esteem

Table 7 shows mean state appearance self-esteem in each condition before and after exposure to the images. It also contains information from Bonferroni pairwise

comparisons on whether these differences were significant. In all conditions, state appearance self-esteem decreased significantly from pre exposure to post exposure.

Table 7. ***Mean state appearance self-esteem at pre and post exposure for each condition.***

Condition	**Pre exposure mean (*SD*)**	**Post exposure mean (*SD*)**	**Difference (Pre -post)**	***p***
Muscular	23.21 (4.10)	18.81 (4.43)	4.40	<.001***
Slim	22.76 (4.68)	18.75 (4.85)	4.01	<.001***
Overweight	22.48 (4.62)	19.07 (4.16)	3.41	<.001***
Landscapes	22.40 (4.43)	19.06 (4.69)	3.34	<.001***

***p ≤ .001

There was a significant interaction between the condition and time on global state appearance self-esteem, $F(3, 191) = 3.64$, $p < .01$, partial $\eta^2 = .05$. When the simple main effects were explored, they showed that there was no significant difference in state appearance self-esteem between groups at pre-exposure ($F(3, 191) = .32$, $p = .81$ partial $\eta^2 = .01$) or at post exposure ($F(3, 192) = .14$, $p = .93$ partial $\eta^2 = .00$). Pairwise comparisons demonstrated that overall appearance self-esteem was significantly reduced from pre exposure (23.21 ± .60) to post exposure (18.81 ± .64) in the muscular condition ($p < .001$). Overall appearance self-esteem was also significantly reduced from pre-exposure (22.77 ± .66) to post exposure (18.75 ± .68) in the slim condition ($p < .001$), overweight condition (22.48 ± .68 vs 19.07 ± .61, $p < .001$) and landscapes condition (22.40 ± .63 vs 19.06 ± .66, $p < .001$).

Satisfied with the Way My Body Looks. There was no significant interaction between the condition and time on the ‘satisfied with the way my body looks’ item,

$F(3, 190) = 1.08$, $p = .36$, partial $\eta^2 = .02$. The main effect of time showed a significant difference in satisfaction with the way the body looks at the different time points, $F(1, 190) = 5.6$, $p = .02$, partial $\eta^2 = .03$. Post hoc tests using the Bonferroni correction demonstrated that image exposure elicited a significant increase in satisfaction with the way the body looks from pre-exposure (2.67 ± .07) to post-exposure (2.78 ± .07) by .10 ($p = .02$). The main effect of condition showed no significant difference in satisfaction with the way the body looks between groups, $F(3, 190) = .04$, $p = .99$, partial $\eta^2 = .00$.

Others Respect and Admire Me. There was no significant interaction between the condition and time on the 'others respect and admire me' item, $F(3, 193) = 1.79$, $p = .15$, partial $\eta^2 = .03$. The main effect of time showed a significant difference in the 'others respect and admire me' item at the different time points, $F(1, 193) = 7.87$, $p = .01$, partial $\eta^2 = .04$. Post hoc tests using the Bonferroni correction demonstrated that image exposure elicited a significant increase in the 'others respect and admire me' item from pre-exposure (2.80 ± .07) to post-exposure (2.90 ± .08) by .10 ($p = .01$). The main effect of condition showed no significant difference in the 'others respect and admire me' item between groups, $F(3, 193) = .53$, $p = .66$, partial $\eta^2 = .01$.

Feel Good about Myself. There was trend for an interaction between the condition and time on the 'I feel good about myself' item, $F(3, 192) = 2.54$, $p = .06$, partial $\eta^2 = .04$. There was no significant difference in the 'I feel good about myself' item between groups at pre-exposure ($F(3, 192) = .30$, $p = .83$ partial $\eta^2 = .01$) or at post exposure ($F(3, 193) = .25$, $p = .86$ partial $\eta^2 = .00$). Pairwise comparisons demonstrated that the 'I feel good about myself' item was almost significantly increased from pre exposure (2.96 ± .15) to post exposure (3.16 ± .13) in the

landscapes condition (p = .07). There was no significant difference in the 'I feel good about myself' item between pre and post exposure in the muscular, overweight or landscapes conditions.

Pleased with Appearance. There was a significant interaction between the condition and time on the 'I am pleased with my appearance' item, $F(3, 189) = 3.92$, p = .01, partial η^2 = .06. When the simple main effects were explored, they demonstrated that there was no significant difference in the 'I am pleased with my appearance' item between groups at pre-exposure ($F(3, 189) = .80$, p = .50 partial η^2 = .01) or at post exposure ($F(3, 193) = .08$, p = .97 partial η^2 = .00). Pairwise comparisons demonstrated that the 'I am pleased with my appearance' item was significantly increased from pre exposure (2.67 ± .14) to post exposure (2.85 ± .14) in the landscapes condition (p = .01). There was a trend towards an increase from pre exposure (2.72 ± .14) to pose exposure (2.87 ± .14) in the overweight condition (p = .07). There was a trend for a reduction from pre exposure (2.94 ± .13) to post exposure (2.80 ± .13) in the muscular condition (p = .07). There was no significant difference in the 'I am pleased with my appearance' item between pre and post exposure in the slim condition.

Feel Unattractive. There was trend toward an interaction between the condition and time on the 'I feel unattractive' item, $F(3, 189) = 2.51$, p = .06, partial η^2 = .04. There was no significant difference in the 'I feel unattractive' item between groups at pre-exposure ($F(3, 193) = .42$, p = .74 partial η^2 = .01) or at post exposure ($F(3, 189) = .59$, p = .63 partial η^2 = .01). Pairwise comparisons demonstrated that the 'I feel unattractive' item was significantly reduced from pre exposure (2.29 ± .13) to post exposure (2.10 ± .13) in the landscapes condition (p = .01). In the muscular condition, there was a trend for an increase from pre exposure (2.20 ± .14) to post

exposure (2.35 ± .16) in the "I feel unattractive" item (p = .09). There was no significant difference in the 'I feel unattractive' item between pre and post exposure in the slim or overweight conditions.

Dissatisfied with Weight. There was no significant interaction or any main effects for the 'dissatisfied with weight' item.

Diet Intentions

Table 8 shows mean diet intentions in each condition before and after exposure to the images. It also contains information from Bonferroni pairwise comparisons on whether these differences were significant. Overall diet intentions increased marginally from pre to post exposure in the muscular, slim and landscapes conditions and decreased marginally in the overweight condition. These differences were not significant.

Table 8. ***Mean diet intentions at pre and post exposure for each condition.***

Condition	**Pre exposure mean (*SD*)**	**Post exposure mean (*SD*)**	**Difference (Pre -post)**	***p***
Muscular	3.11 (1.39)	3.20 (1.52)	-.09	.28
Slim	3.47 (1.30)	3.52 (1.40)	-.05	.65
Overweight	3.63 (1.25)	3.52 (1.36)	.11	.15
Landscapes	3.48 (1.26)	3.50 (1.32)	-.02	.89

There was no significant interaction between the condition and time on overall diet intentions, $F(3, 193) = .91$, $p = .44$, partial $\eta^2 = .01$. The main effect of time showed no significant difference in diet intentions at the different time points, $F(1,$

193) = .05, p = .82, partial η^2 = .00. The main effect of condition showed no significant difference in diet intentions between groups, $F(3, 193) = .96$, p = .42, partial η^2 = .02.

Intention to Follow a Strict Diet Plan. There was a significant interaction between the condition and time on intention to follow a strict diet plan, $F(3, 193) = 2.92$, p = .04, partial η^2 = .04. When the simple main effects were explored, they demonstrated that there was a significant difference in the intention to follow a strict diet plan between groups at pre exposure, ($F(3, 193) = 3.18$, p = .03 partial η^2 = .05). However, there was no significant difference in the intention to follow a strict diet plan between groups at post exposure ($F(3, 193) = 1.80$, p = .15 partial η^2 = .03). Pairwise comparisons demonstrated that the intention to follow a strict diet plan was significantly increased from pre exposure (2.50 ± .27) to post exposure (2.90 ± .28) in the muscular condition (p = .01). Additionally, the intention to follow a strict diet plan was significantly increased from pre exposure (3.38 ± .25) to post exposure (3.74 ± .24) in the landscapes condition. In the slim condition, the intention to follow a strict diet plan was increased from pre exposure (3.00 ± .24) to post exposure (3.28 ± .26) and this was almost significant (p = .08). There was no significant difference in the intention to follow a strict diet between pre and post exposure in the overweight condition, however, the intention did decrease from pre exposure (3.51 ± .26) to post exposure (3.34 ± .25).

Intention to Reduce Carbohydrate Intake. There was almost a significant interaction between the condition and time on intention to reduce carbohydrate intake, $F(3, 190) = 2.36$, p = .07, partial η^2 = .04. There was no significant difference in the intention to reduce carbohydrate intake between groups at pre-exposure ($F(3, 192) = 1.0$, p = .39 partial η^2 = .02) or at post exposure ($F(3, 191) = 1.45$, p = .23 partial η^2 = .02). Pairwise comparisons demonstrated that the intention to reduce carbohydrate

intake was almost significantly reduced from pre exposure (3.67 ± .25) to post exposure (3.44 ± .25) in the overweight condition (p = .07). There was no significant difference in the intention to reduce carbohydrate intake between pre and post exposure in the muscular, slim or landscapes conditions.

Intention to Increase Use of Supplements. There was no significant interaction between the condition and time on intention to increase use of supplements, $F(3, 191) = .60$, $p = .62$, partial $\eta^2 = .01$. The main effect of time showed a significant difference in intention to increase use of supplements at the different time points, $F(1,191) = 4.14$, $p = .04$, partial $\eta^2 = .02$. Post hoc tests using the Bonferroni correction demonstrated that image exposure elicited a significant increase in intention to increase use of supplements from pre-exposure (2.34 ± .12) to post-exposure (2.47 ± .13) by .14 (p = .04). The main effect of condition showed no significant difference in intention to increase use of supplements between groups $F(3, 191) = .69$, $p = .56$, partial $\eta^2 = .01$.

There were no significant interactions or main effects for the intention to change what they usually eat, intention to eat clean, intention to increase protein intake, intention to reduce fat intake or intention to reduce sugar intake items.

Exercise Intentions

Table 9 shows mean exercise intentions in each condition before and after exposure to the images. It also contains information from Bonferroni pairwise comparisons on whether these differences were significant. Mean exercise intentions increased slightly in the muscular and landscape conditions and decreased marginally in the slim and overweight conditions. These differences were not significant.

Table 9. ***Mean exercise intentions at pre and post exposure for each condition.***

Condition	**Pre exposure mean (*SD*)**	**Post exposure mean (*SD*)**	**Difference (Pre -post)**	***p***
Muscular	3.49 (1.65)	3.56 (1.65)	-.07	.49
Slim	4.00 (1.50)	3.94 (1.58)	.06	.70
Overweight	3.98 (1.62)	3.97 (1.71)	.01	.97
Landscapes	3.80 (1.31)	3.90 (1.44)	-.11	.18

There was no significant interaction between the condition and time on global exercise intentions, $F(3, 193) = .50$, $p = .68$, partial $\eta^2 = .01$. The main effect of time showed no significant difference in exercise intentions at the different time points, $F(1, 193) = .39$, $p = .54$, partial $\eta^2 = .00$. The main effect of condition showed no significant difference in exercise intentions between groups $F(3, 193) = .96$, $p = .41$, partial $\eta^2 = .02$.

Items. There were no significant interactions or main effects for the intention to follow a strict exercise plan/routine, intention to exercise more often, intention to increase intensity of exercise, intention to increase weight training or intention to increase cardiovascular training.

Summary of Main Findings from Mixed ANOVAs

- The ANOVAs for the global measures revealed no significant interactions for state body satisfaction, state mood, diet intentions or exercise intentions.
- When mixed ANOVAs were run on individual items of the measures, there were several significant interactions and main effects:

- Muscularity satisfaction and overall body satisfaction were significantly reduced after exposure in the muscular condition. Being pleased with appearance almost significantly decreased in the muscular condition.
- There was a significant reduction in feeling unattractive after image exposure in the landscapes condition. This was in contrast with a small increase (trend) in feeling unattractive after viewing the images in the muscular condition.
- There was a significant increase in the intention to follow a strict diet plan after image exposure in the muscular and landscapes conditions.
- There was a significant increase in intention to use supplements from pre exposure to post exposure, but this was not different between groups.

Secondary Analysis

The study's secondary aim was to explore the mechanism involved in the influence of exposure condition on state body satisfaction, state mood, state appearance self-esteem and intentions to go on a diet or exercise. Therefore, mediation analyses were carried out, with state appearance comparison as the mediator. State appearance comparison was measured after exposure, to assess how much participants compared themselves to the images.

Table 10 shows mean state appearance comparison in each condition. The muscular condition had the highest mean state appearance comparison and as expected, the landscapes (control) condition had the lowest. The reason state appearance comparison was expected to be lowest in the landscapes condition was because there were no people in the images at it was a control condition. So, when participants were asked how much they compared their overall appearance and

specific body parts to the landscape images, participants should have had no opportunity to make any social comparisons in relation to their body. Furthermore, when participants were asked to what extent they thought about their appearance when viewing the images, this was expected to be lower in the landscapes condition as there were no people in the images to prime appearance comparison.

Table 10. ***Mean state appearance comparison in each condition.***

Condition	**Mean State Appearance Comparison**	***SD***
Muscular	8.27	4.49
Slim	8.22	5.93
Overweight	7.00	4.57
Landscapes	3.80	2.92

A one-way ANOVA was carried out to compare whether the difference in mean state appearance comparison between groups was significant. The ANOVA demonstrated that there was a significant difference in mean state appearance comparison between groups $F(3, 191) = 11.30$, $p < .001$. Post hoc tests using the Bonferroni correction showed that state appearance comparison was significantly higher in the muscular (8.27 ± 4.49, $p < .001$), slim (8.22 ± 5.93, $p < .001$) and overweight conditions (7.00 ± 2.92, $p = .002$) compared to the landscapes condition (3.80 ± 2.92). There was no significant difference in mean state appearance comparison between the muscular and slim ($p = 1.0$), muscular and overweight ($p = .50$) or slim and overweight ($p = .52$) conditions.

It was hypothesised that state appearance comparison would mediate the effect of condition (image type) on state body satisfaction, state mood, state appearance self-esteem, diet intentions and exercise intentions, when controlling for pre exposure scores (covariate).

As outlined in the data analysis section, the mediation used to test this prediction was mediation with a multi-categorical x, using model 4 and an indicator coding system in PROCESS v3.3 (Hayes & Preacher, 2014). In order to allow all conditions to be compared using the indicator coding system, the analysis was run three times. First, with the muscular condition as the reference group, second with the slim condition as the reference group and third with the overweight condition as the reference group.

Indirect effects (i.e. the effect of X on Y via the mediator) are reported here because if they are significant then mediation is supported (Hayes, 2017). For the indirect effect to be significant, the lower and upper bootstrap confidence intervals should not overlap with 0 (Field, 2017). Appendix H contains full path details for each mediation analyses.

State Body Satisfaction

To examine whether condition (*X*) impacted upon state body satisfaction (*Y*) through the mediator state appearance comparison (*M*), mediation analyses with a multi-categorical antecedent variable with pre exposure scores as a covariate were run three times to allow all comparisons between conditions to be made. Figure 6 illustrates the mediation analysis with muscular as the reference group.

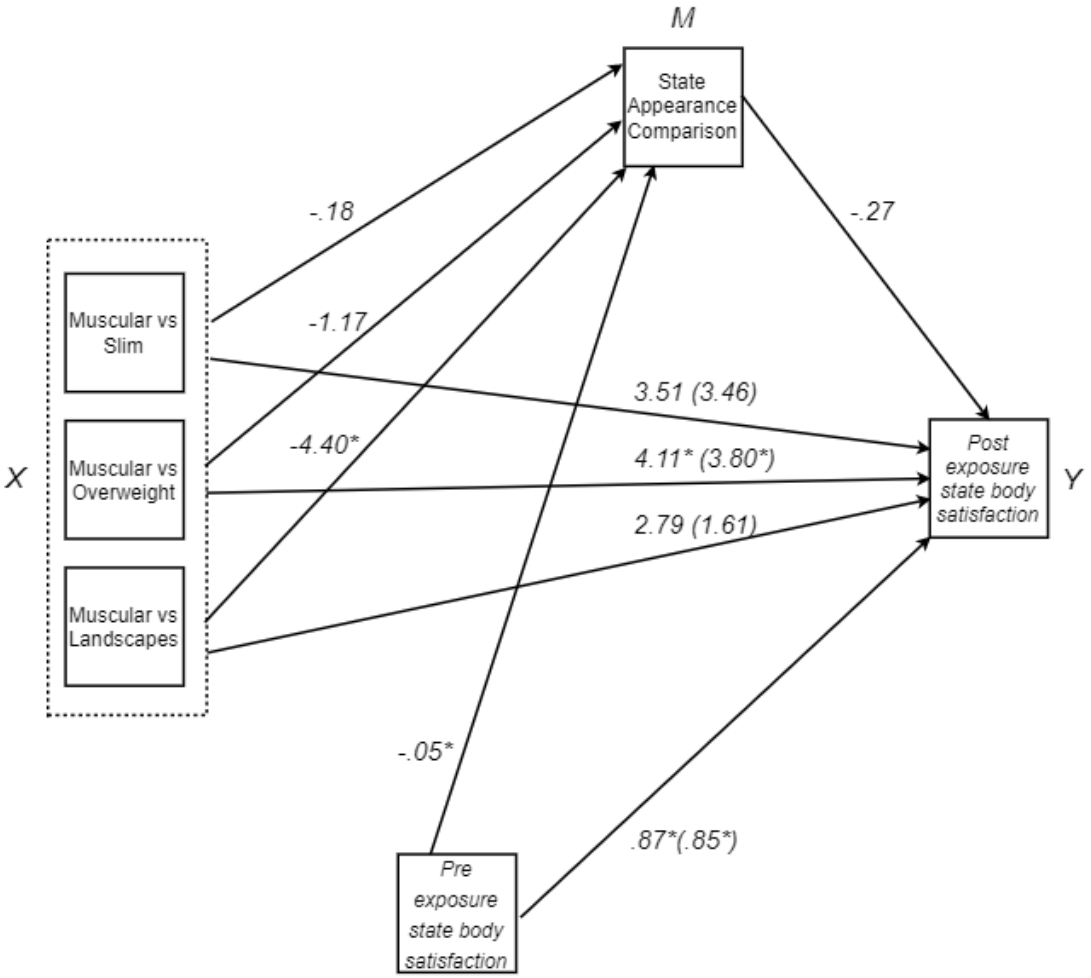

Figure 6. ***Standardised regression coefficients for the analysis with the muscular condition as the reference group and post exposure state body satisfaction as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Path *a* was significant when comparing muscular and landscape images b = -4.40, $t(189)$ = -5.00, $p < .001$. This indicates that people in the muscular condition scored on average 4.40 more on state appearance comparison than those in the landscapes condition. Path *a* was also significant for the covariate which suggests that pre exposure state body satisfaction predicted state appearance comparison (p = .01). The negative coefficient suggests that as pre exposure state body satisfaction increased state appearance comparison decreased.

Path *c* was significant when comparing muscular and overweight conditions, $b = 4.11$, $t(189) = 2.19$, $p = .03$. This means that there was lower mean state body satisfaction post exposure in the muscular condition compared to the overweight condition, when ignoring the presence of the mediator (see Table 5). This path remained significant when controlling for the mediator (see Figure 6).

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on state body satisfaction through state appearance comparison when comparing muscular vs slim $b = -.05$, $SE = .30$, 95% CI [-.57, .72], muscular vs overweight $b = .31$, $SE = .37$, 95% CI [-.17, 1.25] or muscular vs landscapes conditions $b = 1.18$, $SE = .77$, 95% CI [-.11, 2.88]. Hence, mediation did not occur.

Figure 7 illustrates comparisons with the slim condition as the reference group. Path *a* was significant when comparing slim and landscape images $b = -4.21$, $t(142) = -4.85$, $p < .001$. This shows that people in the slim condition scored on average 4.85 more on state appearance comparison than those in the landscapes condition.

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on state body satisfaction through state appearance comparison for slim vs overweight $b = .05$, $SE = .27$, 95% CI [-.36, .80] or slim vs landscapes $b = .22$, $SE = .82$, 95% CI [-1.29, 2.00]. Therefore, mediation did not occur.

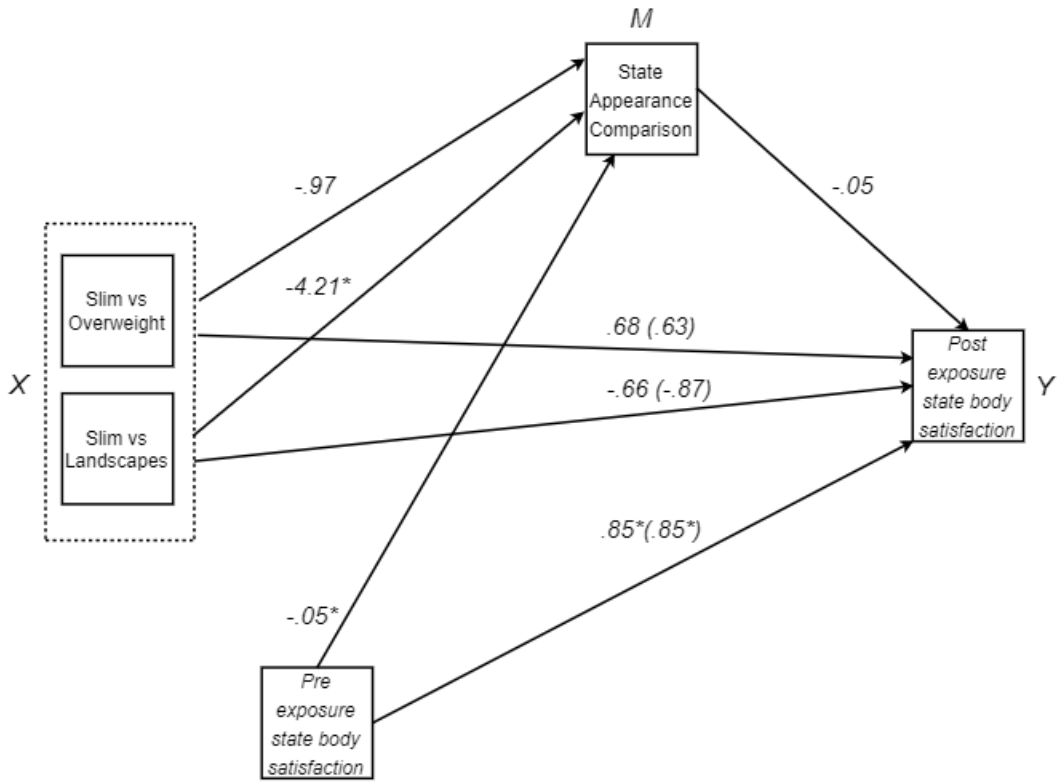

Figure 7. ***Standardised regression coefficients for the analysis with the slim condition as the reference group post exposure state body satisfaction as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Figure 8 demonstrates the final comparison between overweight and landscape images. Path *a* was significant when comparing overweight and neutral conditions b = -3.21, $t(93)$ = -4.12, $p < .001$. This means that people in the overweight condition scored on average 3.21 more on state appearance comparison than those in the landscapes condition.

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on state body satisfaction through state appearance

comparison when comparing overweight vs landscapes images b = -.81, SE = .87, 95% CI [-2.74, .73]. Hence, mediation did not occur.

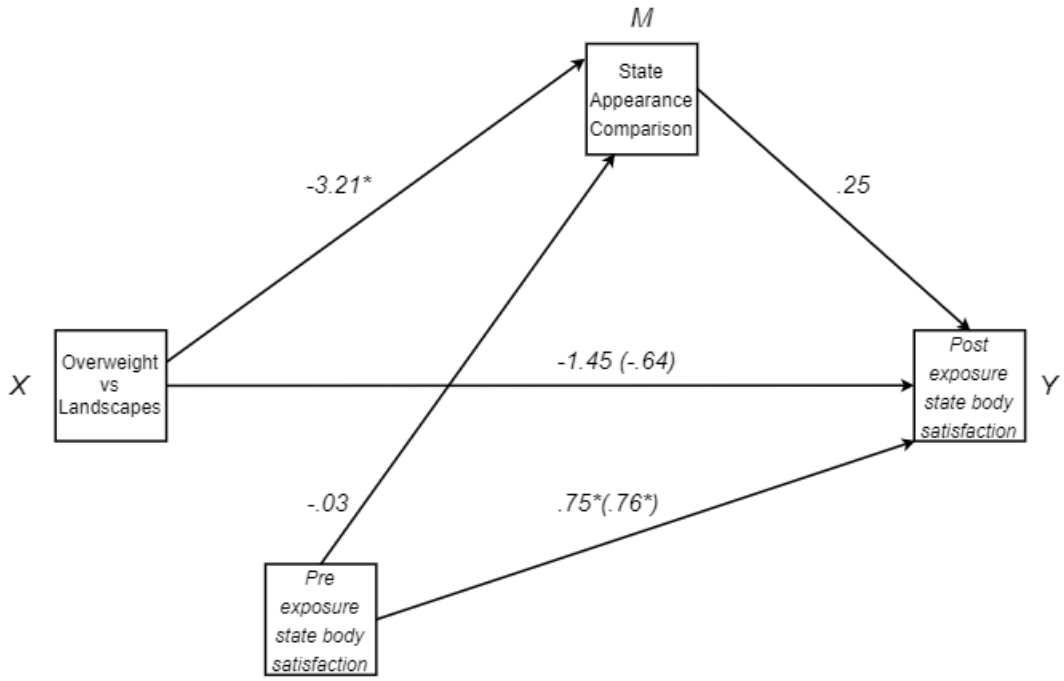

Figure 8. ***Standardised regression coefficients for the analysis with the overweight condition as the reference group post exposure state body satisfaction as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

State Mood

To examine whether condition (*X*) impacted upon state mood (*Y*) through the mediator state appearance comparison (*M*), mediation analyses with a multi-categorical antecedent variable were run three times to allow all comparisons between conditions to be made.

Figure 9 illustrates the mediation analysis with muscular as the reference group. Path *a* was significant when comparing muscular and landscape images b = -4.42, $t(186)$ = -4.86, p <.001. This means that people in the muscular condition scored

on average 4.42 more on state appearance comparison than those in the landscapes condition.

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on state mood through state appearance comparison when comparing muscular vs slim b = .0002, SE = .13, 95% CI [-.27, .29], muscular vs overweight b = .05, SE = .18, 95% CI [-.34, .44] and muscular vs landscapes conditions b = .20, SE = .54, 95% CI = -.83, 1.32]. Therefore, mediation did not occur.

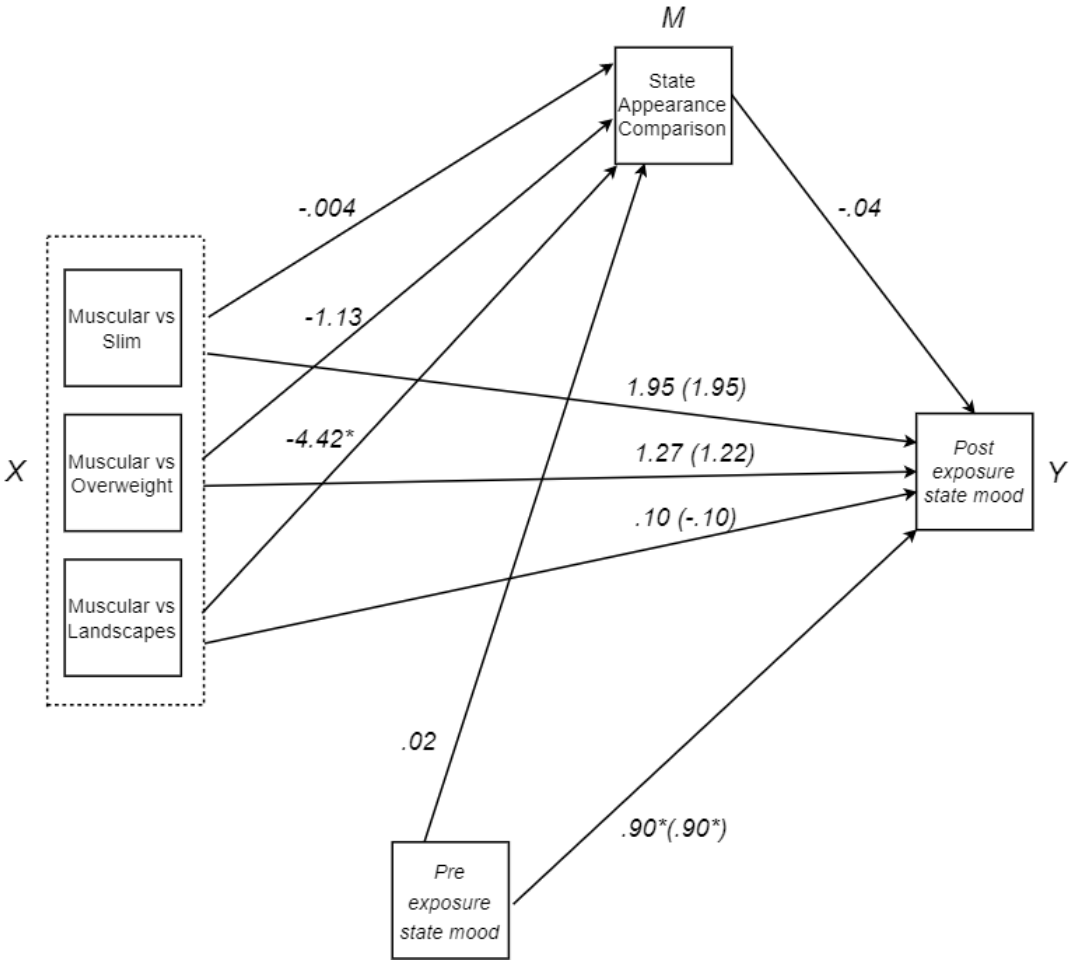

Figure 9. ***Standardised regression coefficients for the analysis with the muscular condition as the reference group and post exposure state mood as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Figure 10 shows the mediation with slim as the reference group. Path *a* was significant when comparing slim and landscapes b = -4.42, $t(141)$ = -5.00, p <.001. This means that people in the slim condition scored on average 4.42 more on state appearance comparison than those in the landscapes condition.

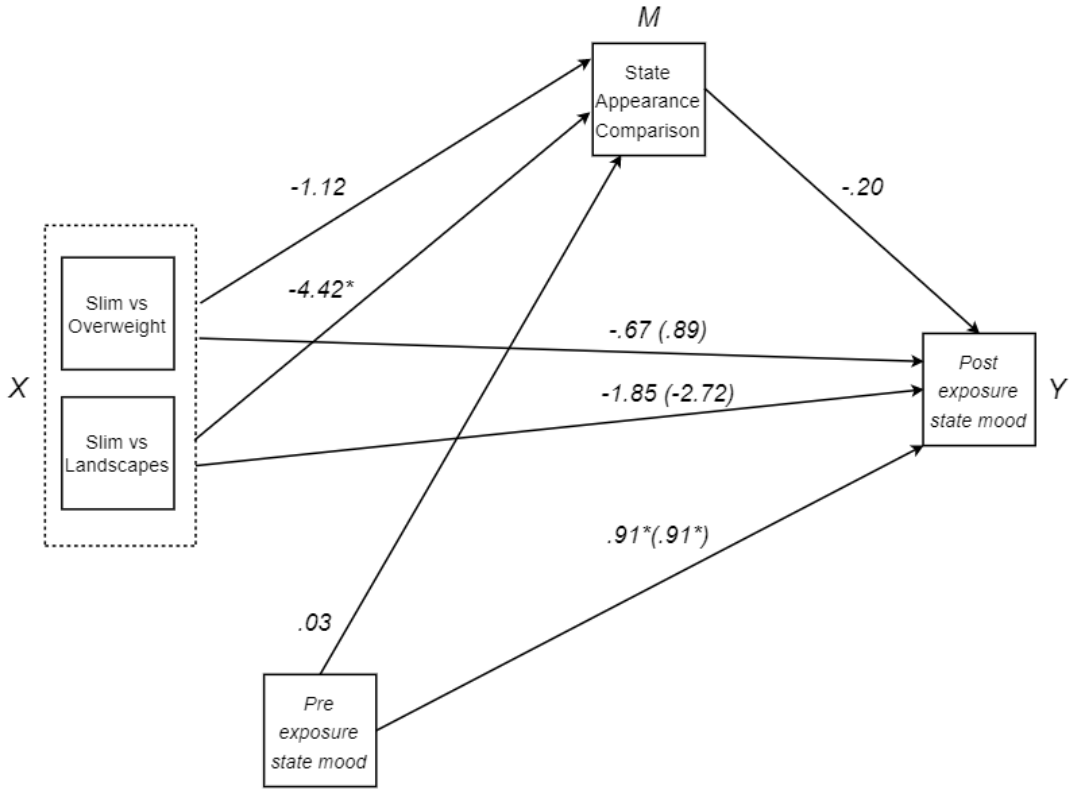

Figure 10. ***Standardised regression coefficients for the analysis with the slim condition as the reference group and post exposure state mood as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on state mood through state appearance comparison when comparing slim vs overweight b = .22, SE = .28, 95% CI [-.28, .83] and slim vs landscapes conditions b = .87, SE = .68, 95% CI [-.22, 2.24]. Therefore, mediation did not occur.

Figure 11 shows mediation with the final group comparison. Path *a* shows that those in the overweight condition demonstrated significantly more state appearance comparison than those in the landscapes condition b = -3.23, $t(92)$ = -4.07, p <.001. Path *b* demonstrated that the mediator, controlling for condition was a significant predictor of post exposure state mood b = -.48, $t(91)$ = -2.17, p = .03. The negative *b* value demonstrated that as state appearance comparison increased post exposure state mood decreased.

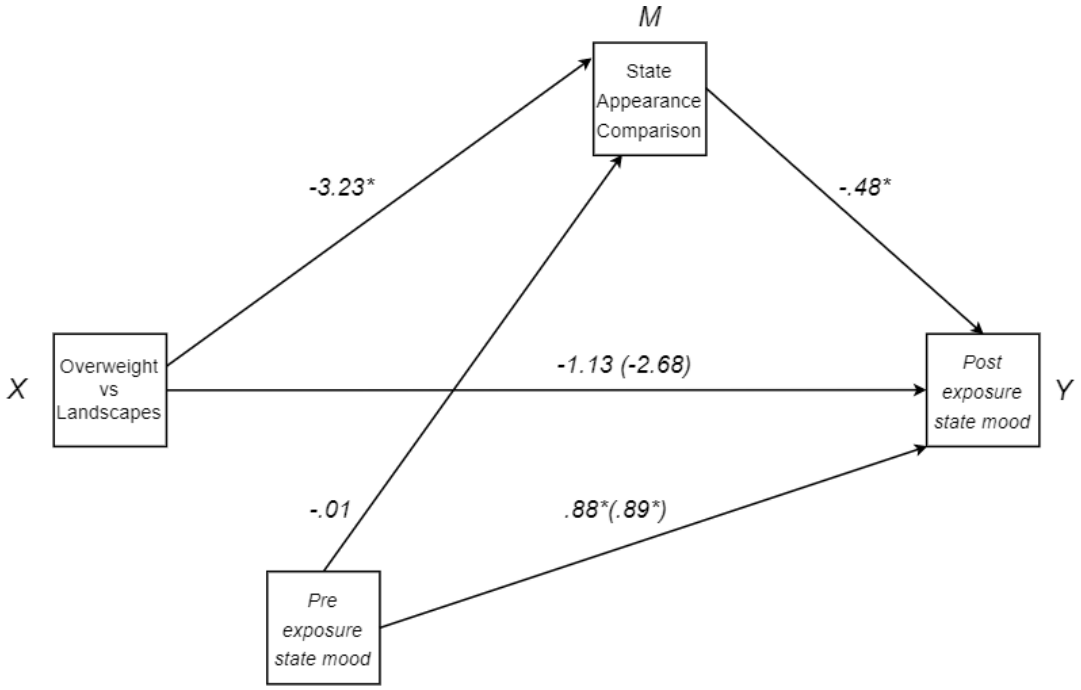

Figure 11. ***Standardised regression coefficients with the overweight condition as the reference group post exposure state mood as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Bootstrap confidence intervals did not overlap with 0 so demonstrated that there was a significant indirect effect of condition on state mood through state appearance comparison when comparing overweight vs landscapes conditions b = 1.54, *SE* = .97, 95% CI [.10, 3.79]. Therefore, mediation occurred. So, it can be concluded that those who viewed overweight images had a lower state mood (post

exposure) than those who viewed landscape images because they engaged in more state appearance comparison.

State Appearance Self-Esteem

To examine whether condition (*X*) impacted upon state appearance self-esteem (*Y*) through the mediator state appearance comparison (*M*), mediation with a multi-categorical antecedent variable were run three times to allow all comparisons between conditions to be made. Figure 12 illustrates the mediation analysis with the muscular condition as the reference group.

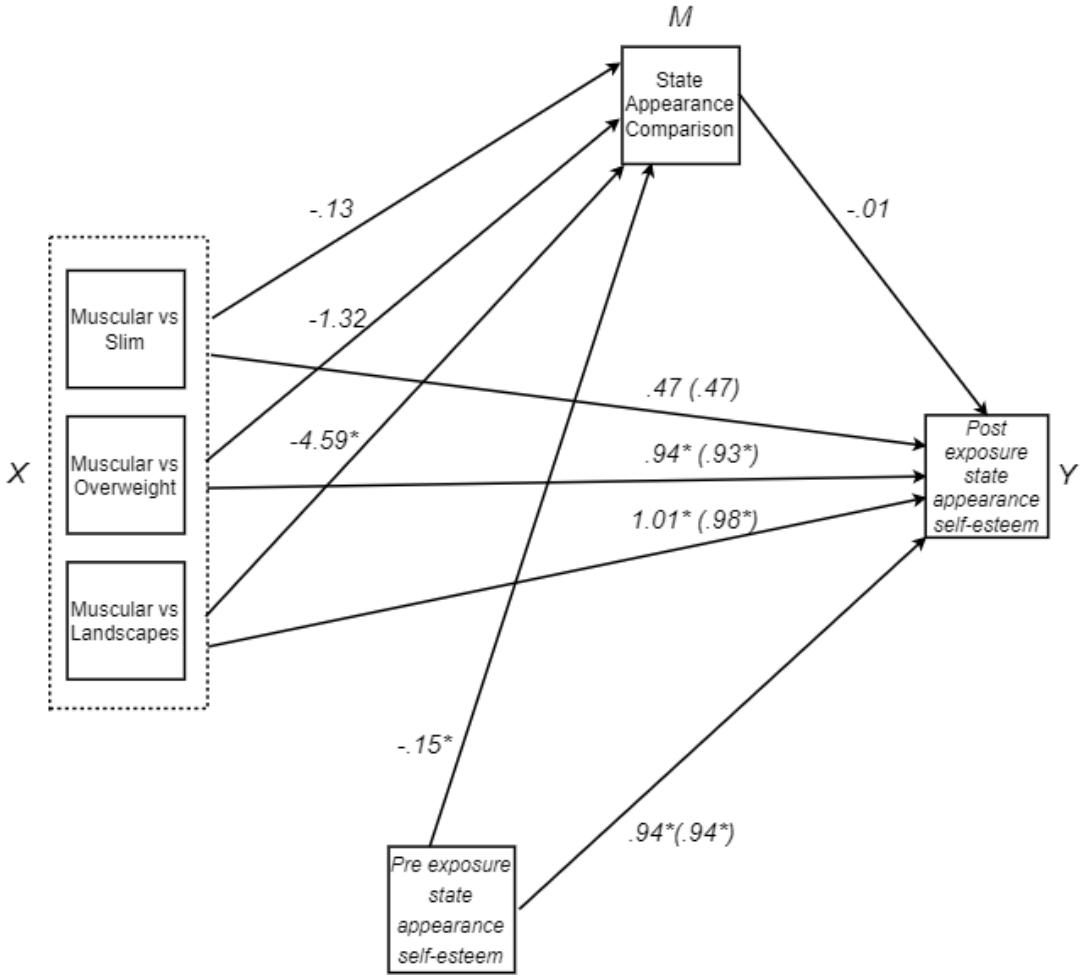

Figure 12. ***Standardised regression coefficients for the analysis with the muscular condition as the reference group and post exposure state appearance self-esteem as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Path *a* was significant when comparing muscular and landscape images *b* = -4.59, *t*(189) = -5.20, *p* <.00. This means that people in the muscular condition scored on average 4.59 more on state appearance comparison than those in the landscapes condition.

Path *c* was significant when comparing muscular vs overweight, *b* = .94, *t*(189) = 2.56, *p* = .01 and muscular vs landscapes conditions *b* = 1.01, *t*(189) = 2.80, *p* = .01. This means that there was lower mean state appearance self-esteem in the muscular condition compared to the overweight and landscape conditions after image exposure. When controlling for the mediator, these paths remained significant.

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on state appearance self-esteem through state appearance comparison when comparing muscular vs slim *b* = .001, *SE* = .03, 95% CI [-.06, .09], muscular vs overweight *b* = .01, *SE* = ..06, 95% CI [-.09, .16] and muscular vs landscapes conditions. *b* = .03, *SE* = .17, 95% CI [-.27, .35]. So, mediation did not occur.

Figure 13 shows the mediation with slim as the reference group. Path *a* was significant when comparing slim and landscape conditions *b* = -4.46, *t*(142) = -5.10, *p* <.001. This means that people in the slim condition scored on average 4.46 more on state appearance comparison than those in the landscapes condition.

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on state appearance self-esteem through state appearance comparison when comparing slim vs overweight *b* = -.01, *SE* = .06, 95% CI [-.13, .13] and slim vs landscapes *b* = -.05, *SE* = .17, 95% CI [-.38, .30]. Therefore, mediation did not occur.

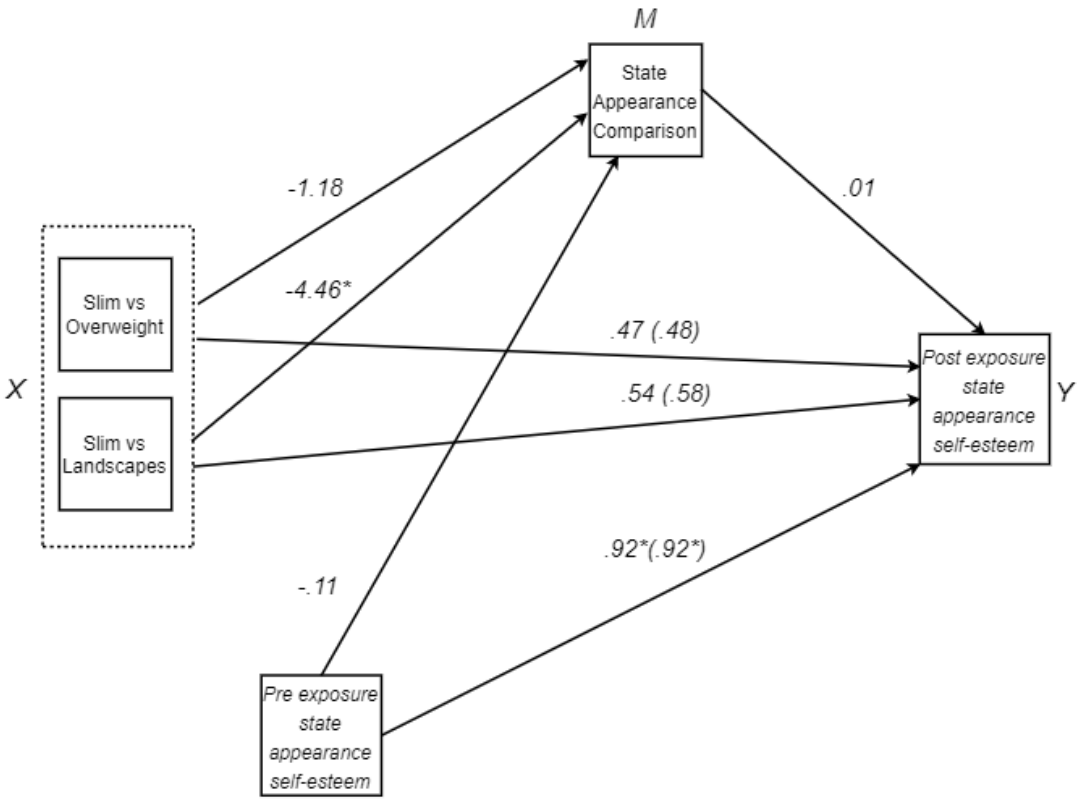

Figure 13. ***Standardised regression coefficients for the analysis with the slim condition as the reference group and post exposure state appearance self-esteem as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Figure 14 shows the mediation with the final group comparison. Path *a* was significant when comparing overweight and landscape conditions b = -3.27, $t(93)$ = -4.18, $p < .001$. This means that people in the overweight condition scored on average 3.27 more on state appearance comparison than those in the landscapes condition.

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on state appearance self-esteem through state appearance comparison when comparing overweight vs landscapes conditions b = -.11, SE = .21, 95% CI [-.57, .24]. Therefore, mediation did not occur.

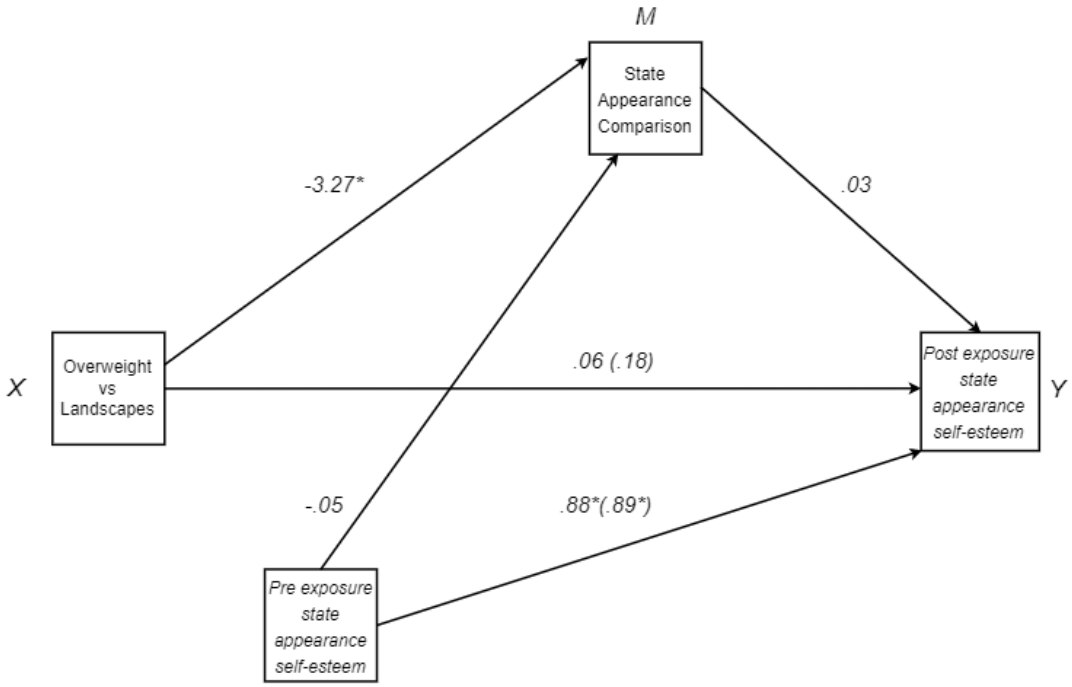

Figure 14. ***Standardised regression coefficients with the overweight condition as the reference group post exposure state appearance self-esteem as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Diet Intentions

To examine whether condition (*X*) impacted upon diet intentions (*Y*) through the mediator state appearance comparison (*M*), mediation with a multi-categorical antecedent variable were run three times to allow all comparisons between conditions to be made.

Figure 15 illustrates the mediation analysis with the muscular condition as the reference group. Path *a* was significant when comparing muscular vs overweight b = -1.75, $t(190)$ = -1.98, p = .05 and muscular vs landscapes conditions b = -4.82, $t(190)$ = -5.57, p <.001. This means that people in the muscular condition scored on average 1.75 more on state appearance comparison than those in the overweight condition and

4.82 more than those in the landscapes condition. Path *a* was also significant for the covariate ($p < .05$) which suggested that as pre exposure dieting intentions increased state appearance comparison also increased.

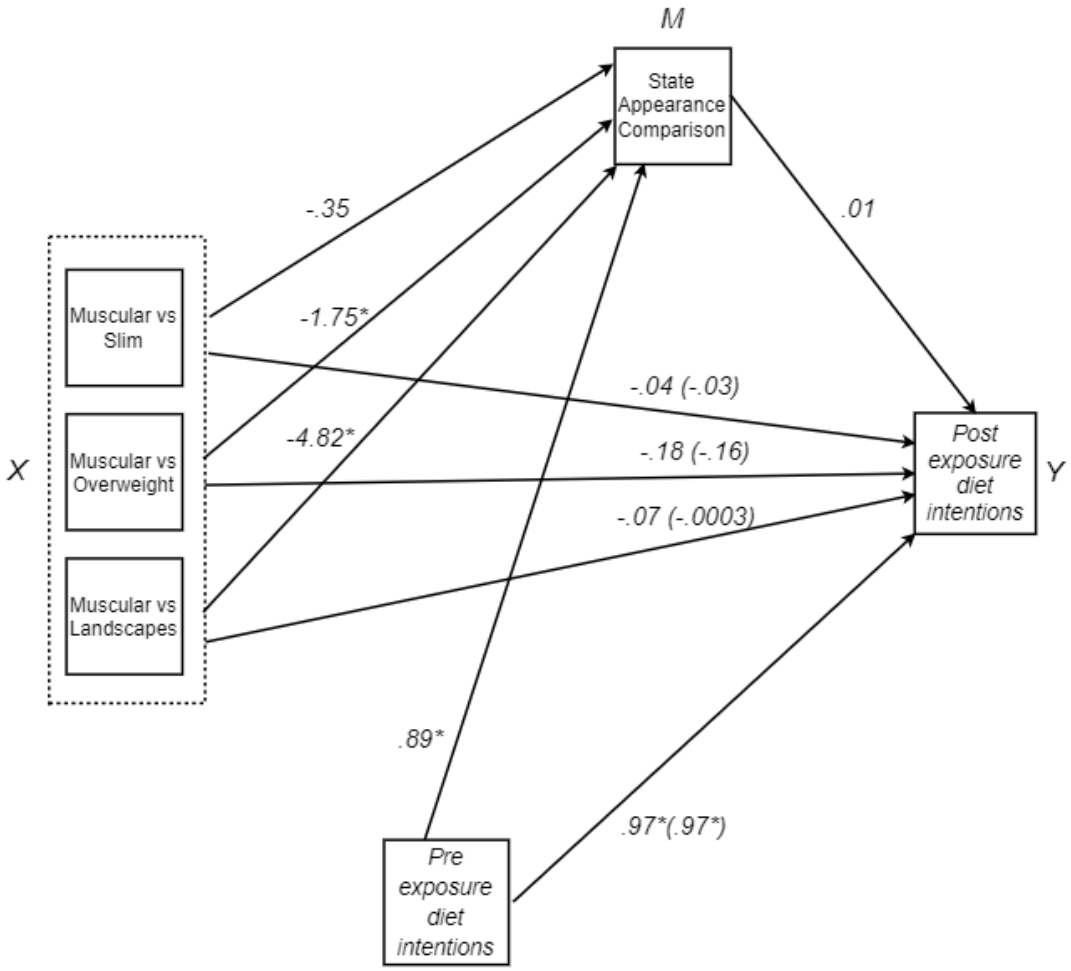

Figure 15. ***Standardised regression coefficients for the analysis with the muscular condition as the reference group and post exposure diet intentions as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on diet intentions through state appearance comparison when comparing muscular vs slim b = -.005, SE = .02, 95% CI [-.06, .03], muscular vs overweight b = -.02, SE = .03, 95% CI [-.11, .03] and muscular vs landscapes conditions b = -.07, SE = .08, 95% CI [-.23, .07]. Therefore, mediation did not occur. However, when the covariate (pre exposure diet intentions) was not included, there

was a significant indirect effect of condition on diet intentions through state appearance comparison for the muscular vs landscape condition.

Figure 16 shows the mediation with slim as the reference group. Path *a* was significant when comparing slim vs landscapes conditions b = -4.45, $t(143)$ = -5.14, p <.001, meaning that people in the slim condition scored on average 4.45 more than those in the landscapes condition on state appearance comparison.

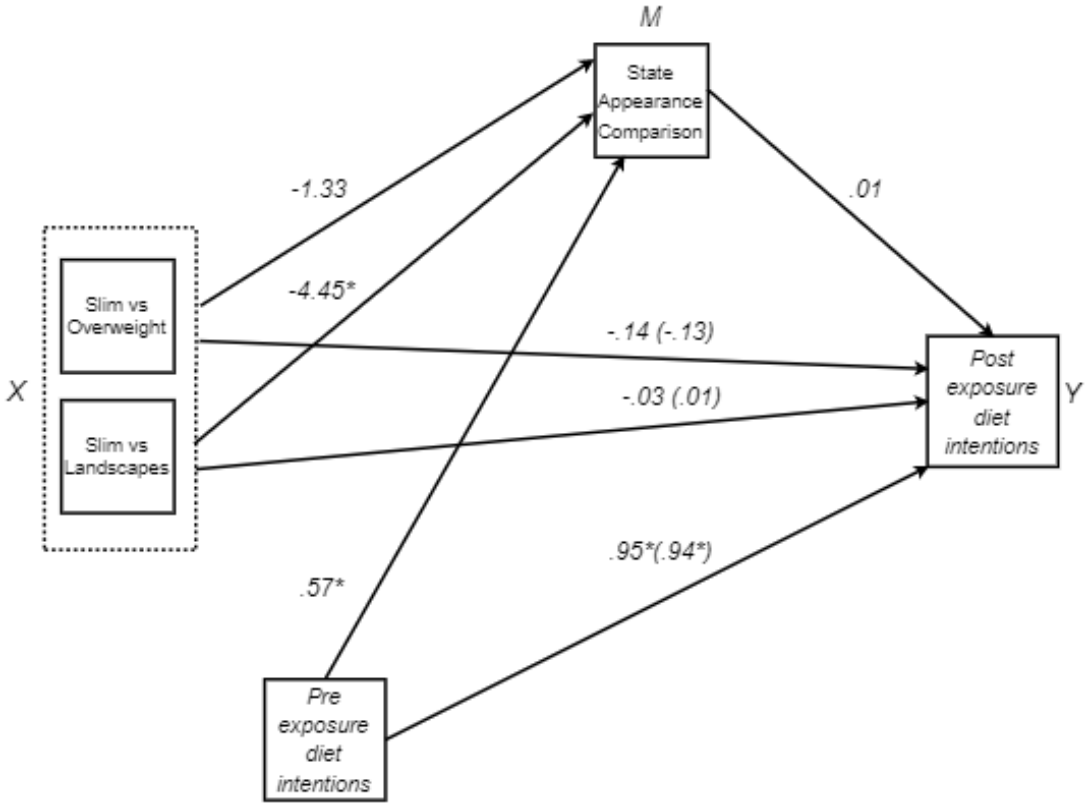

Figure 16. ***Standardised regression coefficients for the analysis with the slim condition as the reference group and post exposure diet intentions as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on diet intentions through state appearance comparison for slim vs overweight b = -.01, SE = .03, 95% CI [-.08, .05], slim vs landscapes b = -.03, SE = .08, 95% CI [-.20, .12]. Therefore, mediation did not occur.

Figure 17 shows mediation with the final group comparison. Path *a* was significant *b* = -3.11, *t*(94) = -4.08, *p* <.001 meaning that people in the overweight condition scored on average 3.11 more than those in the landscapes condition on state appearance comparison.

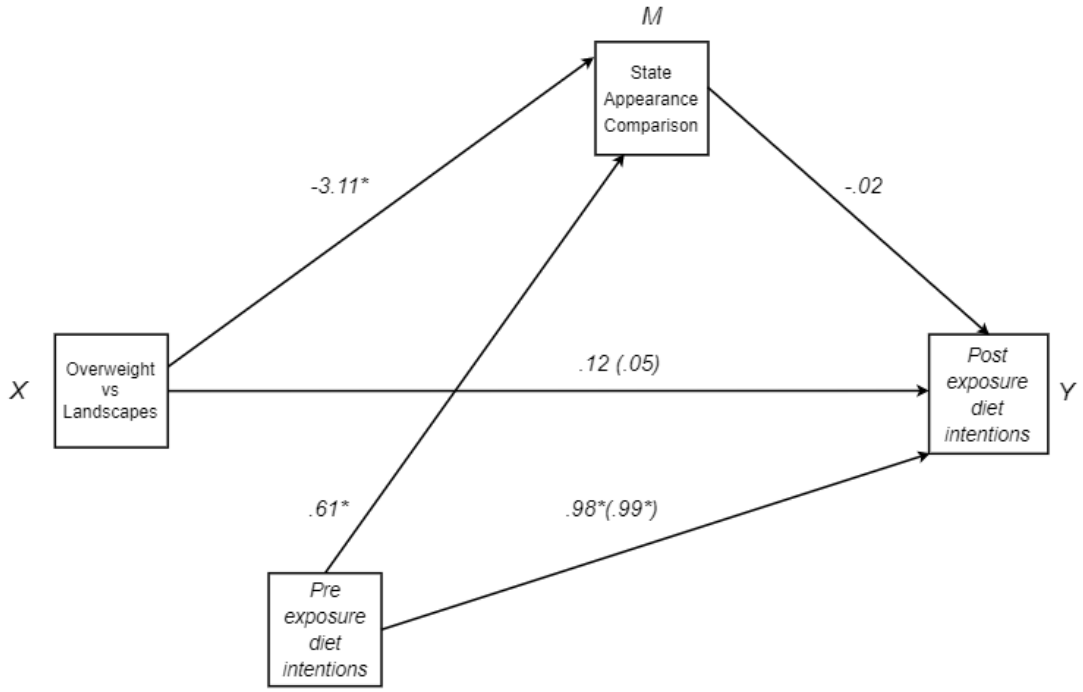

Figure 17. ***Standardised regression coefficients with the overweight condition as the reference group post exposure diet intentions as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on diet intentions through state appearance comparison when comparing overweight vs landscapes conditions *b* = .06, *SE* = .08, 95% CI [-.08, .22]. Therefore, mediation did not occur.

Exercise Intentions

To investigate whether condition (*X*) impacted upon exercise intentions (*Y*) through the mediator state appearance comparison (*M*), mediation with a multi-categorical antecedent variable were run three times to allow all comparisons between

conditions to be made. Figure 18 illustrates the mediation analysis with the muscular condition as the reference group.

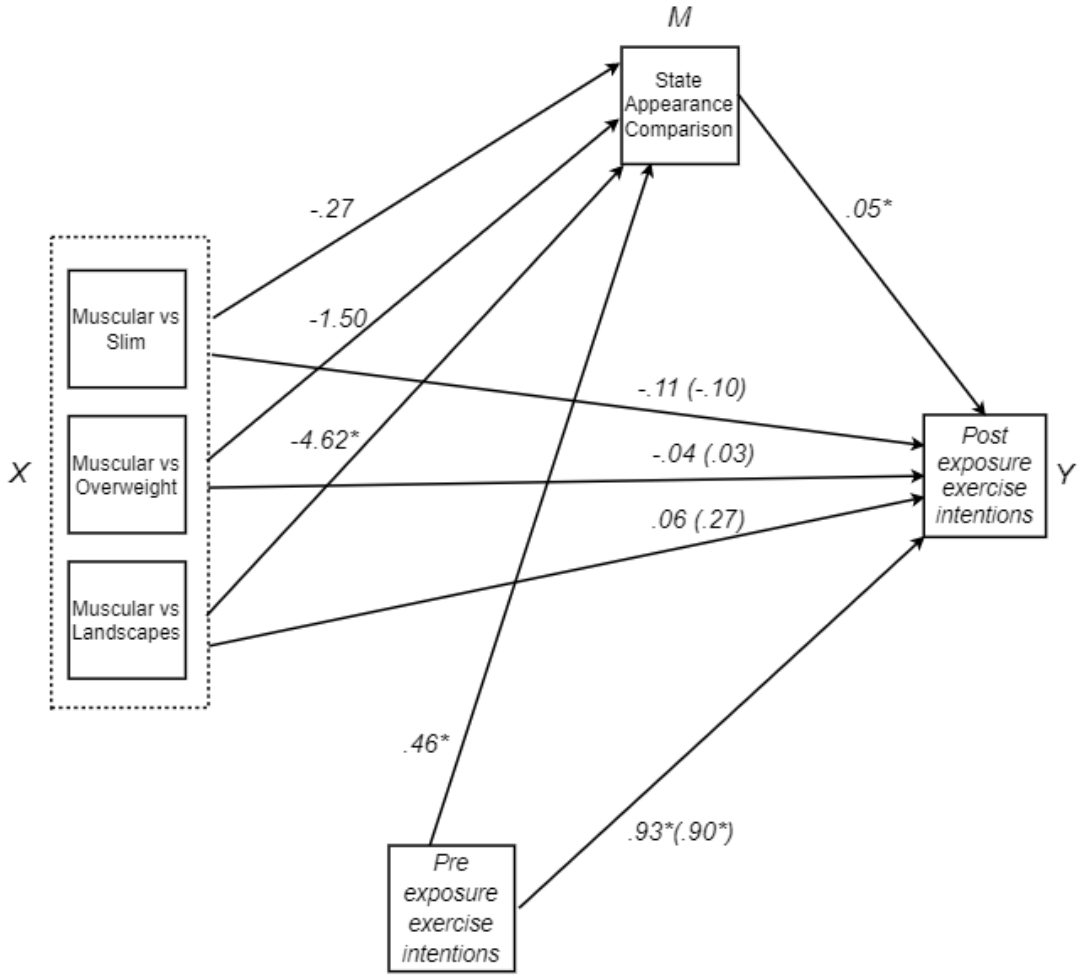

Figure 18. ***Standardised regression coefficients for the analysis with the muscular condition as the reference group and post exposure diet intentions as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Path a was significant when comparing muscular vs landscapes conditions *b* = -4.62, *t*(190) = -5.23, *p* <.001. This means that people in the muscular condition scored on average 4.62 more on state appearance comparison than those in the landscapes condition. Path *b* demonstrated the mediator, controlling for condition was

a significant predictor of post exercise intentions $b = .05$, $t(189) = 3.84$, $p < .001$. The positive coefficient value demonstrated that as state appearance comparison increased post exposure exercise intentions increased.

Bootstrap confidence intervals demonstrated that there was a significant indirect effect of condition on exercise intentions through state appearance comparison when comparing muscular vs landscape conditions $b = -.21$, $SE = .08$, 95% CI [-.39, -.07]. Therefore, mediation occurred. So, it can be concluded that those who viewed the muscular images had higher exercise intentions (post exposure) than those who viewed landscape images because they engaged in more state appearance comparison.

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on exercise intentions through state appearance comparison when comparing muscular vs slim $b = -.01$, $SE = .05$, 95% CI [-.11, .07] and muscular vs overweight conditions $b = -.07$, $SE = .05$, 95% CI [-.18, .01]. Therefore, mediation did not occur.

Figure 19 illustrates the mediation with slim as the reference group. Path *a* was significant when comparing slim vs landscapes conditions $b = -4.39$, $t(143) = -5.01$, $p < .001$, meaning that those in the slim condition scored on average 4.39 more on state appearance comparison than those in the landscapes condition. Path *b* demonstrated the mediator, controlling for condition was a significant predictor of post exercise intentions b = .05, $t(142) = 3.34$, $p = .001$. The positive b value demonstrated that as state appearance comparison increased post exposure exercise intentions increased.

Bootstrap confidence intervals demonstrated a significant indirect effect of condition on exercise intentions through state appearance comparison when

comparing slim vs landscapes conditions b = -.20, SE = .09, 95% CI [-.39, -.05]. Therefore, mediation occurred. So, it can be concluded that those who viewed the slim images had higher exercise intentions (post exposure) than those who viewed landscape images because they engaged in more state appearance comparison.

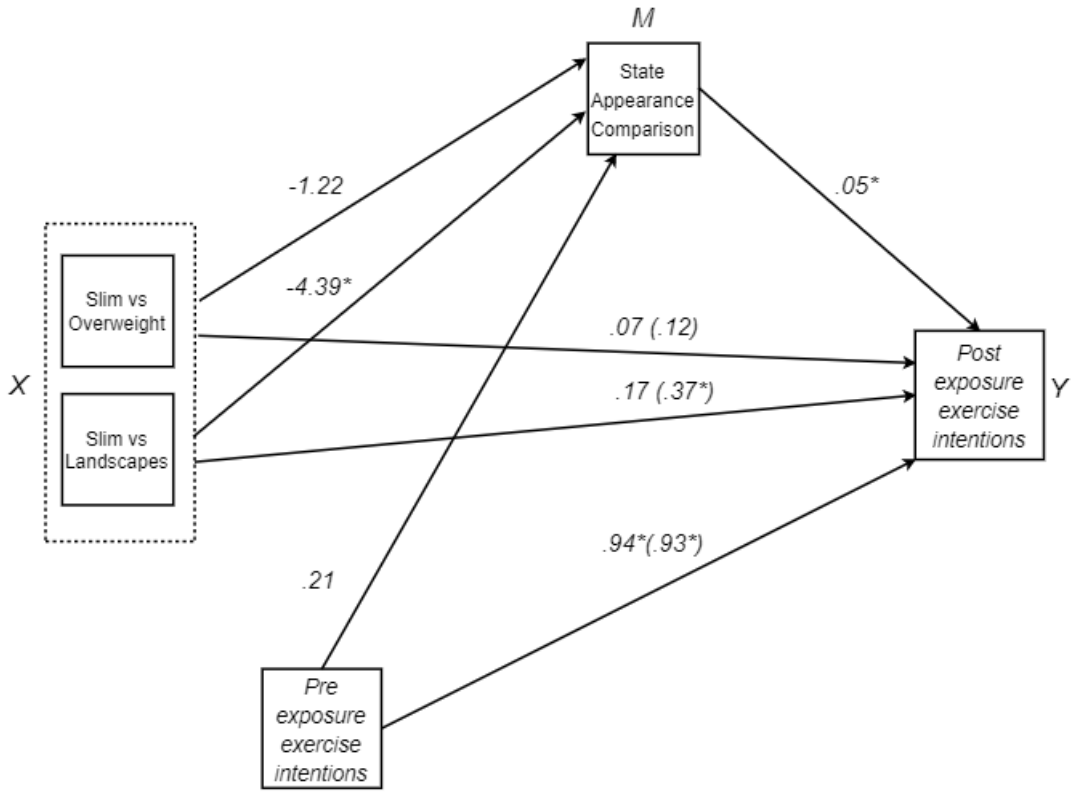

Figure 19. ***Standardised regression coefficients for the analysis with the slim condition as the reference group and post exposure exercise intentions as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Figure 20 illustrates the final mediation analysis comparing the overweight and landscape conditions. Path a was significant b = -3.18, $t(94)$ = .35, p <.001, meaning that those in the overweight condition scored on average 3.18 more on state appearance comparison than those in the landscapes condition. Path b demonstrated the mediator, controlling for condition was a significant predictor of post exercise

intentions $b = .04$, $t(93) = 2.61$, $p = .01$. The positive b value demonstrated that as state appearance comparison increased post exposure exercise intentions increased.

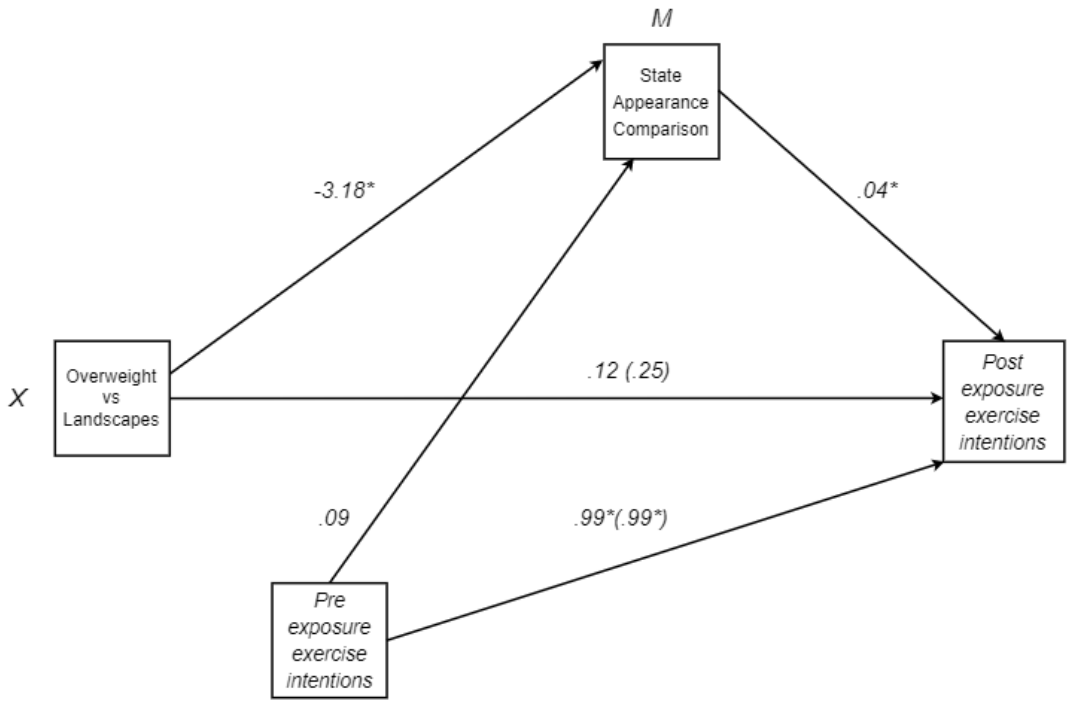

Figure 20. ***Standardised regression coefficients with the overweight condition as the reference group post exposure exercise intentions as the outcome variable.***

Note. *The coefficients in brackets is the direct effect (path c'): *p < .05.*

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on exercise intentions through state appearance comparison when comparing overweight vs landscapes conditions $b = -.14$, $SE = .09$, 95% CI [-.34, .02]. Therefore, mediation did not occur.

Summary of Main Findings from Mediation

- State appearance comparison mediated the effect of condition on post exposure state mood when comparing the overweight and landscape conditions. Specifically, those who viewed overweight images had a lower state mood (post exposure) than those who viewed landscape images because they engaged in more state appearance comparison.

- State appearance comparison mediated the effect of condition on post exposure exercise intentions when comparing the muscular and landscape conditions. Specifically, those who viewed the muscular images had higher exercise intentions (post exposure) than those who viewed landscape images because they engaged in more state appearance comparison.
- State appearance comparison mediated the effect of condition on post exposure exercise intentions when comparing the slim and landscape conditions. Specifically, those who viewed the slim images had higher exercise intentions (post exposure) than those who viewed landscape images because they engaged in more state appearance comparison.
- State appearance comparison did not mediate the relationship between condition and state body satisfaction, state appearance self-esteem or dieting intentions.

Discussion

Body dissatisfaction has been increasingly recognised as an issue that affects young men, therefore research into factors affecting men's body image is growing. Much of this research has focused on the impact traditional media, for example magazines and television, has on outcomes such as body satisfaction and mood in men. This is because sociocultural models, such as the Tripartite Influence Model, suggest that one source of an individual's perception of the idealised physique comes from the mass media and that body dissatisfaction is developed and maintained via internalisation and social comparison (Thompson et al., 1999). Social media is a newer form of media which portrays the idealised physique and is thought to increase the frequency of social comparison due to the ease of access to it using smartphones and its unique features. Despite the rise of social media, very few studies have explored the impact social media has on men's body dissatisfaction. Furthermore, to the author's knowledge, only one study has investigated the impact that Instagram has on men's body dissatisfaction, despite Instagram being named as particularly problematic since it contains the largest proportion of male fitspiration images compared to other social media platforms (Fatt et al., 2019; Tiggemann & Zaccardo, 2016). The study was limited as it was based on men's exposure to their own Instagram account and although this demonstrates good ecological validity, it did not allow other variables to be controlled and is therefore less robust than a randomised experimental design. Therefore, the current study utilised an experimental design to investigate the effect of exposure to Instagram images of the idealised physique compared to other physiques and landscape control images on body satisfaction, mood, appearance self-esteem and intentions to diet and exercise. A secondary aim was to explore the mediating role of social comparison in the relationship between

image exposure and outcomes. Key findings in relation to these research aims are discussed below in the context of previous literature.

Effect of Exposure to the Idealised Physique on Outcomes

The first aim was to investigate the effect of exposing men to Instagram images of the idealised muscular physique and other physiques on body satisfaction, mood, appearance self-esteem and diet and exercise intentions. Mixed ANOVAs were used as the method of analysis to investigate within and between group effects.

Body Satisfaction

There was no significant interaction between exposure condition and time on global state body satisfaction. However, when body satisfaction sub-components were analysed individually, there was a significant interaction between condition and time on muscularity satisfaction and satisfaction with the overall body. As hypothesised, these interactions demonstrated that muscularity satisfaction and overall body satisfaction were significantly reduced after exposure to the idealised muscular physique. Whereas, exposure to other physiques (slim and overweight) and non-appearance related images (landscapes) had no effect on body satisfaction. These findings are consistent with previous experimental studies which demonstrated that men who were exposed to images of advertisements containing the idealised physique emphasising the importance of appearance were more dissatisfied with their bodies than those who were exposed to the neutral advertisements (Agliata & Tantleff-Dunn, 2004); (Farquhar & Wasylkiw, 2007). Accordingly, this demonstrates that similar to traditional media, exposure to images of the idealised physique on social media can also have a detrimental impact on young men's body satisfaction. Furthermore, the lack of significant change in body satisfaction from pre to post exposure in the slim

and overweight conditions suggests that the decrease in muscularity satisfaction and satisfaction with the overall body in the muscular condition is not a result of exposure to any male physique, but specifically to the idealised muscular physique. This finding supports that of Lorenzen et al (2004) who found that exposure to images of men with an average physique did not significantly alter body satisfaction, whereas exposure to the idealised muscular physique did.

However, unlike Lorenzen et al (2004), the present study can make individual conclusions about the effect of exposure to slim and overweight physiques, rather than about them as one 'average' group. Thus, this study highlights that it is specifically exposure to the idealised muscular physique and not slim or overweight physiques that lowers satisfaction with muscularity and the overall body. This is inconsistent with the finding by Galioto and Crowther (2013) who demonstrated that exposure to muscular and slender images both led to increased body dissatisfaction. Galioto and Crowther (2013) suggested that increased body dissatisfaction was also experienced in their slender condition because the slender images reminded men of the low body fat element of the idealised physique. However, unlike Galioto and Crowther (2013), this study directly measured satisfaction with body fat which did not change in the slim condition (or any other conditions) and therefore challenges the idea that body dissatisfaction increases in response to slim images because of their association with low body fat. Instead, this study supports the idea that low body fat might be less important to young men's body satisfaction than muscularity and that low body fat may only be important because it can improve muscle definition which is more central to these men's idealised physique (Hildebrandt et al., 2004; McCreary, 2007; Murray et al., 2017). Hence why exposure to the muscular images and not the slim images resulted in increased muscularity and overall body dissatisfaction.

Additionally, the lack of change in height satisfaction could be because many of the images did not show the men's full body and therefore participants were unable to determine how tall the men were in the images and compare their height.

Mood

Results showed that there was no significant interaction between exposure condition and time on global state mood or any main effects, meaning that exposure did not have a significant impact upon global mood in any of the conditions and that there were no differences between conditions. This is inconsistent with the hypothesis and findings in studies exposing men to traditional media, which have demonstrated that exposure to the idealised physique can increase feelings of depression, anger and anxiety (Agliata & Tantleff-Dunn, 2004; Hausenbals et al., 2013). One possible reason for the lack of finding here and in other results in this study could be because exposure to the images was brief as only 15 images were included in each condition. In a similar study, Cahill and Mussap (2007) found no differences in men's depression, anxiety or anger between pre and post exposure and partly attributed this to the use of only six images. However, Tiggemann and Zaccardo (2015) did demonstrate an increase in negative mood in women after exposure to 18 images of the idealised physique for 20 seconds each. As the present study did not control the amount of time participants viewed the images for, but asked them to rate the visual quality of the images to encourage viewing, it could be that a significant change in mood was not demonstrated because individuals completed the study at their own pace and the time exposed to the images may have been too brief. This brief exposure may not be comparable to the amount of exposure to the idealised physique on Instagram in a natural setting or the cumulative effect of exposure. This is especially since the largest proportion of the sample reported that they spent between 30 minutes

and 2 hours on social media per day which is a great deal longer than the exposure in this study.

However, when each mood item was analysed individually, exposure resulted in reduced happiness and anxiety in all groups. There was no significant difference in happiness or anxiety between groups. A reduction in happiness was expected in the muscular condition since exposure to the idealised physique has been shown to increase negative affect (Hausenblas et al., 2013), however, a reduction was not expected in the other conditions. The reduction in happiness across all groups could be attributed to a possible fatigue or boredom effect in participants when completing the post exposure measures, since they were mostly the same as the pre exposure measures. However, attempts to minimise the chance of fatigue or boredom effects were made in the study by reducing the number of measures and items in the questionnaire. The reduction in anxiety from pre to post exposure across all groups was also unexpected, especially in the muscular condition as previous findings demonstrate that exposure to the idealised physique can increase anxiety (Hausenblas et al., 2013). The reduction in anxiety across all groups could have been due to the presence of anticipatory anxiety in participants in the first half of the study, which usually reduces naturally due to habituation over time (Benito & Walther, 2015).

Appearance Self-esteem

Findings demonstrated that there was a significant interaction between condition and time on global state appearance self-esteem. Closer inspection demonstrated that exposure led to a significant reduction in global self-esteem in all conditions. A reduction in self-esteem was only expected in the muscular condition since previous research has demonstrated that exposure to the idealised physique can lower self-esteem (Cafri et al., 2002). It is possible that the reduction in self-esteem

in all conditions could be due to the men reporting higher levels of self-esteem initially for social desirability purposes and the reduction after exposure could be a measurement effect where asking the same question twice led the men to change their answer (Johnson & Fendrich, 2002; Morwitz et al., 1993).

When individual items were analysed, there was a significant reduction in feeling unattractive and a significant increase in being pleased with appearance after exposure in the landscapes condition. This was in contrast with a small increase (trend) in feeling unattractive after viewing the images in the muscular condition, however this did not reach significance. Again, it could be that this finding lacked significance due to the limited exposure time, described above. Nevertheless, the trend supports previous studies which suggest that exposure to the idealised muscular physique can lead to lower appearance self-esteem (Cafri et al., 2002). Furthermore, analysing the individual items adds more detail to previous literature and suggests that self-esteem lowers because exposure to the muscular images leaves young men feeling more unattractive. Since physical attraction is highly regarded in Western society and the muscular physique has been portrayed in the media as the most desirable or most attractive for years (Blond, 2008), it is likely that exposure to the muscular images increased the men's feelings of being unattractive since most men in this condition identified as having an average physique (see Table 2 in the results section). The social comparison theory (Festinger, 1954) would suggest that this is because most men in this condition may have engaged in upward comparisons with the images, which likely lead to a discrepancy between actual and ideal levels of attraction and left them feeling unattractive (Hobza et al., 2007; Holland & Tiggemann, 2016). This is important since a discrepancy between actual and ideal body image is a feature of muscle dysmorphia (Murray et al., 2010). The social comparison theory would also suggest that the reduction in feeling unattractive and

increase in men being pleased with their appearance in the landscapes condition could be due to the lack of opportunity for social comparison which lowered the chances of a discrepancy between the men's actual and ideal body.

Diet Intentions

There was no interaction between condition and time on overall diet intentions and no main effects of condition or time. However, when items were analysed individually, there was a significant increase in the intention to follow a strict diet plan after image exposure in the muscular and landscape conditions. This was in contrast with a slight decrease in intentions to follow a diet plan and reduce carbohydrate intake after exposure to the overweight images. The finding that dieting intentions increased after exposure to landscape images was not expected. However, the finding in the muscular condition might be due to the increase in body dissatisfaction, and changes to diet is one way in which people can alter their body when they are dissatisfied with it (Cruwys et al., 2013). This finding is amongst the first to demonstrate that exposure to the idealised muscular physique using images taken from Instagram results in increased intentions to follow a strict diet plan in men, since previous studies have failed to directly measure this outcome, despite wishing to draw conclusions regarding the impact of exposure on eating disorders and muscle dysmorphia (Hausenblas et al., 2013). However, the other measure items, which the literature suggested related to achieving the idealised physique, such as intention to increase protein intake or reduce carbohydrate intake (Cruwys et al., 2013), were not altered after exposure to the idealised physique, so it is difficult to uncover what a strict diet plan might entail. The lack of significant findings in relation to the specific elements of diet could be because the measure created was intended to be exploratory and did not undergo rigorous psychometric testing or factor analysis. Therefore, future

studies may benefit from the thorough development of a measure relating to men's diet and exercise intentions/behaviours in relation to achieving a muscular physique. This could help to provide a more thorough account of what a strict diet plan might entail after men are exposed to images of the idealised physique. Nevertheless, the finding that exposure to the muscular physique increased intentions to follow a strict diet plan demonstrates the need for further investigation since following a strict diet plan is a feature of muscle dysmorphia (Cafri et al., 2005).

The finding that exposure to overweight images led to a trend towards decreased intentions to follow a diet plan and reduce carbohydrate intake was also expected. This is because being overweight is seen as unacceptable in today's society (Harrison et al., 2016) so the social comparison theory (Festinger, 1954) would suggest that exposure to the overweight images might have resulted in downward social comparisons, since most of the men reported having an average physique. These downward social comparisons may have led to less of a discrepancy between men's actual and ideal bodies, thus making them feel less of a need to change their body via dieting. This finding suggests that being exposed to overweight images leads young men to relax their intentions around going on a diet. However, it is important to hold in mind that although there was a slight decrease, this was not significant. As outlined earlier, the lack of significance could be attributed to the brief exposure time. Since this finding is novel, it is important for future research to increase the exposure time to see if this finding does become significant, as it may prompt additional implications.

Exercise Intentions

There was no significant impact of condition or time on exercise intentions. It was hypothesised that exercise intentions would increase when men were exposed to

images of the idealised physique in the muscular condition, since achieving the idealised physique partly relies on exercise. One reason for the lack of effect could be that nearly half of the sample reported that they already attended the gym, so the absence of change to exercise intentions after exposure could be the result of a ceiling effect where men were already attending the gym the maximum amount they were willing to. Another explanation for the absence of an effect in the muscular condition could be that gym attendance has previously been found to moderate the effect of exposure to idealised images i.e. those attending the gym are less vulnerable to the effects of exposure (Halliwell et al., 2007). It was proposed that this was because in gym users who were motivated to increase their strength and muscularity, the muscular images were viewed as role models and increased self-enhancement (Halliwell et al., 2017). Therefore, the presence of gym attendees in this sample could have buffered against the effect of exposure to the idealised images on exercise intentions. Alternatively, this study did not measure men's drive for muscularity which could have been low in the overall sample since over half of the sample did not attend the gym. Since the drive for muscularity is associated with increased weight training (Edwards et al., 2014), if the drive for muscularity was low in this study, then this could be a reason that exercise intentions did not increase.

Mediating Role of Social Comparison

A further aim of this study was to explore whether state appearance comparison, a measure of social comparison, mediated the relationship between image exposure and body satisfaction, mood, appearance self-esteem and diet and exercise intentions. This aim was formulated as the Tripartite Influence Model suggests that social comparison, particularly an upward comparison, is one of the

mechanisms of contributing to men's body dissatisfaction and research using traditional media supports the theory (Hargreaves & Tiggemann, 2009).

There were three major findings. First, results indicated that state appearance comparison mediated the relationship between the condition and mood, when comparing the overweight and landscapes conditions. The analysis revealed that those who viewed the overweight images engaged in more appearance comparison than those who viewed the landscape images, which in turn lowered their mood. It was expected that there would be more appearance comparison in the overweight, muscular and slim conditions compared to the landscape condition because as described earlier, individuals compare themselves to others to check that they are living up to the cultural standard (Holland & Tiggemann, 2016). Plus, there was no opportunity for comparison to others in the landscape condition. It was less expected that increased social comparison to overweight images would lower mood as the overweight images were thought to provide opportunity for downward comparison which has been suggested to improve mood (Holland & Tiggemann, 2016).

One explanation for this finding could be that increased appearance comparison in the overweight condition lowered mood because of sociocultural attitudes towards obesity which run alongside sociocultural attitudes towards the idealised physique. People with obesity in Western society are sometimes perceived as lazy and self-indulgent (Rguibi & Belahsen, 2006). This stigmatisation of obesity often goes unchallenged by the media, for example by the lack of overweight models in advertisements (Harrison et al., 2016). This was also inadvertently highlighted in the present study during the search for the images to use in each condition. The #overweight search on Instagram produced only approximately 300,000 images compared to over 17 million images when #muscles was inputted. The rejection of

overweight individuals has also been demonstrated by Vartanian et al. (2016) who asked participants to view images of obese and non-obese individuals. The obese images elicited increased negative attitudes, disgust and social rejection than the non-obese images. Therefore, in the present study, it could be that social comparison to the overweight images elicited feelings of disgust and impacted upon mood because of negative sociocultural attitudes in relation to obesity. However, this cannot be determined since disgust was not measured in this study.

Another explanation could also be that an awareness of negative sociocultural attitudes towards obesity led men to think about their own body and whether it matched the cultural standard more, especially since social comparison is the way of checking you are up to standard (Holland & Tiggemann, 2016). If the men viewed their body as not being up to standard, then this could have lowered mood, especially since physical attraction is so highly regarded in Western society (Hobza et al., 2007). This idea was also proposed by Galioto and Crowther (2013), who suggested that viewing and objectifying any male physiques could trigger a man's underlying dissatisfaction with their body and result in body dissatisfaction even when exposed to images which are not the ideal physique. The final possible explanation could be that as most individuals in the overweight exposure condition identified as having an average physique, it may be that exposure to the overweight images did not create enough of a downward comparison to elicit improved mood.

The secondary finding from the present study was that state appearance comparison was a mediator of the relationship between exposure condition and exercise intentions when comparing the muscular and landscape conditions. As expected, the analysis revealed that participants in the muscular condition engaged in more appearance comparison than those in the landscapes condition, which in turn

increased their intentions to exercise. One could hypothesise that increased social comparison resulted in increased intentions to exercise because men had internalised the sociocultural norm of the idealised muscular physique, so when they engaged in social comparison they realised they did not live up to the standard, which resulted in increased intentions to exercise (Fatt et al., 2019). However, it cannot be said for sure that internalisation contributed to the effect in this study, since this was not measured. Nevertheless, this finding supports the body of research investigating the Tripartite Influence Model of body dissatisfaction, which has demonstrated that social comparison contributes to body dissatisfaction in men and women through upward comparisons (Brown & Tiggemann, 2016; Cafri et al., 2005; Fatt et al., 2019; Griffiths et al., 2015; Myers & Crowther, 2009).

Furthermore, whilst most research has focused on the effects on body dissatisfaction as an outcome, the present study demonstrated the mediating effect of social comparison on exercise intentions which provides a unique contribution to the literature. This finding is also consistent with Fatt et al. (2019) who showed that increased viewing of 'fitspirational' images was associated with more appearance comparison and that this was linked to increased motivation to exercise to change appearance in men. However, the present study adds value to this finding since an experimental design was utilised and therefore demonstrated the direction of the effect. This finding is also supportive of Tylka (2011) who suggested that those with muscularity dissatisfaction are likely to engage in muscularity-enhancing behaviours such as increased exercise. However, this study cannot make conclusions about how the increased intention to exercise might translate from well-intended self-improvement into obsessional exercise or exercise dependence and therefore eating disorders or muscle dysmorphia. It could be hypothesised that repeated or prolonged exposure to the idealised physique contributes to this (Hausenblas et al., 2013).

Therefore, more longitudinal research is required to investigate how this acute change in exercise intention in response to the idealised physique might become harmful.

The third major finding was that state appearance comparison also mediated the effect of exposure condition on exercise intentions when comparing the slim and landscapes conditions. Specifically, those who viewed the slim images engaged in more state appearance comparison than those in the landscape condition which in turn increased their intentions to exercise. This suggests that it is not just the muscular ideal that increases intentions to exercise through increased appearance comparison, but also a slim physique. It could be that exposure to the slim physique also resulted in upward comparisons, which increased men's intentions to exercise because of the desire to reduce body fat in order to achieve the muscular ideal (Galioto & Crowther, 2013).

Finally, contrary to expectations, state appearance comparison did not mediate the relationship between condition and state body satisfaction, state appearance self-esteem or dieting intentions. This was surprising, especially as social comparison has previously been shown to mediate the effect of exposure to the muscular ideal on body dissatisfaction (Fatt et al., 2019). However, Fatt et al., (2019) utilised a serial mediation design which is where one mediator is suggested to be a cause for the other mediator which then in turn influences the outcome. Fatt et al (2019) found that greater internalisation of the muscular ideal was associated with more appearance comparison which in turn mediated the relationship. Therefore, the lack of significant mediation through social comparison on some outcomes in the present study could be because internalisation of the idealised physique was not measured. This supports the idea proposed by Karazsia and Crowther (2009) who highlighted that internalisation and social comparison are distinct constructs and are both important in the

understanding of body dissatisfaction, but that social comparison may be less influential than internalisation. This suggests that the Tripartite Influence Model may have more standing in men if both internalisation and social comparison are measured as mediators in the same analysis. However, most studies usually investigate these constructs one at a time in order to prevent confusion within already complex models, which is what the present study did (Tylka, 2011). Nevertheless, the mediation analyses demonstrate some initial experimental support for the Tripartite Influence Model of body dissatisfaction in men when they are exposed to images taken from Instagram. This is particularly in relation to mood and exercise intentions.

Strengths and Limitations

Strengths

There are several strengths of this study.

Study Design. To the author's knowledge, this is the first study which has utilised an experimental design to investigate the impact of exposing men to images of the idealised muscular physique taken from Instagram. Previous studies have employed an experimental design, but exposed men to more traditional forms of media such as magazines (Lorenzen et al., 2004), television commercials (Agliata & Tantleff-Dunn, 2004), music videos (Mulgrew & Volcevski-Kostas, 2012) or video games (Sylvia et al., 2014). Other studies have used an experimental design and images taken from Instagram but conducted their study in women. One study has investigated the link between viewing images of the idealised physique on Instagram in men but used a correlational design which cannot determine cause and effect (Fatt et al., 2019). The present study purposely combined the use of young male

participants, images of the idealised muscular physique taken from Instagram and an experimental design.

The use of young male participants adds to the growing body of research into men's body dissatisfaction, the utilisation of images from Instagram extends research in mass media to Instagram, which has had minimal investigation (Brown & Tiggemann, 2016) and the experimental design ensured a high level of control (Walker, 2005). Experimental designs can ensure control through the manipulation of variables whilst holding other elements constant, using a control group(s), controlling for extraneous variables that may confound the results and randomising participants to groups (Walker, 2005). In this study, control was achieved by only manipulating one variable (image type) whilst holding all other elements of the online questionnaire constant. This ensured that any change in outcome variables could be attributed to the effect of the manipulation. Additionally, this study utilised three control conditions so that conclusions could be drawn. Landscape images were used as a control as they did not contain any physiques and therefore no effects were expected in comparison to viewing the muscular images. The slim and overweight physiques were also active control conditions to compare to the effect of viewing the idealised muscular physique. The extraneous variable of pre-existing body dissatisfaction was controlled for in two ways since pre-existing body dissatisfaction has been shown to increase likelihood of negative outcomes (Blond, 2008). First, participants who had a diagnosis of an eating disorder were excluded since body dissatisfaction is a feature of eating disorders and would likely skew participant's responses. Second, pre-existing body dissatisfaction was accounted for in the mixed ANOVAs as the pre exposure scores acted as a control for each individual. Bias was also eliminated in the design as participants were randomised to each condition rather than the researcher assigning them to a condition. Overall, control is a key feature of experimental designs which

allows confident conclusions to be drawn about the effect of the manipulation on an outcome (Walker, 2005). Therefore, a strength of the present study is that clear conclusions can be made about the effect of exposure to the different physiques on outcomes, which allows clear implications to be discussed. Furthermore, stronger conclusions can be drawn about the presence of social comparison since it was directly measured rather than inferred, as recommended by Myers and Crowther (2009).

Measurement of Diet and Exercise Intentions. Another strength of this study was the measurement of diet and exercise intentions as outcomes. This builds upon studies which have claimed to investigate the effect of the idealised physique on eating disorder or muscle dysmorphia symptomatology yet have failed to assess diet and exercise which are core features of the disorders (Hausenblas et al., 2013). Furthermore, the questions asked in relation to diet and exercise intentions in this study were based upon common diet and exercise behaviours highlighted in literature as being associated with men's attempts to gain the idealised muscular physique (Cafri et al., 2005). This accounts for the limitation in studies which have measured diet and/or exercise as outcomes but have utilised measures designed for assessing women's body image concerns, which are not sensitive in detecting men's concerns (Galli & Reel, 2009; Harrison & Cantor, 1997; Murray et al., 2010). Therefore, the present study may be more sensitive to detecting outcomes associated with men's eating disorders or muscle dysmorphia than those which utilise measures such as the Eating Disorder Inventory and the Eating Attitudes Test. Whilst the constructs measured by the diet and exercise intentions questionnaire in this study are more related to men's body image concerns, the author recognises that a factor analysis was not run and that the measure was only intended to be exploratory. Nevertheless, the significant finding in relation to exercise intentions in the mediation analysis suggests that the measure has some standing. However, it is important to acknowledge that

intentions do not always translate into behaviours, especially if motivation is extrinsic (Fatt et al., 2019). Therefore, conclusions cannot be drawn about the effect of exposure on behaviour.

Selection and Validation of Images. The criteria for selecting the images from Instagram and the recruitment of men to select and validate the final images is a strength of this study, as it removed the possibility for researcher bias when selecting the images. In addition to this, the procedure for the selection and validation of the final images ensured that the images appeared to represent the constructs they were meant to and not the constructs that they were not meant to i.e. they had face validity and discriminant validity. This could have been made more stringent by providing a definition of overweight, slim and muscular physiques so that all participants were comparing the images to the same definitions. However, a definition was not given because one definition does not account for the possibility that the men viewing the images in the questionnaire may have slightly different internal representations of the physiques.

Sample Size. The sample size is another strength of the study. An a priori power calculation indicated that a sample of N = 79 was required so that the analysis had enough statistical power (.80) to detect an effect. The sample used in the analysis was N = 197 (23.5% dropout). Therefore, there was an appropriate level of power in the study to detect significant effects and means that non-significant findings are not attributable to a lack of power (Faul et al., 2009).

Limitations

The findings of this study should also be interpreted within the context of a number of limitations.

Generalisability to Other Populations. In relation to the sample, generalisability of the findings may be limited because recruitment in this study relied on the snowball effect and began with convenience samples of the author's social media contacts, of which a large proportion have or currently attend university. Another significant part of recruitment for the study was through societies and faculties at the University of Leeds. It is unknown exactly what proportion of the study's sample were or have been university students since this was not recorded. Therefore, readers are encouraged to be cautious about the generalisability of the findings to other non-university populations, since university samples possess certain characteristics such as a higher level of education and often a higher socioeconomic status (Hanel & Vione, 2016).

Generalisability is also limited because similar to previous studies (Fatt et al., 2019), nearly 88% of the sample identified as White British. Whilst this percentage reflects the population of the UK, where 80% of people identified as White British in the 2011 census (Sweet, 2011), this may limit the generalisability of the findings to other ethnicities. Generalisability may be particularly limited for black men since there is some evidence that black men in the UK have a higher drive for muscularity than white men (Swami, 2016). The greater drive for muscularity in black men was associated with increased drive for power (the desire to undertake a role where they could exert authority to make others behave in a certain way) (Swami, 2016). Therefore, it was concluded that the drive for muscularity was a way of black men overcoming inequalities and exerting masculinity, to try and counter the perception that they are of a lower status which threatened their masculinity (Swami, 2016). Generalisability of the findings may also be particularly limited for non-Westernised, non-white countries such as Uganda, since research has demonstrated that men in these populations have less desire for a muscular physique, as they are exposed to the

media less (Thornborrow et al., 2020). Additionally, the variance in desire for a muscular physique between countries seemed to be reflected in the idealised physique in the media and was thought to be partly because of differences in diet and lifestyle (Thornborrow, 2020). Subsequently, future research would benefit from studying non-university samples and other ethnicities in Western and non-Western countries.

Confounding Variable. Another limitation of the study is that sexuality of participants was not recorded. Whilst sexuality was not the focus of the study, it would have been helpful to record. Research has demonstrated that both homosexual and heterosexual men desire to have lower body fat and more muscularity (Tiggemann et al., 2007) and that there is a positive correlation between purchasing fitness magazines and body dissatisfaction in both groups (Duggan & McCreary, 2004). This suggests that the idealised physique is similar in men regardless of sexuality. However, there has been some evidence to suggest that homosexual men have a larger discrepancy between their actual and ideal physique and experience greater body dissatisfaction than heterosexual men (Tiggemann et al., 2007). Furthermore, it was found that individuals identifying as gay, lesbian or bisexual were more likely to report shame in relation to their body image (40%) compared to heterosexual adults (18%) (Mental Health Foundation, 2019). It has been demonstrated that 'minority stress', such as increased internalisation of discrimination and victimisation due to sexuality, predicted increased body and muscularity dissatisfaction and could be one reason why non-heterosexual men have increased body dissatisfaction (Siconolfi et al., 2016). Therefore, results in the present study could have been impacted by the sexuality of participants and future research may benefit from investigating the effect of exposure to the idealised physique whilst taking into account sexuality. This could lead to more specific implications for both heterosexual and homosexual men.

No Measurement of Internalisation. This study is also limited in that it did not measure the extent to which men internalised the sociocultural idealised physique. Internalisation of the sociocultural norms has been associated with the drive for muscularity (Daniel & Bridges, 2010). It has also been shown to predict increased muscle dissatisfaction and muscularity-orientated disordered eating (Griffiths et al., 2015) and use of supplements and exercising to build muscle (Smolak et al., 2001). However, the decision to omit this from the questionnaire was taken in order to minimise the potential for fatigue effects. Therefore, it is unclear whether the men in this study were motivated to achieve a muscular physique. If internalisation and motivation to achieve a muscular physique were low in the sample, this could have helped to explain the lack of effect on outcomes such as mood. However, since internalisation was not measured, it cannot be used to supplement the findings.

Limited Ecological Validity. Additionally, as with all experimental research, there is a trade-off between control and ecological validity (the extent to which the study is reflective of real life) in this study. Since the current study has achieved a good level of control, it lacked ecological validity and therefore may be limited in how much the findings can be generalised to the real-life use of Instagram. However, attempts were made to increase the study's ecological validity. All the images used in the study were sourced from real Instagram profiles and therefore reflect the kinds of images that men are exposed to on the social media platform. The images were also presented with a template around them so that they looked the same as they would if they were being viewed on Instagram. Furthermore, the study took place online rather than in the laboratory, meaning that people were able to access the survey wherever they wanted to and using the device they wanted to, which more closely reflected real life Instagram use. The images were also presented in a format which more readily reflected Instagram, as they were presented one below the other on the same page so

that participants could scroll through them as they would on Instagram. Whilst these attempts to increase ecological validity improve upon studies that have exposed men to images of the idealised physique in a laboratory (Agliata & Tantleff-Dunn, 2004; Lorenzen et al., 2004), the study still lacks ecological validity. This is because viewing images as part of a questionnaire is not the same as using Instagram since participants were not able to interact with the images as they would on Instagram, which is a feature that distinguishes it from traditional media (Meier & Gray, 2014; Tiggemann & Zaccardo, 2015). Therefore, future research exposing men to images of the idealised physique could allow participants to like or comment on the images to increase ecological validity. Additionally, as discussed earlier, exposure to the images was brief which does not fully reflect real life Instagram use since the average time on social media per day is 2 hours and 24 minutes globally (Statista, 2020). Therefore, research would benefit from investigating the effects of repeated exposure to Instagram as this more closely reflects real life use.

Demand Characteristics. Finally, whilst the purpose of the study outlined to participants at the start of the questionnaire was deliberately vague, the absence of a cover story could have meant that participants worked out that the study was based around the effect of exposure to images and body image. This could have increased the chances of demand characteristics, which are typically problematic in experimental research using self-reported measures and are described as cues in research that can impact a participant's response (Allen, 2017). Demand characteristics could have included the 'good participant effect' where participants work out the researcher's hypothesis and try to confirm this or the opposite effect where participants try to spoil the researcher's hypothesis (Nichols & Maner, 2008). Either way, demand characteristics can lead to invalid and unreliable findings (Allen, 2017). This limitation could apply to the within subject effects since the second

presentation of the questions could have provided the cue that the study was measuring changes in participant's answers after viewing the images. Nevertheless, it is unlikely that participants worked out the full purpose of the study since they were randomised to one of four conditions and were encouraged not to talk about the questionnaire with their peers. Furthermore, a cover story was not utilised because previous studies that have utilised one have asked participants additional questions, which in this study could have increased the likelihood of fatigue or boredom effects (Hargreaves & Tiggemann, 2009).

Critique of the Tripartite Influence Model

It is important to hold in mind that the Tripartite Influence Model was initially developed for women. Therefore, whilst research has demonstrated that the basic model can be applied to men, the model fails to provide detail regarding how the specific components of young men's idealised physique (i.e. increased muscularity and low body fat) fit into the Tripartite Influence Model to fully explain the mechanisms behind men's body image concerns and behaviours. This makes it less applicable to men. This limitation was noted by Tylka (2011) who refined the Tripartite Influence Model and suggested that internalisation of the muscular ideal leads to dual pathways (dissatisfaction with muscularity and dissatisfaction with body fat), which lead men to engage in behaviour to increase muscularity and disordered eating respectively. This model, named the Quadripartite Model, goes beyond the Tripartite Influence Model to explain why men engage in behaviours to change their body (Tylka, 2011). Additionally, Tylka (2011) demonstrated that pressure to have the idealised muscular physique from dating partners directly predicted disordered eating. This suggests that it is not just pressure from friends, family and the media that increases men's drive for the muscular physique as the Tripartite Influence Model

suggests. Therefore, Tylka (2011) suggested that partner pressure to be muscular should be added to the original Tripartite Influence Model and the new model be named the Quadripartite Model. However, the Quadripartite Model itself did not include social comparison as a mediator in order to reduce its complexity (Tylka, 2011). Therefore, it could be argued that the Quadripartite Model is also limited since the present study has demonstrated that social comparison contributes to men's mood and intentions to exercise. In the present study, the basic Tripartite Influence Model was explored in order to prevent over-complication and because it is widely used within literature, however, future research may be enriched by providing evidence for the Quadripartite Model.

As social comparison is also an element of the Tripartite Influence Model (Thompson et al., 1999), it is also worth noting some limitations of the Social Comparison Theory (Festinger, 1954) in relation to men's body image concerns. The theory suggests that it is comparison to peers that leads to distress, however, the survey by The Mental Health Foundation (2019) demonstrated that 25% of young people reported that seeing celebrities led them to be concerned about their own body image. The Social Comparison Theory was also developed to explain one-off comparisons and so is limited in being able to explain how the cumulative effect of exposure to the sociocultural norm leads to body dissatisfaction, muscle dysmorphia and eating disorders. Therefore, the development of theory into the cumulative effects of exposure could supplement longitudinal research.

Additionally, utilising self-reported measurement of social comparison in this study may have been limited since it has been suggested that social comparison can occur automatically and outside of a person's awareness (Winerman, 2004). This

means that social comparison in this study may have been higher than reported and could explain the lack of mediation in some of the analyses.

Implications

Findings from this study indicate that exposure to images of the idealised muscular physique taken from Instagram can lead young men to become more dissatisfied with their level of muscularity, overall body and level of attraction as well as increasing their intentions to follow a strict diet plan. In addition, exposure to images of the idealised physique compared to exposure to neutral images also resulted in greater social (appearance) comparison which in turn lowered mood and increased intentions to exercise. These findings have implications for young men, clinicians working with young men in mental health settings, social media platforms and government policy.

Since social media platforms such as Instagram contain large amounts of 'fitspiration' images and nearly 30% of these images are male only images (Carrotte et al., 2017), the above findings could be useful in highlighting to men the potentially deleterious impact of viewing these images on their body satisfaction and therefore mental health. This awareness may be useful in helping men to evaluate their use of social media platforms and make a more informed choice about the profiles they follow or interact with. In support of this, The Mental Health Foundation (2019) recommends that men should be mindful of how they feel when using social media platforms and could consider uninstalling them if they cause distress in relation to body image. Social media users also have a responsibility in being mindful about the images that they post or share from their profile in relation to body image in order to help protect others.

For mental health professionals, such as clinical psychologists working with men with concerns about their body image, the above findings have implications for assessment, formulation, intervention and evaluation. In relation to assessment and formulation, it will be crucial to develop a thorough awareness of the service users' body image concerns. This may involve acquiring an awareness of the service user's social media use, such as the frequency of use and profiles they follow which might increase the opportunity for social comparison and subsequently muscularity dissatisfaction. In addition, since this study demonstrated that increased social comparison can be detrimental, it would also be useful for clinicians and service users to discuss other times the service user engages in appearance comparison, for example when with peers or when watching television. It may also be important for clinicians to thoroughly understand the service user's unique perception of what the idealised physique is. This is because although the idealised physique in men in the UK generally involves increased musculature and low body fat, the Tripartite Influence Model highlights that the 'ideal' is a socially constructed concept and therefore may vary slightly between individuals (Hobza et al., 2007; Thompson et al., 1999). Furthermore, as the Tripartite Influence Model suggests, it may also be important for clinicians to understand the individual's view on the importance of body image in society and what this means for them and their place within it. Building upon this, it may also be useful to explore the service user's thoughts about body image in relation to masculinity, whether masculinity is important to them and whether they believe their masculinity has implications for their social standing. Again, it is vital for clinicians to avoid making assumptions and explore each service user's individual perceptions of these concepts, since they are socially constructed and may vary across individuals as a result of sexuality, ethnicity or different life and cultural experiences.

A thorough understanding of the above will help to inform intervention or the way in which clinicians work with men with body image concerns and may help to improve outcomes. Intervention could involve therapy to help young men challenge their potentially rigid ideas about the physique they need and the behaviours they need to engage in to achieve the idealised physique and be attractive or socially accepted. Therapy could also include encouraging an appropriate balance of healthy eating and exercise, whilst avoiding creating the impression that they are always problematic. Helping men draw upon a time when they had less body image concerns or a positive body image may also be useful, since a positive body image has been shown to be protective (Halliwell, 2015). In addition, encouraging young men to focus on relationships with peers and family members who accept them regardless of body image may also reduce the importance of body image in their life, since The Tripartite Influence Model highlights that the influence of peers and family members are important. Clinicians may also help young men explore and challenge other potentially unhelpful constructs such as ideas they hold about traditional masculine norms. The aim of these interventions would be to create more flexibility in young men's beliefs about how they should look.

The finding that exposure to idealised images on social media impacts upon body image concerns also has implications for schools (Mental Health Foundation, 2019). This is especially since The Mental Health Foundation (2019) found in their survey that 40% of teenagers in the UK (56% girls and 26% of boys) reported that images on social media made them worry about their body image. Schools could play a part in prevention of body image concerns by intervening at a younger age. Schools could help young people to learn about social media platforms, including increasing their awareness that images are filtered/edited and do not necessarily reflect reality. In addition, schools could help young people to consider the hidden motivations

behind images of the idealised physique, such as the promotion of products (Mental Health Foundation, 2019). Schools could also help young people to become aware of the consequences of social comparison and help them to monitor whether their social media use is harmful in relation to their body image.

This study also has implications for social media platforms themselves because although they contribute to body image concerns, The Mental Health Foundation (2019) states that they can also be part of the solution and should take some responsibility for protecting their users. Since this study demonstrated that exposure to the idealised physique may impact upon men's body image, social media platforms could find ways of giving users more control over the content they are exposed to and could develop tutorials demonstrating how users can do so (Mental Health Foundation, 2019). Social media platforms could also work towards finding new ways of promoting healthy body image (Mental Health Foundation, 2019). The present study has demonstrated that exposure to images of overweight men reduced participants' intentions to follow a strict diet and therefore these images could buffer against the effect of exposure to a muscular physique. Therefore, as part of promoting a balanced and healthy body image, social media platforms could promote the presentation of a diverse range of physiques which could help normalise them and reduce the prominence of the muscular physique on social media. Additionally, since this study and others (Farquhar & Wasylkiw, 2007) have demonstrated that exposure to images focused on appearance are detrimental to body satisfaction and mood, social media platforms could encourage users to promote images demonstrating the functionality of the body rather than its appearance. Social media platforms could also encourage more non-appearance related images, since the landscape images in this study reduced participant's thought that they are unattractive.

Up until now social media platforms have been reluctant to engage in action to protect their users against content in relation to body image which can be harmful (Mental Health Foundation, 2019). Since more and more research is demonstrating the negative effect social media can have on body image, there is a call for the government and regulating bodies to step in to protect the public (Mental Health Foundation, 2019). The UK government published an Online Harms White Paper which outlined that an independent regulator should ensure that social media platforms engage in reducing harmful content online (Javid & Wright, 2019). Findings from the present study suggest the this should also involve reducing the promotion of the idealised physique on social media platforms which usually occurs through advertising and algorithmic targeting, since the idealised physique can increase men's body image concerns (Mental Health Foundation, 2019).

Finally, since this study demonstrated that exposure to overweight images also negatively impacted upon mood and it was hypothesised that this was due to the negative attitudes and stigma towards obesity, government campaigns trying to reduce obesity should avoid adding to the stigma around obesity and fat shaming (Mental Health Foundation, 2019). It would be more helpful if these campaigns promoted health-based fitness and nutrition for everyone, regardless of physique.

Future Directions

Some ideas for future directions have already been noted throughout the discussion, other possibilities are outlined below.

Future experimental research into the effects of exposing men to Instagram images of the idealised physique is needed, since this is the first study to do so. These studies should aim to address the limitations of the current study outlined earlier.

Therefore, research would benefit from replicating this study or something similar in other populations. First, it may be useful to carry out the study in non-university samples since university samples do not necessarily represent the whole population as they are likely to contain individuals with a higher socioeconomic status which may impact results. Second, it would be useful to replicate this study in minority male populations such as black or homosexual men as they may be more vulnerable to the effects of the idealised physique. This is because it has been suggested that attempts to combat the discriminatory effects of being in these minority groups may be related to an increased drive for muscularity and greater body dissatisfaction (Siconolfi et al., 2016; Swami, 2016). Third, as suggested by Fatt et al. (2019), future studies may wish to use samples from groups who might be particularly concerned about their body as there is some evidence that they may be more susceptible to the effects of exposure to the idealised physique. One of these groups could be male bodybuilders as studies have shown them to exhibit high levels of distorted body image, body dissatisfaction, exercise dependence, disordered eating and muscle dysmorphia (Pope et al., 1993; Stapleton et al., 2016).

In addition to bodybuilders, future research may benefit from understanding the effect of exposure to the idealised physique on gym users, since this study contained both gym users and non-gym users which could have impacted the results. There has been mixed evidence for whether gym use increases body dissatisfaction and disordered eating (Stapleton et al., 2016) or decreases it because gym users are actively working towards the idealised physique and the upward comparison might result in self-enhancement (Halliwell et al., 2007). Since previous research relating to gym use is inconsistent, future research could replicate the present study in gym users or study the moderating role of gym use between exposure to Instagram images of the idealised physique and outcomes. Overall, the replication of this study in other groups

could help to understand who is most affected by exposure to the idealised physique and could therefore consider more specific recommendations.

Since this study was unable to address the long-term cumulative effect of exposure to social media, future research may wish to utilise longitudinal designs, especially as this could result in more conclusions about the development of eating disorders and muscle dysmorphia which happen over time (Hausenblas et al., 2013). This research could investigate the cumulative effect of repeated exposure to the idealised physique through social media platforms such as Instagram. There is some evidence of the cumulative effect of exposure the idealised physique in teenage girls over time (Hargreaves & Tiggemann, 2003) and therefore, this should also be investigated in men. This is especially relevant in research into exposure to the idealised physique on social media due to how readily it can be accessed. It would be ideal to pay particular attention to the long-term effect of exposure to the idealised physique on exercise intentions/behaviour, since the present study has demonstrated that acute exposure can result in increased exercise intentions through increased social comparison. Longitudinal research may also help to demonstrate an effect in some of the outcomes that the brief exposure in the present study was unable to.

Future research may also build upon this study by attempting to provide more evidence for the Tripartite Influence Model. This could be achieved by investigating the mediating role of internalisation in the relationship between exposure to the idealised physique and study outcomes, since it has been suggested that internalisation and social comparison both have a distinct contribution to men's body dissatisfaction (Karazsia & Crowther, 2009). Furthermore, since the media is only one part of the Tripartite Influence Model, future research could investigate the influence of peers

and family on men's body dissatisfaction as there is some evidence that they also contribute to the drive for muscularity (McCabe et al., 2015).

The research area may also benefit from more qualitative research which could provide rich accounts of what it is like for men living in today's society whilst being exposed to images of the idealised physique on social media. This could include exploring the underlying processes of their interaction with the idealised physique, such as internalisation of the cultural norm and social comparison.

Positive body image is emerging as a protective factor against body image concerns (Halliwell, 2015), however, once again the research is more focused on women. Future research may benefit from exploring positive body image as a protective factor against exposure to the idealised physique in men or other protective factors.

Conclusion

Body dissatisfaction, eating disorders and muscle dysmorphia in men are all increasing (Jankowski, 2016; Leit et al., 2001). Sociocultural models of men's body dissatisfaction suggest that one reason for this is the growing presence of the male body in the media and the importance of appearance in Western society. Subsequently there is a growing body of research investigating the relationship between media exposure and men's body image concerns. More recently, there has been the need to extend this research to investigating the effect of social media on men's body image concerns. This study is the first to utilise an experimental design to investigate the effect of exposing men to images of a range of physiques including the idealised physique taken from Instagram. Findings demonstrated that those who viewed the idealised muscular physique reported a reduction in muscularity satisfaction,

satisfaction with the overall body and increased intentions to follow a strict diet plan. In contrast, exposure to slim, overweight and neutral images did not lead to changes in these outcomes. Findings also demonstrated that social comparison, specifically appearance comparison was increased in those exposed to images of the idealised physique compared to neutral landscape images, which in turn lowered mood and increased men's intentions to exercise. This highlights the importance of increasing understanding of the underlying mechanisms contributing to men's body dissatisfaction.

Contrary to expectation, exposure to the idealised physique did not have a significant impact on mood or exercise intentions, however, this may be attributed to exposure to the images being brief. Furthermore, whilst this study has demonstrated the detrimental effect of exposure to the idealised physique on outcomes related to eating disorders and muscle dysmorphia, it cannot be concluded that changes in these outcomes results in the development of these disorders. Therefore, future research would benefit from longitudinal research investigating the cumulative effect of exposure to social media and how long-term exposure may contribute to the development of eating disorders and muscle dysmorphia. Longitudinal research into cumulative effects could also help to account for the lack of effect in some of the outcomes in this study. Nonetheless, this study has important implications in relation to men's social media use, the way in which mental health professionals might work with young men with body image concerns, the responsibility that social media sites have in protecting users from harm in relation to body image and the responsibility of the government and regulating authorities to oversee and where necessary, enforce the protection of social media users.

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Appendix A
Ethical Approval Email Confirmation

Your ethics application has been passed.

Re your ethics application, What is the Impact of Exposure to 'idealised' Images on Body Satisfaction, Dieting Intentions and Mood in Men?, ethics reference number: PSC-605.

I am pleased to inform you that the above research application has been reviewed by the School of Psychology Research Ethics Committee and has been approved.

If the reviewers have left any comments they will appear below.

Primary reviewer comments (if applicable) : This look fine, sorry for the delay.

Secondary reviewer comments (if applicable) :

Please note that this approval only relates to the particular version of documentation supplied in this specific application (ethics ref no: PSC-605).

Appendix B
Survey Information and Consent Page

Welcome

You are invited to take part in a research project through the University of Leeds and Leeds Teaching Hospitals NHS trust.

The research has been reviewed by the University of Leeds School of Psychology ethics review committee and given a favourable opinion (ref: PSC-670) (date: 12/04/19).

Before you decide whether to take part, please take time to read the following information.

The purpose of this research is to study the relationship between social media use and mental health. You have been asked to take part because this area is under researched in men.

The research will involve answering questions and viewing images in an online survey which will take approximately 15-20 minutes.

Once you press "Next", you won't be able to go back to edit previous pages so please ensure you have answered all questions you want to before leaving the page.

Your participation in this research is voluntary and you can choose not to participate. If you do decide to participate you can withdraw at any time (without providing a reason) by closing the browser without submitting your answers. If you choose to withdraw, you will not be penalised in any way. You can also choose to not answer questions as some will require you to think about topics that may be sensitive to you. If this is the case, you can miss these questions and move on to the next. If you choose to submit your answers we are unable to withdraw your data as individual responses will be unidentifiable.

Your responses will be confidential and we will not collect any identifying information such as your name. If you would like to be entered into the prize draw to **be in with the chance of winning 1 of 5 £20 Amazon gift vouchers** then you will be asked to leave your email address at the end of the survey. You are also free not to do this. Your email address will only be used so that you can be entered into the prize draw. The prize draw will occur at the end of data collection and your email address will be deleted from SurveyMonkey before data analysis so that your individual responses to questions cannot be identified. Data will be stored in a password protected electronic format on SurveyMonkey and may be transferred to countries such as the Unites States where SurveyMonkey has offices. You can read SurveyMonkey's full privacy policy here https://www.surveymonkey.com/mp/legal/privacy-policy/

Data from the survey will be accessible to the lead researcher and supervisors within the University of Leeds Faculty of Medicine and Health and Institute of Psychological Science. All data will be combined so that individual data will not be identifiable. Data collected will be included in a doctoral thesis and may be published in an academic journal. Data may be made available for relevant future research upon reasonable request to the research supervisor. Data will be destroyed after 3 years.

If you have any questions or concerns about the research project, please contact:
Lucy Siena: ps11mls@leeds.ac.uk
Professor Graham Finlayson: g.s.finlayson@leeds.ac.uk
Dr Thomas Cliffe: T.D.Cliffe@leeds.ac.uk

If you identify any concerns about your mental health then you should seek help from your GP or Samaritans on 116 123 (UK).

Appendix B Continued
Survey Information and Consent Page

1. Please read the following statements. By ticking each statement, you are consenting to taking part in the research.
(If you do not wish to take part, you can close this browser now.)

- [ ] I have read and understood the above information.
- [ ] I understand that my participation is voluntary and should I wish to withdraw at any point I can close the browser without submitting my answers.
- [ ] I understand that once I have submitted my answers at the end of the survey, I am unable to withdraw my data from the research project.
- [ ] I consent to having my data processed as described above.
- [ ] I consent to having my data stored and used in relevant future research (upon reasonable request to the research supervisors).
- [ ] I consent to taking part in this research.

Appendix C
Survey Debrief

Debrief

Previous research has demonstrated that showing men magazine images of the 'idealised' male physique (muscular and lean) has a negative impact on their mood, body satisfaction and self-esteem. In recent years, images of the 'idealised' physique have been more readily available due to the rise in social media use. One of the social media sites/applications where images of the 'idealised' physique are readily available is Instagram. Alongside the increase in social media use, there has been a rise in the number of men with eating disorders such as body (muscle) dysmorphia. Often, these men will exercise excessively even when injured, have an extreme diet and become anxious if either of these things are not carried out. Currently, no research has investigated what impact viewing 'idealised' images has on men's intentions to exercise or follow a diet.

Research also suggests that those who are impacted the most by these images are more likely to compare their body to those in the images (social comparison).

This research aims to:

·Update previous research by showing men images of different physiques (or neutral images) taken from Instagram and investigating the impact this has on mood, body satisfaction and self-esteem

· Investigate whether viewing images of different physiques alters dieting and exercise intentions.

·Investigate whether those who are more negatively impacted after viewing the images are more likely to socially compare their body to the one in the image.

The findings from this research will be written up as a doctoral thesis and may be published in an academic journal.

Again, thank you for taking part.

If you have any questions or concerns about the research project, please contact:

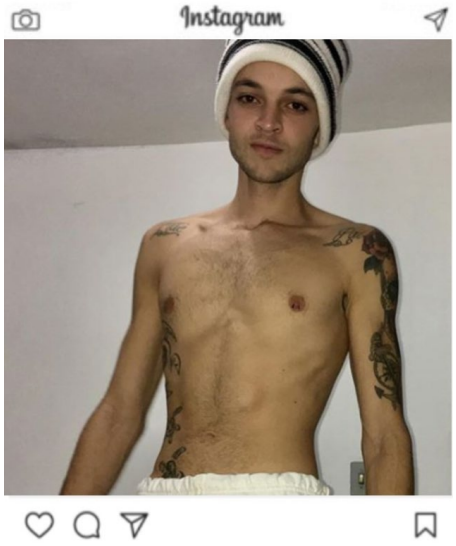
Lucy Siena: ps11mls@leeds.ac.uk
Professor Graham Finlayson: g.s.finlayson@leeds.ac.uk
Dr Thomas Cliffe: T.D.Cliffe@leeds.ac.uk

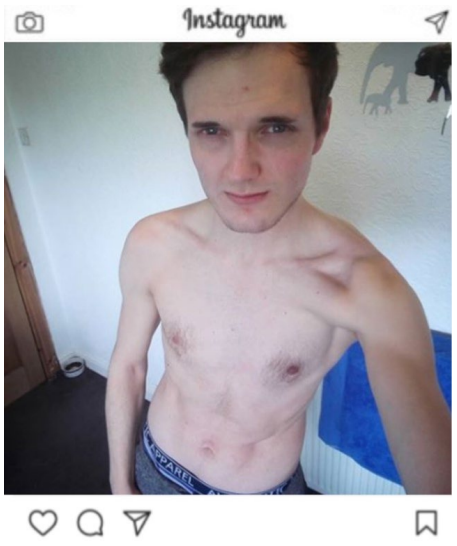
If you have any concerns about your mental health then you should seek help from your GP or the Samaritans on 116 123 (UK).

Appendix D
Example of Images in Each Condition

Muscular:

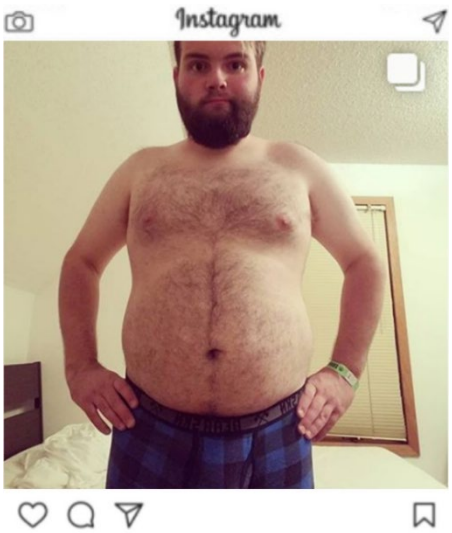
Slim:

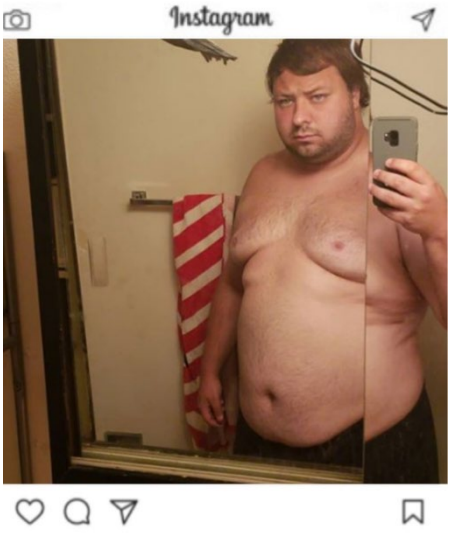




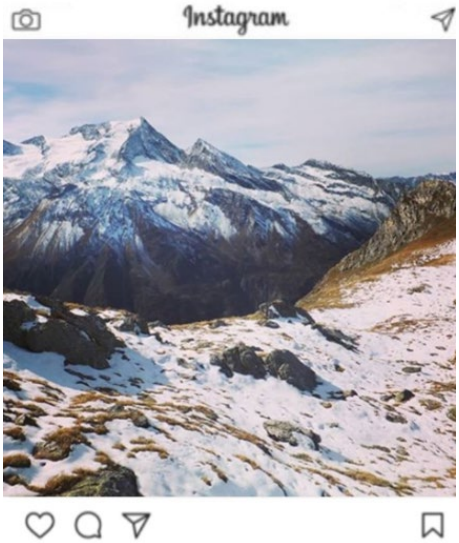
Appendix D Continued
Example of Images in Each Condition

Overweight:





Landscapes:

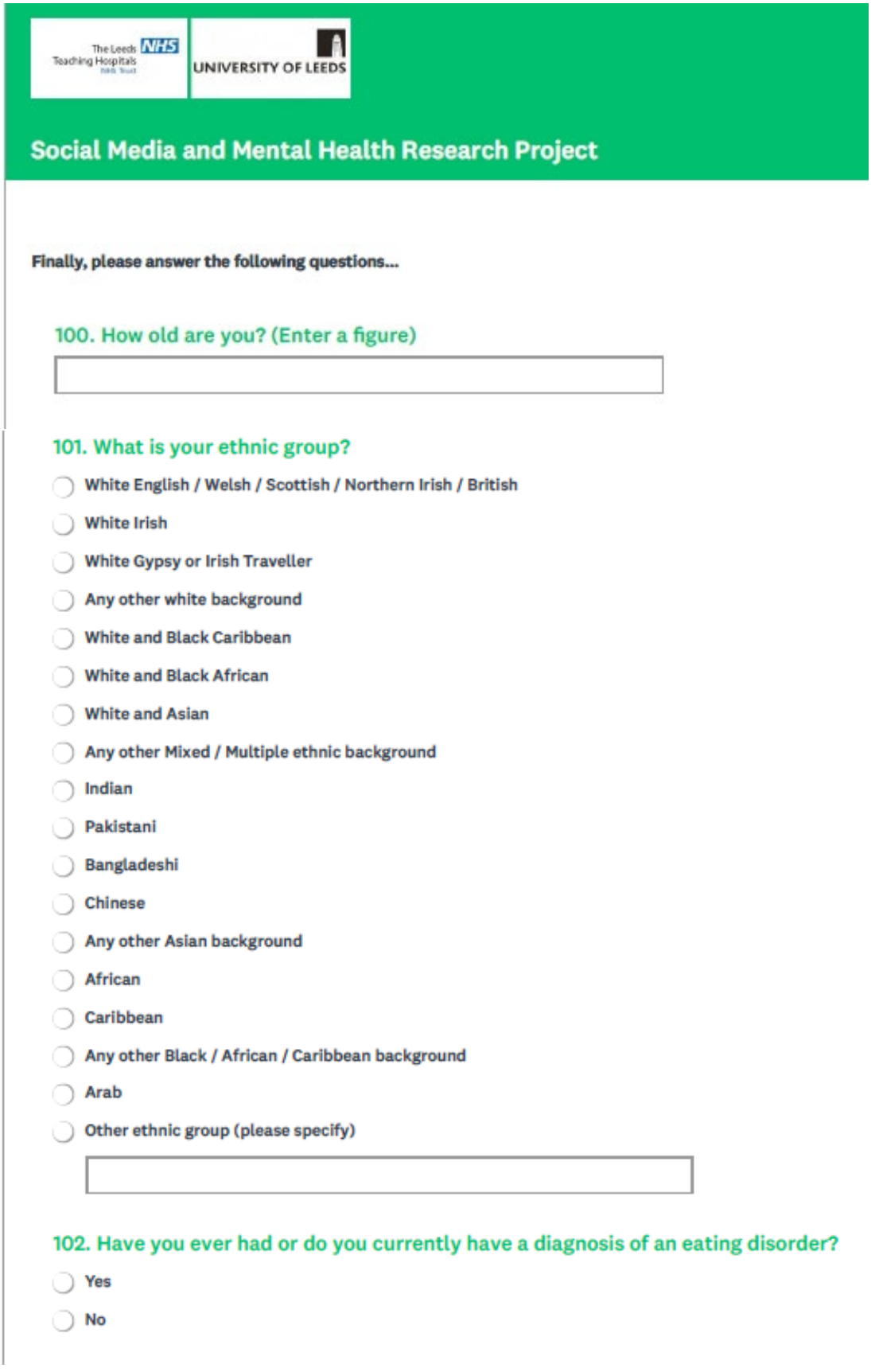


Appendix E
Diet and Exercise Intentions Questionnaire

Anchors: Strongly disagree, disagree, somewhat disagree, neither, somewhat agree, agree, strongly agree.

1. Over the next 2-3 days, I intend to make changes to what I usually eat.
2. Over the next 2-3 days, I intend to follow a strict diet plan/routine (including meal preparation).
3. Over the next 2-3 days I intend to 'eat clean' (eating foods such as fruits, vegetables and grains in their natural state and cutting out refined sugar)
4. Over the next 2-3 days, I intend to increase my protein intake.
5. Over the next 2-3 days, I intend to reduce my fat intake.
6. Over the next 2-3 days I intend to reduce my carbohydrate intake.
7. Over the next 2-3 days I intend to reduce my sugar intake.
8. Over the next 2-3 days I intend to increase my use of supplements (e.g. pre-workout, protein shakes)
9. Over the next 2-3 days I intend to follow a strict exercise plan/routine.
10. Over the next 2-3 days I intend to exercise more often.
11. Over the next 2-3 days, I intend to increase the intensity of my exercise.
12. Over the next 2-3 days I intend to increase my weight training.
13. Over the next 2-3 days I intend to increase my cardiovascular training.

Appendix F
Demographic Questionnaire



The Leeds Teaching Hospitals NHS Trust

UNIVERSITY OF LEEDS

Social Media and Mental Health Research Project

Finally, please answer the following questions...

100. How old are you? (Enter a figure)

101. What is your ethnic group?

- White English / Welsh / Scottish / Northern Irish / British
- White Irish
- White Gypsy or Irish Traveller
- Any other white background
- White and Black Caribbean
- White and Black African
- White and Asian
- Any other Mixed / Multiple ethnic background
- Indian
- Pakistani
- Bangladeshi
- Chinese
- Any other Asian background
- African
- Caribbean
- Any other Black / African / Caribbean background
- Arab
- Other ethnic group (please specify)

102. Have you ever had or do you currently have a diagnosis of an eating disorder?

- Yes
- No

Appendix F Continued
Demographic Questionnaire

103. Please select all the social media applications (apps) and/or websites you use:

- [ ] Facebook
- [ ] Twitter
- [ ] Instagram
- [ ] Snapchat
- [ ] YouTube
- [ ] Whatsapp
- [ ] Facebook Messenger
- [ ] LinkedIn
- [ ] Pinterest
- [ ] Other (please specify)

104. What do you use social media for? (Select all that apply)

- [ ] Talking with friends
- [ ] Sharing posts
- [ ] Viewing other's posts
- [ ] Uploading images
- [ ] Liking other's posts
- [ ] Commenting on other's posts
- [ ] Other (please specify)

105. How long (on an average day) do you spend on social media?

- ○ Less than 10 minutes
- ○ 10–30 minutes
- ○ 30–60 minutes
- ○ 1–2 hours
- ○ More than 2 hours

Appendix F Continued
Demographic Questionnaire

106. How would you describe your body type?

- ◯ Slender
- ◯ Average
- ◯ Muscular
- ◯ Overweight

107. How often do you go to the gym on an average week?

- ◯ I don't go to the gym
- ◯ Once
- ◯ Twice
- ◯ Three times
- ◯ Four times
- ◯ Five times
- ◯ Six times
- ◯ Seven times
- ◯ More than once a day

108. What exercise do you do in the gym? (Select all options that apply)

- ☐ I don't go to the gym
- ☐ Cardiovascular
- ☐ HIIT (high intensity interval training)
- ☐ Weights
- ☐ Classes
- ☐ Swimming
- ☐ Other (please specify)

[ ]

Appendix F Continued
Demographic Questionnaire

109. How often do you take part in other types of exercise (other than the gym)?

- ◯ I don't take part in other types of exercise
- ◯ Once
- ◯ Twice
- ◯ Three times
- ◯ Four times
- ◯ Five times
- ◯ Six times
- ◯ Seven times
- ◯ More than once a day

110. Are you currently on a diet or following a diet plan?

- ◯ Yes
- ◯ No

If yes, please specify

111. Are you currently taking any dietary supplements?

- ◯ Yes
- ◯ No
- ◯ If yes, please specify

Appendix G
Self-reported Dieting and Use of Supplements in the Overall Sample and in Each Condition

	Total sample	**Muscular condition**	**Slim condition**	**Overweight condition**	**Control condition**
	N=197	n=49	n=51	n=47	n=50
On a diet					
n (%)					
Yes	33 (16.8%)	7 (14.3%)	6 (11.8%)	9 (19.1%)	11 (22.0%)
No	162 (82.2%)	42 (85.7%)	45 (88.2%)	36 (76.6%)	39 (78.0%)
Missing data	2 (1.0%)	0 (0.0%)	0 (0.0%)	2 (4.3%)	0 (0.0%)
Taking supplements					
n (%)					
Yes	37 (18.8%)	6 (12.2%)	11 (21.6%)	8 (17.0%)	12 (24.0%)
No	159 (80.7%)	43 (87.8%)	40 (78.4%)	38 (80.9%)	38 (76.0%)
Missing Data	1 (0.5%)	0 (0.0%)	0 (0.0%)	1 (2.1%)	0 (0.0%)

Appendix H
Full Path Descriptions for Mediation Analyses

State Body Satisfaction

Step 1 (Path *c*). In step 1 of the mediation model, the regression of condition on post exposure state body satisfaction (path *c*) was significant when comparing muscular vs overweight conditions $b = 4.11$, $t(189) = 2.19$, $p = .03$. This suggests that there was a significant difference in post exposure body satisfaction between muscular and overweight conditions, specifically, there was lower mean state body satisfaction post exposure in the muscular condition compared to the overweight condition (see Table 5). The regression of condition on post exposure state body satisfaction (path *c*) showed a trend toward significance when comparing muscular vs slim conditions $b = 3.51$, $t(189) = 1.90$, $p = .06$. The muscular condition had lower mean state body satisfaction post exposure than the slim condition (see table 5). The regression of condition on body satisfaction was non-significant when comparing muscular vs landscapes $b = 2.79$, $t(189) = 1.50$, $p = .13$, slim vs overweight $b = .68$, $t(142) = .35$, $p = .73$, slim vs landscapes $b = -.66$, $t(142) = -.34$, $p = .73$ and overweight vs landscapes conditions $b = -1.45$, $t(93) = -.74$, $p = .46$. The regression of the covariate (pre exposure state body satisfaction) on post state body satisfaction was significant ($p \leq .001$) for all the comparisons.

Step 2 (Path *a*). This demonstrated that the regression of condition on the mediator (state appearance comparison) was significant when comparing muscular vs landscapes $b = -4.40$, $t(189) = -5.00$, $p < .001$, slim vs landscapes $b = -4.21$, $t(142) = -4.85$, $p < .001$ and overweight vs landscapes conditions $b = -3.21$, $t(93) = -4.12$, $p < .001$. Specifically, those who viewed the muscular images demonstrated more state appearance comparison ($M = 8.27$, $SD = 4.49$) than those who viewed the landscape

images (M = 3.80, SD = 2.92); those who viewed the slim images demonstrated more state appearance comparison (M = 8.22, SD = 5.30) than those who viewed the landscape images (M = 3.80, SD = 2.92) and those who viewed the overweight images demonstrated more state appearance comparison (M = 7.00, SD = 4.57) than the landscape images (M = 3.80, SD = 2.92).

The regression of condition on the mediator was non-significant when comparing muscular vs slim b = -.18, $t(189)$ = -.21, p = .83, muscular vs overweight b = -1.17, $t(189)$ = -1.31, p = .19 and slim vs overweight conditions b = -.97, $t(142)$ = -1.10, p = .27.

The regression of the covariate on the mediator was significant when comparing the muscular vs slim, muscular vs overweight, muscular vs landscapes, slim vs overweight and slim vs landscapes conditions (p = .01). The regression of the covariate on the mediator was non-significant when comparing overweight and landscapes conditions (p = .21). All the regressions had negative b values which suggests that as pre exposure state body satisfaction increased state appearance comparison decreased.

Step 3 (Path *b*). It was demonstrated that the mediator, controlling for condition, was not a significant predictor of post state body satisfaction when controlling for muscular vs slim, muscular vs overweight and muscular vs landscapes b = -.27, $t(188)$ = -1.76, p = .08. The mediator was also non-significant when controlling for slim vs overweight and slim vs landscapes b = -.05, $t(141)$ = -.28, p = .78. The negative b values demonstrate that as state appearance comparison increased, state body satisfaction decreased. Finally, the mediator was also non-significant when controlling for overweight vs landscapes b = .25, $t(92)$ = .97, p = .33. However, the

positive *b* value demonstrates that as state appearance comparison increased, body satisfaction increased.

Step 4 (Path *c′*). This path showed that when controlling for the mediator, condition became slightly less significant, but continued to be a significant predictor of state body satisfaction when comparing muscular vs overweight conditions b = 3.80, $t(188) = 2.03$, $p = .04$. When controlling for the mediator, condition was still almost a significant predictor of state body satisfaction for muscular vs slim images b = 3.46, $t(188) = 1.88$, $p = .06$. When controlling for the mediator, condition continued to be a non-significant predictor of state body satisfaction when comparing muscular vs landscapes $b = 1.61$, $t(188) = .82$, $p = .41$, slim vs overweight $b = .63$, $t(141) = .32$, $p = .75$, slim vs landscapes $b = -.87$, $t(141) = -.42$, $p = .67$ and overweight vs landscapes conditions $b = -.64$, $t(92) = -.30$, $p = .76$.

Finally, when controlling for the mediator, the covariate continued to be a significant predictor of post state body satisfaction $p < .001$ for all comparisons.

Indirect Effects. Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on state body satisfaction through state appearance comparison for any of the group comparisons: muscular vs slim $b = -.05$, $SE = .30$, 95% CI [-.57, .72], muscular vs overweight $b = .31$, $SE = .37$, 95% CI [-.17, 1.25] muscular vs landscapes $b = 1.18$, $SE = .77$, 95% CI [-.11, 2.88], slim vs overweight $b = .05$, $SE = .27$, 95% CI [-.36, .80], slim vs landscapes $b = .22$, $SE = .82$, 95% CI [-1.29, 2.00] or overweight vs landscapes images $b = -.81$, $SE = .87$, 95% CI [-2.74, .73]. For mediation to occur, the lower and upper confidence intervals should not overlap with 0 (Field, 2017). Hence, mediation did not occur.

State Mood

Step 1 (Path *c*). In step 1 of the mediation model, the regression of condition on state mood (path *c*) was non-significant when comparing all conditions: muscular vs slim $b = 1.95$, $t(186) = 1.29$, $p = .20$, muscular vs overweight $b = 1.27$, $t(186) = .82$, $p = .41$, muscular vs landscapes $b = .10$, $t(186) = .06$, $p = .95$, slim vs overweight $b = -.67$, $t(141) = -.42$, $p = .68$, slim vs landscapes $b = -1.85$, $t(141) = -1.17$, $p = .24$ and overweight vs landscapes $b = -1.13$, $t(92) = -.67$, $p = .51$. The regression of the covariate (pre exposure state mood) on post state mood was significant ($p \leq .001$) when all the comparisons were run.

The regression of the covariate (pre exposure state body satisfaction) on post state mood was significant ($p \leq .001$) for all the comparisons.

Step 2 (Path *a*). This demonstrated that the regression of condition on the mediator (state appearance comparison) was significant when comparing muscular vs landscapes $b = -4.42$, $t(186) = -4.86$, $p < .001$, slim vs landscapes $b = -4.42$, $t(141) = -5.00$, $p < .001$ and overweight vs landscapes conditions $b = -3.23$, $t(92) = -4.07$, $p < .001$. As above, those who viewed the muscular images demonstrated more state appearance comparison ($M = 8.27$, $SD = 4.49$) than those who viewed the landscapes images ($M = 3.80$, $SD = 2.92$); those who viewed the slim images demonstrated more state appearance comparison ($M = 8.22$, $SD = 5.30$) than those who viewed the landscapes images ($M = 3.80$, $SD = 2.92$) and those who viewed the overweight images demonstrated more state appearance comparison ($M = 7.00$, $SD = 4.57$) than the landscapes images ($M = 3.80$, $SD = 2.92$).

The regression of condition on the mediator was non-significant when comparing muscular vs slim $b = -.004$, $t(186) = -.004$, $p = 1.00$, muscular vs

overweight b = -1.13, $t(186)$ = -1.21, p = .23 and slim vs overweight conditions b = -1.12, $t(141)$ = -1.24, p =.22.

The regression of the covariate on the mediator was non-significant (p > .05) for all comparisons.

Step 3 (Path *b*). It was demonstrated that the mediator, controlling for condition, was not a significant predictor of post exposure state mood when controlling for muscular vs slim, muscular vs overweight and muscular vs landscapes b = -.04, $t(185)$ = -.37, p = .71 or slim vs overweight and slim vs landscapes b = -.20, $t(140)$ = -1.31, p =.19. The mediator was a significant predictor of post state mood when controlling for overweight vs landscapes b = -.48, $t(91)$ = -2.17, p = .03. The negative b values demonstrate that for all conditions (whether they were significant or not), as state appearance comparison increased state mood decreased.

Step 4 (path *c′*). This path showed that when controlling for the mediator (state appearance comparison), condition continued to be a non-significant predictor of state mood when comparing all conditions: muscular vs slim b = 1.95, $t(185)$ = 1.28, p = .20, muscular vs overweight b = 1.22, $t(185)$ = .78, p = .44, muscular vs landscapes b = -.10, $t(185)$ = -.37, p = .71, slim vs overweight b = -.89, $t(140)$ = -.55, p = .58, slim vs landscapes b = -2.72, $t(140)$ = -1.59, p = .11 or overweight vs landscape conditions b = -2.68, $t(91)$ = -1.47, p = .14. When controlling for the mediator, the covariate continued to be a significant predictor of post state mood (p <.001) for all comparisons.

Indirect Effect. Bootstrap confidence intervals did not overlap with 0 so demonstrated that there was a significant indirect effect of condition on state mood through state appearance comparison when comparing overweight vs landscapes b = 1.54, SE = .97, 95% CI [.10, 3.79]. Therefore, mediation occurred. The negative b

value in step 4 indicates lower mean state mood (post exposure) in the overweight condition compared to the landscape condition as a result of the mediation.

Bootstrap confidence intervals also demonstrated that there was no significant indirect effect of condition on state mood through state appearance comparison for muscular vs slim b = .0002, SE = .13, 95% CI [-.27, .29], muscular vs overweight b = .05, SE = .18, 95% CI [-.34, .44], muscular vs landscapes b = .20, SE = .54, 95% CI = -.83, 1.32], slim vs overweight b = .22, SE = .28, 95% CI [-.28, .83] or slim vs landscapes b = .87, SE = .68, 95% CI [-.22, 2.24]. Therefore, mediation did not occur.

State Appearance Self-Esteem

Step 1 (Path *c*). In step 1 of the mediation model, the regression of condition on post exposure state appearance self-esteem (path c) was significant when comparing muscular vs overweight b = .94, $t(189) = 2.56$, p = .01 and muscular vs landscape conditions b = 1.01, $t(189) = 2.80$, p = .01. Specifically, there was lower mean state appearance self-esteem (post exposure) in the muscular condition than the overweight condition and a lower mean state appearance self-esteem (post exposure) in the muscular than the landscapes condition. The regression of condition on post exposure state appearance self-esteem was non-significant when comparing muscular vs slim b = .47, $t(189) = 1.30$, p = .20, slim vs overweight b = .47, $t(142) = 1.28$, p = .20, slim vs landscapes b = .54, $t(142) = 1.49$, p = .14 and overweight vs landscapes conditions b = .06, $t(93) = .17$, p = .87. The regression of the covariate (pre exposure state appearance self-esteem) on post state appearance self-esteem was significant ($p \leq .001$) when all the comparisons were run.

Step 2 (Path *a*). This path demonstrated that the regression of condition on the mediator (state appearance comparison) was significant when comparing muscular vs landscapes b = -4.59, $t(189) = -5.20$, p <.001, slim vs landscapes b = -

4.46, $t(142) = -5.10$, $p < .001$ and overweight vs landscapes conditions $b = -3.27$, $t(93) = -4.18$, $p < .001$. As above, those who viewed the muscular images demonstrated more state appearance comparison ($M = 8.27$, $SD = 4.49$) than those who viewed the landscapes images ($M = 3.80$, $SD = 2.92$); those who viewed the slim images demonstrated more state appearance comparison ($M = 8.22$, $SD = 5.30$) than those who viewed the landscapes images ($M = 3.80$, $SD = 2.92$) and those who viewed the overweight images demonstrated more state appearance comparison ($M = 7.00$, $SD = 4.57$) than the landscapes images ($M = 3.80$, $SD = 2.92$).

The regression of condition on the mediator was non-significant when comparing the muscular vs slim $b = -.13$, $t(189) = -.14$, $p = .89$, muscular vs overweight $b = -1.32$, $t(189) = -1.46$, $p = .15$ and slim vs overweight conditions $b = -1.18$, $t(142) = -1.33$, $p = .19$.

The regression of the covariate on the mediator was significant when comparing muscular vs slim, muscular vs overweight and muscular vs landscapes conditions ($p = .03$). The regression of the covariate on the mediator was non-significant when comparing slim vs overweight and slim vs landscapes conditions ($p = .16$) and overweight and landscapes conditions ($p = .56$). All the regressions had negative b values which suggests that as pre exposure state appearance self-esteem increased state appearance comparison decreased.

Step 3 (Path *b*). It was demonstrated that the mediator was not a significant predictor of post exposure state appearance self-esteem when controlling for muscular vs slim, muscular vs overweight and muscular vs landscapes conditions $b = -.01$, $t(188) = -.19$, $p = .85$. The mediator, controlling for condition was also non-significant when comparing slim vs overweight and slim vs landscapes $b = .01$, $t(141) = .30$, $p = .76$. Finally, when condition was controlled for, the mediator was also a non-

significant predictor of post exposure state appearance self-esteem for the overweight vs landscapes comparison b = .03, $t(92) = .67$, $p = .51$. For all these paths, even though they were non-significant, the *b* value indicates a trend in that as state appearance comparison increased, state appearance self-esteem increased.

Step 4 (Path *c′*). This path showed that when controlling for the mediator (state appearance comparison), condition continued to be a significant predictor of post exposure state appearance self-esteem when comparing muscular vs overweight conditions $b = .93$, $t(188) = 2.51$, $p = .01$ and muscular vs landscapes conditions $b = .98$, $t(188) = 2.54$, $p = .01$. When controlling for the mediator, condition was not a significant predictor of post exposure state appearance self-esteem when comparing muscular vs slim $b = .47$, $t(188) = 1.29$, $p = .20$, slim vs overweight $b = .48$, $t(141) = 1.30$, $p = .20$, slim vs landscapes $b = .58$, $t(141) = 1.49$, $p = .14$ or overweight vs landscapes conditions $b = .18$, $t(92) = .42$, $p = .68$. When controlling for the mediator, the covariate continued to be a significant predictor of post state appearance self-esteem ($p < .001$) for all comparisons.

Indirect Effect. Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on state appearance self-esteem through state appearance comparison for any of the comparisons: muscular vs slim $b = .001$, $SE = .03$, 95% CI [-.06, .09], muscular vs overweight $b = .01$, $SE = .06$, 95% CI [-.09, .16] muscular vs landscapes $b = .03$, $SE = .17$, 95% CI [-.27, .35], slim vs overweight $b = -.01$, $SE = .06$, 95% CI [-.13, .13], slim vs landscapes $b = -.05$, $SE = .17$, 95% CI [-.38, .30] or overweight vs landscapes images $b = -.11$, $SE = .21$, 95% CI [-.57, .24]. For mediation to occur, the lower and upper confidence intervals should not overlap with 0 (Field, 2017). Hence, mediation did not occur.

Diet Intentions

Step 1 (Path *c*). In step 1 of the mediation model, the regression of condition on diet intentions (path c) was not significant when comparing any of the conditions: muscular vs slim b = -.04, $t(190)$ = -.31, p = .76, muscular vs overweight b = -.18, $t(190)$ = -1.41, p = .16, muscular vs landscapes b = -.07, $t(190)$ = -.53, p = .60, slim vs overweight b = -.14, $t(143)$ = -1.07, p = .29, slim vs landscapes b = -.03, $t(143)$ = -.21, p = .84 and overweight vs landscapes b = .12, $t(94)$ = 1.07, p = .29. The regression of the covariate (pre exposure diet intentions) on post exposure diet intentions was significant ($p \leq .001$) when all the comparisons were run.

Step 2 (Path *a*). This demonstrated that the regression of condition on the mediator (state appearance comparison) was significant when comparing muscular vs overweight b = -1.75, $t(190)$ = -1.98, p = .05, muscular vs landscapes b = -4.82, $t(190)$ = -5.57, p <.001, slim vs landscapes b = -4.45, $t(143)$ = -5.14, p <.001 and overweight vs landscapes b = -3.11, $t(94)$ = -4.08, p <.001. Those who viewed the muscular images demonstrated more state appearance comparison (M = 8.27, SD = 4.49) than those who viewed the overweight images (M = 7.00, SD = 4.57). As above, those who viewed the muscular images demonstrated more state appearance comparison (M = 8.27, SD = 4.49) than those who viewed the landscapes images (M = 3.80, SD = 2.92); those who viewed the slim images demonstrated more state appearance comparison (M = 8.22, SD = 5.30) than those who viewed the landscapes images (M = 3.80, SD = 2.92) and those who viewed the overweight images demonstrated more state appearance comparison (M = 7.00, SD = 4.57) than the landscapes images (M = 3.80, SD = 2.92).

The regression of condition on the mediator was non-significant when comparing muscular vs slim b = -.35, $t(190)$ = -.40, p = .69 and slim vs overweight b = -1.33, $t(143)$ = -1.51, p = .13.

The regression of the covariate on the mediator was significant for all comparisons ($p \leq .05$). All these regressions had positive b values which suggested that as pre exposure dieting intentions increased state appearance comparison also increased.

Step 3 (Path *b*). This path demonstrated that the mediator (state appearance comparison) was non-significant when controlling for muscular vs slim, muscular vs overweight and muscular vs landscapes b = .01, $t(189)$ = 1.30, p = .19. The b value indicates that for these comparisons, as state appearance comparison increased so did diet intentions. The mediator was also non-significant when controlling for slim vs overweight and slim vs landscapes b = .01, $t(142)$ = .58, p = .57. The b value here also suggests that as state appearance comparison increased, diet intentions also increased. Finally, the mediator was also non-significant when controlling for overweight vs landscapes b = -.02, $t(93)$ = -1.35, p = .18. However, the b value indicates that as state appearance comparison increased, dieting intentions decreased.

Step 4 (Path *c′*). This showed that when controlling for the mediator (state appearance comparison), condition continued to not be a significant predictor of diet intentions for any of the comparisons: muscular vs slim b = -.03, $t(189)$ = -.27, p = .79, muscular vs overweight b = -.16, $t(189)$ = -1.21, p = .23, muscular vs landscapes b = -.0003, $t(189)$ = -.002, p = 1.00, slim vs overweight b = -.13, $t(142)$ = -.98, p = .33, slim vs landscapes b = .01, $t(142)$ = .04, p = .97, overweight vs landscapes b = .05, $t(93)$ = .47, p = .64. When controlling for the mediator, the covariate continued to be a significant predictor of post diet intentions (p <.001) for all comparisons.

Indirect Effect. Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on diet intentions through state appearance comparison for any of the comparisons muscular vs slim b = -.005, SE = .02, 95% CI [-.06, .03], muscular vs overweight b = -.02, SE = .03, 95% CI [-.11, .03] muscular vs landscapes b = -.07, SE = .08, 95% CI [-.23, .07], slim vs overweight b = -.01, SE = .03, 95% CI [-.08, .05], slim vs landscapes b = -.03, SE = .08, 95% CI [-.20, .12] or overweight vs landscapes images b = .06, SE = .08, 95% CI [-.08, .22]. Therefore, mediation did not occur. However, when the covariate was not included, there was a significant indirect effect of condition on diet intentions through state appearance comparison for the muscular vs landscape condition.

Exercise Intentions

Step 1 (Path *c*). In step 1 of the mediation model, the regression of condition on post exposure exercise intentions (path c) was non-significant for all of the comparisons: muscular vs slim b = -.11, $t(190)$ = -.75, p = .46, muscular vs overweight b = -.04, $t(190)$ = -.28, p = .78, muscular vs landscapes b = .06, $t(190)$ = .41, p = .68, slim vs overweight b = .07, $t(143)$ = .46, p = .64, slim vs landscapes b = .17, $t(143)$ = 1.19, p = .24 and overweight vs landscapes b = .12, $t(94)$ = .91, p = .37. The regression of the covariate (pre exposure exercise intentions) on post exposure exercise intentions was also significant ($p \leq .001$) when all the comparisons were run.

Step 2 (Path *a*). This path demonstrated that the regression of condition on the mediator (state appearance comparison) was significant when comparing muscular vs landscapes b = -4.62, $t(190)$ = -5.23, p <.001, slim vs landscapes b = -4.39, $t(143)$ = -5.01, p <.001 and overweight vs landscapes b = -3.18, $t(94)$ = .35, p <.001. As above, those who viewed the muscular images demonstrated more state appearance comparison (M = 8.27, SD = 4.49) than those who viewed the landscapes

images (M = 3.80, SD = 2.92); those who viewed the slim images demonstrated more state appearance comparison (M = 8.22, SD = 5.30) than those who viewed the landscapes images (M = 3.80, SD = 2.92) and those who viewed the overweight images demonstrated more state appearance comparison (M = 7.00, SD = 4.57) than the landscapes images (M = 3.80, SD = 2.92).

The regression of condition on the mediator was non-significant when comparing muscular vs slim b = -.27, $t(190)$ = -.31, p = .76, muscular vs overweight b = -1.50, $t(190)$ = -1.76, p = .10 and slim vs overweight b = -1.22, $t(143)$ = -1.38, p = .17.

The regression of the covariate on the mediator was significant when comparing muscular vs slim, muscular vs overweight and muscular vs landscapes conditions (p = .03). The regression of the covariate on the mediator was non-significant when comparing slim vs overweight and slim vs landscapes conditions (p = .40) and overweight and landscapes conditions (p = .73). All the regressions had positive b values which suggests that as pre exposure diet intentions increased state appearance comparison increased.

Step 3 (Path *b*). This path demonstrated that the mediator (state appearance comparison), was significant when controlling for muscular vs slim, muscular vs overweight and muscular vs landscape b = .05, $t(189)$ = 3.84, p <.001, slim vs overweight and slim vs landscapes b = .05, $t(142)$ = 3.34, p = .001 and finally for overweight vs landscapes b = .04, $t(93)$ = 2.61, p =.01. The positive b values all suggest that as state appearance comparison increased, post exposure exercise intentions also increased.

Step 4 (Path *c′*). This path showed that when controlling for the mediator, condition became a significant predictor of exercise intentions when comparing slim

vs landscapes b = .37, $t(142)$ = 2.42, p =.02. Specifically, there was a higher score for exercise intentions (post exposure) in the slim compared to the landscape condition (see Table 9). When controlling for the mediator, condition also almost became a significant predictor of exercise intentions for muscular vs landscapes b = .27, $t(189)$ = 1.76, p = .08. There was a higher score for exercise intentions (post exposure) in the landscape compared to the muscular condition. Condition also almost became a significant predictor of exercise intentions when controlling for the mediator for overweight vs landscapes b = .25, $t(93)$ = 1.88, p = .06. There were higher post exposure exercise intentions in the overweight condition compared to the landscape condition. When controlling for the mediator, condition continued to not be a significant predictor of post exposure exercise intentions when comparing muscular vs slim b =-.10, $t(189)$ = -.69, p =.49, muscular vs overweight b = .03, $t(189)$ = .18, p = .86 and slim vs overweight conditions b = .12, $t(142)$ = .86, p = .39. When controlling for the mediator, the covariate continued to be a significant predictor of post exercise intentions (p <.001) for all comparisons.

Indirect Effect. Bootstrap confidence intervals did not overlap with 0 so demonstrated that there was a significant indirect effect of condition on exercise intentions through state appearance comparison when comparing muscular vs landscape b = -.21, SE = .08, 95% CI [-.39, -.07] and slim vs landscapes b = -.20, SE = .09, 95% CI [-.39, -.05]. Therefore, mediation occurred for both.

Bootstrap confidence intervals demonstrated that there was no significant indirect effect of condition on exercise intentions through state appearance comparison when comparing muscular vs slim b = -.01, SE = .05, 95% CI [-.11, .07], muscular vs overweight b = -.07, SE = .05, 95% CI [-.18, .01], slim vs overweight b

= -.06, *SE* = .05, 95% CI [-.17, .03] or overweight vs landscapes *b* = -.14, *SE* = .09, 95% CI [-.34, .02]. Therefore, mediation did not occur.