An exploration of some contemporary risk factors for the development of disordered eating.

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Abstract

Eating disorders are amongst the most deadly and difficult to treat mental health conditions (Beat, 2015), thought to be influenced by many complex factors, including in part social pressures of body appearance. However, current understanding of eating disorders is based heavily on a very specific population; cisgender, heterosexual, able-bodied, white women (Burke et al., 2020; Fabello, 2020). Furthermore, modern advances in communication mean that the social context in which eating disorders develop is rapidly changing. This thesis examined whether a frequently used measure of disordered eating, the Eating Disorder Examination Questionnaire (EDE-Q) is fit for purpose in minoritized communities that deviate from the traditional eating disorder patient, as well as the role of social media (specifically 'fitspiration' images) as a contemporary eating disorder risk factor. The results identify a new structure for the EDE-Q that is relevant across genders and sexualities (bisexual, homosexual, and heterosexual). Data obtained suggest that both gender and sexuality had a small but significant influence on eating disorder symptomatology. We also find that although disordered eating thoughts and behaviours may influence our judgments of social media images of other people's bodies, viewing such images has no immediate effect on the judgments we make about our own bodies

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Declaration

I declare that this thesis is a presentation of original work and I am the sole author. This work has not previously been presented for an award at this, or any other, University. All sources are acknowledged as references.

Chapter 1. Literature Review

Introduction

Anorexia nervosa (AN) has the highest mortality rate of any mental health conditions, with 20% of sufferers dying because of the illness (Beat, 2015). Indeed, all eating disorders have an undeniable and profoundly damaging effect on the lives of those who live with them and their families (Hillege, Beale & McMaster, 2006). It is estimated that 20 – 23% of those who experience an eating disorder remain chronically ill (Beat, 2015; Engel & Keizer, 2017), and relapse rates are high (McFarlane, Olmsted & Trottier, 2008). The ways in which we measure disordered eating have been developed in a certain subset of sufferers, specifically heterosexual and cisgender people (who are typically white, able-bodied, and slim) (Carey et al., 2019; Lavender, De Young & Anderson, 2010). This means that measures used in research around disordered eating may not be useful for other demographic groups, and this may have influenced our understanding of what disordered eating looks like. Eating disorders affect the sufferer's body image; the mental representation that they have about their appearance, both the affective and attitudinal aspects (their body satisfaction and how they feel about themselves) and the perceptual and cognitive aspects (body size estimation) (Cash, 2012; Gaudio & Quattrocchi, 2012). There are decades of research that highlight how traditional media may have a small negative effect on body satisfaction, and more recently the influence of social media has begun to be addressed (Fardouly & Vartanian, 2016).

Measuring Disordered Eating

As indicated earlier, tools used in ED research and for clinical ED assessment have typically been developed in female heterosexual samples, and their use has not always been validated in other populations (Carey et al., 2019; Lavender, De Young & Anderson, 2010). This bias

in reporting and researching EDs is reflected in the many anecdotal experiences of those who do receive a diagnosis but do not fit the typical idea of what someone with disordered eating looks like (Robinson et al., 2013). Although clinical EDs are thought to present with similar symptoms for men and women (Feldman & Meyer, 2007), significant differences have been identified between genders in community samples. For example, men generally score lower on attitudinal aspects of ED symptomatology compared to women (Lavender et al., 2010; Carey et al., 2019). This difference in prevalence of ED symptomatology has been suggested to represent a qualitative difference between the way that men and women interpret assessment questions rather than solely a quantitative difference (Smith et al., 2017; Carey et al., 2019). It may be that the constructs underlying disordered eating might be different for men and women, as well as being related to other attributes such as self-identified sexual orientation, which may influence how these experiences are measured. It is not surprising that common ED assessment tools do not fully capture male or non-heterosexual symptomology due to these measures being developed in heterosexual women, and the majority not having been adapted for more current DSM (The Diagnostic and Statistical Manual of Mental Disorders) ED diagnoses, such as binge eating disorder, which is has a similar prevalence in males and females (Smith et al., 2017; Carey et al., 2019; Murray, Griffiths, & Mond, 2016). Understanding and addressing body-related disorders in different groups requires the ability to correctly identify its presence, which calls for more accurate, validated measures (Talbot et al., 2019).

The Tripartite Influence Model

Many potential factors might influence how an individual feels about their body and the kind of eating behaviours that they engage in, including media pressure, low self-esteem, negative affect, peer influences, social comparison, and pressure from parents, and The Tripartite

Influence Model brings several of these factors together (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999; Wertheim et al., 2004). This model suggests that there are three main factors influencing body image and how people feel about their body; namely peers, parents, and the media. These factors influence individuals through two key mechanisms, appearance comparison and the internalization of the thin ideal (Thompson et al., 1999).

The Tripartite Influence model suggests that peer influences might affect eating behaviours and body image. This has been evidenced in various studies, results of which indicate that weight-related teasing from both peers and family members is linked to body dissatisfaction in women; teasing in particular is also a factor predicting body image and disordered eating for college women and adolescent girls (Thompson, Cattarin, Fowler & Fisher, 1995; Stormer & Thompson, 1996; Paxton, Schutz, Wertheim & Muir., 1999; Kanakis & Kelen, 1995). Family members also seem to have influence over how people feel about their body and the kind of eating behaviours that they engage in (Levine, Smolak, Moodey & Shuman, 1994; Rieves & Cash, 1996).

The Tripartite Influence Model also suggests a role of the media in the development and maintenance of disordered eating and evidence from research in the area supports this. This relates to both traditional media as well as social media, and is explored in further detail later in this review. As social media involves seeing content from peers, the comparisons the viewer makes may be more potent, as research suggests we make more powerful comparisons with those we perceive as peers as opposed to public figures (Monks, Costello, Dare & Boyd, 2021; Hamilton, Do & Choukas-Bradley, 2021). . Based on the evidence available, it seems that the factors which the Tripartite Influence Model suggest affect our body satisfaction do play important roles in this complex process. This thesis will particularly focus on the peer

and media influences, through the effects of being part of specific communities alongside the influence of social media. Social media is unique in that it potentially includes both the influence of being a media source, as well as being a place where people interact with their peers.

This Tripartite Influence Model has been evaluated in multiple ways, and research supports the role of peer, parent, and media influence on body satisfaction and disordered eating thoughts and behaviours (Field et al., 1999; 2001; Keery, van den Berg & Thompson, 2004). Social comparison has been found to mediate the influence that family and media pressure has on body dissatisfaction, which in turn influence both restrictive and bulimic behaviours (van den Berg, Thompson, Obremski-Brandon & Coovert, 2002). Social comparison is a collection of processes that involve thinking about others in relation to the self (Wood, 1996). For example, when browsing Instagram one might look at another person's hair, and think it looks better than their own. Previous research in the area has suggested that passively browsing social media results in making upwards comparisons to others (or deeming others as superior in some way than oneself), however more recently results indicate there may also be positive effects such as inspiration (Meier & Johnson, 2001). It may be that effects are linked to whether one is passively viewing content or actively engaging with it; however the amount of social comparison that the user engages in on social media platforms does not necessarily seem to influence wellbeing (Wirtz, Tucker, Briggs & Schoemann, 2020).

For adolescent girls, peer and media influences seem to be particularly important, when compared to family influences (Shroff & Thompson, 2006). Many of the earlier studies exploring this model focussed on women and girls; however, research has also been conducted to explore the pertinence of this model to body dissatisfaction in men. Tylka

(2011) considered how body fat and muscularity concerns fit into the model for men. Dual body image pathways, one for muscularity dissatisfaction and one for body fat dissatisfaction, towards muscularity-driven and disordered eating behaviours, were included in the model, and dating partners were added as a potential social influence. This suggests that both muscularity and body fat dissatisfaction should be considered within models of male body image, each predicting different kinds of behaviours (Tylka, 2011). Tylka and Andorka (2012) explored this expanded model in a sample of gay men, and found evidence supporting its use, with the addition of gay community involvement within the social influences. More recently, the model has been supported in a group of men, wherein it was found that muscularity and thinness-oriented pressures are linked to disordered eating in men via pathways of thin internalization, muscular internalization, and appearance comparisons (Schaefer, Rodgers, Thompson & Griffiths, 2021). There may also be a link between muscularity and disordered eating in women, as newer social media trends such as fitspiration content (designed to promote behaviours related to physical health rather than just thinness) encourages thinness and muscularity as being attractive in women as well. Interestingly, due to the promotion of health messages in fitspiration, positive body image may not protect against damaging appearance comparisons from viewing fitspiration content, unlike with thinspiration (Dignard & Jarry, 2021). Thus, arguably fitspiration may be more damaging to body image compared to thinspiration.

It is also possible that disordered eating in sexual minority communities could be explained by using both the Tripartite Influence Model and the minority stress model (stresses of being part of a minority group are detrimental to well-being) (Convertino, Helm, Pennesi, Gonzales & Blashill, 2021). Concentrating on a group of participants who were attracted to the same gender that they themselves identified as, Convertino et al. (2021) found that community

involvement and minority stressors were linked to body dissatisfaction and muscularity related attitudes. For women specifically, community involvement speeded up the link between muscular-ideal internalization and also the link between muscularity dissatisfaction and muscularity-driven behaviours (Convertino et al., 2021).

Men and Eating Disorders

Given that eating disorders are historically associated with young, heterosexual, white women (National Eating Disorders Association (NEDA), 2016), it follows that much of the research exploring EDs has focussed on a predominantly female, heterosexual population, so much more research is needed regarding the relationships between sexuality, gender identity, body image, and eating disorders (NEDA, 2016). Some studies even exclude men as they are seen as atypical, despite EDs having been reported in men for as long as they have been reported in women (Murray et al., 2017). Men with EDs report feeling invisible as EDs are seen as a 'female problem', with the majority of the available literature being aimed at women, and they hesitate to seek support because of this (Robinson et al., 2013; Bosley, 2011).

Research indicates men may account for around 1 in 4 of all ED cases (Murray et al., 2017). Studies have considered how the public perceives men with eating disorders. When participants were given a vignette that was randomly attributed to a man or woman with anorexia, bulimia, or binge eating disorder, participants estimated that the men with anorexia and bulimia were more likely not to be heterosexual (Essayli, Murakami & Latner, 2019). The researchers inferred that the public are more likely to perceive that a man with an eating disorder is gay or bisexual (Essayli et al., 2019). Furthermore, men with eating disorders are less likely to seek treatment than women experiencing an eating disorder, most likely due to

the stigma around mental health problems in men as well as the perception that only women experience eating disorders (Lewinsohn, Seeley, Moerk & Striegel-Moore, 2002). The clinical manifestations of EDs in men and women are similar in terms of age of onset, weight control and behaviours, but physical activity is more pronounced in men with EDs (Núñez-Navarro et al., 2012). This may be due to a greater preoccupation with muscularity (that can only be achieved through exercise), as opposed to thinness, in men (Murray et al., 2017).

In a study of the lived experience of men with eating disorders, it was found that development of symptoms is often linked to a need to fit in, alongside weight and mental health problems that run in the family (Lyons, McAndrew & Warne, 2019). They have a variety of experiences in treatment, but often feel discrimination due to their gender (Lyons et al, 2019). There has been an increase new terms on social media for men with eating disorders, such as "rexyboy" (similar to the derivations of "thinspo" found in social media tags like "thynspo") (Pater, Reining, Miller, Toscos & Mynatt, 2019). The study that found this increase identified that 63% of content would not have been included had they only used 2016 terms for promoting ED behaviours (e.g pro-ana), which demonstrates how quickly content changes and develops in this area (Pater et al., 2019).

EDs may have similar features in men and women, but being gay appears to be a specific risk factor in men for developing an ED (Feldman & Meyer, 2007). Symptoms relating to EDs are thought to be 10 times more likely in gay and bisexual men than in heterosexual men (Strother, Lemberg, Stanford, & Turberville, 2012). Gay men report higher overall levels of body dissatisfaction, and display more negative, thinness-oriented eating attitudes and behaviours (Duggan & McCreary, 2004). Although being gay and male is not predictive in itself of developing an ED, it certainly seems to be an indication of risk (Strother et al., 2012). Considering different groups, heterosexual women and gay men show the highest concern for physical attractiveness, and there is a substantial increase in risk for development

of an ED based on sexuality in men (Harvey & Robinson, 2003). Evidence indicates that gay men show more distress related to body dissatisfaction and ED symptoms, and are less satisfied with their bodies than straight men (Harvey & Robinson, 2003). Gay men are also thought to be at greater risk of a range of body image concerns than heterosexual men, including binge eating, purging, restrictive dieting, and using diet pills (Murray et al., 2017). As much as 42% of men with eating disorders may identify as gay (Bosley, 2011).

In a study of 170,005 men and women in New Zealand, it was found that gay and plurisexual (those identifying as being attracted to multiple genders) men reported lower body satisfaction than heterosexual men (Basabas, Greaves, Barlow & Sibley, 2019). Gay men also reported lower body satisfaction than lesbian women, and equivalent body satisfaction to heterosexual and plurisexual women (Basabas et al., 2019). These results controlled for differences in age and BMI, and emphasise the importance of considering sexuality when exploring body image issues. They suggest that one reason why gay men may be more susceptible to poor body image is that men value physical attractiveness in partners, so there are strong sociocultural pressures on gay men to be thin, muscular, and therefore attractive, just as there are pressures on women to be attractive in this way (Griffiths, 2018). However, they found that gender alone did not have an impact on body image, but sexual orientation and the interaction between sexual orientation and gender did (Basabas et al., 2019). However, one should bear in mind that this data was collected through measures that were developed in a very specific group of people (heterosexual, cisgender, thin women) so the results should be taken with caution. Also, it is worth highlighting that the lived experiences of poor body image, although at similar levels quantitatively, is likely to be qualitatively different across different groups (Richardson & Paslakis, 2020).

One way of measuring ED pathology is by using the EDE-Q (Eating Disorder Examination Questionnaire), a self-report questionnaire derived from the Eating Disorder Examination

interview (Fairburn & Beglin, 1994). Some studies have compared how men and women score on the EDE-Q. No difference was found between men and women in binge eating or excessive exercise, but differences were found between men and women in purging and dietary restraint (Lavender et al., 2010). Men generally scored lower on global and subscale scores than women despite similar rates of binge eating and excessive exercise (Lavender et al., 2010). It is not clear whether the higher scores of women completing the EDE-Q is due to qualitative differences in how the behaviours present, or because of quantitative differences (Smith et al., 2017). However, it is clear that the norms established using female populations might not generalize to men with EDs (Carey et al., 2019). As opposed to reflecting differences in severity of ED pathology based on gender, the differences between male and female responses on the EDE-Q may indicate differences in how symptoms manifest and are assessed (Hilbert et al., 2012; Nagata et al., 2021). The EDE-Q was developed to assess traditional ED symptoms, so may not be representative of ED symptoms that men experience, such as muscularity concerns (Smith et al., 2017). Recent research has found a significant difference in the factor structure of the EDE-Q in men compared to women (Carey et al., 2019). This research indicates that for the traditional EDE-Q, the sub-factor's contribution to the overall score are not the same, which may affect how disordered eating is measured in these groups.

Both the drive for muscularity and the drive for thinness are relevant in eating disorders, particularly in men (Klimek, Murray, Brown, Gonzales & Blashill, 2018). Research indicates that men who internalize the muscular ideal have a higher level of drive for muscularity when they do not internalize the thin ideal; however, the internalization of both together is most relevant to men developing eating disorders (Klimek et al., 2018). A recent study considering the usefulness of the EDE-Q in various sexuality groups support the use of this measure in sexual minority men and women (Klimek et al., 2021). However, although the study did

examine measurement variance between genders, the authors did not consider potential differences across sexuality, grouping all sexual minorities as a single sample.

Given that there seems to be an impact of being a gay man on experiences of body satisfaction, researchers have explored the reasons that this might be. Body dissatisfaction may be linked to the experiences of living in a heteronormative society, and the stigma that comes along with this (Brennan, Crath, Hart, Gadalla & Gillis., 2011). Gay subculture seems to value attractiveness especially highly, such that concerns about the body are particularly salient for gay men (Drummond, 2005; 2010). Unlike women, who it is suggested primarily experience pressure to a thin ideal, gay men experience a pressure to be simultaneously lean (devoid of fat) and muscular (Drummond, 2005; 2010). Physical power and prowess, and thus muscularity, are seen as vitally important in our conception of masculinity, however some suggest that muscularity serves a different purpose for gay men. Muscularity for gay men does not just relate to dominance or the ability to physically overpower, but is increasingly related to attractiveness and the ability to form relationships with sexual partners, as well as having access to the social capital that it confers (Drummond, 2005; 2010; Brennan, Craig & Thompson., 2012). Although it may also be a way to reject femininity and demonstrate masculinity, given the way that being gay is conflated with femininity (Brennan et al., 2011). Drummond (2005) also highlights the possibility of 'protest muscularity', which demonstrates physical health and virility against the stigma related to the frailer bodies associated with HIV/AIDS, something that gay men have borne the brunt of. The bulky muscularity that was deemed as attractive in gay culture in the 70s and 80s waned in popularity due to having connotations related to HIV/AIDS, and following this we begin to see the lean and muscular body presented as the ideal (Filiault & Drummond, 2005). However, given the changing health landscape around treatment options, and the fact that

there is greater public understanding around HIV/AIDS, this may not have such a big influence at present.

The pressure to have a lean, muscular figure is not the only appearance related pressure that gay men face. The pressure to embody the 'look', or the overall appearance of looking right according to that specific group's ideals, including clothes and style, is also something experienced by gay men (Drummond, 2005; 2006). If muscularity has become the normative body for men, gay and bisexual men might attempt to develop this kind of body to display masculinity, in order to counteract possible homophobia (Tiggemann, Martins & Kirkbride., 2007). The attempt to look a certain way to avoid negative experience linked to stigma and homophobia, could in itself have a damaging impact on the individual's health, given that it is related to depression and experiences of disordered eating (Brennan et al., 2012; Blashill, 2010).

The ideal gay body of today, which as above is presented as lean but muscular, does not match the ideal gay body of the 1970s and 80s (Filiault & Drummond, 2007). In fact, what was deemed as most attractive amongst gay men 50 years ago could be described as the ideal heterosexual body of today, one that was large and muscular. In their discussion of the hegemonic aesthetic, Filiault and Drummond (2007) highlight that gay men may attempt to embody the dominant idea of masculinity by developing an extremely muscular body. Gay men who achieve this kind of body attain power associated with masculinity that might not usually be granted to them given that their sexuality is in contrast to the hegemonic attitude of heterosexuality (Filiault & Drummond, 2007). Muscularity in gay men has also been linked to sexually risky behaviours, potentially adding another layer into the attempt to confirm masculinity (Brennan et al., 2015). Embodying the right 'look' also grants access to gay spaces, such as nightclubs or bars (Drummond, 2010).

The experience of body dissatisfaction may manifest as drive for muscularity in gay and bisexual men, particularly given that muscularity is desired in gay culture (Brennan et al., 2012). It is suggested that as well as helping gay men to access the spaces and benefits of belonging to this group by conforming to group norms, alongside the way in which masculinity is objectified via muscularity, being muscular also enables gay men to attract a partner of at least equal level of desirability (Swami & Tovée, 2008). It should be noted that on occasions, due to the possible complexities of recruiting a specific sample, research in the area sometimes uses samples from the same place repeatedly (such as Brennan et al's recruitment in the 2008 Toronto LGBT festival). This could limit the generalisability of these claims, and reminds us of the importance of recruiting diverse samples (Filiault & Drummond, 2009).

It seems that experiences of body dissatisfaction and related drive for muscularity in gay and bisexual men have multiple complex reasons behind them. It may be related to internalised homonegativity and the expectation of experiencing homophobia and needing to protect against discrimination; feelings of shame from internalised homonegativity; the desire to appear more masculine and to reject femininity, amongst other things (Badenes-Ribera, Fabris & Longobardi, 2018).

Understanding how disordered eating may manifest in men and how this may differ from women is important. Bosley (2011) points out that the available statistics around rates of eating disorders in men are likely to be an underestimate, as our concept of what an eating disorder is was developed based on what we see in women. It is likely that further research is needed in order to fully understand what eating disorders in men look like and to incorporate this into diagnostic criteria and treatment approaches.

Sexual orientation may not just be important for understanding disordered eating in males. In a paper looking at lifetime prevalence rates of anorexia, bulimia, and binge eating disorder in a group of 35,995 people participating in a national survey, prevalence rates were significantly higher amongst sexual minority participants compared to heterosexual participants, across all genders (Kamody, Grilo & Udo, 2019). This difference remained even when sociodemographic variables were controlled for (Kamody et al., 2019). Rates were also higher in those who had experienced discrimination (Kamody et al., 2019). This leads us to consider how sexuality affects eating disorders in other marginalized groups, aside from gay and bisexual men. Body satisfaction is often seen as something that primarily affects women, but sexual orientation may also play a part in their experiences.

Women and Eating Disorders

Of the estimated 1.25 million adults in the UK living with an eating disorder, it is likely that up to 75% identify as female (Beat, 2015). Although women are often centred in eating disorder research, there is a focus on cisgender, heterosexual, slim women, who are seen as the typical presentation of an eating disorder (Bordo, 2009). Being gay is established as a clear risk factor for the development of an eating disorder in men, but there are contradictory results for this as a risk factor in women (Dotan, Bachner-Melman & Dahlenburg, 2019). The sexuality of women who experience eating disorders and how this might influence rates of disordered eating has not been fully explored in the research to date, though it has been established that bisexual and lesbian women have significantly worse mental health in general than heterosexual women (Colledge, Hickson, Reid & Weatherburn, 2015). A review of the available research from 2011 to 2017 shows that sexual minority groups continue to show higher rates of disordered eating, and calls for more intersectional research in the future (Calzo, Blashill, Brown & Argenal, 2017). In particular, research that explores the

intersection between sexual orientation and gender identity is needed to better understand how these factors may be related to disordered eating experiences.

Researchers point to the differing pictures found in the research regarding how sexuality relates to eating disorder experiences in women (Austin et al., 2004). Some studies show adult lesbian and heterosexual women to have similar rates of disordered eating (Beren et al., 1996; Singh et al., 1999; Striegel-Moore et al., 1999). Other studies suggest that lesbian women are less dissatisfied with their bodies, show less dietary restraint, and score lower on measures of eating disorder symptoms than heterosexual women (Brand et al., 1992; Herzog et al., 1992; Lakkis & Ricciardelli, 1999; Meyer et al., 2001; Siever et al., 1994). Lesbian and bisexual girls were more satisfied with how their bodies looked, dieted less, and made less effort to look like figures in the media than heterosexual girls (Austin et al., 2004).

A meta-analysis considered 21 studies that examined how sexuality affects eating disorder rates in women (Dotan et al., 2019). They found that there was no overall difference in eating disorder rates between lesbians and heterosexual women (Dotan et al., 2019). However, in terms of experiences, lesbians reported less restricting and more bingeing than heterosexual women did. Bisexual women were more likely than lesbian women to restrict food and to purge, and more likely than straight women to restrict food and have overall eating disorder symptoms (Dotan et al, 2019). This meta-analysis indicates that there are distinct patterns of disordered eating across sexuality groups, with bisexual and 'mostly heterosexual' women being most at risk (Dotan et al., 2019). It may be that stigma and experiences of prejudice related to sexual orientation rather than the sexual orientation itself are what confer the extra risks and differences in patterns of symptoms. However research regarding womens'

sexualities and their relationship to eating disorders is less consistent than that found for men (Markey & Markey, 2014; Morrison et al., 2004; Yean et al., 2013).

There are long-standing ideas of lesbian culture downplaying the importance of physical attractiveness and challenging traditional ideas of what is attractive (Blumstein & Schwarz, 1983). One study found that body esteem (how good one felt about one's body) was more closely related to self-esteem in lesbian women compared to heterosexual women (Striegel-Moore, Tucker & Hsu, 1990). However this study had a relatively small sample size (N = 82 total participants), which may have lacked power to detect an effect. Other authors point to the focus in eating disorder and sexuality research on gay men, and the differences found in rates of eating disorders in women (Jones & Malson, 2013). Some suggest that around 2-3% of lesbian women have an eating disorder, compared to 5-10% of heterosexual women (Settles, Hanks & Sussman, 1993). However, other, more recent, studies suggest equivalent rates of eating disorders across sexualities in women (Jones & Malson, 2013). Other recent research has tried to estimate prevalence of eating disorders in sexual minority groups, with a sample of 126 heterosexual participants and 388 lesbian, gay, and bisexual participants (Feldman & Meyer, 2007). They assessed diagnosis using the WHO interview and found no difference in eating disorder prevalence by sexuality in women, criticising previous research for predominantly using unrepresentative college samples (Feldman & Meyer, 2007).

Some researchers suggest that lesbian culture's lack of emphasis on appearance might be a protective factor against eating disorders for lesbians (Beren, Hayden, Wilfley & Grilo, 1996). However, lesbian women are still exposed to the wider cultural ideals that heterosexual and bisexual women experience. A study considering 257 women found that lesbian and heterosexual women did not differ on measures of body dissatisfaction and

distress related to body dissatisfaction (Beren et al., 1996). The authors indicate that this may be because lesbian culture's flexibility about appearance is not sufficient to offset societal messages about the importance of adhering to the thin ideal, alongside internalized homophobia, and the pressures of belonging to a minority group (Beren et al., 1996).

Based on the aforementioned research, it may be that, regardless of sexual orientation, exposure to sociocultural pressures around the ideal body for women influences how they feel about themselves and their bodies. The internalization of sociocultural norms plays an important role in the development of body dissatisfaction and eating disorders (Bergeron & Senn, 1998). One study explored whether lesbian identity can act as a buffer to this internalization, and included 108 lesbian women and 115 heterosexual women (Bergeron & Senn, 1998). It was found that lesbians felt more fit and had less negative attitudes about their bodies, as well as less internalization of sociocultural norms around bodies, whereas this internalization of norms significantly predicted attitudes to their bodies (Bergeron & Senn, 1998). However both lesbian and straight women seem to be similarly aware of and exposed to society's messages, and so their attitudes to their bodies overlap (Bergeron & Senn, 1998). Lesbians may be buffered from these views in specific areas, most likely due to different internalization of norms (Bergeron & Senn, 1998). Brown (1987) suggests that lesbians are like fat women (used as a term of reclamation), in that both are denigrated and breaking rules and moulds, and pushing the confines of patriarchal control, in fact there may even be an influence not to conform to sociocultural norms.

Research regarding how lesbians score on measures of weight concern, dieting, and body image issues is mixed, with some studies suggesting that they score lower on these measures (Gettelman & Thompson, 1993). Contrary to this, as above other research suggests that

lesbians are not conferred the assumed protection from sociocultural norms but that all women experience this socialization, regardless of sexuality (Dworkin, 1989). In fact, many studies find lesbian and heterosexual women did not differ on measures of body image (Striegel-Moore, Tucker & Hsu, 1990). One theory, from almost thirty years ago, explaining the finding that lesbian women have lower body dissatisfaction suggests that differences in body image found between sexuality groups is down to sexual objectification experiences related to the gender group you are trying to attract (Siever, 1994; Gonzales & Blashill, 2021; Soulliard & Wander Val, 2022). In other words, heterosexual women may experience more body dissatisfaction because they are trying to attract heterosexual men, who place high value on physical attractiveness. On the other hand, lesbian women are trying to attract lesbian women, thus may experience less body dissatisfaction because physical attractiveness is not so important in this group. However, this is predicated on the idea that gender is binary and that an individual is only ever trying to attract men or women. Our contemporary understanding of gender and sexuality underlines that this is not the case, so further research is needed to understand this fully (Hart, Saperstein, Magliozzi & Westbrook, 2019).

One study compared the experiences of 47 heterosexual and 45 lesbian women, and found that lesbian women have significantly lower rates of drive for thinness and exercise to control weight than heterosexual women (Moore & Keel, 2003) do. There is support for this finding in that other research has found that lesbian women have lower levels of body dissatisfaction (French, Story, Remafedi, Resnick, & Blum, 1996; Gettelman & Thompson, 1993; Herzog, Newman, Warshaw, & Yeh, 1992; Lakkis, Ricciardelli, & Williams, 1999; Siever, 1994; Share & Mintz, 2002), alongside lower rates of dieting (Lakkis et al., 1999), and lower rates of eating-disordered behaviours (Gettleman & Thompson, 1993; Herzog et al., 1992; Lakkis et al., 1999) than heterosexual women. However, many other studies have found no

difference in the rates of body dissatisfaction (Beren, Hayden, Wilfley, & Grilo, 1996; Heffernan, 1996; Striegel-Moore et al., 1990), concerns about dieting and weight (French et al., 1996; Heffernan, 1996), or rates of eating disorders (French et al., 1996; Heffernan, 1996) based on sexuality. This group have also been found to score higher for drive for muscularity, lower self-esteem, and lower internalization than heterosexual women, but did not significantly differ on body dissatisfaction, drive for thinness, or disordered eating (Yean et al., 2013). This difference in scores may indicate a differing pattern of disordered eating behaviours in lesbian women. However, lesbians are generally understudied in the eating disorder research (Yean et al., 2013) and thus more research is require to understand how disordered eating might manifest in this group. A meta-analysis considering rates of disordered eating in women found a small difference for studies comparing lesbian and heterosexual women, in that there was greater body satisfaction in lesbian women (Morrison, Morrison & Sager, 2004). However, the average effect size found was -0.02, and thus results suggest no meaningful difference between groups (Morrison et al., 2004). There was also no exploration of others thoughts and behaviours that might link to disordered eating experiences such as drive for muscularity.

Research that considers other attitudes and behaviours related to disordered eating seems to indicate that women in general, regardless of their sexual orientation, are vulnerable to body dissatisfaction and related behaviours. A study in 1996 explored the prevalence of binge eating in lesbian communities, whereas much previous literature had focussed on restrictive symptoms (Heffernan, 1996). In 203 lesbian women, they found that rates of bulimia symptoms were similar to the rates found amongst heterosexual women (Heffernan, 1996). They also found that lesbian and heterosexual women did not have significantly different attitudes to weight and appearance, or dieting (Heffernan, 1996). Based on this they suggest

that ‘gender trumps sexual orientation’, in other words identifying as female is a bigger risk factor than being lesbian is a protective factor. They suggest that the idea that dieting is not common among lesbians does not hold up to empirical scrutiny – 48% of the sample did in fact engage in dieting (Heffernan, 1996). This may suggest that there is a certain kind of stigma around dieting in the lesbian community, or held about lesbians and dieting by people who are not part of the community. The within-groups differences found in body image amongst lesbian participants in some samples may go some way to explaining the diversity of disordered eating rates found in this group across the research. Interviews with lesbian and bisexual women support the idea that they continue to be affected by appearance norms even after they come out, and that overall appearance norms of the culture still exist within queer communities (Myers, Taub, Morris & Rothblum, 1999). Research also suggests that the stressors related to being in a sexual minority group may influence how eating disorders develop in these groups (Watson, Grotewiel, Farrell, Marshik & Schneider, 2015; Convertino et al., 2021). Objectification theory suggests that we live in a society that sees a woman’s body as a commodity, something that is objectified by others. Over time women begin to see their own body as an object too, basing judgments of it on its attractiveness (Fredrickson & Roberts, 1997). However, it is noted that much of the research we have referred to thus far does not include bisexual women as a separate group, often combining them with lesbian women instead.

Brewster et al. (2014) highlight that objectification theory has not been shown to explain body image discrepancies in bisexual women specifically. They recruited a group of 316 bisexual women, and considered stressors specific to bisexual people, namely antibisexual discrimination and internalized biphobia (Brewster et al., 2014). Both stressors showed a significant link with the internalization of sociocultural standards of attractiveness, which in

turn was significantly linked with body surveillance, linking to body shame (Brewster et al., 2014). Bisexual women have unique experiences of sexual objectification - the media presents them as hypersexual and there are also distinct cultural ideas of what bisexuality is (making someone untrustworthy and therefore undateable), which contributes to their experiences with their bodies (Brewster et al., 2014). In a study of 74 women, just under half felt that coming out as bisexual influenced their ideas of beauty and body image (Taub, 1999). However, another study of 353 bisexual women found that the relationship between outness and disordered eating was not significant (Watson, Velez, Brownfield & Flores, 2016). Higher levels of antibisexual discrimination were related to more disordered eating behaviours (Watson et al., 2016). It is clear from the relative dearth of research exploring different sexualities and their relationship to disordered eating that the call for diversity in eating disorder research has not been met (Moradi & Huang, 2008).

Prevalence of eating disorder symptoms varies across groups of women, however on the whole the research indicates that sexual orientation may play a part in the kinds (but not the amount) of experiences women have (Jones et al., 2019). Race also seems to moderate the relationship between being in a sexual minority and levels of eating disorder symptoms, which highlights the importance of having an intersectional lens on this research, and that we need wider and more diverse community samples in order to do this (Jones et al., 2019). Overall it seems that identifying as a lesbian or plurisexual does not influence body satisfaction and body image over and above being a woman in society and the pressures that confers (Basabas et al., 2019). However, there is limited research that includes bisexual women as a separate group as opposed to combining them with lesbian women.

The Impact of Viewing Social Media Images of Bodies on Body Image

Meta-analysis suggests a link between exposure to the thin ideal in traditional media and body dissatisfaction, with small to moderate effect sizes (Hausenblas et al., 2013). There are also small effect sizes concerning exposure to the thin ideal and ED symptoms, especially in those who are at high risk for developing an ED (Hausenblas et al., 2013). Groesz et al. (2002) found moderate effect sizes for the impact of media exposure on body image/dissatisfaction, although another exploration of 34 studies found only small effect sizes (Holmstrom, 2004). Media exposure has been found to result in decreased appearance satisfaction, with pre-existing appearance concerns modulating this such that those who are more concerned about how they look experience greater decreases in appearance satisfaction after viewing media images (Want, 2009). Meta-analysis has also found that media exposure increased body dissatisfaction, internalization of the thin ideal, and eating disordered behaviours and beliefs in women (Grabe, Ward, & Hyde, 2008). These meta-analyses indicate that exposure to the thin ideal via traditional media has a small but significant effect on body dissatisfaction and eating concerns, especially in those who are already vulnerable to the development of an ED.

The most recent and thorough meta-analysis to date suggests that the evidence for a link between exposure to thin-ideal media and body image concerns has been overstated (Ferguson, 2013). There is very little evidence to support a link between media exposure and body dissatisfaction for men, and only minimal effects for women, which are generally only found in those predisposed to body dissatisfaction (Ferguson, 2013). Previous meta-analyses find small effect sizes, often below the practical usefulness cut off of .20 (Ferguson, 2009). This meta-analysis highlights problems with previous meta-analyses, which suggest that a few null results should be expected based on methodological issues and Type 2 errors (Grabe et al., 2008). However, the answer may not be as simple as this. Usefully, Ferguson (2013)

suggests some best practice guidelines for future research, based on the findings of the meta-analysis. They find that many experimental studies in the area suffer from demand characteristics, such that participants work out what the purpose of the study is and this effects their results. This can be seen in studies that use measures obviously about body image at the beginning of the experiment. Studies often also do not have a convincing cover story to obscure the purpose of the experiment, and use non-human controls, which may not be the best control for thin-ideal media (Ferguson, 2013). Higher effect sizes were found for methodologically weaker studies, and when publication bias was accounted for, effect sizes were generally very small In summary, it is suggested that the evidence in this area does not support a causal link between media exposure and body dissatisfaction. It may have an impact on a sub-group of people who are already vulnerable to these concerns, but it is likely that even in this group media exposure did not cause these concerns initially (Ferguson, 2018).

When considering the influence that the media, whether that be traditional or social media, has on body satisfaction, it is important to do so in the context of the above meta-analyses indicating only small effects. In fact, in some cases, it may be that some types of images in the media can even help young people to develop more positive body image (Holmstrom, 2004). This meta-analysis points out several methodological problems that can be found in most of the relevant research: specifically, researchers often fail to accurately define what exactly body image is, in other words, what are they actually measuring; wide variation in how long participants are exposed to the relevant media for; not being consistent in the type of media used as stimuli, for example exploring the effects of television images but extrapolating these results to all media images, as well as the kinds of comparison stimuli that are used (Holmstrom, 2004; Ferguson, 2013). Although there may well be a relationship between viewing media images and body image, this relationship is likely very small. It is

interesting to consider whether this finding remains the same for participants viewing social media images. Exploration of the different effects of media type on body image concerns seems to suggest that the type of media does not change the size of the effect, thus there may be no reason to think that social media would have bigger effects on body satisfaction than traditional media (Ferguson, 2013). It is suggested that many women do not feel worse about themselves after viewing images in magazines or on TV because they are not comparing themselves to those that they see, however some have suggested that people we see on social media are deemed as peers, thus we may be more likely to directly compare ourselves to them, meaning social media may have the potential to be more damaging (Fardouly, Pinkus & Vartanian, 2017).

There have been some reviews specifically focussing on the relationship between body satisfaction and exposure to social media. It is found that correlational studies do tend to show a relationship between social media use and body image concerns, however experimental studies indicate that brief exposure to this content may not negatively affect body satisfaction (Fardouly & Vartanian, 2016). However, there are limitations with these studies. The difficulty in capturing the experience of social media accurately in a controlled environment is raised as a potential issue when attempting to explore the possible relationship between social media and body satisfaction (Fardouly & Vartanian, 2016). Additionally, a review of the effects of social media suggests that image-based platforms, such as Instagram, are more negative for body image than text-based platforms, such as Facebook (Vandenbosch, Fardouly & Tiggemann, 2021). A more recent meta-analysis included 56 studies and found that there is a significant small positive relationship between social media use and body image disturbance; however, the type of social media use, age of participant, and body image dimension used were all significant moderators of the relationship (Saiphoo & Vahedi, 2019). More specific body image dimensions, for example those focussing on the

cognitive or behavioural aspects on body image (as opposed to more general/evaluative dimensions) showed larger effects. This may indicate potential mechanisms of effect; the authors suggest that social media may influence thoughts or behaviours about the body, as opposed to body satisfaction directly (Saiphoo & Vahedi, 2019). The authors point to the discrepancy between the ideas around this relationship presented by the media and the small effect size of the relationship itself. Although there may well be a relationship between the two factors, it is likely that social media use does not play a large role in body image disturbance. One hundred and thirty studies were included in another recent meta-analysis examining this relationship, which found that media exposure had a small to moderate effect on body satisfaction, thin-ideal internalization, and eating behaviour (Huang, Peng & Ahn, 2020).

Sixty six percent of Internet use in the UK is for social media (ONS, 2017) with photo-based social media platforms being the most popular (Ofcom, 2019) attracting massive followings such as Instagram citing 14 million UK users in 2015 (Instagram, 2015) Social media also provides a resource for almost limitless social comparisons, with new content constantly created and old content accessible using hashtags (Santarossa, Coyne, Lisinski, & Woodruff, 2016). Elements of social media that differ from traditional media that may impact how it affects body image include that it features users themselves instead of models or celebrities; that it presents an idealized version of the self (through use of photo editing and filters); and it is usually used to interact with peers, with peer comparison being especially potent for body image (Fardouly & Vartanian, 2016).

Use of social media platforms has been linked to body image concerns and disordered eating, especially when considering certain activities such as viewing and uploading photos (Holland & Tiggemann, 2016). Correlational and longitudinal studies have established an association between the two (Holland & Tiggemann, 2016). Photo-based activities in particular on older

social media platforms such as Facebook are related to body image and eating concerns, so further research should focus on newer photo-based platforms such as Instagram and Snapchat (Holland & Tiggemann, 2016; Engeln et al., 2020). As peers feature more on social media than celebrities or models there is the potential for more powerful social comparisons on social media, which are particularly relevant in body image concerns (Holland & Tiggemann, 2016). Social comparison theory suggests that we make comparisons between our peers and ourselves, making upwards comparisons with those we deem as more attractive than ourselves, and downwards comparisons with those we see as less attractive than ourselves (Festinger, 1954; Morrison, Kalin & Morrison, 2004).

Social media is the most popular use of the internet for 8 – 18 year olds, but measuring overall exposure time to a site such as Facebook may not be helpful, as it has so many individual features, including posting statuses, browsing other peoples' walls, as well as viewing and posting photos. Instead it may be more important to consider what function the site is being used for – posting photos, sending messages, or updating statuses may all have different effects (Meier & Gray, 2014). Facebook appearance-related exposure was positively correlated with internalization of the thin ideal, self-objectification, and drive for thinness, and negatively correlated with weight satisfaction (Meier & Gray, 2014). No significant correlations were found for total Facebook use and body image measures (Meier & Gray, 2014). Facebook users scored significantly higher for self-objectification and physical appearance comparisons (Meier & Gray, 2014). The study was correlational and thus causation cannot be inferred, however a bi-directional relationship is proposed, in which those with higher body dissatisfaction interact more with appearance-related Facebook activity, exacerbating the existing body image concerns (Meier & Gray, 2014). Another experiment including 112 female participants found that exposure to Facebook in general was linked to more negative mood than an appearance-neutral website, but it did not have a direct

effect on body or appearance satisfaction (Fardouly, Diedrichs, Vartanian, & Halliwell, 2015). However there was an effect on weight, hair, and skin concerns (which could be argued to be specific aspects of general body satisfaction) (Fardouly et al., 2015). A longitudinal study showed that greater usage of social media predicted greater body dissatisfaction and more appearance-related discussion with peers 18 months later. However body dissatisfaction did not predict social media usage, therefore the relationship appears not to be as simple as those who are more concerned about their bodies use social media more frequently (de Vries & Kühne, 2015).

Facebook appearance exposure, not overall social media use, was significantly positively correlated with thin ideal internalization and body surveillance (Cohen, Newton-John, & Slater, 2017). There was also a significant difference between Instagram users and non-Instagram users on body surveillance measures (Cohen et al., 2017). In fact, further research found that 'selfie' activities (taking, posting, and viewing selfies) specifically were linked to body-related and eating concerns (Cohen, Newton-John, & Slater, 2018). Those who regularly shared images of themselves on social media scored significantly higher on measures of over-evaluation of shape and weight, body dissatisfaction, dietary restraint, and internalisation of the thin ideal (McLean, Paxton, Wertheim, & Masters, 2015). Based on these results we can infer that social media use as a whole may not be what is related to body dissatisfaction, but specific functions of social media that are focussed on images of the body are important in how body dissatisfaction relates to use of photo-based platforms such as Instagram, and the photo functions on sites such as Facebook and Twitter. Appearance comparisons seem to mediate the link between thin-ideal exposure and disordered eating thoughts and behaviours, specifically in clinical samples (Griffiths et al., 2018). However this may not extend to the general population given previous findings that effect sizes for this relationship are only of practical significance for the subset of women who are already

predisposed to body dissatisfaction, such as those self-identifying as having an eating disorder (Ferguson, 2013; 2018).

There may also be an effect of social media exposure on eating behaviours, related to body satisfaction. In a large study of 1765 participants aged 19 – 32 years it was found that those in the highest quartile for social media use have significantly higher chances of having eating concerns (Sidani, Shensa, Hoffman, Hanmer, & Primack, 2016). There were strong and consistent associations between social media use and eating concerns in young adults, which is important as subclinical eating concerns have a much higher prevalence in the general population than diagnosed EDs (Sidani et al., 2016). Despite being sub-clinical, these behaviours are unhealthy and are risk factors for developing a clinically diagnosed eating disorder. However, the direction of this relationship and how it develops needs to be uncovered, which will require further research.

When 118 young women browsed the social media account of an attractive peer or of a family member, it was found that those who viewed the peer's account had an increase in negative body image (Hogue & Mills, 2019). Based on this, it seems that upward appearance comparisons with peers lead to worse body image in young women, however these effects may only be small (Hogue & Mills, 2019). There may also be an impact of taking and posting selfies on social media. A group of 110 young women were split into three groups (a control, taking and uploading an untouched selfie, or taking and uploading a favourite retouched selfie) and state mood and body image was measured before and after the task (Mills, Musto, Williams & Tiggemann, 2018). There was a main effect of condition, in that those who took and posted selfies felt more anxious, less confident, and less physically attractive than those in the control group (Mills et al, 2019). This suggests that there are harmful effects associated with specific aspects of social media, such as taking and posting selfies, even when they are retouched.

Others suggest that the link between social media and body dissatisfaction is inconsistent, and that any links between them should be considered within a wider context, for example peer effects, which have been consistently shown to link to body dissatisfaction and eating disorder pathology in women and feature as one of the factors in the Tripartite Influence Model (Ferguson, Muñoz, Garza, & Galindo, 2014). An alternative viewpoint on this is that social media may have a larger impact than traditional media, as it involves peer comparisons. A study of mainly Hispanic girls aged 10-17 found that TV exposure to thin ideas and social media use did not predict body dissatisfaction or eating disorder symptoms, but body satisfaction did predict life satisfaction (Ferguson et al., 2014). Only peer competition predicted negative body image outcomes, however social media use did have a predictive relationship with peer competition, which may suggest a way in which these factors are interlinked (Ferguson et al., 2014). The study also collated use of all social media platforms into one measure, which could miss important differences between primarily text-based platforms such as Twitter, and image-based ones such as Instagram. Effect sizes found in the aforementioned studies were generally small, as is supported by meta-analyses finding only small relationships between viewing social media images and body satisfaction, suggesting that if viewing media images does affect how we feel about our bodies, this is likely only a small part of a much bigger picture.

The Impact of Specific Kinds of Media Images on Body Image - Fitspiration

More recently another trend in the kind of content seen on social media has developed. Fitspiration, or fitspo, focuses on thin and extremely fit/muscular bodies. Originally fitspiration was intended to inspire users to a healthier lifestyle through diet and exercise, and to provide a healthy alternative to thinspiration (focusing on thinness only), however it may

be that this content could also have damaging effects (Tiggemann & Zaccardo, 2015). A content analysis of fitspiration images on Instagram revealed that the majority of images contain only toned and thin bodies, with objectifying elements in most photos (Tiggemann & Zaccardo, 2016). Another content analysis of fitspiration images and text on multiple social media platforms found that this content endorses sociocultural appearance ideals for both men and women, positing exercise as a means to achieve these ideals (Deighton-Smith & Bell, 2018). It also encourages self-objectification and distancing oneself from internal bodily functions, such as pain and fatigue, when exercising (Deighton-Smith & Bell, 2018). Adolescents in focus groups identified that fitspiration content is appearance focussed, with appearance ideals and problematic messages around diet and exercise These include pressure to limit the kinds of and amount of food that you eat in order to lose weight, and to exercise in potentially damaging ways, such as exercising compulsively or past the point of pain (Bell, Deighton-Smith & Hurst, 2019). Recent research indicates that fitspiration content may be just as damaging to body satisfaction as thinspiration, perhaps even more so, as positive body attitudes do not seem to protect against its negative effects as is found with thinspiration (Dignard & Jarry, 2021).

One study compared the content found under fitspiration and thinspiration hashtags across three social media platforms (Instagram, Tumblr, and Twitter) (Alberga, Withnell & von Ranson, 2018). Three hundred and sixty posts in total were coded, and researchers found that there were striking similarities between thinspiration and fitspiration content, with no differences in sexual suggestiveness, appearance comparison, and messages promoting restriction of food (Alberga et al, 2018). Fitspiration content was, on the whole, less extreme than that found under the thinspiration hashtags, however it tended to have more messages of guilt about weight and body shape than thinspiration did (Alberga et al, 2018). This

highlights how thinspiration messages related to health and wellness appear to be becoming more mainstream in society.

An experience sampling study explored how fitspiration and thinspiration content appears in peoples' everyday lives (Griffiths & Stefanovski, 2019). One hundred and eight participants carried out an experience sampling protocol on their smartphones for a week. Women experienced an average of 8.4 thinspiration and 9.5 fitspiration exposures per week, and men experienced on average 2.3 thinspiration and 4.9 fitspiration exposures per week (Griffiths & Stefanovski, 2019). Thinspiration exposure was linked to lower body satisfaction, lower positive affect, and higher negative affect (Griffiths & Stefanovski, 2019). Fitspiration exposure was related to lower body satisfaction and lower positive affect, and exposure ad a nearly identical impact to exposure to thinspiration for both genders (Griffiths & Stefanovski, 2019). One study compared different kinds of fitspiration content, and found that there was no difference between the effect of functional and non-functional images (those in which people were being active or still), or whether or not there was a text accompaniment, on body satisfaction, mood, or self-objectification (Prichard, McLachlan, Lavis & Tiggemann, 2018). However, state body satisfaction decreased and negative mood increased after viewing fitspiration content in general (Prichard et al, 2018). Fitspiration has been shown to have a negative effect on those who consume it, but 10 minutes of exercise or quiet rest can help to mitigate these negative effects (Prichard, Kavanagh, Mulgrew, Lim & Tiggemann, 2020).

Research has begun to consider the impact of thin and extremely muscular bodies, in comparison with the more established (albeit small) effects of viewing thin bodies, on body image and dissatisfaction. When 138 female college students were exposed to images of thin and athletic bodies and normal-sized athletic bodies, only the thin-athletic condition had a significant effect on body dissatisfaction (Homan, McHugh, Wells, Watson, & King, 2012). This supports the idea that exposure to images featuring a fit body only produces body

dissatisfaction when this is paired with thinness (Homan et al., 2012). It may be that fitspiration could be particularly nefarious as it promotes the idea that only one type of body, namely a slim and toned one, can be healthy. It also focuses on the appearance-based benefits of exercise, as opposed to health benefits (Tiggemann & Zaccardo, 2015). One hundred and thirty female undergraduates aged 17-30 who viewed fitspiration images taken from public Instagram profiles showed significant increases in negative mood and body dissatisfaction, which were not found in the non-fitspiration condition (Tiggemann & Zaccardo, 2015). There was also a significant effect of image type on state appearance comparison, with appearance comparison mediating the effects of image type on negative mood and body dissatisfaction, such that those who made more appearance comparisons experienced increased negative mood and body dissatisfaction (Tiggemann & Zaccardo, 2015). It seems that viewing fitspiration content has a negative impact on peoples' moods and feelings about their bodies. This effect has been replicated several times (Prichard, Kavanagh, Mulgrew, Lim & Tiggemann, 2020). However, exposure to fitspiration does not seem to translate into increased exercise (Prichard et al., 2020).

In a large study of 276 young women from the USA and Australia the relationship between Instagram use, body image concerns, and self-objectification was explored. More frequent viewing of fitspiration content was linked to greater body image concerns (specifically greater body dissatisfaction and higher drive for thinness), which was also mediated by internalization of the thin ideal and appearance comparisons (Fardouly, Willburger, & Vartanian, 2017). Viewing functional images (images in which the subject was actively exercising) with accompanying text led to poorer body satisfaction in women with higher trait self-objectification, but not for those with lower trait self-objectification (Prichard, McLachlan, Lavis, & Tiggemann, 2017). Fardouly et al. (2017) highlight the need for longitudinal studies to more firmly establish relationships, which are likely to be bi-

directional, for example that those with higher levels of self-objectification spend more time on platforms like Instagram, which in turn increases self-objectification further. In one study, even partial exposure to fitspiration content (in a half-and-half condition in which participants were exposed to some fitspiration and some travel content), resulted in increased negative mood and decreased body satisfaction (Rounds & Stutts, 2020). This suggests that even seeing fitspiration content mixed with other things in your feed could be detrimental to body satisfaction and mood.

One hundred and twenty-nine college-aged young women viewed one of six blogs that were created for an experiment (either fitspiration, pro-ana, or a control blog focussed on home decoration) (Jennings, LeBlanc, Kisch, Lancaster & Allen, 2019). Fitspiration blogs produced more positive emotions and social comparisons, whereas pro-ana blogs elicited negative and anxious emotions (Jennings et al., 2019). Interestingly, having a history of disordered eating influences participants' affective reactions to the blogs (either fitspiration or pro-ana), in that those with these histories are more negatively affected (Jenning et al., 2019).

Given that research also suggests that viewing fitspiration content does not motivate participants to take part in higher levels of exercise, it is unlikely to be effective in its original purpose (Robinson et al., 2017). Viewing athletic images (lean with a toned/muscular appearance) led to higher levels of body dissatisfaction, followed by thin images, whereas muscular images (overtly muscular) did not lead to increased body dissatisfaction in female participants (Robinson et al., 2017). Very similar results were in other studies, which found an increase in body dissatisfaction in both thin and athletic conditions (Benton & Karazsia, 2015). However when muscularity is coupled with average amounts of body fat, compared to low to moderate body fat, the effect on body dissatisfaction disappears (Homan et al., 2012). This suggests that there is something about lean and muscular images (those frequently seen in fitspiration content) that influences body satisfaction.

In a different approach, Holland and Tiggemann (2017) compared women who post fitspiration content on Instagram with women who post travel images. Those who post fitspiration content scored significantly higher on drive for thinness, bulimia, drive for muscularity, and compulsive exercise scales (Holland & Tiggemann, 2017). Almost a fifth of these participants were at risk of a clinical diagnosis of an ED, compared to only 4.3% in the group of participants who posted travel photos (Holland & Tiggemann, 2017). Fitspiration content may be a culturally acceptable way of presenting dietary restriction, disordered eating, and over-exercising, which frequently promotes extreme attitudes to exercise that are not healthy (for example, exercising to the point of exhaustion or through intense pain).

Due to the suggestion that social media may have a more negative effect on those already vulnerable to disordered eating experiences, recent research considered how exposure to fitspiration images may impact those who are experiencing an eating disorder. Griffiths et al (2018) asked 228 participants with self-reported eating disorders (mainly females experiencing anorexia) to complete measures of media use, exposure to thinspiration and fitspiration content, appearance comparisons, and symptom severity. They found that more frequent use of image-focussed social media was associated with more frequent exposure to thinspiration and fitspiration, which was associated with more frequent appearance comparisons, and mediated by this, greater symptom severity (Griffiths et al., 2018). Exposure to fitspiration was more common than exposure to thinspiration (Griffiths et al., 2018).

Much of the research into fitspiration focuses on women, however men are increasingly exposed to this content too, with over a third of fitspiration content on Instagram featuring only men (Carrotte et al., 2017; Tiggemann and Zaccardo, 2016). A 2019 study specifically explored the impact of exposure to fitspiration for men, and recruited 118 Australian men aged 17 - 27 years old (Fatt, Fardouly & Rapee, 2019). Frequency of viewing fitspiration

content was not directly related to body satisfaction and exercise motivation, however there were indirect pathways through greater muscular-ideal internalization and high appearance comparison tendencies, which led to lower body satisfaction and more appearance-based exercise motivation (Fatt et al., 2019). When 300 men viewed images of muscular bare-chested men, clothed men, or nature photos posted by the same Instagram influencers, they experienced increased body dissatisfaction when viewing the fitspiration images of bare-chested men (Tiggemann & Anderberg, 2020).

The research has been criticised for not providing any evidence that social media is more detrimental to body image than traditional media, and it has been asked why, if exposure to media causes EDs and media exposure is so widespread, is it that not everyone has an ED (Williams & Ricciardelli, 2014). The most likely explanation for this is that the picture is more nuanced than simply that viewing social media causes eating disorders. Factors such as self-objectification, thin ideal internalization, appearance comparison, and body appreciation all seem to play an important role in the process. Furthermore, subclinical levels of EDs are much higher in the general population than the prevalence of diagnosed EDs. One survey suggests that as many as 75% of women endorse unhealthy thoughts, feelings, or behaviours related to food or their bodies (ScienceDaily, 2008). Other reports suggest that 80% of 10-year-old girls have been on a diet (Miller, 2015). Research indicates that over 25% of women were above at least one clinical cut off for eating disorder symptoms (Carey et al., 2019). Statistics like these suggest that eating concerns are widespread amongst the general population, and begin to be experienced at a very young age. These statistics indicate that the relationship between social media and disordered eating experiences may be more important than some suggest; more research is needed, particularly in subclinical samples.

Research exploring the relationships between social media use and body satisfaction might extend to other measures relating to body image, such as body size estimation. Body size

judgements are related to body satisfaction, often with body satisfaction decreasing when the body is perceived to be larger. Twenty-four women with AN or BN alongside 24 healthy controls were exposed to affective images (20 photos from womens' fashion magazines) or neutral images (20 images from a home magazine) (Hamilton & Waller, 1993). Participants were told that the study was investigating stability of body size estimation over time when a distractor task was used (Hamilton & Waller, 1993). The type of stimulus affected women with EDs, in that overestimation of their body size was significantly bigger when shown photos of models compared to neutral photos (Hamilton & Waller, 1993). This suggests that, particularly for those suffering from an ED, viewing thin ideal images affects body size judgments, alongside body satisfaction, both of which contribute to the maintenance and development of EDs. However, despite the deception measures used in this experiment, it is possible that participants could still guess at the real purpose of the study, especially as the experiment used an explicit measure of body size estimation. Implicit measures of body size could therefore be more informative. However, because this effect was only evident in the patient groups, their findings are in line with suggestions that media effects on body satisfaction disproportionately affects a small set of women who are already at increased risk of body image concerns (Ferguson, 2013).

Body Perception

Studies indicate that those with AN frequently believe their bodies are larger than they really are, but the mechanisms underlying this are unclear (Guardia et al., 2010). This may be due to a false belief based on an individual's emotional or aesthetic attitudes towards their body, or it could be a result of abnormal processing of perceptual signals from the body. In other words, it could be an attitude-based belief that their body is larger than it actually is, or it may

be due to incorrect body perception that creates the sense of a body that is larger than it truly is. A door aperture task has been used to assess this. In the task participants are asked to judge whether or not an aperture on a screen is wide enough for them to pass through without turning their body whilst walking at a normal speed (Guardia et al., 2010). It was discovered that anticipation of these actions was severely impaired in participants with AN, who judged that they could not pass through some apertures even when they were wide enough for them to do so (Guardia et al., 2010). Participants with AN behaved as though their body was much larger than it is. Instead of measuring how a participant feels about their body, the door aperture task accesses how they move in their bodies through the world. Therefore, these results indicate that body size overestimation is not solely due to emotional or aesthetic attitudes towards one's body, but rather is related to a real impairment in the processing of body dimensions (Guardia et al., 2010). The door aperture task is an ecologically valid paradigm therefore is likely to access the real experiences of participants with AN in everyday life. The results were supported when a similar study was repeated, but participants actually walked through apertures of varying width, and sensors on their shoulders indicated how early they began to rotate their shoulders (Keizer et al., 2013). Participants with AN began to turn their shoulders for doors that were 40% wider than their own shoulders, whereas healthy controls turned their shoulders for doors that were 25% larger than their own bodies (Keizer et al., 2013). This demonstrates that the body representation error extends to action.

The overestimation of body size experienced by those with eating disorders is not due to problems in overall perceptual abilities as they can accurately evaluate the size of inanimate objects (Smeets, Ingleby, Hoek, & Panhuysen, 1999). Results from meta-analyses suggest that people with AN have impaired tactile and proprioceptive abilities related to body perception (Gaudio, Brooks, & Riva, 2014). A related body image distortion is suggested to

be central to anorexia, including elements of body overestimation, body dissatisfaction, and greater self-ideal discrepancies (Gaudio et al., 2014). Gaudio et al. (2014) also suggest that the non-visual elements of body perception are under investigated in AN, highlighting the importance of using tasks such as the door aperture task when exploring body perception in people with eating disorders. The door aperture task is non-visual and a more implicit task as it focuses on how the participant perceives their body moving through space. This is important as the evidence points to a broader multisensory error in perception in eating disorders, which is more than simply a visual perception error (Gaudio et al., 2014).

None of the studies explored around body size estimation thus far have explicitly explored whether changes in body perception can be induced through changes in body satisfaction or emotion. If social media exposure influences emotions about the body, and there is a link between feelings towards the body and body perception, it might be that using social media indirectly influences body perception through feelings about the body. Preston and Ehrsson (2014) explored the link between how we feel about our bodies and how we perceive them. Multisensory illusions of owning different sized bodies were used to manipulate perceived body size and to examine how this affects body satisfaction (Preston & Ehrsson, 2014). In the small body condition (85% of participant's own body size) the illusory ownership of a slimmer body caused a decrease in perceived body size, and an increase in body satisfaction scores. No difference was found in the large body condition (115% of participant's own body size), and no gender differences were found in either the large body or small body condition (Preston & Ehrsson, 2014). A significant positive correlation was found between EDE-Q (a questionnaire measuring levels of eating disorder psychopathology) score and change in body satisfaction in the large body condition, with higher levels of ED psychopathology related to more positive changes in body satisfaction (Preston & Ehrsson, 2014). This could seem counter-intuitive, however as people with EDs typically have an extremely negative view of

their own body it could be that any change from this is preferable and leads to an increase in body satisfaction (Preston & Ehrsson, 2014). It is also worth noting that the large bodies in this experiment were not socially undesirable, insofar as they were wider than the real body, but they still adhered to cultural standards around attractiveness and were not overweight (had a flat stomach). This may have influenced the results, participants may have had a more negative reaction if they had embodied a seemingly unattractive body. These results suggest that the perception of our bodies can directly influence our emotional experiences towards our bodies.

These findings were extended using fMRI during multisensory illusions to elicit feelings of ownership over slim and large bodies, with more ecologically valid stimuli (Preston & Ehrsson, 2016). A modified body swap illusion was conducted in the scanner, using pre-recorded videos of slim and large models from a first-person perspective delivered on head mounted displays (HMDs). The HMDs were also used to ask the participants how satisfied they were with their body and their feelings of ownership over it. Feelings of ownership over a large body elicited significantly lower body satisfaction scores than pre-illusion baselines, with women showing greater dissatisfaction than men (Preston & Ehrsson, 2016). Ownership over a slim body did not significantly change body satisfaction (Preston & Ehrsson, 2016). The anterior insula and anterior cingulate cortex (ACC) were implicated in negative feelings towards the body through functional interactions with the posterior parietal cortex (Preston & Ehrsson, 2016). Anterior cingulate responses were modulated by non-clinical ED pathology, and were increased in female participants, which demonstrates neural links between emotion and body perception (Preston & Ehrsson, 2016). The involvement of the ACC in ED pathology seems important as this study used healthy participants, and historically the involvement of this area in ED pathology has been attributed to emaciation and its effects on the brain (Mühlau et al., 2007).

The aforementioned studies suggest that body perception can be modified in healthy participants via multisensory body illusions. Furthermore the body perception of those living with an ED might be particularly malleable (Keizer et al., 2014; Keizer et al, 2016; Beckmann et al., 2021), and in both groups changes in body perception can affect body satisfaction. Research suggests that body dissatisfaction plays a key role in the development and maintenance of EDs. Body dissatisfaction is also widespread in the general population, and causes significant distress (Stice & Shaw, 2002). Body dissatisfaction is thought to lead to EDs through increased dieting, and the risk factors contributing to this dissatisfaction include perceived pressure to be thin, exposure to media-portrayed thin ideals (the concept of the ideally slim body, which is slender with a small waist and very little body fat), social pressures, and increased thin ideal internalization (Stice & Shaw, 2002). It is suggested that future research should pay particular attention to factors that may mitigate the relationship between the predictors and consequences of body dissatisfaction (Stice & Shaw, 2002).

Preliminary findings suggest using tasks that access body perception can be beneficial in eating disorder treatment. Hoop training influences not just cognitive and emotional elements of eating disorders, as is the case with traditional treatments, but also tactile and body representation facets of the disorders (Keizer, Engel, Bonekamp & Elburg, 2018). In the pilot study, 12 anorexic participants completed treatment as usual, and 14 completed treatment as usual alongside hoop training. Hoop training consists of 8 (randomly selected from 15) hoops of differing diameters being placed on the floor in front of the participant, who is asked to choose the hoop she believes exactly fits her body (Keizer et al, 2018). She is then asked to step inside the hoop and lift it up over her head. This is crucial as it allows the participants a direct experience of their own body size, and is multisensory. Over time a participant is able to get direct multisensory feedback on their judgements of their own body size. Participants who received hoop training as well as treatment as usual did better from baseline to follow up

than those who just received treatment as usual. The importance of body size perception in recovery for EDs, taken together with behavioural and neural links between body satisfaction and body size perception suggest that perceptual factors should be examined more closely in relation to other risk factors, including the impact of traditional and social media.

Conclusion

The Tripartite Influence Model suggests that there are multiple factors that contribute to body dissatisfaction and disordered eating. This highlights the complexity of these experiences, and indicates that the risk factors associated with them will likely be numerous and complicated. Changes in society, including increased use of social media as well as a more inclusive understanding of gender identity and sexual orientation, might make new contributions to this complex picture and emphasise the need for contemporary research that more accurately reflects our society. Similarly, measures aimed at capturing eating disorder related thoughts and behaviours (such as the EDE-Q) are predominantly based on outdated ideas of what eating disorders looks like (not in line with current DSM definitions) and do not consider intersectional identities within our modern society. Therefore, this thesis will firstly (Chapter 2) aim to establish an appropriate factor structure for the EDE-Q whilst simultaneously examining the potential impact of sexuality on both male and female participants. Once I have established an appropriate factor structure for the EDE-Q, I will then use this to address important questions concerning another new pressure within our current society, social media. Specifically I aim to examine the effect of viewing fitspiration style selfies, firstly in how we judge other peoples' bodies (Chapter 3) and secondly on how we feel about our own body (Chapter 4). Because of the unique pressures experienced by women in society these experimental chapters will focus on female samples only.

Chapter 2. An EFA to CFA examination of the Eating Disorder Examination Questionnaire (EDE-Q) in men and women identifying as heterosexual, gay, lesbian, or bisexual.

Introduction

Eating disorders (EDs) are serious psychiatric conditions with notoriously high mortality (Smink et al. 2012) and relapse (Fairburn et al. 2000) rates. Historically, EDs are associated with young, thin, heterosexual women (NEDA, 2016) and research investigating ED aetiology in other groups, including men and sexual minorities, is lacking despite men making up at least one in four diagnosed cases and sexual minorities exhibiting poorer mental health in general (Cohn et al., 2016; Elliott et al., 2015). Indeed, much of the prior research in EDs has excluded men and sexual minorities, considering them atypical despite EDs being reported in men for as long as they have been reported in women. Moreover, some previous studies have demonstrated that sexual minority participants show higher rates of disordered eating behaviours (Murray et al., 2017; Hazzard et al., 2020). Current work in the area of sexual orientation and gender identity's links to disordered eating suffers from at least three problems that hinder our understanding. Firstly, finding measures that are appropriate for the wide range of people who experience disordered eating. Secondly, potential influences of gender on the kinds of thoughts and behaviours that people experience, as well as the rates of these. Thirdly, the influence of sexuality on the rates of these experiences as well as the kind of thoughts and behaviours that different people experience. I elaborate on these issues below.

Tools used in ED research and for clinical ED assessment have typically been developed in female heterosexual samples, and their use has not always been validated in other participants (Carey et al., 2019; Lavender, De Young & Anderson, 2010). Furthermore, alongside such

inappropriate measures, much of the previous research that has focussed on men is also limited by the use of small sample sizes (Smith et al., 2017). This bias in reporting and researching male EDs is reflected in the many anecdotal experiences of men who do receive a diagnosis, reporting that they feel invisible because EDs are seen as a 'female problem' (Robinson et al., 2013). Although clinical EDs are thought to present with similar symptoms for men and women (Feldman & Meyer, 2007), significant differences have been identified between genders in community samples. For example, men generally score lower on attitudinal aspects of ED symptomatology compared to women (Lavender et al., 2010; Carey et al., 2019). This difference in prevalence of ED symptomatology has been suggested to represent a qualitative difference between the way that men and women interpret assessment questions rather than simply a quantitative difference (Smith et al., 2017; Carey et al., 2019). It is not surprising that common ED assessment tools do not fully capture the male symptomology due to these measures being developed in women, and the majority not having been adapted for more current DSM ED diagnoses, such as binge eating disorder (Smith et al., 2017; Carey et al., 2019; Murray, Griffiths, & Mond, 2016). Understanding and addressing body-related disorders in different groups requires the ability to correctly identify their presence, which calls for more accurate, validated measures (Talbot et al., 2019).

Previous meta-analysis concluded that there were no meaningful differences in body satisfaction across women based on sexuality because effect sizes were so small (Morrison, Morrison & Sager, 2004). Results from a more recent meta-analysis, considering 48 studies also indicate that there is a low likelihood of heterosexual and lesbian women experiencing tangible differences in body image disturbance (Dahlenburg et al., 2020). Another contemporary meta-analysis considered 75 studies exploring the impact of sexuality on body satisfaction specifically and found no difference in women's body satisfaction across

sexuality groups, with any differences found being small and statistically non-significant (He et al., 2020). The only significant moderator effecting conclusions found for sexual minority women versus heterosexual women was survey method; the authors suggest that participants may give more open and honest answers to online surveys compared to pen and paper surveys (He et al., 2020). However, these previous findings focus predominantly on general eating disorder symptoms and do not consider aspects that may be more strongly influenced by modern social media driven body ideals, such as drive for muscularity (linked to fitspiration trends) and restrictive eating behaviours. Gay men were found to experience more body dissatisfaction than heterosexual men did, but less than women who identified as either heterosexual or lesbian (Dahlenburg et al., 2020). However, the authors do point out the extremely small effect sizes, which suggest that any differences in body image disturbance based on sexuality or gender may be trivial.

Some researchers suggest that being in a sexual minority group seems to be an indication of increased risk of disordered eating (Strother et al., 2012; Calzo, Blashill, Brown, & Argenal, 2017). Gay men have been found to report higher overall levels of body dissatisfaction and display more negative, thinness-oriented eating attitudes and behaviours compared to heterosexual men (Duggan & McCreary, 2004), demonstrating equivalent concern for physical attractiveness as heterosexual women (Harvey & Robinson, 2003). Furthermore, men identifying as gay are found to be less satisfied with their bodies and show more distress about body dissatisfaction compared to heterosexual men (Harvey & Robinson, 2003). Gay men are also thought to have a greater risk of a range of disordered eating behaviours, including binge eating, purging, restrictive dieting, steroid misuse, and using diet pills (Murray et al., 2017). Most studies examining the influence of sexuality in ED psychopathology focus primarily on sexuality in that gay men in particular may experience

similar pressures to women in terms of being physically attractive due to the male preference for attractive partners (Siever, 1994; Legenbauer et al., 2009; Lippa, 2007). Preliminary research suggests that bisexual men are also at risk for eating disorders when compared to heterosexual men (Feldman & Meyer, 2007). One explanation for this is that both gay and bisexual men aim to sexually attract men, which may put them under the same body image pressures as heterosexual women (Hatfield & Sprecher, 1986; Siever, 1994; Duggan & McCreary, 2004). Empirical support for this idea comes from a study using self-report questionnaires that suggested that lesbians were the least concerned about physical attractiveness, whereas gay men and heterosexual women showed the highest concern for physical attractiveness (Siever, 1994). The authors concluded that heterosexual men and lesbian women may be less concerned about physical attractiveness due to a lack of pressure to sexually attract men, and thus are less dissatisfied with their bodies (Siever, 1994).

Traditionally it has been thought that heterosexual women show higher rates of disordered eating than lesbian women, however a review of the available research from 2011 to 2017 suggests that sexual minorities may actually exhibit higher rates of disordered eating, however, most of these studies examined overall health and greater differences in men were found (Calzo, Blashill, Brown & Argenal, 2017). With women having high levels of disordered eating irrespective of sexuality, one possible explanation for this relates to objectification. Objectification theory suggests that in Western cultures womens' bodies in particular exist in some way for the pleasure of others, and this objectification of their bodies for others then causes women to self-objectify (see themselves as an object for the use of others) (Fredrickson & Roberts, 1997). Women begin to see and evaluate their bodies in terms of their attractiveness to others, and measure this against an unattainable societal beauty standard, which they deem themselves as falling short of, creating body shame and

body dissatisfaction. This could explain previous results showing that lesbian women experience less body dissatisfaction than heterosexual women, which could be attributed to the protective factor of being part of lesbian culture (Brown, 1987). According to this hypothesis, lesbian women are protected from trying to attract a male partner, and thus shielded from the negative impact of objectification. They reject heteronormative ideas of beauty and are more accepting of all body types (Alvy, 2013; Polimeni et al., 2009; Owens, Hughes & Owens-Nicholson, 2003; Hazzard et al., 2019).

This theory has been criticised as explaining heterosexual womens' experience of body dissatisfaction, but not that of women from sexual minorities. It might predict that heterosexual women would have higher rates of disordered eating than women of other sexualities, which is not always supported in research (Kozee & Tylka, 2006). Despite this criticism, it could be that objectification theory does in fact help us understand sexual minority womens' experiences of body dissatisfaction. Regardless of sexuality, women are raised in a male-dominated society and thus are exposed to the same cultural norms around attractiveness (Dworkin, 1989; Hill & Fischer, 2008). Self-objectification may therefore predict equivalent rates of disordered eating and body dissatisfaction across sexualities. Two recent meta-analyses suggest that if there any differences in disordered eating between women of different sexualities, these are very small, and actually women of different sexualities have similar rates of ED psychopathology (Dahlenburg, Gleaves, Hutchinson & Coro, 2020; He et al., 2020). The minority stress model may also explain why sexual minority women experience equivalent rates of body dissatisfaction as heterosexual women, despite not trying to attract a male partner (Meyer, 1995; 2003). This model suggests that women from sexual minorities are subject to chronic stress by virtue of belonging to a minority group (stigma, prejudice, discrimination), which leads to poor general mental health

but also poor body image specifically. However, the minority stress model could be seen as predicting higher rates of disordered eating amongst these groups.

A key symptom that is not captured in traditional ED assessments, but thought to be of increased importance for evaluating male attractiveness, is muscularity (Duggan & McCreary, 2004; Murray et al., 2017). The internalization of muscularity as well as thinness ideals are associated with body dissatisfaction and eating concerns in men (Klimek et al., 2018). Moreover, muscle dysmorphia (misestimation of one's own muscularity) is considered the male equivalent of body size overestimation, which is frequently linked to EDs in women (Boehm et al. 2016; Slade and Russell 1973; Keizer et al. 2013). Some studies have suggested that gay men have a stronger drive for muscularity relative to heterosexual men (Yelland & Tiggemann, 2003), whilst other studies suggest that sexuality does not influence overall drive for muscularity in men (Nerini, Matera, Baroni & Stefanile, 2016). There is evidence that sexual minority men tend to place more importance on muscularity than thinness (Levesque & Vichesky, 2006; Tiggemann, Martins, & Kirkbride, 2007; Yelland & Tiggemann, 2003). This may link to the pressure on sexual minority men to appear masculine, a trait that is often associated with muscularity (Kimmel & Mahalik, 2004). This, combined with the pressure to be physically attractive, may result in a pressure to conform to a muscular body ideal of physical attractiveness (Talbot et al., 2019). However research is limited, and the way in which sexuality relates to drive for muscularity and ED symptoms in men is not yet clear. In the past, research has suggested that men are more satisfied with their bodies because they show low drive for thinness, however in fact men may experience low body satisfaction based on drive for muscularity and comparisons to the muscular ideal (McCreary, 2012). Men are often thought to have greater levels of drive for muscularity than women, potentially related to typical gender and sexuality roles (McCreary, 2012; McCreary,

Saucier & Courtenay, 2005). Research shows that women consistently find muscular men more attractive (Swami & Tovée, 2005) and that men who are muscular have greater sexual success than non-muscular men (Frederick & Haselton, 2007). Research comparing groups of men based on sexuality suggest that gay men show a higher drive for muscularity than heterosexual men, and that for gay men in particular, the ideal body is both thin and muscular (Yelland & Tiggemann, 2003). It is suggested that gay men have these specific concerns for a combination of reasons, including conforming to social and cultural norms (social identity theory) and also that gay men aim to be thin and muscular due to this being the ideal that their group conforms to (objectification theory) (Brennan, Craig & Thompson, 2012). Being masculine and muscular is likely to provide social capital for gay men in cultures that prize thinness and muscularity (Brennan et al., 2012). There may also be a link to HIV/AIDS, in that gay men developed a muscular physique in order to avoid being perceived as HIV + (Klein, 1993). However, this is potentially not as important in current culture (Drummond, 2005). Furthermore, modern culture which includes social media trends such as fitspiration, that promote an ideal body type that is both lean and muscular for women as well as men may suggest drive for muscularity is not gender specific.

Bisexual people in particular are often not included in the research that focuses on eating disorders and sexuality (Russell & Keel, 2002), either being excluded because of small sample sizes (Duggan & McCreary, 2004) or being considered as a single group with gay and lesbian participants (Filiault & Drummond, 2009; Gigi et al, 2016; Brown & Keel, 2015). There is little empirical justification available for grouping gay and bisexual participants together in one heterogeneous group. Therefore, it is important that research going forward considers how bisexual people experience disordered eating and in what ways this may differ from people of other sexualities. Further exploration of how bisexual participants experience

EDs may also enable a fuller understanding of how sexuality itself influences these symptoms. At the moment, the majority of research focuses on gay or heterosexual peoples' experiences, so the inclusion of bisexual participants will allow a more detailed picture of the link between sexuality and EDs, given that bisexual participants may be trying to attract people of multiple genders instead of just one. It has also been noted that research in the area tends to rely too heavily on samples of undergraduate university students, and that research should consider other means of recruitment that may be more representative (Filiault & Drummond, 2009).

This study aimed to resolve some of the issues outlined earlier. I explored whether identifying as gay, bisexual, or heterosexual impacted prevalence of ED symptoms and drive for muscularity attitudes in a community sample of men and women as examined through the Eating Disorder Examination Questionnaire (EDE-Q) and the Drive for Muscularity scale (DMS). The EDE-Q has traditionally measured eating disorder symptoms with a four factor structure (scales: Restraint, Eating Concern, Shape Concern, and Weight Concern) derived from 22 attitudinal questionnaire items (Fairburn & Beglin, 1994) The DMS measures the drive to have a muscular physique and consists of two subscales tapping into behaviours and attitudes. Firstly, I examined the appropriateness of the standard EDE-Q as a measure of disordered eating by testing model fit in a large community sample and used the best fit measure for all subsequent analyses in this thesis. Based on the numerous previous studies that find that the original four-factor structure is not a good fit, as well as changes in society and the current understanding of what constitutes an ED since the measures conception, I predicted that the original four factor structure will be a poor fit. I then examined, through measurement invariance analysis, whether there was evidence that the EDE-Q is measuring equivalent constructs for participants of different sexualities and genders. I also considered

the prevalence of attitudes and behaviours relating to disordered eating and drive for muscularity in gay, lesbian, bisexual, and heterosexual participants. The majority of previous research has focussed on either muscularity or ED attitudes, sexuality or gender, and has not considered bisexual participants as a group in their own right. Furthermore, modern definitions of the ideal body type being both lean and muscular may suggest an important link between ED symptoms and drive for muscularity in both men and women.

If ED and muscularity attitudes are influenced mainly by the minority stress model, one would predict an effect of sexuality irrespective of gender such that bisexual and gay/lesbian participants would score higher on all measures compared to heterosexual participants. However, if the driving factor for ED and muscularity attitudes is based on trying to attract male partners and the resultant emphasis on appearance, an interaction between sexuality and gender is anticipated. Specifically, I predicted that both gay and bisexual men would show greater prevalence of ED related attitudes compared to heterosexual men across all measures. Similarly, I also predicted that heterosexual and bisexual women would have higher ED and muscularity concerns compared to lesbian women. This is based on the idea that those individuals who are attempting to attract men, will experience greater appearance related pressures. The Tripartite Influence Model may predict ED symptomology being influenced by multiple factors, so I also examined hypotheses predicted by additive effects of minority stress and mate preference. An effect of these theories both influencing ED attitudes and behaviours would predict that gay men would have higher concerns to that of lesbian women, because gay men are both a minority group and aim to attract male partners. Similarly, this would also predict that gay men would have greater ED and muscularity attitudes compared to heterosexual women, who aim to attract male partners but are not a minority group.

Methods

Participants

In total 2975 participants took part in the study, and 1638 of these completed the measures in question. There were not sufficient numbers of participants who were agender, non-binary, demi-gender, or asexual to include them in analysis (although participants identifying as these sexualities did take part in the study). In total there were 1737 participants identifying as either male (1047) or female (591) and heterosexual (men = 525, women = 152), gay (276) or lesbian (159), or bisexual (men = 246, women = 280). Demographic information on gender identity, sexual orientation, age, race/ethnicity, country of origin, and education level was collected. For this study, gender identity was operationalized as the gender that the participant identified as, including whether or not this matched the gender that they were assigned at birth. Participants could choose from a set of labels or use a free text box to describe their gender identity. Sexual identity was operationalized as the sexual identity that participants described themselves as, as opposed to collecting information on their sexual relationship history. The average age of participants was 27 years. 80% of participants identified as White, 3.8% as Hispanic/Latino, 5% as Black, and 5.48% as Asian. 4.52% identified as other (specifically 15 participants identified as Mixed Race, 1 as Native American, and one as Romany), and 0.24% chose not to answer. Many of the sample were highly educated with 44.32% of participants reported having completed at least an undergraduate degree.

Measures

Eating Disorder Examination Questionnaire (EDE-Q) 6.0

The EDE-Q is a 28-item self-report questionnaire that assesses eating disorder symptoms (Fairburn & Beglin, 1994; 2008). It assesses disordered eating behaviours and attitudes in the

last 28 days and has four subscales (Restraint, Eating Concern, Shape Concern, Weight Concern) as well as a global score, which is calculated from the mean of the four subscale scores. Participants rate items on a 7-point Likert scale, with higher scores indicating higher eating disorder psychopathology. There are six items that relate to the frequency of eating disorder attitudes and behaviours in the past 28 days, which do not contribute to the subscale or global scores but provide information on some core eating disorder behaviours such as laxative use and self-induced vomiting. These were not examined in this analysis. Research has established acceptable levels of internal consistency for global and subscale scores in men and women, alongside the reliability of the scale (Berg et al., 2011; Peterson et al., 2007; Lavender, De Young & Anderson, 2010; Vaewsorn, Rosselli-Navarra, Wilson & Weissman, 2013; Hilbert, De Zwaan & Braehler, 2012).

Drive for Muscularity Scale (DMS)

The DMS is a 15-item self-report questionnaire that assesses how important being muscular is to participants, and how they act to develop their muscularity. Participants answer each item on a 5-point Likert scale anchored by 'Always' and 'Never'. The scale uses reverse scoring on all items. Higher scores indicate higher drive for muscularity. In men, the DMS can give muscularity-driven behaviours and muscularity-oriented body image attitudes scores individually, as well as an overall drive for muscularity score. The item has shown acceptable reliability and validity in male samples (McCreary, 2007). Research has already established the optimal factor structure in sexual minority men and women, as well as measurement invariance across genders (Klimek et al., 2021) thus, we did not assess the factor structure or assess invariance across sexual identity groups in this chapter. Based on the findings from

previous research we used the 14-item two-factor model that has been established as the best fit for sexual minority men and women (Klimek et al., 2021).

Procedure

Participants were invited to take part in an online questionnaire through social media adverts, adverts posted through local community groups, and adverts in Attitude magazine. Participants followed a link to an online questionnaire, delivered via Qualtrics software (Qualtrics, Provo, UT). The questionnaire included demographic information (age, gender, sexuality, and ethnicity), followed each time by the EDE-Q and then the DMS. Participants were asked to select the gender identity and sexuality that they felt best suited them, including a free text option. The survey took approximately 20 minutes to complete.

Data Analysis

To explore the factor structure of the EDE-Q, I used an EFA to CFA approach (Swami & Barron, 2019). I split the overall sample using a computer generated random number in order to get equal data points from each group based on sexuality and gender. I used this split sample for the EFA and retained the remaining data for the CFA. There were no significant differences in basic demographics (age, ethnicity, gender) between the EFA and CFA samples.

I conducted an EFA using the lavaan, psych, and GPArotation packages in R. I assessed the suitability of this data for factor analysis using Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, with a value of .80 being ideal and .60 being adequate (Kaiser, 1974) and Bartlett's test of sphericity, which should be significant,. Maximum likelihood estimation with an oblique oblimin rotation was used as research in the area suggests that factors of the

EDE-Q are correlated. Both men and women were included in the EFA as the aim of the study was to derive a factor structure suitable for mixed samples of both men and women.

In the EFA, to work out how many factors to extract, I followed best practice guidelines by using parallel analysis alongside examination of the fit indices (Swami et al., 2018; Swami et al., 2021). I retained items based on the recommendations that items with loadings > .40 with low inter-item correlations should be kept whilst bearing in mind the recommendation that factors with fewer than three items should be excluded, alongside those that explain less than 5% of the variance (Comrey & Lee, 1992; Guadagnoli & Velicer, 1988; Tabachnick & Fidell, 2007; 2013). A cut off of loadings of .40 was used for retaining factors (Stevens, 1992). I followed criteria set out as best practice in the literature to assess the fit of the model (Hu & Bentler, 1999). SRMR should be less than .08, and CFI and TLI should be close to .95. An RMSEA value of < .06 indicates good fit and .07 - .08 show adequate fit. However the literature indicates that the above values should not be used in a rigid way given the other factors that may influence these values (Swami & Barron, 2019).

The above values were also used to assess model fit in the CFA. Using the information provided by modification indices can also influence the fit of the model. Modification indices give an estimate in the increase in chi-squared for a fixed parameter if it were to be freed (Perry, Nicholls, Clough & Crust, 2015). This may be particularly relevant for scales in which items might be correlated, as is the case with the EDE-Q. However, one should also practice caution when using this approach, as it is data driven as opposed to theoretical (Perry et al., 2015). When modification indices are used a cut off of at least 3.84 is recommended, although more conservative accounts indicate a cut off of at least 5.00 (Byrne, Shavalson & Muthen, 1989).

I then conducted measurement invariance analysis of the EDE-Q between the gender and sexuality groups. As per recommendations in the literature, a multigroup CFA approach was used. Firstly I looked at the configural level (whether the number of latent variables and loadings are similar across groups) and then at the metric level (assessing whether the magnitude of the loadings are similar across groups). At the scalar level I assessed whether item loadings and intercepts are similar across groups. Strict invariance suggests the residuals are similar across groups. Recommendations of cut offs from the literature were used to assess invariance, such that a difference in CFI of less than .01 indicated metric invariance. Scalar invariance is supported by a difference in CFI of less than .01 as well as a difference in RMSEA of less than .015 or a difference in SRMR of less than .030 (Chen, 2007). However some suggest that the difference of less than .01 in CFI is sufficient to indicate scalar invariance (Cheung & Rensvold, 2002).Omega (McDonald's ω) values alongside Cronbach's alpha will be used to establish reliability of factor scores. Having established at least scalar invariance, I compared EDE-Q scores between gender and sexuality groups using a MANOVA.

Results

Firstly, to examine the initial hypothesis that the original four-factor model would be a poor fit, I tested the fit of this model on the first split half of the data, which included 420 participants, with 70 participants from each group (men identifying as gay, bisexual, and heterosexual, and women identifying as lesbian, bisexual, and heterosexual). Results indicated that this was not a good fit for the data with all fit indices falling well below acceptable cut off scores (chi squared(183) = 2407.554, $p < .001$, CFI = 0.791, TLI = 0.762, RMSEA = 0.12, SRMR = 0.097). Following this I proceeded to identify a better fitting model using an EFA.

EFA

For the half of the data that the EFA was carried out on, which included 420 participants, with 70 participants from each group (men identifying as gay, bisexual, and heterosexual, and women identifying as lesbian, bisexual, and heterosexual), This was a sufficient sample based on recommendations in the literature, reaching at least 15 participants per item (Nunnally & Bernstein, 1995; Tabachnick & Fidell, 2013). Bartlett's test of sphericity, chi squared (120) = 5564.052, $p < .001$, and the KMO measure of sampling adequacy, KMO = 0.92, indicated that the EDE-Q has sufficient common variance for factor analysis. EFA indicated that three factors should be extracted, and this was confirmed by parallel analysis. The factors explained 69% of the common variance. The fit indices for the model are chi squared (52) = 4550.13, $p < .001$, CFI = 0.971, TLI = 0.948, RMSEA = 0.079 (90% CI = .0.067, 0.092), SRMR = .03. This indicated that this three-factor model is an adequate to good fit, with CFI and SRMR showing good fit, TLI close to good fit, and RMSEA showing adequate fit. Considering advice cautioning against dismissing models for not adhering to the strict cuff offs (Morrison et al., 2017) and that all indices indicated at least an adequate fit, we continued with this model. Factor loadings, reported in Table 2.1, indicated that 14 items should be retained (those with split loadings were removed from analysis: items 10, 12, 20, and 24; alongside those with factor loadings less than .40: items 2 and 6). The factors retained were Preoccupation and Eating Concern, Shape and Weight Concern, and Restriction. This differs from the originally proposed four-factor model in that in this model Shape and Weight Concern are combined.

Table 2.1

A table showing EFA results (bold type indicates retained factor).

Item	Shape and Weight Concern	Preoccupation and Eating Concern	Restriction
Q1 – deliberately trying to limit food to influence shape or weight	0.06	-0.03	**0.85**
Q2 – going for long periods without eating to influence shape or weight	0.1	0.15	0.25
Q3 – tried to exclude foods that you like to influence shape or weight	0.02	0.02	**0.81**
Q4 – tried to follow definite rules to influence shape or weight	-0.07	0.05	**0.75**
Q5 – desire to have empty stomach to influence shape or weight	0.13	**0.41**	0.2
Q6 – desire for a flat stomach	0.26	0.11	0.28

Item	Shape and Weight Concern	Preoccupation and Eating Concern	Restriction
Q7 – thinking about food/eating/calories made it difficult to concentrate	-0.07	**0.93**	-0.01
Q8 – thinking about shape or weight made it difficult to concentrate	0.02	**0.95**	-0.01
Q9 – fear of losing control over eating	0.13	**0.69**	0.06
Q10 – fear of gaining weight	**0.48**	**0.41**	0.02
Q11 – felt fat	**0.72**	0.06	0.14
Q19 – eaten in secret	0.12	**0.46**	-0.03
Q20 – felt guilt over eating	**0.45**	**0.41**	0.02
Q22 – weight influenced how feel about self	**0.62**	0.2	0.14

Item	Shape and Weight Concern	Preoccupation and Eating Concern	Restriction
Q23 – shape influenced how feel about self	**0.38**	0.16	0.13
Q24 – upset if asked to weigh self once a week	**0.47**	0.35	-0.19
Q25 – dissatisfied with weight	**0.85**	0	0.07
Q26 – dissatisfied with shape	**0.90**	-0.05	0.09
Q27 – discomfort at seeing body	**0.96**	-0.01	-0.1
Q28 – discomfort at others seeing shape or figure	**0.89**	0.03	-0.1

CFA

Monte Carlo simulation indicated that 450 would be a sufficient sample size for CFA. We conducted CFA on the 14-item model derived from the initial EFA with the second half of the sample, results for which can be found in Table 2.2. This sample was made up of 170 bisexual men, 180 heterosexual men, 202 gay men, 206 bisexual women, 76 heterosexual

women, and 85 lesbian women. As EDE-Q items are often related to one another, and in fact in this three factor EDE-Q are sometimes items in the same factor are identical to each other aside from change in the word "weight" or "shape" (e.g items that focus on dissatisfaction with weight or shape), we, allowed items to correlate, based on Byrne, Shavelson, and Muthén (1989) I used a conservative modification indices cut off of ≥5.00 for items to allow to correlate. I tested each model on the second split half of the sample (N = 904). Although model fit indices were close to a good fit initially, when modification indices were used to free relevant parameters the model showed good fit on all fit indices. Based on this analysis, and the fact that CFI, TLI and SRMR fit indices showed a good fit and RMSEA, which showed acceptable fit. I used the 14 item model in future analysis, see Table 2.2 for further information.

Table 2.2

A table showing CFA results for the 14 item model, with and without allowing items to correlate.

Model	Sample	chi squared	CFI	TLI	RMSEA	SRMR
14 item	Combined	chi squared(74) = 551.910, $p < .001$	0.944	0.931	0.085 (0.078 – 0.091)	0.051
14 item (with MI)	Combined	chi squared(58) = 202.147, $p < .001$	0.983	0.974	0.052 (0.045 – 0.060)	0.03

Measurement invariance

Finally, I undertook measurement invariance analysis. It is suggested that between-groups comparisons of mean scores should not be made in the absence of scalar invariance (Swami & Barron, 2019). I used the suggested change in CFI as being less than .01 as sufficient for metric invariance and change in CFI as less than .01 plus change in RMSEA of less than .015 or a difference in SRMR of less than .030 (Chen, 2007) The 14-item model reached scalar invariance between gender groups (change in CFI was .007, change in RMSEA was .002 and change in SRMR was .003 (see Table 2.3)). The model was invariant to at least scalar invariance between sexuality groups (see Appendix 1 for further details). Based on this analysis I conducted between-group analysis using the 14-item model.

Table 2.3

A table showing measurement invariance analysis between gender groups.

	chi squared	CFI	TLI	RMSEA (95% CIs)	SRMR
Configural	chi squared(148) = 645.801, $p <$ .001	0.943	0.930	0.086 (0.080 – 0.093)	0.054
Metric	chi squared(159) = 658.685, $p <$ .001	0.942	0.934	0.083 (0.077 – 0.090)	0.056
Scalar	chi squared(170) = 730.975, $p <$ .001	0.935	0.931	0.085 (0.079 – 0.092)	0.059
Strict	chi squared(184) = 828.886, $p <$ .001	0.926	0.927	0.088 (0.082 – 0.094)	0.060

Scale Reliability

Before moving on to comparing scores across groups, reliability statistics will be considered using both McDonald's ω and Cronbach's alpha. Cronbach's alpha values over 0.7 indicate acceptable reliability, those over 0.8 indicate good reliability, and those over 0.9 show excellent reliability. McDonald's ω values over 0.7 suggest reliability that is adequate for research purposes, and over 0.9 indicate excellent reliability (Catalan, 2019). For the CFA sample, overall scale reliability was demonstrated through Cronbach's alpha of 0.913 and McDonald's ω of 0.920, suggesting excellent reliability. We also calculated the reliability of

each factor individually. For SWC, Cronbach's alpha was 0.935 and McDonald's ω was 0.936, indicating excellent reliability. For PEC, Cronbach's alpha was 0.838 and McDonald's ω was 0.847, indicating good reliability. For Restriction, Cronbach's alpha was 0.786 and McDonald's ω was 0.786, indicating acceptable reliability.

For the DMS, Cronbach's alpha was 0.934 and McDonald's ω was 0.935, indicating excellent reliability. For the DMS Attitudes factor, Cronbach's alpha was 0.899 and McDonald's ω was 0.902, indicating good to excellent reliability. For the DMS Behaviours factor, Cronbach's alpha was 0.916 and McDonald's ω was 0.920. These values indicate that reliability was at least sufficient for both measures.

Comparison of scores

Further analysis for the EDE-Q was conducted on a random subset of participants, as groups were not equal in size in the original sample. This was generated using a random seed. In this subset, N = 200 bisexual women, N = 159 lesbian women, N = 152 heterosexual women, N = 200 bisexual men, N = 200 gay men, and N = 200 heterosexual men. Not all the participants completed both the EDE-Q and the DMS, so for the DMS sample there were N = 269 bisexual women, N = 266 lesbian women, N = 251 heterosexual women, N = 281 bisexual men, N = 154 gay men, and N = 172 heterosexual men. Cronbach's alpha for this sample was 0.915 and Mcdonald's ω was 0.920 demonstrating good internal consistency. Data met the assumptions for an ANOVA. A one-way ANOVA found that age was significantly different across sexuality groups for the EDE-Q ($F(5,1108) = 106.86$, $p < .001$, $\eta p^2 = 0.325$) and for the DMS ($F(5, 1387) = 87.29$, $p < .001$, $\eta p^{2 =} 0.239$). Due to this, age was controlled for in all future analysis.

A 2x3 MANCOVA on the EDE-Q scales (Shape and Weight Concern, Preoccupation and Eating Concern, Restriction) with the factors gender (male, female) and sexuality

(heterosexual, gay/lesbian, bisexual) revealed a significant main effect of sexuality ($F(6,2210) = 10.96$, Wilks lambda = 0.94, $p < .001$) and gender ($F(3,1105) = 19.59$, Wilks lambda = 0.96, $p < .001$). There was also a significant interaction between gender and sexuality ($F(6,2210) = 15.49$, Wilks lambda = 0.92, $p < .001$) and a significant effect of age ($F(3,1105) = 6.38$, Wilks lambda = 0.983, $p < .001$). To follow up the MANCOVA results I conducted univariate analysis on each of the subscales. Means and SDs for each group can be found in the Figures below.

For the SWC factor, Cronbach's alpha was 0.938 and Mcdonald's ω was 0.939 demonstrating good internal consistency. A 2x3 ANCOVA was conducted on SWC scores with the factors gender (male, female) and sexuality (heterosexual, gay/lesbian, bisexual) and age as a covariate. There was no significant main effect of gender ($F(1, 1107) = 1.62$, $p = .204$, $\eta p^2 = 0.001$). There was a significant main effect of sexuality ($F(2, 1107) = 7.305$, $p < .001$, $\eta p^2 = 0.013$). There was also a significant gender*sexuality interaction ($F(2, 1107) = 25.24$, $p < .001$, $\eta p^2 = 0.044$), but no significant effect of age ($F(1, 1107) = 0.9$, $p = .343$, $\eta p^2 = 0.001$).

To follow up on the significant main effect of sexuality on SWC, I conducted Bonferroni corrected pairwise comparisons (the Bonferroni critical p value is .025). The minority stress hypothesis predicts that as both gay/lesbian and bisexual participants are minority groups they would have higher SWC scores. Supporting this, gay/lesbian participants scored significantly higher than heterosexual participants ($t(711) = 5.21$, $p < .001$, d = 0.39). However, contrary to this hypothesis, there was no significant difference between bisexual and heterosexual participants ($t(742) = 0.556$, $p = .578$, d = 0.041).

To follow up on the significant gender*sexuality interaction, I conducted further Bonferroni corrected pairwise comparisons based on hypothesised contrasts (the Bonferroni critical p

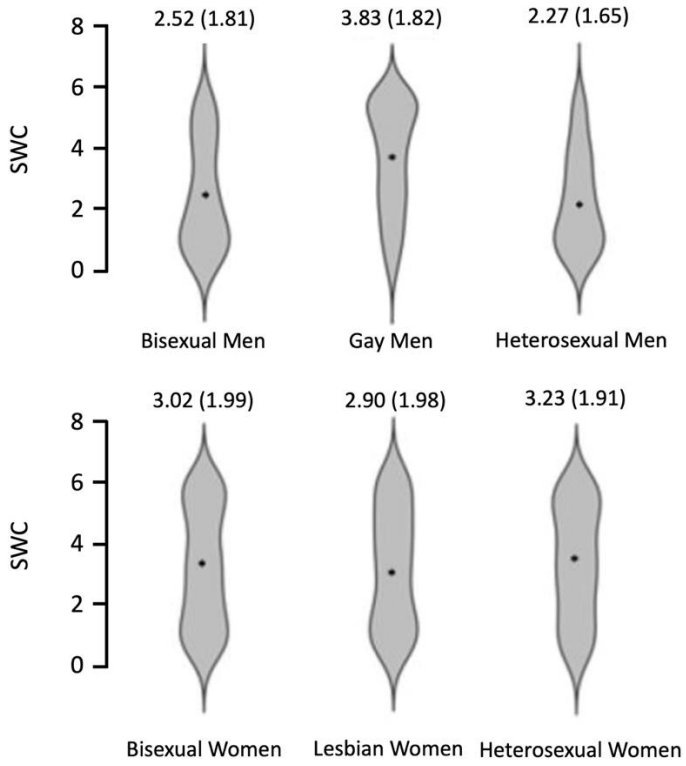
value is .0083). Firstly, to examine the hypothesis that gay and bisexual men would score higher compared to heterosexual men due to the desire for the former two groups to attract male partners. As predicted, gay men scored significantly higher on SWC than heterosexual men ($t(400) = 8.96$, $p < .001$, $d = 0.895$). However, there was no significant difference between bisexual and heterosexual men ($t(390) = 1.44$, $p = .151$, $d = 0.145$). Although these results are partially in line with a strong influence of attracting male partners in PEC scores for gay men, this was not supported in bisexual men.

Next, I wanted to examine the importance of attracting male partners in women by testing if heterosexual and bisexual women scored higher compared to lesbian women. Contrary to this hypotheses there was no significant difference in SWC between bisexual women and heterosexual women ($t(350) = -0.976$, $p = .330$, $d = -0.105$). There were also no significant differences between lesbian and heterosexual women ($t(309) = -1.45$, $p = .147$, $d = -0.165$). These results do not support a strong influence of wanting to attract male partners in SWC scores for women.

To examine potential additive effects of minority stress and wanting to be attractive to males I wished to establish potential differences in SWC between gay men and both heterosexual and lesbian women. In line with the hypotheses that a minority group wanting to attract men (gay men) would be associated with more negative attitudes compared to those in a minority group wanting to attract women (lesbian women), and those wanting to attract men but not in a minority group (heterosexual women) it was found that gay men scored significantly higher on the SWC compared to both lesbian ($t(368) = -4.65$, $p < .001$, $d = =0.498$) and heterosexual women ($t(361) = -3.04$, $p = .003$, $d = -0.324$). See Figure 2.1. These results are in line with an additive effect of minority stress and wanting to attract males.

Figure 2.1

*Two violin plots showing the small significant gender*sexuality interaction in Shape and Weight concern scores, such that there are no differences in scores amongst women, but gay men show higher scores than heterosexual men and women, and lesbian women.*



Note. Means and SDs (in brackets) are displayed in the figure.

For PEC, Cronbach's alpha was 0.839 and Mcdonald's ω was 0.847 demonstrating good internal consistency. A 2x3 ANCOVA was conducted on PEC scores with the factors gender (male, female) and sexuality (heterosexual, gay/lesbian, bisexual) and the covariate age. There was no significant main effect of gender ($F(1, 1107) = 2.99$, $p = .084$, $\eta p^2 = 0.003$). There was a significant main effect of sexuality ($F(2, 1107) = 3.77$, $p = .023$, $\eta p^2 = 0.007$). There was also a significant gender*sexuality interaction ($F(2, 1107) = 11.67$, $p < .001$, $\eta p^2 = 0.021$) and no significant effect of age ($F(1, 1107) = 1.63$, $p = .20$, $\eta p^2 = 0.001$).

To follow up on the significant main effect of sexuality, I conducted Bonferroni corrected pairwise comparisons (the Bonferroni critical *p* value is .025). As above, the minority stress model would predict that gay/lesbian and bisexual participants would have higher PEC scores irrespective of gender. In line with this hypothesis, gay/lesbian participants were found to have higher scores compared to heterosexual participants ($t(711) = 2.39$, $p = .017$, $d = 0.180$). Conversely, however, there was not a significant difference in PEC scores between bisexual and heterosexual participants ($t(742) = 0.112$, $p = .910$, $d = 0.008$).

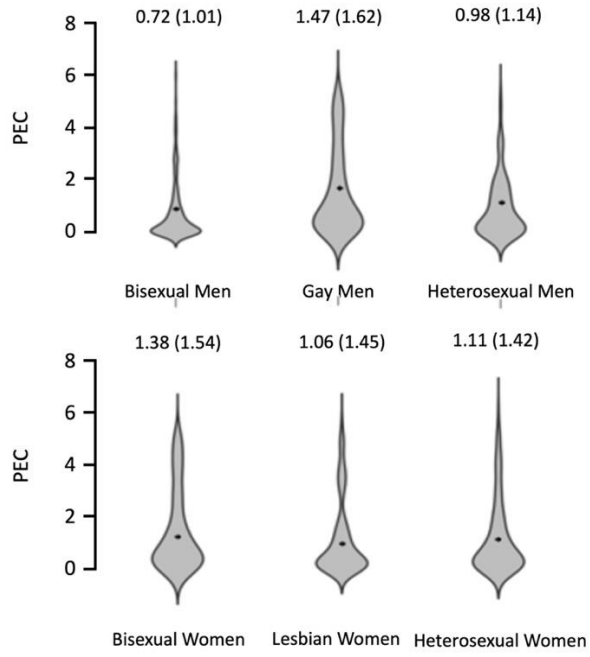
To follow up on the significant gender*sexuality interaction, I conducted further Bonferroni corrected pairwise comparisons based on hypothesised contrasts (the Bonferroni critical *p* value is .0083). Firstly, I examined the hypotheses that gay and bisexual men would score higher compared to heterosexual men due to the desire to attract a male partner. In line with this hypothesis I found that gay men had significantly higher scores compared to heterosexual men ($t(400) = 3.46$, $p < .001$, $d = 0.345$). However, contrary to the hypothesis there were no significant differences between heterosexual and bisexual men ($t(390) = -2.29$, p .022, $d = -0.232$). Although these results are partially in line with an influence of attracting male partners in PEC scores for gay men, this was not supported in bisexual men.

Next, if attracting male partners was a main driving factor for PEC in women I predict that heterosexual and bisexual women would score higher compared to lesbian women. Contrary to the predictions, there were no significant differences between bisexual and lesbian women ($t(350) = 1.68$, $p = .095$, $d = 0.180$) on this subscale. There were also no significant differences in scores between heterosexual and lesbian women ($t(309) = -0.285$, $p = .776$, $d = -0.032$). These results do not support wanting to attract male partners as the key driving factor for PEC scores for women.

I then wished to examine potential effects of multiple factors from both theories influencing behaviours at the same time by examining differences in PEC between gay men and both heterosexual and lesbian women. If being in a minority group increases negative attitudes then one would expect gay men to have higher PEC scores compared to heterosexual women, despite both aiming to attract male partners (because gay men are also a minority group). Contrary to this hypothesis I found no significant differences in PEC scores between gay men and heterosexual women ($t(361) = -2.22$, $p = .027$, $d = -0.236$). Similarly, if wanting to attract a male partner has a detrimental effect over and above that being part of a minority group one would expect gay men to have higher PEC scores despite both being minority groups. However, there were no significant differences in PEC scores between gay men and lesbian women ($t(368) = -2.52$, $p = .012$, $d = -0.265$). Thus, these data do not support an additive effect of attracting a male partner and minority stress on PEC scores (see Figure 2.2).

Figure 2.2

*Two violin plots showing the small significant gender*sexuality interaction in Preoccupation and Eating Concern scores, such that there were no differences amongst women, but gay men score higher than heterosexual and bisexual men, but not differently from heterosexual and lesbian women.*



Note. Means and SDs (in brackets) for each group are shown in the figure.

For the Restriction subscale, Cronbach's alpha was 1.00 and Mcdonald's ω was 0.999 demonstrating good internal consistency. A 2x3 ANCOVA was conducted on Restriction scores with the factors gender (male, female) and sexuality (heterosexual, gay/lesbian, bisexual). There was a significant main effect of gender ($F(1, 1107) = 35.12$, $p < .001$, $\eta p^2 = 0.031$, such that men ($M = 2.94$, $SD = 2.11$) scored significantly higher than women ($M = 2.22$, $SD = 2.02$). There was a significant main effect of sexuality $F(2, 1107) = 8.14$, $p < .001$, $\eta p^2 = 0.014$). There was also a significant gender*sexuality interaction ($F(2, 1107) = 9.24$, $p < .001$, $\eta p^2 = 0.016$) and a significant effect of age ($F(1, 1107) = 6.14$, $p = .013$, $\eta p^2 = 0.006$).

However, the effect size of the effect of age was small, and not supported by a follow up correlation (r = 0.03, p = .307).

To follow up on the significant main effect of sexuality, I conducted Bonferroni corrected pairwise comparisons (the Bonferroni critical p value is .025). The minority stress model would predict that gay/lesbian and bisexual participants would have higher Restriction scores irrespective of gender. Contrary to the predictions of this model there were no significant differences found in Restriction scores between gay/lesbian and heterosexual participants (t(711) = -1.07, p = .284, d = -0.080). Furthermore, heterosexual participants were found to score significantly higher on the Restriction subscale than bisexual participants (t(742) = -4.47, p < .001, d = -0.329). Thus, the results do not support an impact of the minority stress model on Restriction scores.

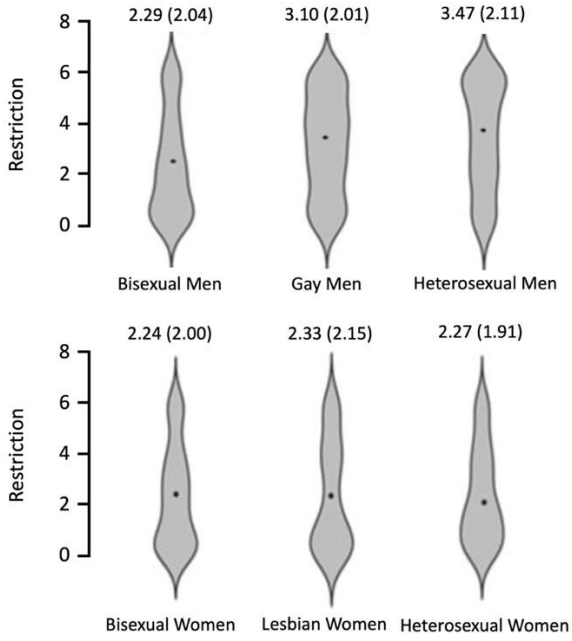
To follow up on the significant gender*sexuality interaction, I conducted further Bonferroni corrected pairwise comparisons based on hypothesised differences (the Bonferroni critical p value is .0083). Contrary to the hypothesis that wanting to attract a male partner would have a detrimental effect on Restriction attitudes there were no significant differences between gay and heterosexual men (t(400) = -1.80, p = .073, d = -0.180). Furthermore, heterosexual men scored significantly higher than bisexual men (t(390) = -5.64, p < .001, d = -0.570).

Next, if attracting male partners was a main driving factor for Restriction scores in women one predicts that heterosexual and bisexual women would score higher compared to lesbian women. It was found that neither bisexual (t(350) = -0.165, p = .869, d = -0.018) nor lesbian women (t(350) = -0.165, p = .869, d = -0.018) scored significantly differently from heterosexual women on Restriction. These results do not support the notion that attracting male partners increases vulnerability to Restrictive thoughts and behaviours for women.

Finally, I wanted to directly test the hypotheses that there are effects of multiple factors, namely minority stress experiences and wishing to attract a male partner, on Restriction scores. Supporting this it was found that gay men scored significantly higher than heterosexual women (t(361) = -3.95, $p < .001$, d = -0.420). Also in line with this hypothesis, it was found that gay men scored significantly higher than lesbian women (t(368) = -3.53, $p < .001$, d = -0.371). However, given the pattern of results described above these significant differences may only reflect a main effect of gender, with men scoring higher than women (Figure 2.3).

Figure 2.3

*Two violin plots showing the small significant gender*sexuality interaction in Restriction scores, such that there were no differences between women, but gay men scored significantly higher than heterosexual and lesbian women. Heterosexual men scored higher than gay men.*



Note. Means and SDs (in brackets) for each group are shown in the figure.

Drive for Muscularity

Firstly we considered reliability for the DMS in this sub-sample. For DMS, Cronbach's alpha was 0.939 and Mcdonald's ω was 0.940, indicating excellent reliability. For DMS Behaviours, Cronbach's alpha was 0.905 and Mcdonald's ω was 0.907, indicating excellent reliability. For DMS Attitudes, Cronbach's alpha was 0.918 and Mcdonald's ω was 0.922, indicating excellent reliability.

A 2x3 ANCOVA was conducted on DMS scores with the factors gender (male, female) and sexuality (heterosexual, gay/lesbian, bisexual) and the covariate of age. There was a significant main effect of gender ($F(1, 1386) = 417.16$, $p < .001$, $\eta p^2 = 0.254$) such that men scored significantly higher than women. There was a significant main effect of sexuality ($F(2, 1386) = 28.69$, $p < .001$, $\eta p^2 = 0.040$). There was also a significant gender*sexuality interaction ($F(2, 1386) = 40.44$, $p < .001$, $\eta p^2 = 0.055$) and a significant effect of the covariant, age ($F(1, 1386) = 40.88$, $p < .001$, $\eta p^2 = 0.040$). A follow up correlation ($r = -0.19$, $p < .001$) suggests that as age increases, drive for muscularity decreases.

To follow up on the significant main effect of sexuality, I conducted Bonferroni corrected pairwise comparisons (the Bonferroni critical *p* value is .025). Similar to the EDE-Q subscales reported above, the minority stress model would predict that gay/lesbian and bisexual participants would have higher DMS scores irrespective of gender. Contrary to this it was found that heterosexual participants scored significantly higher on DMS than gay/lesbian participants ($t(841) = -5.14$, $p < .001$, $d = -0.354$) and bisexual participants ($t(971) = -8.87$, $p < .001$, $d = -0.574$).

To follow up on the significant gender*sexuality interaction, I conducted further Bonferroni corrected pairwise comparisons based on hypothesised differences (the Bonferroni critical *p* value is .0083). Contrary to the hypothesis that wanting to attract a male partner would have a

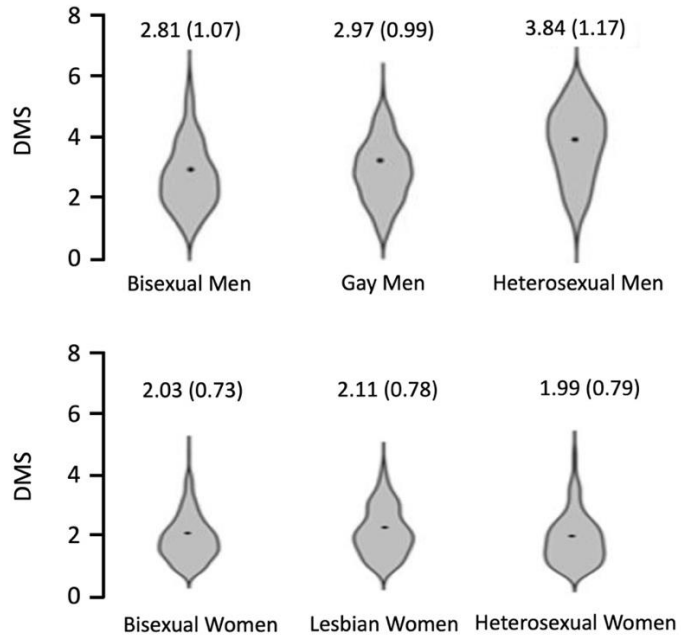
detrimental effect on DMS it was found that heterosexual men had statistically equivalent DMS scores to both gay men ($t(515) = 1.54$, $p = .147$, $d = 0.161$) and bisexual men ($t(518) = 0.663$, $p = .508$, $d = 0.064$).

Next, contrary to the hypotheses that trying to attract a male partner would increase DMS scores in women, pairwise comparisons revealed no significant difference between heterosexual women and both bisexual ($t(451) = -10.50$, $p < .001$, $d = -0.921$) and lesbian ($t(324) = -9.07$, $p < .001$, $d = -0.798$) women.

Finally, I examined potential additive effects of minority stress and mate preference by comparing gay men (attracting men and a minority group) to both lesbian (minority group) and heterosexual women (attracting men). As predicted gay men scored higher than both heterosexual women ($t(436) = 16.2$, $p < .001$, $d = 1.66$) and lesbian women ($t(418) = 9.26$, $p < .001$, $d = 0.938$) in line with an additive effect of minority stress and aiming to attract a male on DMS scores, however due to the lack of statistical differences found in scores within genders, this is likely to reflect a main effect of gender such that males have higher DMS scores compared to females. See Figure 2.4 below.

Figure 2.4

*Two violin plots showing the small significant gender*sexuality interaction in Drive for Muscularity scores, such that there were no differences amongst men, but heterosexual women scores significantly higher than lesbian and bisexual women.*



Note. Means and SDs (in brackets) for each group are shown in the figure.

Discussion

In this study I used an EFA to CFA approach to explore the best fitting model of the Eating Disorder Examination Questionnaire (EDE-Q) in a group of men and women identifying as gay/lesbian, bisexual, or heterosexual. I also conducted measurement invariance analysis in order to determine whether means could be compared across the individual groups. Finally I compared rates of disordered eating thoughts and behaviours across the groups as well as drive for muscularity given the increased popularity of fitspiration, which promotes a lean and muscular physique. I specifically examined hypotheses predicted by the minority stress model, that minority groups (gay/lesbian and bisexual participants) would have higher ED an

muscularity concerns compared to non-minority groups (heterosexual participants). I also tested hypotheses concerning the role of wanting to be attractive to men, given the male preference for appearance (Murnen et al., 2015), such that individuals wanting to attract men (gay men, bisexual men, heterosexual women, bisexual women) would have higher ED and muscularity concerns compared to those not wanting to attract men (lesbian women, heterosexual men) for both men and women. Finally, I tested predictions based on additive effects of these pressures such that gay men who are both a minority group and want to attract male partners would have greater concerns compared to heterosexual women (who want to attract male partners but are not a minority) and lesbian women (who want to attract women but are a minority group).

As anticipated, the original EDE-Q factor structure was not a good fit for the data. Instead, the EFA suggested that a 14-item three-factor model would be the best fit, which was confirmed in the CFA. The best fitting factor structure collapsed Shape Concern and Weight Concern into one factor. There was a significant small effect of gender on disordered eating thoughts and behaviours, and further analysis found that men scored significantly higher than women only on the Restriction subscale. There was no difference in gender for shape and weight concern or preoccupation and eating concern. There were small to medium differences in these thoughts and behaviours based on a sexuality and gender interaction. For both shape and weight concern and preoccupation and eating concern gay/lesbian participants scored higher than heterosexual participants, but bisexual participants demonstrated statistically equivalent scores. This does not fit with the minority stress model as bisexual participants are a minority group but do not seem to be at greater risk for ED symptomology compared to heterosexual participants. For Restriction related thoughts and behaviours, gay/lesbian participants had statistically equivalent scores, whereas bisexual participants

scored lower. Again this does not fit with the minority stress model due to the bisexual participants being a minority group, but having the lowest scores.

Other studies have also suggested combining the Shape and Weight Concern subscales into one scale (Carey et al., 2019; Peterson et al., 2017). By combining these factors, there is the potential to lose information relating to how people may feel differently about their shape and their weight. However it might indicate that how people feel about their body shape and weight are related. In fact, it may be that when discussing how one feels about one's body, shape and weight are both used to mean the same thing. Results from the EFA and CFA suggest that a three-factor model is a better fit than the traditional four-factor model, collapsing the individual factors of Shape Concern and Weight Concern into one factor. This finding is consistent with results from other studies that have also found a three factor model is the best fit for the EDE-Q, in which the Shape and Weight Concern factors are combined into one (Carey et al., 2019; Heinz, Timco & Hormes, 2020; Klimek et al., 2021). Three factor models have been supported in studies with both students and non-students (Barnes, Prescott & Muncer, 2012) and in men and women (Darcy, Hardy, Crosby, Lock & Peebles, 2013). Most studies that support a three factor model suggest that Shape and Weight Concern should be collapsed in one factor as opposed to split into two individual factors (Darcy et al., 2013; Peterson et al., 2007; Barnes et al., 2012). The results from this study supported a 14-item model for men and women, unlike other results that supported a brief, 7-item model (Heiss et al., 2020) or a longer 21-item model in women (Peterson et al., 2007). This study is in line with other research that has found that the traditional four-factor model of the EDE-Q is not optimal. This should be considered in future research as well as assessment. It is also important that we update our measures of eating disorders, as there may be nuances in behaviour that are being missed by basing our understanding of disordered eating on a very

limited population , as well as changes to the DSM V (Bordo, 2009). It would be helpful to examine Shape and Weight Concern in clinical populations, as it seems that there are similarities in these factors, and it may be that it is unhelpful to consider them separately. I should note that this study was done with a community sample as opposed to a clinical sample, and the factor structure may be different in a clinical population.

The hypotheses predicted by mate preference suggesting that gay and bisexual men would score higher on the measures compared to heterosexual men was partially supported, in that gay men scored higher in shape and weight concern and preoccupation and eating concern, but bisexual men showed statistically equivalent levels of these thoughts and behaviours compared to heterosexual men. For Restriction, gay and heterosexual men had statistically equivalent scores, whereas bisexual men scored lower than heterosexual. DMS demonstrated a different pattern with heterosexual men scoring higher compared to both gay and bisexual men. Furthermore, the same theory would predict that heterosexual and bisexual women would score higher on all these measures than lesbian women given that the former groups aim to attract men. However, this study did not find support for this effect as heterosexual and bisexual women showed statistically equivalent scores to lesbian women for all the measures. It was also anticipated that gay men would score greater than heterosexual and lesbian women on these measures, due to additive effects of being in a minority group and wanting to attract males for gay men. This was supported across all measures except for PEC, for which no statistical difference between gay men and heterosexual women was detected. However, given the pattern of results this effect was most likely driven by a main effect of gender for both Restriction and DMS as opposed to additive effects of attracting males and being part of a minority group. Together these results suggest a more complex picture, with

separate and additive contributions of gender, minority stress and wanting to attract males varying dependant on the different measures taken.

Measurement invariance analysis found that each group met at least scalar invariance, which is deemed to be sufficient for comparing means across groups (Chen, 2007). This suggests that our 14-item, three factor model can be used to compare means across different gender and sexuality groups, which is useful when considering how disordered eating influences different people in different ways. There has only been one previous study that has examined this in sexual minority men and women, however heterosexual participants were not included in the study, meaning invariance could only be established between gay/lesbian and bisexual participants (Klimek et al., 2021). This research was the first to establish invariance between gay/lesbian, bisexual, and heterosexual participants, allowing us to compare means between these groups directly.

As stated previously, there were differences in EDE-Q scores based on both gender and sexuality. The only difference in these scores based on gender was a small one, in that men scored significantly higher on the Restriction subscale than women, whereas other studies have found that women score higher than men on this subscale (Carey et al., 2019). To understand this, it is important to consider which items contributed to this factor. These items focussed on deliberately limiting food, excluding foods or following rules to influence shape or weight. Not eating in order to be thin, alongside preoccupation with thinness, are symptoms that we typically think of when we think of an eating disorder. However, our concept of what an eating disorder looks like is based on these experiences in a very specific set of people (young, slim, heterosexual women: Bordo, 2009). It may be that what constitutes an eating disorder differs in a more diverse sample of people, and the symptoms

that we traditionally associate with them are not as central as initially thought when considering men and women together.

In the traditional model, the Restriction factor also included items about going for long periods without food and the desire for a flat stomach. As stated above, these additional items from the original scale fit the traditional concept of an eating disorder, and potentially one that is more influential for women in keeping with the thin-ideal and its disproportionate impact based on gender (McCarthy, 1990). Given that these items were excluded from our 14-item model, it is perhaps less surprising that women didn't score as highly as men in these results. The items that were included focussed on following rules and excluding certain foods in order to influence shape or weight. This is compatible with behaviours associated with disordered eating more frequently associated with men, such as fasting and bulking in order to gain muscle (fasting and bulking refers to a pattern of behaviour in which a person eats very little for a certain period of time before eating a lot of specific types of food (Lavender, Brown & Murray, 2017)), related to drive for muscularity and muscle dysmorphia or 'bigorexia' that disproportionately affects men (Pope et al., 2005; Pope et al., 1997; Davey & Bishop, 2006). It may be that it would be more accurate to say that men have higher rates of muscularity-related eating behaviours, and women have higher rates of thinness-oriented eating behaviours. This is something that should be considered further in future research.

There were also small to medium differences in EDE-Q scores based on a gender and sexuality interaction, such that gay men scored higher than heterosexual women on all measures except for the PEC, for which they were statistically equivalent. This may be explained by theories suggesting that there are similarities in the sociocultural pressures on heterosexual women and gay men, as they are both attempting to attract men (Hatfield &

Sprecher, 1986; Siever, 1994; Duggan & McCreary, 2004). This may lead to similar shape and weight concern related ideas and behaviours, as both groups could be said to be influenced by sociocultural pressure to confirm to the thin-ideal (Legenbaeur et al., 2009; Yelland & Tiggemann, 2003), but that gay men have the added pressure of being in a minority group, thus accounting for the higher scores. Interestingly, however, bisexual men did not seem to have the same pressures as gay men, which may be due to wanting to attract males and females or specific subcultural values. The caveat to this is that there were fewer items included in this scale, and we may therefore be missing some thoughts and behaviours related to shape and weight concern that apply differently to these groups. The equivalent scores between all our female sexualities does not seem to support either theory, although perhaps any protective element for lesbians maybe mitigated by pressures associated with being a minority group. Although again, this does not fit with bisexual women, who may be subject to different subcultural norms, but this needs to be examined in further research.

Gay men scored significantly higher than heterosexual men on the PEC subscale. This may relate to the increased rates of dieting behaviours and the pressure to be both thin and muscular, alongside higher levels of body dissatisfaction in the gay community (Duggan & McCreary, 2004). Gay and heterosexual men scored the highest on the Restriction subscale, which, as mentioned above, could be related to the items included in this subscale in the 14-item model. However, these results should be interpreted with the caveat that these differences generally had small effect sizes. Based on this, it is important to remember that eating disorders are complex syndromes that are multi-faceted, and likely have many risk factors associated with them (Striegel-Moore & Bulick, 2007). Although it seems there is some impact of gender and sexuality on disordered eating behaviours, these are only small pieces in part of a much larger puzzle that may be influenced by other factors as identified by

the Tripartite Influence Model. It would be incredibly simplistic to assert that sexuality or gender are the only things driving differences in disordered eating thoughts and behaviours. However, it is useful to consider what their impact could be and how this may influence clinical presentation of EDs. Based on the results from this study it is likely that both gender and sexuality have a small effect on the kind of thoughts and behaviours that different people engage in.

This research indicates that gender and sexuality may be one of the many influences on disordered eating thoughts and behaviours, in line with previous literature on the subject. The symptoms that men and women experience under the umbrella of disordered eating may differ based on their sexuality as well as their gender. It has been suggested that men seem to focus on behaviours that could be linked to muscularity as well as thinness, whereas women are more concerned with staying or becoming thin (Striegel-Moore et al., 2009; Murray, Griffiths & Mond, 2016; Murray, 2017). It is clear that it is not sufficient to simply look at rates of behaviours, but also to begin to uncover the motivation behind different behaviours. Women may pursue restrictive behaviours because of pressures to conform to a thin-ideal and a desire to be thin, whereas similar behaviours may be employed by men in order to 'bulk up' or become more muscular (Murray, 2017). This is in line with our results showing that men showed higher levels of drive for muscularity than women. Both gender and sexuality should be taken into account when assessing people with disordered eating, as well as when considering how to best treat and support them (Mensinger et al., 2020). Interventions that focus on thinness are likely to be less relevant or effective for men, for example.

This study focussed on only three sexual identities, namely heterosexual, gay, and bisexual male and female participants. Contemporary understanding of gender, sexuality, and

relationship diversity recognise that there is a broader range of sexualities, which should be given consideration in future research. This could help us understand both individual peoples' experiences and also the broader theory around risk factors for disordered eating. For example, asexual participants may show a different pattern of results as they are not attempting to attract a sexual partner, something that has been posited to explain the similarities between gay men and heterosexual women (Hatfield & Sprecher, 1986; Siever, 1994; Duggan & McCreary, 2004). It would also be relevant to consider rates of these behaviours in pansexual participants, for whom gender does not play a part in attraction. Research has established that those from sexual minorities have worse mental health in general (minority stress model), so it is important that we understand how different sexual minority groups are affected by disordered eating and influenced by subcultural norms and values, in order to provide better assessment and intervention for the wellbeing of these individuals. Given the findings regarding the potential relationship between sexual orientation and disordered eating thoughts and behaviours, it may be useful for research considering the influence of sexual orientation on muscularity related thoughts and behaviours to be conducted. Research has established measurement invariance for this scale across gender groups in sexual minority participants, but not based on sexual orientation (Klimek et al., 2021).

This study did not sufficiently examine drive for muscularity in men as I did not examine more closely what kinds of behaviours men were engaging in order to pursue this, something that has been suggested to be particularly relevant (Lavender et al., 2017) It may be that men employ behaviours that we traditionally associate with dieting, but not with the intention to be thin, instead with the intention to develop muscularity. Understanding this could be important in developing tailored and effective treatment for men. A further limitation is that

this research did not collect information regarding participant's socio-economic status, something that may well influence experiences of disordered eating. It should be highlighted that the questionnaires were presented in a way that meant participants could not skip past questions in an effort to limit missing data, however this meant that participants were unable to skip past questions that they were not comfortable with, instead having to exit the entire questionnaire. In the future there should be an option for participants to skip questions. It may have also been useful to ask participants to identify their sexuality using an established measure such as the Kinsey scale; however it seemed important to allow participants an element of control over how they would identify their sexual orientation.

This study explored the factor structure of the EDE-Q in gay/lesbian, bisexual, and heterosexual men and women. A three-factor 14-item model was supported, and this was used to consider disordered eating thoughts and behaviours in this population. Sexuality and gender had small but significant effects on disordered eating thoughts and behaviours. The pattern of results was not in strong support of either the minority stress module or stresses relating to seeking to attract male partners as predictors of EDs. Although there was some evidence for additive effects for men, as gay men tended to score higher for SWC and PEC, bisexual men did not seem to have increased vulnerability for being a minority group and heterosexual women had statistically equivalent scores to both lesbian and bisexual women across all measures. Interestingly, Restriction and DMS had a distinctly different pattern, both with higher scores for men compared to women. This may reflect the changed EDE-Q scale in this new 14-item measure which omits many of the more traditional restrictive behaviours relating to drive for thinness and thus may be more compatible with restricted diets to increase muscle mass. Together the results support a complex picture of factors that contribute to risk of disordered eating, for which gender and sexuality have different small

effects depending on the construct measured. Therefore, it is suggested that an individual's sexuality and gender should be considered amongst other risk factors in both the assessment and treatment of disordered eating. It is also highlighted that there is a relative dearth of literature exploring other sexual minorities' experiences, such as pansexual and asexual people, indicating that research should focus on understanding these behaviours in other sexual minority populations too.

Chapter 3. Aesthetic judgements of social media style images.

Introduction

After establishing an appropriate factor structure of the EDE-Q to capture eating disorder thoughts and behaviours, this can be used measure to examine important questions concerning a newer pressure within our current society, social media. Our previous study demonstrated that there were no differences in disordered eating experiences for women based on sexuality. This underlines the importance of considering other potential risk factors influencing women's experiences of disordered eating thoughts and behaviours. Ferguson (2013) highlights that social media seems to only have significant effects for a subset of people, namely women who are already vulnerable to body dissatisfaction. University aged women are a group that research suggests are vulnerable to negative feelings about their body (Rudd et al., 2000; Falvey et al., 2021). Based on this, this chapter will consider the relationship between social media style content and the body satisfaction and disordered eating experiences of university-aged women.

Selfies are synonymous with social media yet little is known about the effect of viewing selfies on how we feel about others and our own bodies. Taking and posting selfies is a popular activity, particularly among social media users, with some participants in one study taking over eight selfies a day (Balakrishnan & Griffiths, 2017). However, research has previously suggested that selfies can evoke criticism and are associated with a lack of authenticity and narcissism in the person taking the selfie (Diefenbach & Christoforakos, 2017). Selfies do allow the poster to share social information and have control over photographic and compositional aspects of the picture, thus they might have a strong impact on aesthetic judgements (Schneider & Carbon, 2017). The connection between selfies and

social media is well-established, with many selfies being taken with the intention to post them on social media platforms, such as Instagram, Snapchat, or Facebook (Murray, 2015).

Objectification theory suggests that when someone is objectified they are perceived as, and even behave as, an object instead of an individual (Fredrickson & Roberts, 1997). This objectification may be what happens when we view images of people on social media - we begin to see the people on these platforms as objects as opposed to people (Bell, Cassarly & Dunbar, 2018). It could even extend to the person posting the content, who begins to see themselves from the observers' view as an object, leading to self-objectification (Calogero, Tantleff-Dunn & Thompson, 2011). It may be that the objectifying elements found on social media make us more likely to make upwards comparisons, those that favour others, thus damaging our own body satisfaction (Hanna et al., 2017; Saunders & Eaton, 2018). Selfies in particular have the potential to be self-objectifying as when we take selfies to post on social media we are likely to see them from the viewpoint of the people who will be interacting with them, thus perceiving ourselves as a photo to be 'liked' by others. One study explored the relationship between posting self-objectifying images on social media and levels of self-objectification (Bell et al., 2018). They found that a third of the content 86 women posted on social media was objectified selfies (selfies containing an objectifying element, i.e. presenting the person in the photo as a sexual object to be viewed by others), and the frequency of posting these images was associated with trait levels of self-objectification (Bell et al., 2018). Eating disorders have been found to be related to increased self-objectification and objectification of the body (Calogero, Davis & Thompson, 2005). There is also research indicating that use of social media is related to risk of developing an ED (Sidani, Shensa, Hoffman, Hanmer, & Primack, 2016; Mabe, Forney & Keel, 2014). Taken together, it seems

that selfies might play a particularly important role in the relationship between social media use and disordered eating.

One particular type of body-related content that is widespread on Instagram is fitspiration. Fitspiration is intended to inspire followers to pursue a healthier lifestyle through healthy eating and exercise (Tiggemann & Zaccardo, 2015). It can be found by searching hashtags such as #fitspiration or #fitspo or can be seen inadvertently in a user's feed. A content analysis of what can be found under the banner of fitspiration on social media revealed that one kind of body is overwhelmingly on display - a body that is both thin and toned (Tiggemann & Zaccardo, 2015). There are objectifying elements in most fitspiration images, such as the way influencers present their bodies or use exposure to sell products in sponsored or advertising posts. The sense that other users on Instagram are peers may encourage upwards appearance and health-related comparisons, which alongside the ease of access, could make fitspiration content particularly likely to influence a user's body image (Tiggemann & Zaccardo, 2015). There is an implicit suggestion in this kind of content that there is only one kind of body that can be healthy and attractive, which is not true.

Research has highlighted several factors that play a role when we are judging attractiveness, particularly in women. Two potentially important elements are waist to hip ratio (WHR) and overall body fat (indexed by BMI) (Cornelissen, Hancock, Kiviniemi, George & Tovée, 2009). When participants judged attractiveness in an eye-tracking experiment, there were fixations focussed on the central and upper abdomen and chest, but not on pelvic or hip areas (those used for judging WHR), and fixations for body fat judgements were similar (Cornelissen et al., 2009). When participants viewed colour video clips with 360-degree views of 43 female bodies, attractiveness judgements depended heavily on body fat

percentage (Smith, Cornelissen & Tovée, 2007). However, Singh (1994) found that WHR was the key variable associated with attractiveness in women, not body fat, as thin female figures were not perceived as being the most attractive. Instead, body shape as indicated by WHR, was key in judging both the physical attractiveness and personality characteristics of women, with those with more optimal WHRs judged as less attractive and being deemed as more intelligent and kinder. Other studies comparing the influence of WHR and BMI on attractiveness indicate that BMI is more important when making these kind of judgements (Wilson, Trip & Boland., 2007; Swami & Tovée, 2007; Cornelissen, Tovée & Bateson., 2009; Holliday, Longe, Thai, Hancock & Tovée, 2011). However, the angle of a photograph cannot modulate the actual BMI of the model, it may however, influence the appearance of WHR and thus perceived body fat. As selfies are designed to produce optimal angles of the person in the photo, a selfie could also make the WHR appear more optimal, which may mean that selfies are judged as slimmer and thus more attractive from allocentric (traditional media) images. Levels of ED symptoms experienced by the viewer can also influence attractiveness and weight judgements of other bodies, with those scoring highly on these symptoms rating other women as thinner than themselves, but equally as unattractive (Alleva, Jansen, Martijn, Schepers & Nederkoorn, 2013).

When we make aesthetic judgements of bodies, we typically look at bodies and faces together (Peters, Rhodes & Simmons, 2007). However, research suggests that face and body judgements do not interact when individuals make an overall attractiveness judgement, but both make significant independent contributions to overall attractiveness (Peters et al., 2007). For women, both face and body components influence overall attractiveness, which validates looking at attractiveness judgements of faces and bodies together, as well as individually (Peters et al., 2007). Perspective can also strongly affect aesthetic judgements of bodies in

photographs; lateral selfies gave rise to higher attractiveness ratings than frontal allocentric views of people (Schneider & Carbon, 2017). However, this was entirely on the attractiveness of faces, and did not include the contribution of bodies towards these judgements, or whether the angle the photograph was taken from impacted judgements. Research suggests that we manipulate camera angle to help improve how we appear to those we are trying to attract, with women in particular angling their selfies from above (Sedgewick, Flath & Elias, 2017). This may be due to issues around mate-selection, and what qualities are valued in a potential mate. Selfies give cues of height and power, which may be why women tend to take selfies angled more from above, in order to appear smaller (Sedgewick et al., 2017). Related to this is the advent of the selfie-stick. Selfie-stick as tools that allow us to take selfies from further away. This increased distance may have an impact of aesthetic appraisal of the bodies viewed in selfies, as enables a greater degree variability in angle to create the optimal image.

Making aesthetic judgements in an experiment may not be the same as making aesthetic judgements in everyday life, and an experiment designed to explore this recruited 20 men and 20 women to judge the attractiveness of 20 female bodies, with 400 judges separately rating the attractiveness of one body (Tovée et al., 2017). We would not usually explicitly judge 20 bodies for attractiveness one after the other in our day to day lives (although we may unconsciously do this on social media apps like Instagram or Tinder). The attractiveness judgements of each body individually were compared as to when seen amongst other bodies, and no significant difference was found, suggesting that bodies have an attractiveness value regardless of whether or not they are viewed and judged alongside other bodies (Tovée et al., 2017). This suggests that the attractiveness judgements participants make in experimental conditions are not necessarily different from those we make in everyday life.

It is argued that we tend to make self-promoting judgements of our own characteristics, but self-deprecating judgements of our body size. Donaghue and Smith (2008) explored whether this extends to other physical attributes, such as attractiveness and sexiness, in their study with 60 participants (30 men and 30 women, aged 18 - 88 years) viewing 20 full length photos from an allocentric perspective, including photos of themselves. Participants made self-enhancing judgements of their own attractiveness and sexiness, but self-deprecating judgements of their own body size - they rated themselves as more overweight than ratings made of them by others (Donaghue & Smith, 2008). The comparisons that we make to other bodies on social media may be influenced by this tendency to make judgements of our own bodies as larger but not less attractive than others' bodies. Visual perspective can also mediate how bodies are related to the self, for example bodies viewed from a first person perspective are more easily linked to one's own body (Carey, Crucianelli, Preston & Fotopoulo, 2019). Previous research showed that there was a significant interaction between visual perspective and size when participants were rating the attractiveness of bodies, in that large bodies were rated as significantly less attractive and larger when seen from an allocentric perspective as opposed to an egocentric perspective (Carey, Knight & Preston, 2019). Again, this may relate to the kinds of comparisons that we make about ourselves to others that we see in the media. Recent research indicates that viewing more selfies is linked to facial dissatisfaction, a relationship mediated by appearance comparisons (Yang, Fardouly, Wang & Shi, 2020).

Ferguson (2013) suggests that the effects of media exposure on body satisfaction is so small as to be negligible, and that its effects, which have been generally overstated, can be explained by methodological issues. This suggest that media exposure may only be a factor relevant to body satisfaction for groups of women who are already vulnerable to disordered

eating thoughts and behaviours (Ferguson, 2013). University student aged women have been shown to be especially vulnerable to disordered eating experiences (Eisenberg, Nicklett, Roeder & Kirz, 2013; Tavolacci et al., 2015). Based on this, we recruited university students identifying as female for this study. In the previous chapter we established that there do not seem to be differences in disordered eating experiences for women based on their sexual orientation. For this reason we did not group participants based on sexual orientation, but we did measure EDE-Q scores as an index of vulnerability to disordered eating thoughts and behaviours.

This study aimed to consider how people might judge social media style content of bodies differently when it is taken from different perspectives. Firstly, based on previous research that found that selfies of faces were judged as more attractive, egocentric images were judged as more attractive and slimmer only for overweight bodies and that selfies allow for optimal viewing angle which is likely to be slim given the link between attractiveness and slimness in females, it is hypothesised that selfies will be deemed more attractive and slimmer than both allocentric and egocentric images. Secondly, because additional distance provided with a selfie-stick enables more scope to achieve the optimal angle, it was predicted that selfies taken with a selfie-stick will be judged as slimmer and more attractive compared to regular selfies. Thirdly, based on previous research indicating that participants judge others' bodies as thinner if they have an eating disorder (Alleva et al., 2013), and that social media particularly affects those vulnerable to disordered eating (Ferguson, 2013) it was hypothesized that aesthetic judgements of the social media style body images will be correlated with participants' disordered eating symptomology (EDE-Q score), such that aesthetically favourable judgements for selfies would be stronger for those participants with greater ED vulnerability. Finally, based on previous findings suggesting that WHR and BMI

may be an important cue in judging attractiveness in women, and given that assumed WHR may change based on the perspective a photo is taken from (unlike BMI), it was hypothesized that differences in WHR between the perspectives will correlate with differences in attractiveness judgements across perspectives.

Methods

Participants

A power analysis was conducted using R studio (package pwr) based on detecting a medium effect size (as shown in previous studies comparing attractiveness and weight ratings (Carey et al., 2019)). This suggested that the study would need at least 33 participants for each of the first three experiments (power = 0.80, alpha of .05, d = .5). A second power analysis also based on a medium effects size for a general linear model analysis including four conditions, suggested that at least 77 participants were needed for Experiment 4 (power = 0.80, alpha of .05, f = .15). In total 269 female participants took part in the four experiments. In the previous chapter we established that there do not seem to be differences in disordered eating experiences for women based on their sexual orientation. For this reason we did not group participants based on sexual orientation. Demographic information and sample sizes for each experiment can be found in Table 3.1.

Table 3.1

A table showing means and standards deviations (SD) of age and BMI for each experiment.

	N	BMI (SD)	Age (SD)
Experiment 1	69	22.59 (3.95)	19.32 (1.54)
Experiment 2	50	21.72 (3.47)	18.98 (1.06)
Experiment 3	44	22.61 (3.07)	19.16 (2.00)
Experiment 4	109	21.82 (3.54)	19.22 (1.56)

Materials

Participants accessed the questionnaire online, and it was delivered via Qualtrics. Participants completed the Eating Disorder Examination Questionnaire 6.0 (EDE-Q 6.0). The EDE-Q is a 28-item self-report questionnaire that assesses eating disorder symptoms (Fairburn & Beglin, 1994; 2008). It assesses disordered eating behaviours and attitudes in the last 28 days and has traditionally used four subscales (Restraint, Eating Concern, Shape Concern, and Weight Concern) as well as a global score, which is calculated from the mean of the four subscale scores. However, in the previous chapter a three-factor structure using 14 items was found to be a better fit, with the factors Shape and Weight Concern, Preoccupation and Eating Concern, and Restriction. The three-factor structure was used in this chapter. Participants rate

items on a 7-point Likert scale, with higher scores indicating higher eating disorder psychopathology. There are six items that relate to the frequency of eating disorder attitudes and behaviours in the past 28 days, which do not contribute to the subscale or global scores but provide information on some core eating disorder behaviours such as laxative use and self-induced vomiting, which are not used in this study. Research has established acceptable levels of internal consistency for global and subscale scores in men and women, alongside the reliability of the scale (Berg et al., 2011; Peterson et al., 2007; Lavender, De Young & Anderson, 2010; Rose, Vaewsorn, Rosselli-Navarra, Wilson & Weissman, 2013; Hilbert, De Zwaan & Braehler, 2012). Stimuli consisted of photographs of bodies from four different perspectives (see below).

Stimuli

Colour photographs were taken of 10 female models bodies (excluding the head) standing against a white backdrop from four angles on a Samsung tablet. The models were students attending the Psychology department at the University of York and received course credit for taking part. Model BMI ranged from 18.5 to 30.6 (M = 22.46, SD = 4.23). Models were asked to wear form-fitting clothes that they would work out in, to resemble outfits people often wear when posting fitspiration content. Most models wore leggings and a form-fitting vest top. Models stood with their arms loosely by their sides with their right leg pointed slightly out towards the side, in order to simulate photos commonly seen under fitspiration hashtags. This pose was maintained for every photograph. Photos were taken from four angles. For the allocentric angle, the experimenter stood roughly two metres in front of the model capturing the whole body. For the egocentric perspective, the experimenter took a photo from directly above the model as if from the location of the eyes in the head when looking down at the body. The model took the selfie angle with the tablet held in their left

hand an arms-length away angled from above. The selfie-stick angle was again taken by the model holding the tablet on a selfie-stick an arm's length away (approximately 90 cm). Stimuli for the experiment included images from all four perspectives of ten models (see Figure 3.1 for further information).

Figure 3.1

Example stimuli: Allocentric (top left), selfie (top right), selfie-stick (bottom left), and egocentric (bottom right) perspectives.

Procedure

In experiments one to three, participants judged weight and attractiveness for two perspectives; experiment one compared selfie and allocentric images, experiment two compared selfie and egocentric images, and experiment three compared selfie and selfie-stick images. The order of these blocks was randomized and images within the blocks were presented in a random order.

Each participant completed four blocks of judgements - weight and attractiveness judgements for bodies from two different perspectives. Participants then completed the EDE-Q 6.0 and recorded their own weight and height before finishing the questionnaire and being debriefed. BMI was calculated by dividing their weight (in kg) by their height (in metres) squared. In experiment four, participants judged weight and attractiveness for all four perspectives in turn. The order of these blocks was randomized and the order of the questions within each block was randomized. Participants did not complete the EDE-Q in experiment four.

Participants were recruited via adverts on social media and through a departmental system to allow students to participate in experiments to gain course credit for taking part. Participants accessed the questionnaire via a personalised Qualtrics link sent to their university email address. Firstly they answered demographic questions regarding age, gender, and nationality. Once they had answered the demographic questions, they were given the instructions for the experimental task. Within each block, they were presented with 10 images of bodies from the same visual perspective in succession and for each image were asked to rate the attractiveness and then weight of these bodies on a visual analogue scale (VAS) ranging from zero to 100. The VAS were anchored with 'Very Unattractive' and 'Very Attractive' for the attractiveness ratings, and 'Very Underweight' and 'Very Overweight' for the weight ratings. Participants used their mouse to select the position on the scale that they felt best represented the attractiveness or weight of the body in the photo that was displayed. For all experiments the procedure was identical however the stimuli differed.

Data Analysis

Firstly, I calculated the EDE-Q subscale scores for each participant by taking the mean of the relevant items for each subscale based on our previous EFA to CFA. I then calculated the

mean weight and attractiveness ratings for each image for each perspective. If data were normally distributed, I used paired samples t-tests and Pearson's r correlations. If data were not normally distributed, I used Wilcoxon signed rank tests and Kendall's tau correlations. Bonferroni correction was used for multiple comparisons. To directly test hypotheses that selfies will be judged as more attractive and slimmer than allocentric (experiment one) and egocentric (experiment two) images, and that selfies taken with a selfie-stick will be judged as slimmer and more attractive compared to regular selfies (experiment three), I compared the stimuli across perspectives on attractiveness and weight ratings using pairwise comparisons. I directly tested the hypothesis that aesthetic and weight judgements will be related to eating disorder symptomatology by assessing if there were significant correlations between the differences in aesthetic and weight judgements between selfies and the other perspectives and EDE-Q scores. I took waist and hip measurements in each photo in order to calculate WHR. I tested the final hypothesis, that WHR will be related to attractiveness judgements, by testing for correlations between WHR and differences in attractiveness judgements across perspectives. Finally, I aimed to replicate our main hypotheses that selfies will be judged as more attractive and slimmer than both allocentric and egocentric images, and that selfies taken with a selfie-stick will be judged as slimmer and more attractive compared to regular selfies in experiment four with two one-way ANOVAs. One ANOVA was for weight judgements and one for attractiveness judgements.

Results

Experiment 1 - Selfie vs Allocentric

Sixty-nine female participants took part in this experiment. Results were not normally distributed, according to Shapiro-Wilk tests and analysis of histograms. Because of this, I used Wilcoxon signed-rank tests. The 14 item EDE-Q subscales demonstrated good internal

consistency in this sample using both Mcdonald's ω and Cronbach's alpha (SWC ω = .948, α = .922; PEC ω = .748, α = .726; Restriction ω = .845, α = .845)

Contrary to the hypothesis that selfies would be judged as more attractive compared to allocentric images a Wilcoxon signed-rank test showed no significant difference in attractiveness ratings between the conditions (W = 879.50, p = .073, rank-biserial correlation = -0.25). However, a second Wilcoxon signed-rank test showed a significant difference in weight ratings between allocentric and selfie images (W = 387.00, p < .001, rank-biserial correlation = -0.68), such that selfie images were judged to be slimmer (mean = 45.07) than allocentric images (mean = 48.86). This supported the hypothesis that selfies would be judged as slimmer compared to allocentric images.

To examine whether higher attractiveness ratings and slimmer weight judgment ratings for selfies compared to allocentric images is related to eating disorder psychopathology I calculated difference scores in attractiveness and weight ratings between the two image types. Attractiveness difference scores were calculated by subtracting attractiveness scores for allocentric images from selfie images such that positive scores represented greater attractiveness judgements for selfie images and negative scores represented greater attractiveness and slimmer judgments for allocentric images. The reverse calculation was done for the weight rating such that positive scores were represent slimmer judgements for selfies and negative scores represent slimmer scores for allocentric images.

Difference scores were then correlated with EDE-Q subscale scores, using Kendall's tau. There was not a significant correlation found between attractiveness differences and Restriction scores (τb = 0.15, p = .090). However there were significant correlations between

attractiveness differences and Shape and Weight Concern scores (τb = 0.21, *p* = .011) and between attractiveness differences and Preoccupation and Eating Concern scores (τb = 0.23, *p* = .009), such that greater SWC and PEC scores were related to greater attractiveness ratings for selfies compared to allocentric images. This partially supported the hypothesis that those with higher EDE-Q scores would judge selfies as more attractive.

Contrary to the hypothesis that those with higher EDE-Q scores would judge selfies as slimmer than allocentric images there were no significant correlations between weight differences and Restriction scores (τb = 0.10, *p* = .262), weight differences and Shape and Weight Concern scores (τb = 0.14, *p* = .086), or weight differences and Preoccupation and Eating Concern scores (τb = 0.13, *p* = .121).

Contrary to the hypothesis that WHR would be related to attractiveness ratings, differences in WHR measured in the images were not correlated with differences in attractiveness judgements (τb = -0.22, p = .536).

Experiment 2 - Selfie vs Egocentric

The 14 item EDE-Q subscales demonstrated good internal consistency in this sample using both Mcdonald's ω and Cronbach's alpha (SWC ω = .959, α = .958; PEC ω = .868, α = .855; Restriction ω = .905, α = .904). Fifty female participants took part in this experiment. According to Shapiro-Wilk tests and examination of histograms, selfie weight averages, selfie attractiveness averages, egocentric attractiveness averages, Restriction subscale scores, Shape and Weight Concern subscale scores, and Preoccupation and Eating Concern subscale scores were not normally distributed. Because of this, we used Wilcoxon signed-ranks tests and Kendall's tau.

In line with the hypothesis that selfies would be judged as slimmer and more attractive than egocentric images Wilcoxon signed-ranks tests showed that selfies (mean = 44.47) were judged as slimmer compared to egocentric (mean = 48.70) images (W = 121.50, $p < .002$, rank-biserial correlation = -0.81). Also in line with the hypothesis, selfies were (mean = 57.22) judged to be more attractive than egocentric (mean = 53.38) images (W = 923.50, $p = .002$, rank-biserial correlation = 0.51).

Next, to examine the difference in aesthetic and weight ratings for selfies compared to egocentric images related to eating disorder psychopathology I calculated difference scores in attractiveness and weight ratings between the two image types. Attractiveness difference scores were calculated by subtracting scores for egocentric images from selfie images such that positive scores represented greater attractiveness judgments for selfie images and negative scores represented greater attractiveness and slimmer judgements for egocentric images. The reverse calculation was done for the weight rating such that positive scores were represent slimmer judgements for selfies and negative scores represent slimmer scores for egocentric images.

Difference scores were then correlated with EDE-Q subscale scores, using Kendall's tau. Contrary to the hypotheses that those with high EDE-Q scores would judge selfies as slimmer and more attractive there were no significant correlations between attractiveness differences and any of the EDE-Q subscale scores (Restriction: $\tau b = -0.01$, $p = .899$; Shape and Weight Concern; $\tau b = -0.05$, $p = .645$, Preoccupation and Eating Concern scores: $\tau b = -0.03$, $p = .747$). There were also no significant correlations between weight differences and EDE-Q

subscale scores (Restriction: τb = 0.08, *p* = .458; Shape and Weight Concern: τb = 0.10, *p* = .307; Preoccupation and Eating Concern: τb = 0.08, *p* = .430).

As anticipated, differences in WHR were significantly correlated with differences in attractiveness judgements (r =-0.64, p = .047).

Experiment 3 - Selfie vs Selfie-Stick

Forty-four female participants took part in this experiment. The 14 item EDE-Q subscales demonstrated good internal consistency in this sample using both Mcdonald's ω and Cronbach's alpha (SWC ω = .786, α = .785; PEC ω = .867, α = .845; Restriction ω = .786, α = .785). Shapiro-Wilk tests and examination of histograms showed that selfie weight average ratings, selfie attractiveness average ratings, weight rating differences, Restriction scores, and Preoccupation and Eating Concern scores were not normally distributed. Based on this I used Wilcoxon signed-rank tests and Kendall's tau.

Contrary to the hypothesis that selfie-stick images would result in slimmer ratings compared to regular selfies a Wilcoxon signed-rank test showed that there was no significant difference in weight ratings between selfies and selfie-stick images (W = 350.50, *p* = .141, rank-biserial correlation = -0.26). However, in line with the hypothesis that selfies taken with a selfie-stick would be judged as more attractive than those taken without a selfie-stick, a Wilcoxon signed-rank test showed that selfie-stick (mean = 56.52) images were judged to be more attractive than standard selfie (mean = 53.44) images (W = 232.00, *p* = .006, rank-biserial correlation = -0.49),

Next, to examine how the difference in aesthetic and weight ratings for selfies compared to selfie-stick images related to eating disorder psychopathology I calculated difference scores in attractiveness and weight ratings between the two image types. Attractiveness difference scores were calculated by subtracting scores for selfie images from selfie-stick images such that positive scores represented greater attractiveness ratings for selfie-stick images and negative scores represented greater attractiveness ratings for selfie images. The reverse calculation was done for the weight rating such that positive scores represent slimmer judgements for selfie-slick images and negative scores represent slimmer scores for selfie images.

Difference scores were then correlated with subscale scores of the EDE-Q. There were no significant correlations between attractiveness differences and Shape and Weight Concern scores ($r = 0.16$, $p = .311$) or attractiveness differences and Preoccupation and Eating Concern scores ($\tau b = 0.24$, $p = .119$), however there was a significant correlation between attractiveness differences and Restriction scores ($\tau b = 0.35$, $p = .022$) such that higher Restriction scores were associated with greater attractiveness ratings for selfie-stick compared to regular selfie images.

There were no significant correlations between weight differences and Restriction scores ($\tau b = -0.01$, $p = .969$), between weight differences and Shape and Weight Concern scores ($\tau b = -0.25$, $p = .101$), or between weight differences and Preoccupation and Eating Concern scores ($\tau b = -0.23$, $p = .131$).

Finally, in line with the hypothesis that WHR would be related attractiveness ratings, differences in WHR measured between the two types of images were significantly correlated

with differences in attractiveness scores in the selfie vs selfie-stick condition (r = -0.71, p = .022), such that higher WHR was correlated with higher attractiveness judgements for selfie-stick images compared to for selfies.

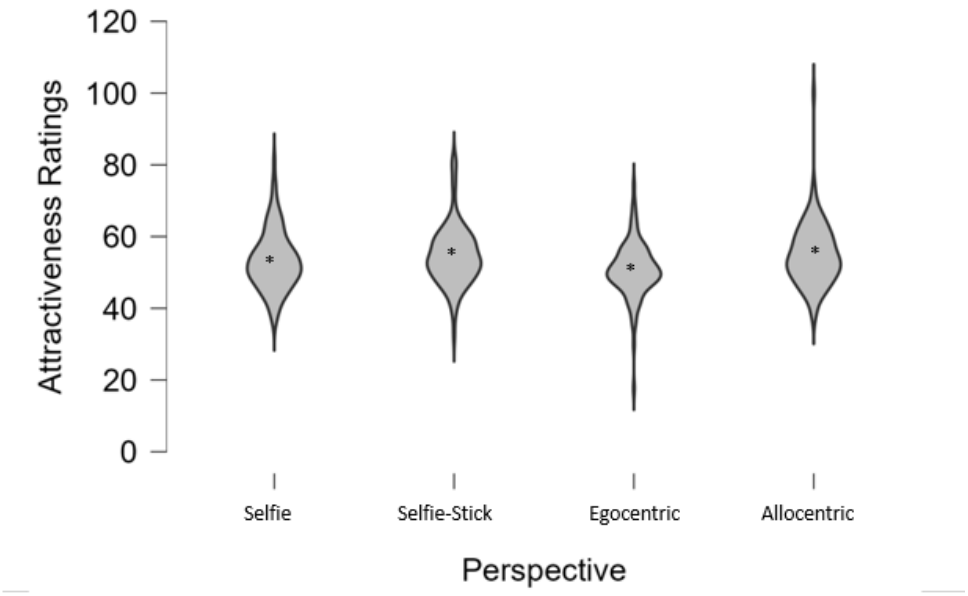
Experiment 4

The final experiment in this chapter aimed to replicate findings described above in a single sample. Data met the assumptions for a repeated measures one-way ANOVA for both attractiveness and weight judgments.

The ANOVA for attractiveness judgments revealed a significant effect of perspective on ratings of attractiveness ($F(3, 324) = 14.67$, $p < .001$, $\eta p^2 = 0.12$). In order to replicate findings from experiments one, two and three we conducted pairwise comparisons addressing our main hypotheses. Bonferroni correction was used with a critical $p = .0167$. Firstly we wanted to examine whether selfies were judged as more attractive compared to allocentric images. This effect was found to be non-significant correcting for multiple comparisons ($t(108) = -2.25$, $p = .026$, $d = .22$). Next, as anticipated selfies (M = 53.31, SD = 8.2) were judged as more attractive compared to egocentric (M = 50.65, SD = 7.7) images ($t(108) = 3.65$, $p < .001$, $d = .35$). Contrary to the findings of experiment three, however, the difference between attractiveness ratings for selfies and selfie-sticks did not reach significance $t(108) = 2.18$, $p = .031$, $d = .35$). More information can be found in Figure 3.2.

Figure 3.2

A violin plot showing attractiveness ratings across each perspective. Egocentric images were rated as the least attractive, with selfie, selfie-stick, and allocentric images rated as the most attractive.

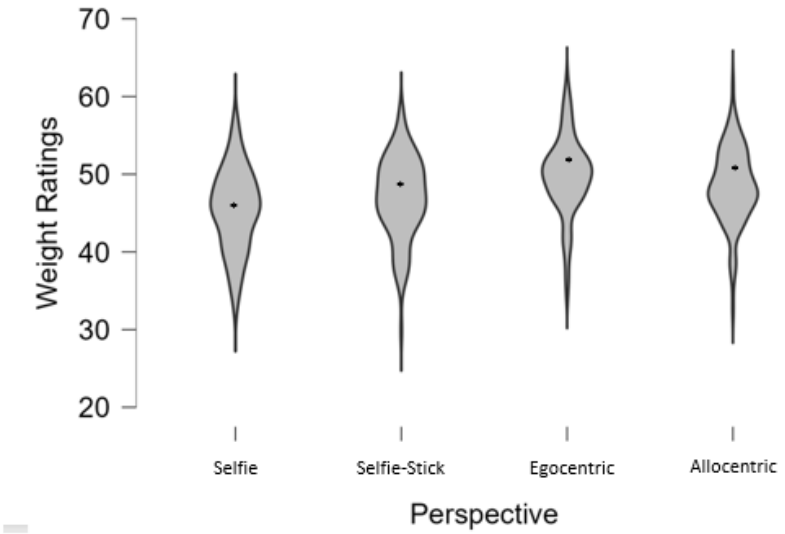


Mauchly's test indicated that the data violated the assumption of sphericity (p = .043) thus I used the Greenhouse-Geisser correction. The second repeated measures one-way ANOVA on weight judgments revealed was a significant effect of perspective on weight ratings ($F(2.79,300.88) = 27.29$, $p < .001$, $\eta p^2 = 0.20$). Bonferroni correction was used with a critical p =.0167. Firstly I wanted to examine whether selfies were judged as slimmer compared to allocentric images as was found in experiment one. Supporting this hypothesis it was found that selfies (M = 45.5, SD = 5.2) were judged as slimmer compared to allocentric (M = 48.45, SD = 4.8) images ($t(108) = -6.04$, $p < .001$, d = .58). Next, supporting the findings from experiment two, selfies were judged as significantly slimmer compared to egocentric (M = 49.79, SD = 5.1) images ($t(108) = -7.31$, $p < .001$, d = .7). Finally, contradictory to the results of experiment three, selfies were judged as slimmer compared to images taken with a selfie-

stick (M = 49.79, SD = 5.1) (t(108) = 2.98, *p* = .004, d = .29). More information can be found in Figure 3.3.

Figure 3.3

A violin plot showing weight ratings across the perspectives. Selfies were rated as the slimmest, followed by selfie-stick images, with egocentric and allocentric images rated as the largest.



Discussion

This study aimed to consider whether the perspective that images of the body are taken from influences how we judge their attractiveness and weight, including social media style images such as selfies. I also wished to consider whether these differences, if they exist, are influenced by disordered eating thoughts and behaviours. It was hypothesized that selfies would be judged as more attractive and slimmer than other images, and that selfies taken with a selfie-stick would be judged as slimmer and more attractive than regular selfies. It was also hypothesized that the role perspective plays in aesthetic judgements would be related to disordered eating thoughts and behaviours. Finally, it was anticipated that WHR would relate

to attractiveness judgements across perspectives. Results suggested that there are clear differences between selfies and egocentric images, with the latter judged as both slimmer and more attractive. Interestingly, whilst selfies were found to be judged as slimmer than allocentric images there was not a corresponding significant effect on attractiveness. Differences between attractiveness and weight judgments for selfies and images taken with a selfie-stick were less clear and not replicated across experiments, with experiment three suggesting selfies may be judged as slimmer than selfie-stick images and experiment four suggesting that selfie-stick images are more attractive than regular selfies. In terms of disordered eating thoughts and behaviours, greater thoughts and behaviours around shape and weight concern as well as preoccupation and eating concern were related to finding selfies more attractive than allocentric images. More thoughts and behaviours around restriction were linked to finding selfie-stick images more attractive than selfies. There were no correlations between differences in weight judgements and eating disorder thoughts and behaviours. WHR differences across perspectives did correlate with differences in attractiveness.

Results suggest that selfies are viewed as being slimmer than both allocentric images, which are associated more with traditional media, and egocentric images, which are thought to be more linked to the self (Carey et al., 2019). Selfies are widespread on social media, and there is thought to be a negative impact on body satisfaction of viewing these images (Fardouly & Vartanian, 2016). The effect sizes for this difference in weight judgements were medium to large across our experiments, suggesting that the effect selfies have on weight judgments is not trivial. However, effect sizes for attractiveness ratings were notably smaller and thus may reflect a more complex picture for aesthetic judgments across image angles (discussed further below). Our results suggest that aesthetic judgments of selfies may be related to some of the

links between social media use, body dissatisfaction, and disordered eating, such that having higher levels of disordered eating thoughts and behaviours is related to more favourable judgements of social media style selfies. It is also relevant that correlations between differences in aesthetic judgements that favour selfies compared to allocentric and egocentric images and disordered eating symptoms are specifically related to thoughts and behaviours to do with weight and shape concern. Research suggests that we often make appearance comparisons to ourselves with the photos we see on social media (Fardouly, Pinkus & Vartanian, 2017; Tiggemann & Anderberg, 2020), so if selfies are deemed as slimmer and therefore more desirable due to being in accordance with the thin ideal, then we are more likely to make damaging upwards comparisons to those images on social media (Vogel, Rose, Roberts & Eckles, 2014). This could lead to increased body dissatisfaction, which is a risk factor in developing disordered eating (Stice, Marti & Durant, 2011). This may mean that, as selfies are judged as being slimmer, they could be more damaging to those vulnerable to developing an eating disorder, who might give more prominence to weight in judgments of attractiveness.

In terms of attractiveness differences, selfies were judged as being more attractive than egocentric images, and selfie-stick images were judged to be more attractive than selfies. When comparing all the perspectives, egocentric images appeared to have the lowest attractiveness judgments compared to images from the other three perspectives. A previous study showed that large bodies were judged as slimmer from an egocentric perspective; however this was only with large bodies whereas our study contains a range of body sizes (Carey et al., 2019). This may also be why the study did not find differences in attractiveness between selfie and allocentric images, as the pattern might be different depending on the size of the body (Carey et al., 2019). Selfie-stick images were judged to be more attractive than

typical selfie images. This finding may be related to the photo being taken from further away (therefore a more optimum angle of the body, taken from further away and from further above the person's body than a regular selfie) and thus giving a slightly different perspective. Research into face perception has shown that the distance the face is from the camera affects viewers ability to identify faces and attractiveness judgements of the face, with faces seen from further away being deemed more attractive than those seen close up (Noyes & Jenkins, 2017; Bryan, Perona & Adolphs, 2012). This effect may also be at play in why in experiment three selfie-stick images are judged as more attractive than selfies, as selfie-sticks place the subject's body further away from the camera. The enhanced selfie-angle achievable with a selfie-stick may also enhance the social cues linked with attractiveness (appearing smaller) also enhancing the individual's attractiveness. However, the other effect of increased distance of camera-to-subject is that faces appear more convex and so may appear as rounder, which could make bodies appear less slim. These competing observations may explain why this study only found differences in attractiveness and not slimness comparing selfies and selfie-stick; the body may appear rounder and less slim, but the social attributes linked to the appearance and position may make the image more attractive. However, those seen using selfie-sticks have also been judged as less attractive than individuals taking selfies without selfie-sticks (Bevan, 2017) and increased attractiveness for selfie-sticks in experiment four were not replicated. Therefore, further research comparing selfies and selfies taken with a selfie-stick is needed to elucidate the differences between these kinds of images, alongside studies examining distance effects on judgements of the body (not just the face).

The differences that were observed in weight ratings between selfies and the other perspectives may also be linked to the aforementioned effects found in face recognition experiments, namely that faces appear convex when seen from further away and flatter when

seen from closer (Noyes & Jenkins, 2017). Selfies (without a self-stick) are closer and thus may be seen as less round, which may make them appear slimmer. In relation to our research, it may be that selfies show the body from at least arm's length, whereas egocentric images show a closer view, which may be why selfies are judged as being slimmer. It may also be related to selfies traditionally being taken from above the subject, which could make the body shape more optimal, and thus make the body look slimmer and more attractive. The exact reasons why selfies are judges as slimmer are unclear. Selfie angles may provide an optimal WHR compared to traditional allocentric media images due to the perspective that they are taken from, which is suggested as a possible cue for attractiveness and overall body fat (Henss, 2000). This relates to the findings that apparent differences in WHR correlate with differences in attractiveness ratings between many of the perspectives. This suggests that the differences in WHR that are perceived from different visual perspectives of bodies may be driving, at least in part, the differences in how people judge their attractiveness. However, sample sizes for these analyses were small so should be taken with caution. It may also be that participants viewed selfie images as being more attractive due to the qualities that they convey or are associated with. Selfies may endorse the idea that the person in the photo is more extroverted, sociable, and open to experience; qualities that have been associated with attractiveness in previous research (Segal-Caspi, Roccas & Sagiv, 2012; Musil et al., 2017). Interestingly, changes in slimness did not always have a corresponding change in attractiveness ratings for selfies. This could be due to some of the more negative personality characteristics linked to selfies, such as narcissism and untrustworthiness (Taylor, Hinck & Lim, 2017; Kramer et al., 2017), which partly dissociate a link between slimness and attractiveness. However, more research should aim to replicate and extend these findings to understand the mechanisms behind these effects.

There were some correlations between differences in attractiveness judgements and EDE-Q subscale scores, but no significant correlations between EDE-Q subscale scores and weight judgement differences. The correlations between attractiveness differences and Shape and Weight Concern and Preoccupation and Eating Concern in the selfie vs allocentric condition were both small. The correlations may mean that those who are more vulnerable to eating disorders might be more vulnerable to the effects of social media, such that those experiencing more thoughts and behaviours around disordered eating are more likely to judge social media style images like selfies as more attractive. There may be relationships that indicate that having more worries about your shape and weight and how much you are preoccupied with your diet and deeming selfies as more attractive than allocentric images, however these relationships are likely to be small. The relationship between judging selfie-stick images as more attractive than selfies and experiencing more thoughts and behaviours around restricting your diet is moderate in size, suggesting that further research into the directionality of this relationship as well as the mechanisms behind it is needed. It makes sense that the judgements that we make about the bodies we see on social media are related to our own feelings about eating and our bodies, however the direction of cause and effect and the mechanism behind this relationship is not clear. Further research could try to tease this out.

There are several limitations to this series of experiments. Initially two perspectives were compared with each other in three separate experiments, as well as EDE-Q scores. In the final experiment, participants saw images from all four perspectives, but did not fill in the EDE-Q. It would have potentially been more effective to recruit a larger number of participants who both saw all stimuli and filled in the EDE-Q so we could aim to replicate not only the effects of perspective but also the correlational relationships with eating disorder thoughts and

behaviours. Previous research in the area has also been criticised for not being sufficiently ecologically valid and presenting stimuli in isolation from their usual context (Huang et al., 2021). Although all images were presented online so that participants could view these in a similar way to how they usually view social media. Future research may benefit from presenting the relevant stimuli using the platform of interest. It is important to note, too, that although the for weight related judgements effect sizes were medium-sized, effect sizes for attractiveness judgments were only a small, with small correlations found as well. The small effect sizes remind us that, although participants may judge the attractiveness of social media style images differently based on the perspective that they are taken from, these differences may not have much impact in terms of vulnerability to developing disordered eating or poor body image.

In conclusion, this series of studies aimed to explore the influence of the perspective that social media style images are taken from. Selfies are judged to be slimmer than other perspectives, and photos taken from the egocentric perspective are judged to be the least attractive. It also seemed that increased disordered eating thoughts and behaviours were related to judging selfies to be more attractive. Whilst effects sizes for weight ratings were medium to large, the effect sizes for attractiveness judgments were mainly small. This draws into question whether viewing images could have a significant detrimental effect on how the viewers feels about their own body and how important these images are for eating disorder vulnerability. Furthermore, future research should aim to consider these questions using paradigms that are more ecologically valid to the relevant social media platforms used in everyday life to ensure these effects are not just specific to experimental environments.

Chapter 4. Body satisfaction, body size estimation, and exposure to social media style images.

Introduction

After finding that selfies are judged as slimmer and in some cases more attractive than other visual perspectives of the body in the previous chapter, I wanted to examine whether viewing these images would have a negative effect on the viewers body satisfaction. Social media is one of the most popular ways to spend time on the internet, with approximately 70% of people using the Internet in the UK spending time on social media platforms (ONS, 2020). Instagram is particularly popular, reporting one billion users in 2018, a number that has no doubt risen in the subsequent years (Instagram, 2018). As a photo-based sharing platform, use of Instagram seems to be especially relevant when exploring the impact of social media on body image and body satisfaction. Previous research has found that use of Instagram is associated with greater self-objectification (Fardouly, Pinkus & Vartanian, 2017). In fact, eating disorder related posts seem to "hide in plain sight" on these platforms, for example through the use of modified hashtags, making this kind of content accessible to a vast number of people (Pater et al., 2016). A study of 259 women found a significant difference between Instagram users and non-Instagram users on body surveillance measures (measures of how often people monitor their own body and are preoccupied with its appearance) (Cohen, Newton-John & Slater, 2017). Higher overall Instagram use has also been associated with a higher tendency towards orthorexia nervosa, a pattern of disordered eating associated with obsessive healthiness (Turner & Lefevre, 2017).

Traditional media, in the form of magazines and television amongst others, has been shown to have a negative effect on the viewer's body image (Dakanalis & Riva, 2013; Grabe, Ward

& Hyde, 2008). In particular, exposure to media portraying the thin ideal, or a desirable thin body, seems to have a negative effect on body satisfaction (Grabe et al., 2008). More recently, attention has turned to whether social media has a similarly negative effect on the viewer's feelings about their body. One kind of body-related content that is widespread on Instagram is fitspiration. Fitspiration is intended to inspire followers to pursue a healthier lifestyle through healthy eating and exercise (Tiggemann & Zaccardo, 2015). It can be found by searching hashtags such as #fitspiration or #fitspo or can be seen inadvertently in a user's feed. A content analysis of what is found under the banner of fitspiration revealed that there is overwhelmingly one kind of body shown - a body that is both thin and toned (Tiggemann & Zaccardo, 2015). There are also objectifying elements in most fitspiration images. The sense that other users on Instagram are peers may encourage appearance and health-related comparisons, which alongside the ease of access, could make fitspiration content have a high potential to influence users body image (Tiggemann & Zaccardo, 2015). There is an implicit suggestion in this kind of content that there is only one kind of body that can be healthy and attractive. However, there is research suggesting that the effects of media exposure on body satisfaction are small, and that results of the aforementioned studies should be understood in the context that these effects, although significant, are small contributors (Holmstrom, 2004; Grabe et al., 2008; Ferguson, 2013).

Following 'health and fitness' accounts that post fitspiration content on Instagram is related to higher thin-ideal internalisation and drive for thinness (Cohen et al., 2017). When participants viewed fitspiration content from Instagram, there was an increase in negative mood and body dissatisfaction compared to viewing non-fitspiration content (Tiggemann & Zaccardo, 2015). There also seems to be a relationship between body satisfaction and posting fitspiration content; those who posted fitspiration content scored significantly higher on

measures of drive for thinness, drive for muscularity, bulimia, and compulsive exercise compared with participants who posted travel-related content (Holland & Tiggemann, 2017). It is important to note that of the participants who posted fitspiration content, 17.5% were at risk of a diagnosis of an eating disorder, compared to just 4.3% in the travel group, indicated by Eating Disorder Inventory (EDI) score of 14, as per recommended cut-offs (Holland & Tiggemann, 2017). It seems that fitspiration content might not only be associated with body dissatisfaction, but also with disordered eating.

Fitspiration content is problematic in many ways, not least because it presents an idea of health and beauty that is unattainable for most people (Holland & Tiggemann, 2017). It also focuses solely on the appearance-related benefits of health and fitness, and promotes extreme aspects of exercise, such as continuing to exercise through intense pain, which are not recommended by medical professionals (Holland & Tiggemann, 2017; Prichard, McLachlan, Lavis & Tiggemann, 2018). In one study, state body satisfaction decreased and negative mood increased when participants were exposed to fitspiration content, regardless of whether that focussed on a body exercising or a body at rest and whether or not it was accompanied by an appearance-focussed caption (Prichard et al., 2018). Participants viewed images of thin and toned bodies taken from social media platforms after completing VAS measures of state body satisfaction, mood, and self-objectification, which they then repeated after viewing the images. To ensure attention, the participants rated the images they saw according to how inspirational they found them (Prichard et al., 2018). Trait self-objectification also influenced the impact of viewing this kind of content on participants, in that viewing functional images with accompanying appearance-related text resulted in poorer body satisfaction for women with higher trait self-objectification, but not for those with lower trait self-objectification (Prichard et al., 2018). It is unlikely that fitspiration content is successful in motivating

viewers to make changes in diet and exercise – one study found that viewing fitness related content did not motivate participants to engage in more frequent exercise (Robinson et al., 2017). These results suggest that fitspiration is unsuccessful in its supposed primary aim, and in fact has a negative impact on body image. The type of fitspiration content consumed may also impact how social media users experience the effects of fitspiration, for example content focussing on healthy eating has a different effect than that focussed on mental wellbeing, in that visiting pages focussed on mental wellbeing was not related to body dissatisfaction, unlike healthy eating content (Sumter, Cingel & Antonis, 2018). However, exposure to fitspiration content in general still had the overall effect of feelings of body dissatisfaction and increased rates of compulsive exercise (Sumter et al., 2018). It is not clear whether there is a causal relationship between viewing social media images like these and poorer body satisfaction, or whether those with higher levels of body dissatisfaction view these images more often.

A lot of fitspiration content is made up of selfies, a photo that an individual has taken of themselves (Diefenbach & Christoforakus, 2017). Some research suggests that selfie activities in particular, as opposed to general social media use, are linked to body-related and eating concerns (Cohen, Newton-John & Slater, 2017). Frequent viewing of selfies has also been found to be related to decreased life satisfaction and self-esteem (Wang, Yang & Haigh, 2017). Selfies are unique due to the visual angle from which they are taken. The visual angle from which a body is seen has been shown to influence aesthetic judgements that viewers make of the model. For instance large bodies are rated as significantly less attractive from an allocentric perspective as from an egocentric perspective, and participants rated bodies from an allocentric perspective as weighing significantly more than from an egocentric perspective, particularly for large bodies (Carey et al., 2019). To the best of my knowledge

there is little to no research that has explored whether fitspiration selfies have a particularly negative effect when compared to fitspiration images of bodies from other visual perspectives. Given that taking and viewing selfies in particular has been found to have a negative impact on body image and self-esteem (Veldhuis, Alleva, de Vaate, Keijer & Konijn, 2020), and that our previous experiments suggest that selfies are judged as slimmer than bodies seen from other angles, it may be that fitspiration selfies could be especially influential on the body satisfaction of users who view them.

Although there is a foundation of research underlining the impact that fitspiration can have on body image, there has been no research to date exploring whether this kind of content also influences how we experience our bodies in terms of body size perception. This has been shown to be different in women experiencing an eating disorder compared to women without an eating disorder, in that they perceive their bodies as being bigger than they are in reality (Keizer et al., 2013; Stice, 2002; Stice & Shaw, 2002). Perception of the body has been found to be linked both behaviourally and neurally to our emotions about our bodies (Preston & Ehrsson, 2014, 2016, 2018). Thus, it seems sensible to explore whether social media negatively affects body perception in a similar manner as it does body satisfaction. Many body size estimation tasks that aim to tap into perceptual experiences of the body may actually be more related to attitudes to the body (Cornelissen, Johns & Tovée, 2013). One task that might avoid the issues around being driven by attitudes rather than perception is the door aperture task (Keizer et al., 2013; Guardia et al., 2010). In this more implicit task participants see door apertures projected on a screen in front of them, and have to select whether or not they would be able to pass through the door without turning their shoulders to get past (Guardia et al., 2010). It has been found that participants with anorexia turn their bodies for apertures 40% wider than their own shoulders (both in terms of judgements and in

actual action), whereas healthy participants only start turning their bodies for doors 25% wider than their own shoulders (Guardia et al., 2010; Keizer et al., 2013). This suggests that body size perception, as well as body satisfaction, is different for people with an eating disorder. Based on this, it seems that participants more vulnerable to an eating disorder, and therefore those more susceptible to the negative body attitudes from engaging with social media, may also show changes in body perception.

Based on previous literature, it seems that media effects are only relevant for certain groups of people, such as women who are already vulnerable to disordered eating experiences (Ferguson, 2013). Prevalence of disordered eating symptoms have been shown to be high in university students, so we specifically recruited female university students for this study (Eisenberg et al., 2013; Tavolacci et al., 2015). Specifically, we collected EDE-Q scores as an indicator of vulnerability to disordered eating thoughts and experiences to determine whether or not this affected the results.

This study considered whether viewing fitspiration-style content influences body satisfaction and body size perception. Female participants were recruited and stimuli were all female models (from Chapter 3). Image taken from different visual perspectives, including selfies were used, in order to explore whether visual perspective influences the effects of this content on the viewer. Based on findings in traditional and social media as mentioned above, it is firstly hypothesized that in both a lab-based and more ecologically valid setting body satisfaction will decrease following viewing fitspiration style images. Furthermore, because selfies are found to be slimmer than other perspectives it is anticipated that reductions in body satisfaction are greater in participants who view selfie and selfie-stick images compared to those who view allocentric and egocentric images. It is also hypothesized that viewing

fitspiration style images will impact body size perception, such that after viewing images of slim bodies participants will judge the smallest size of door aperture they can fit through to be larger compared to before viewing the images and that this effect will also be larger after viewing selfies. Finally, it is hypothesized that those participants who spend more time on social media in general will have lower body satisfaction, greater decreases in body satisfaction form viewing the images and more disordered eating thoughts and behaviours as measured by the new three-factor structure of the EDE-Q found in Chapter Two.

Methods

Participants

Experiment One

Based on the small effect sizes found in previous meta-analyses and Chapter 3, a power analysis was conducted using R studio (pwr package) for general linear model analysis with three groups. This indicated that a minimum of 96 participants was needed to be sufficiently powered (power = .08, alpha = .05, f = .1). Ninety-six female participants aged 18 to 26 took part in the experiment (mean age = 20.14, SD = 1.48). The majority of participants identified as White (87), with three participants identifying as Asian and six as Other, specifying Mixed Race. They were recruited through an online system allowing students on undergraduate Psychology courses to gain course credit for taking part in experiments.

Experiment Two

Based on the small effect sizes found in previous meta-analyses and Chapter 3, a power analysis was conducted using R studio (pwr package) for general linear model analysis with four groups. This indicated that a minimum of 112 participants were needed to be sufficiently powered (power = .08, alpha = .05, f = .1). One hundred and thirty four female participants

aged 18 to 35 took part in the experiment (mean age = 19.30, SD = 2.42). The majority of participants identified as White (N = 121), with 1 identifying as Hispanic/Latino, 2 identifying as Black, 6 as Asian, and 4 as Mixed Race. All participants were recruited through an online system allowing students on undergraduate Psychology courses to gain course credit for taking part in experiments.

Equipment

Experiment One

An iMac computer and projector were used to project images of door apertures onto a large blue screen, positioned approximately 200cm away from the projector and participants stood approximately 150cm away from the screen, in order to present accurately sized images of the door apertures. Participants used a wireless keyboard to respond to the question of whether or not they felt they could walk through the door without turning their shoulders. Questionnaires (demographic information and Eating Disorder Examination Questionnaire 6.0) were presented via Qualtrics on the iMac computer. Images of female bodies, taken from either an allocentric, egocentric, or selfie perspective were displayed on the computer on a programme coded with Python in Psychopy (Peirce et al., 2019).

Experiment Two

Participants accessed the questionnaire via a Qualtrics link on their smartphones. They also used the Instagram app to view the images. Stimuli images of female bodies from the shoulders down were taken from four different perspectives (egocentric, allocentric, selfie and selfie-stick) against a white background. The people in the photos wore clothing suitable for going to the gym (e.g. leggings and a form-fitting vest or t-shirt). The same eight models were shown in each perspective - the researcher took the allocentric photo, and the

egocentric, selfie, and selfie-stick photo were taken by the model themselves. There were eight photos for each condition. The same stimuli were used for both experiments and are a subset of slim bodies from Chapter Four.

Measures

Eating Disorder Examination Questionnaire 6.0 (EDE-Q)

The EDE-Q is a 28-item self-report questionnaire that assesses eating disorder symptoms (Fairburn & Beglin, 1994; 2008). It assesses disordered eating behaviours and attitudes in the last 28 days and has traditionally used four subscales (Restraint, Eating Concern, Shape Concern, Weight Concern) as well as a global score, which is calculated from the mean of the four subscale scores. However, in a previous chapter a three-factor model using 14 items showed the best fit, with factors consisting of Shape and Weight Concern, Preoccupation and Eating Concern, and Restriction. This three-factor structure was used in this chapter. Participants rate items on a 7-point Likert scale, with higher scores indicating higher eating disorder psychopathology. There are six items that relate to the frequency of eating disorder attitudes and behaviours in the past 28 days, which do not contribute to the subscale or global scores but provide information on some core eating disorder behaviours such as laxative use and self-induced vomiting. Research has established acceptable levels of internal consistency for global and subscale scores in men and women, alongside the reliability of the scale (Berg et al., 2011; Peterson et al., 2007; Lavender, De Young & Anderson, 2010; Rose, Vaewsorn, Rosselli-Navarra, Wilson & Weissman, 2013; Hilbert, De Zwaan & Braehler, 2012).

Procedure

Experiment One

Between 72 and 24 hours before coming into the lab to do the experiment, participants were sent a personalised link to a questionnaire on Qualtrics consisting of demographic information and the EDE-Q. The results of this were used to assign the participant to one of three conditions (allocentric, egocentric, and selfie-stick), to ensure an even spread of EDE-Q scores across groups. In the lab, the participants firstly completed the door aperture task. In this task, the participant sees 51 door apertures of widths ranging from 30cm to 80cm, increasing in 1 cm increments projected in front of her (Guardia et al., 2010). Using the keyboard, she responded as to whether or not she would be able to walk at a normal pace through the door aperture without turning her shoulders to fit through the door. After finishing this task participants completed a state body satisfaction measure, using a visual analogue scale (VAS) anchored by 'Very Dissatisfied' and 'Very Satisfied'. Following this participants viewed six bodies taken from one perspective (depending on which of the three conditions they had been allocated to, either egocentric, allocentric, or selfie-stick) and in order to maintain attention completed a 1-back task. In this task participants are instructed to press the spacebar if they saw the same photo repeated twice in a row. This happened at least twice per participant and the photos were presented in a random order, presented for 2 seconds each and repeated 6imes. Then participants completed post manipulation measures of body satisfaction (VAS) and body size judgments (the door aperture task). At the end of the experiment the participant's shoulder width was measured with a tape measure by the experimenter. Participants also measured and recorded their own weight on a set of scales and the experimenter in the lab measured height.

Experiment Two

Participants followed the link to the questionnaire via social media or an online participant recruitment platform. They were presented with the study information and consent sheet, before doing the initial measures of body satisfaction. This consisted of a visual analogue scale (VAS) asking them how satisfied they are with their body at that moment. The VAS was anchored by 'Very Dissatisfied' and 'Very Satisfied', as in Experiment One. Body perception was not measured, as the measure used (the Photographic Figure Ratings Scale) measured trait not state body perception. Then participants were directed to one of four Instagram profiles (depending on which condition they had been allocated to) which contained the stimuli photos from one condition (selfie, selfie-stick, allocentric, and egocentric). They were instructed to browse and engage with these profiles for five minutes. Whether or not participants clicked on the image and the time spent away from the Qualtrics survey were recorded. Those who did not click on the link or spent less than the 5 minutes on the platform (measured by the time taken to progress to the next question, which was recorded via Qualtrics) were excluded. The body image tasks were then repeated. Finally, participants completed the EDE-Q and recorded their height and weight. At the end of the questionnaire, participants were presented with a debrief sheet providing details of the purpose of the study and signposts to sources of further support and information.

Data Analysis

Body satisfaction scores for before and after viewing images were calculated from the VAS, and critical apertures for before and after viewing images were calculated by finding the aperture for which there was a 50% positive 'yes' response (Guardia et al., 2010). This was calculated for each trial for each participant. EDE-Q scores were calculated for each

participant by taking a mean of the relevant items. All data were normally distributed. A MANOVA was used to identify potential differences in EDE-Q scores between conditions.

In order to directly test the hypotheses that body satisfaction will decrease following viewing fitspiration images and that selfies will have the biggest effect, I conducted a 2x3 (experiment one) or 2x4 (experiment two) mixed ANOVA for body satisfaction scores with the within factor of time (pre and post) and between factor of condition (egocentric, allocentric and selfie-stick, with the addition of selfie for Experiment Two).

In order to directly test the hypotheses that viewing fitspiration images will impact body size perception and that selfies will have the biggest effect, I conducted a 2x3 mixed ANOVA for critical aperture on the door aperture task with the within factor of time (pre and post) and between factor of condition (egocentric, allocentric, and selfie-stick) for experiment one.

In order to test the hypotheses that those who spend more time on social media will have lower body satisfaction, a greater negative affect of viewing the images and higher eating disorder thoughts and behaviours, I combined data from experiments one and two. Pearson's correlation coefficient was used to examine relationships between reported weekly social media and baseline body satisfaction (body satisfaction measure before viewing the stimuli), change in body satisfaction (the difference between pre and post body satisfaction scores) and EDE-Q scores. Change in body satisfaction scores were calculated by subtracting pre exposure body satisfaction scores from post exposure scores, such that negative scores represented decreases in body satisfaction and positive scores represented increases in body satisfaction.

Results

Experiment One

EDE-Q Scores

The 14 item EDE-Q global score and subscales demonstrated good internal consistency in this sample using both Mcdonald's ω and Cronbach's alpha (Global ω = .940, α = .919; score SWC ω = .928, α = .927; PEC ω = .864, α = .857; Restriction ω = .735, α = .735).

A one-way MANOVA with the factor of condition (egocentric, allocentric, and selfie-stick) examined whether there was differences in EDE-Q subscales (Restriction, SWC, PEC) between the groups. No significant differences were found ($F(2, 93) = 0.64$, Pillai's trace = 0.04 $p = .695$). Because this finding does not support significant changes in EDE-Q between the different conditions, EDE-Q is not used as a covariate in subsequent analysis.

Body Satisfaction

To examine whether body satisfaction changed as a result of viewing the images and if this varied depending on the type of images viewed I conducted a 2 x 3 mixed ANOVA on the body satisfaction (VAS) scores with a between-subjects factor of condition (egocentric, allocentric, and selfie-stick) and a within-subjects condition of time (pre and post). There was no significant main effect of time, although this was approaching significance ($F(1,92) = 3.63$, Wilk's lambda = 0.962, $p = .060$, $\eta p^2 = .038$) with body satisfaction before (pre) viewing the images being higher (mean = 51.22, SD = 20.70) compared to after (mean = 50.35, SD = 21.65). There was also no significant main effect of condition ($F(2, 92) = 1.59$, $p = .211$, $\eta p^2 = .033$) and no significant time and condition interaction ($F(92, 2) = 0.09$, Wilk's lambda = .998, $p = .912$, $\eta p^2 = .002$).

Critical Aperture

To examine whether body size judgements changed as a result of viewing the images and if this varied depending on the type of images viewed I conducted a 2 x 3 mixed ANOVA on the critical aperture scores with a between-subjects factor of condition (egocentric, allocentric, and selfie-stick) and a within-subjects condition of time (pre and post). There was no significant main effect of time ($F(1,93) = 0.00$, Wilk's lambda = 1.000, $p = .949$, $\eta p^2 = .000$). There was also no significant main effect of condition ($F(2,93) = 0.17$, $p = .845$, $\eta p^2 = .004$) and no significant time and condition interaction ($F(2,93) = 0.64$, Wilk's lambda = 0.986, $p = .528$, $\eta p^2 = .014$).

Experiment Two

EDE-Q Scores

The 14 item EDE-Q global score and subscales demonstrated good internal consistency in this sample using both Mcdonald's ω and Cronbach's alpha except for the Restriction subscale, which was low (Global ω = .948, α = .917; score SWC ω = .931, α = .929; PEC ω = .820, α = .809; Restriction ω = .647, α = .647). A one-way MANOVA with the factor of condition (egocentric, allocentric, selfie and selfie-stick) examined whether there was differences in EDE-Q subscales between the groups. There was no significant effect of condition ($F(3, 130) = 0.32$, Pillai's trace = 0.02, $p = .969$) suggesting no significant differences in EDE-Q scores between conditions.

Body Satisfaction Scores

To examine whether body satisfaction changed as a result of viewing the images and if this varied depending on the type of images viewed I conducted a 2 x 4 mixed ANOVA with a between-subjects factor of condition (egocentric, allocentric, selfie and selfie-stick) and a

within-subjects factor of time (pre and post). There was no significant main effect of time (F(1, 130 = 0.01, Wilk's lambda = 1.00, p = .921, ηp^2 = .000). There was also no significant main effect of condition (F(3, 130) = 0.17, p = .915, ηp^2 = .004) and no significant time and condition interaction (F(3,130) = 1.11, Wilk's lambda = 0.975, *p* = .348, ηp^2 = .025).

Social Media Use (Collapsed Over Experiments One and Two)

In line with the hypotheses that social media use will be linked with lower body satisfaction, Pearson's correlations revealed a significant weak negative correlation between weekly social media use and baseline (pre) body satisfaction scores, such that higher weekly social media use was related to lower body satisfaction score (r = -0.14, *p* = .038) (see Figure 4.1). I also found the predicted relationship between social media used and negative impact of the images with a significant weak negative correlation between weekly social media use and change in body satisfaction, such that higher social media use was linked to greater decreases in body satisfaction after viewing the images (r = -0.14, *p* = .041) (see Figure 4.2). Finally, and in line with the hypothesis linking social media use to ED vulnerability, weekly social media use was significantly positively correlated with EDE-Q scores, such that as weekly social media use increased, so did EDE-Q scores. This was the case for Restriction scores (r = 0.16, *p* = .018), Shape and Weight Concern scores (r = 0.21, *p* = .001), and Preoccupation and Eating Concern scores (r = 0.16, *p* = .013). However, all these relationships represent small effects. It is important to note that reliability scores for the Restriction scale in the second experiment of this chapter was low, therefore the correlations with Restriction should be interpreted cautiously.

Figure 4.1

A scatter graph showing the significant weak correlation between social media weekly use and baseline body satisfaction score.

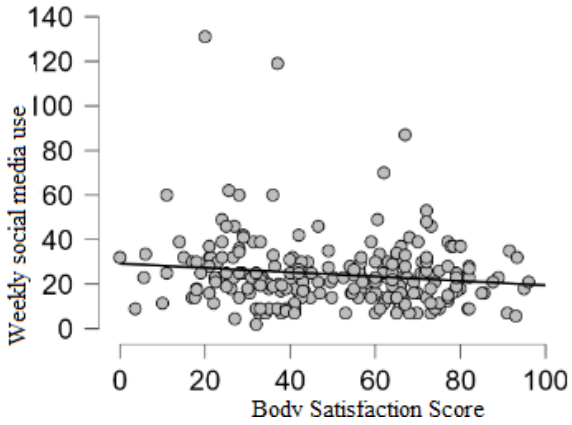
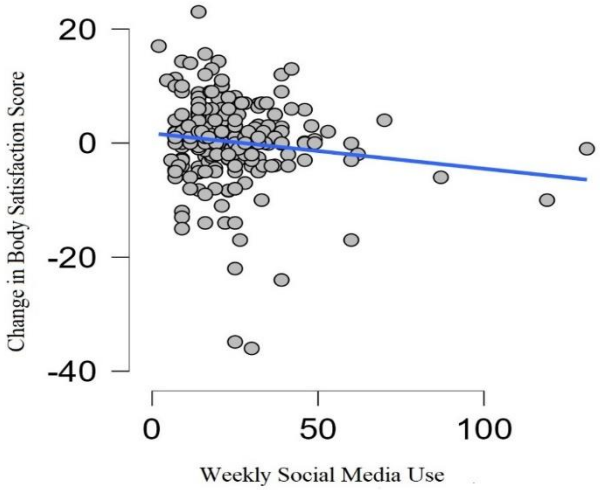


Figure 4.2

A scatter graph showing the significant weak positive correlation between change in body satisfaction score and social media weekly use.



Discussion

This study aimed to consider the effect of viewing social media content via Instagram on participants' body satisfaction and body perception, as well as the relationships between the amount of time spent on social media and body image measures. Following on from previous

studies examining traditional media and from the results describes in Chapter 3 I predicted a negative effect of viewing body images on body satisfaction and that this would be a stronger effect following viewing selfies, which are judged as slimmer. In both the current experiments, there were no significant effects of viewing fitspiration content, either on a computer or on an Instagram profile on the participant's own device on body satisfaction or body perception measures. Although this effect of viewing images on body satisfaction approached significance in experiment one, the effect size was small and was not replicated in experiment two. However, there were significant correlations between baseline body satisfaction scores and weekly social media use. There were also relationships between change in body satisfaction and weekly social media use, as well as between social media use and disordered eating thoughts and behaviours, such that higher social media use was related to lower body satisfaction, larger decreases in body satisfaction following viewing the images and more disordered eating thoughts and behaviours. However, these correlations were weak, indicating that the relationships may not be key factors in body image and risk of developing an ED.

In experiment one, the lab-based study, there was no significant change in body satisfaction after viewing the fitspiration images, and there was no effect of perspective that the bodies were viewed from on body satisfaction scores. There was also no significant change in body satisfaction and no effect of perspective after viewing the Instagram profile in experiment two. This suggests that a short exposure to fitspiration content does not elicit significant changes in body satisfaction, whether this is in laboratory conditions or more ecologically valid conditions, via the Instagram app on the participants own smartphone. It also suggests that there is no change based on the perspective that the images are taken from either. Although this approached significance for the experiment conducted in the lab, the effect size

was small. In the previous chapter it was found that participants make different aesthetic judgements of the same bodies depending on the perspective that images are taken from, and hypothesised that this may have different effects on body satisfaction due to the increased potential for upwards comparisons. Social comparison theory, that we compare ourselves to others as self-exploration, suggests that media and social media may be particularly rife with potential for comparisons, as we perceive other users as peers (Reaves, 2011). Making upward social comparisons might be inspirational in the short-term but may be detrimental to wellbeing in the long-term (Lewallen & Behm-Morawitz, 2016; Vogel, Rose, Roberts & Eckles, 2014). However these results suggest that this is not so simple. The results do not support effects of short-term exposure to these images on body satisfaction, though correlations may be indicative of more long-term effects of social media use.

Similarly, there were no significant effects of either visual perspective or viewing the images on a measure of body perception. Given that there was no effect of these factors on body satisfaction, it makes sense that there were also no effects on body perception. Research indicates that people struggling with disordered eating and low body satisfaction may also have changes in their body perception, and that there is a neural link between body satisfaction and body perception in healthy controls (Keizer et al., 2011; Keizer et al., 2013; Preston & Ehrsson, 2016). However, these results indicate that transient exposure to either fitspiration-style content, or Instagram itself, does not immediately change an individual's body satisfaction or body size perception.

Other aspects of social media content may have effects on body satisfaction, such as comments, likes, and captions, as opposed to the body in isolation. Although it was aimed to make Experiment Two more ecologically valid by presenting the images via Instagram, they did not have the captions, likes, and comments that would usually accompany this type of

content on the platform. This suggests that there may be something about the social context of a social media platform that could exacerbate the potentially negative effects of viewing these kind of images. I can find no research to date directly comparing the effects of viewing the same images in a laboratory setting and on social media, which future research should consider. Research suggests that making attractiveness judgements in the lab is similar to doing so in real life settings (Tovee et al., 2017), however the effects of interacting with social media content may not be. This may be why this experiment had different results from others that ask participants to scroll through their own social media feeds, as opposed to a specific profile. This also suggests that the different aesthetic judgements of bodies from different perspectives, such as those found in Chapter Three, may not translate to differing effects on body satisfaction and body size estimation.

It is worth noting that in this experiment considered the specific role of viewing the body on the participants. Stimuli did not show the models' heads. Previous research indicates that the face and the body made independent contributions to attractiveness (Peters, Rhodes & Simmons, 2007), however how we make social comparisons using the face and body has not been considered in this research. Despite this, selfies are often taken in order to show the model's face, and common filters and adaptations seen on social media are often applied to make the face look more attractive, such as popular apps like Facetune and Perfect365, which contour the face, make lashes and lips appear bigger, and add volume to hair. It may be that including the face in selfies increases the negative effect that these stimuli have on the viewer, and that the effect of viewing the body alone is minimal. Future research could directly compare the impact of viewing selfies of just the body, just the face and of those that include the body and the face.

Participants who reported spending more time on average in a week on social media also reported lower baseline body satisfaction. Despite this only being a weak correlation, it does corroborate previous findings that have indicated that social media may have an impact on body satisfaction, albeit a small one (Holmstrom, 2004; Robinson et al., 2014). There was also a weak relationship between social media use and change in body satisfaction after viewing the fitspiration images, such that more time spent on social media was related to a bigger decrease in body satisfaction after viewing the images. Recent research has found that by and large there are no direct effects of social media use on body satisfaction, however there are indirect effects, such that social comparisons mediate the relationship over time, and higher social media use predicted higher comparisons, which in turn predicted lower body satisfaction (Jarman, McLean, Slater, Marques & Paxton, 2021). These results support this stance, as there were no immediate effects of exposure to social media but correlations support the idea that there may be a relationship between these factors in the long term. Given what a potentially complex factor body satisfaction is, it makes sense that any contributors would likely play small but significant parts (Cash, 2004). Increased time on social media was also weakly correlated with more shape and weight concern, preoccupation and eating concern, and restriction thoughts and behaviours (however reliability for the Restriction scale was below recommended cut-offs for the second experiment, so this should be interpreted cautiously). This is in line with previous studies that have found that the total amount of time spent on social networking sites is related to disordered eating concerns (Santarrossa & Woodruff, 2017), potentially through appearance comparisons (Griffiths et al., 2018).

Transient exposure to social media content, either in the lab or in the Instagram app on participants' own smartphones, does not immediately affect an individual's body satisfaction

or body size perception. However, there are small but significant relationships between the decrease in body satisfaction that we see after viewing this content and the amount of time participants spend on social media. The direction of this relationship needs to be further explored.

Chapter 5. Discussion

Over the last few chapters, I have considered several studies that have explored the impact of fitspiration content on disordered eating and how sexuality may modify or relate to its effects. It is impossible to ignore the context that this chapter is being written in, at the end of a second year of the covid-19 pandemic, which has increased the amount of time people spend on social media and meant that, for many, online connections have been the only way to maintain relationships. One study suggested that almost 43% of people questioned continued to spend longer on social media as a result of lockdown, even in the summer when restrictions were lighter (Trifonova, 2020). Perhaps unsurprisingly, lockdown resulted in increased anxiety in those with eating disorders and increased rates of eating disorders in general (Cooper et al., 2020). Therefore, given the situation that so many people currently find themselves in, it is more important than ever that we work to understand the link between consuming social media content and feelings towards the body and disordered eating behaviour.

Changing social attitudes and culture have meant that there is increased exposure to social media alongside a greater inclusivity and awareness about sexuality, both of which could be modern risk factors in developing an eating disorder. It has been established for some time that exposure to traditional media can have a small negative effect on how we feel about our bodies (Grabe, Ward & Hyde, 2008; Holmstrom, 2004). Social media has also been shown to have potentially negative effects on how we feel about our bodies (Robinson, Prichard, Nikolaidis & Drummond, 2017). Given the changing landscape of social media and the fact that it now plays a central role in many peoples' lives, it is important that we understand the effects that exposure to unregulated content about bodies may potentially have on the viewer.

Other risk factors for developing eating disorders have also been identified, such as sexuality and gender and how these may intersect in order to influence how we feel about our bodies (Castellini, Rossi & Ricca, 2020). In this thesis, I aimed to explore the potential effects of exposure to certain kinds of media content and individual differences in eating disorder thoughts and behaviours based on sexuality.

The second chapter developed a new factor structure for capturing ED thoughts and behaviours form the EDE-Q that was used for all subsequent studies. In this chapter I also considered individual differences and risk factors for developing disordered eating attitudes and behaviours, specifically looking at sexuality and gender by considering this in men and women. A large group of heterosexual, bisexual, lesbian and gay men and women completed measures of disordered eating thoughts and behaviours and drive for muscularity. The measures used were the Eating Disorder Examination Questionnaire (EDE-Q) and the Drive for Muscularity scale (DMS). In order to verify whether the EDE-Q was a valid measure within this sample of participants of different sexual orientations, I used an EFA to CFA model that supported a new 14-item, three-factor model over the traditional four-factor model in this group. Men are thought to have greater drive for muscularity as opposed to thinness, with some researchers coining the term 'bigorexia' as the extreme of this (Mosley, 2009). Thus this seemed a particularly pertinent measure given the potential exposure to fitspiration content that both men and women may see on their social media feeds, although for women this may manifest in dual pressures to be both lean and muscular (Carrotte, Prichard & Lim, 2017). It was found that both gender and sexuality played a role in the kinds of thoughts and behaviours that people experience related to disordered eating and that gender and sexuality interacted in creating different patterns of experiences.

Results indicate that there is a complex relationship between sexuality, drive for muscularity, and disordered eating, which may go some way to explaining the mixed results that can be found in the literature. Some suggest that sexuality does not influence disordered eating in men; however others assert that being gay puts men at greater risk of developing these thoughts and behaviours (Strother, Lemberg, Stanford & Turberville, 2012). Similarly, whether or not sexuality influences disordered eating in women is unclear (Basabas et al., 2019). These results highlight the importance of both sexuality and gender in the experience of disordered eating and underline that clinicians and researchers alike should consider this within their practice and research when working with people experiencing disordered eating. These results also provide evidence that sexuality groups should be considered separately, instead of collapsing gay and bisexual participants into one (non-heterosexual) group, as has been done historically. The reasons why people of different sexualities might experience different kinds of symptoms of disordered eating thoughts and behaviours are not clear, however some researchers point to different social pressures and ideas of what is attractive depending on which sexuality people identify with, but body dissatisfaction seems to be a driving factor (Hospers & Jansen, 2005). A participant in this research noted in their response to the EDE-Q that "straight thin is gay fat", which points to potentially different pressures experienced by men of different sexualities, in particular. Given that women of all sexualities seem to be equally vulnerable to this, it may be that the dominant culture, which endorses a particular view of what is attractive, is equally damaging for all women regardless of their sexuality (Feldman & Meyer, 2007). As the EFA to CFA showed that there were no differences in EDE-Q score in women based on sexuality, and both of the experimental studies focussed on women, participants' responses based on sexuality were not compared.

The third chapter in this thesis considered aesthetic judgements of fitspiration style content taken from different visual angles, including selfies, which are synonymous with social media content, and how these may relate to disordered eating. In a series of experiments, participants judged the weight and attractiveness of bodies (without the head included) from selfies and visual angles that we traditionally see a body from in a photo, namely allocentric photos. Egocentric views of the body were also included, the view from which we most frequently see our own body. Selfies were consistently rated as being slimmer than photos of the same bodies taken from the other more traditional perspectives. Selfie-stick images were not judged as being a different size to selfies; however they were rated as being more attractive. Egocentric images were rated as the least attractive compared to all the other angles. These experiments highlight selfies as being somehow different from images taken from other, more traditional perspectives. It seems like selfies are judged in a more favourable way than those other images. There is limited research available on how people judge selfies in general, however some studies have shown that people rate those who post selfies as less socially attractive and more narcissistic, but also less trustworthy and more extroverted than people in images taken by others (Taylor, Hinck & Lim, 2017; Kramer et al., 2017). This might be why selfies were not judged as more attractive despite being judged as slimmer, as selfies are associated with unattractive qualities. In our experiments there were some small relationships between judgements of images and disordered eating thoughts and behaviours, especially when participants were making judgements of selfies. This could indicate that those people who have higher levels of disordered eating may be more vulnerable to the content that they consume on social media. Social comparison theory would indicate that making positive judgements about others' bodies on social media but not our own may have a negative effect on how we feel about our bodies and our general mood (Lewallen & Behm-Morawitz, 2016). Upwards appearance comparisons (those favouring the

other person and not ourselves) on social media have been shown to be related to negative effects across many measures, including body satisfaction and mood (Fardouly, Pinkus & Vartanian, 2017). Therefore, if selfies are judged as slimmer (closer to the social ideal) this could lead to more upwards comparisons, which may in turn result in increased body dissatisfaction. This could have a particularly damaging effect on those people who struggle with higher levels of disordered eating.

The fourth chapter considered two experiments that explored the impact of social media style fitspiration content on body satisfaction and body size estimation. Given the fact that in the previous experiments, selfies were judged as slimmer than other images, I wanted to ascertain whether the visual angle images were taken from would have differing effects on how people experience and feel about their own body. The first experiment took place in the laboratory. Participants completed a body satisfaction scale and the door aperture task (where participants judge whether they would be able to walk through a doorway projected in front of them without turning their shoulders and at a normal speed) before and after viewing fitspiration style photos of bodies on a PC computer. The second experiment was completed by a different set of participants on their smartphones via Instagram. They completed a body satisfaction task (VAS scale; Carey, Knight & Preston, 2019) before and after interacting with an Instagram profile showing fitspiration content. In the first experiment, there was no difference in body satisfaction or implicit measures of body size (the door aperture participants thought they could fit through) after viewing the fitspiration style images in the laboratory. In the second experiment, there was not a significant change in body satisfaction following spending time on the Instagram profile. The visual angle from which the photos were taken did not have an effect on results in either experiment.

The results from these experiments highlight that there may be something particularly important about the context in which we see social media style content. When users browse a social media platform, like Instagram for example, they are likely to see many instances of the same type of content, displayed in a particular way, alongside others' comments, likes, and captions. This context may influence how much we are affected by the content we see on social media, however in neither context did viewing the images elicit a change in the participants' body satisfaction. Despite the fact that in the previous experiments I found that selfies were judged to be slimmer than images from other angles, visual angle did not impact body size estimation or body satisfaction in the study. This does not support a damaging effect on the way people feel about their bodies following transient exposure to social media content like this. However, there was a small correlation between time spent on social media in a week and body satisfaction change, such that more time spent on social media was related to decreased body satisfaction after viewing the images. This is in line with previous research that suggests that exposure to media images only has a small effect on body satisfaction (Holmstrom, 2004; Ferguson, 2013; 2018), and these results indicate that transient exposure is not sufficient to create even a small negative effect, rather supporting a more complex long-term impact of social media. It is likely that effects found from social media have other mediating factors leading to poorer body satisfaction (Jarman et al., 2021). This underlines the potential complexity of these mechanisms and how different factors likely interact with each other in a complicated pattern.

Taken together, these results suggest that fitspiration style content might have a negative effect on the viewer's body satisfaction in the long-term, which may make individuals more vulnerable to negative changes in body satisfaction from viewing these types of images. Fitspiration may influence people of different sexualities in different ways, in terms of the

impact that drive for muscularity has on disordered eating thoughts and behaviours. Men's sexuality influences the muscularity and disordered eating thoughts and behaviours that they experience. Women, on the other hand, experience disordered eating thoughts and behaviours and overall drive for muscularity at similar rates. This highlights the importance of awareness of intersectional issues such as gender and health within eating disorder research and treatment, particularly in men. It may be that what constitutes an eating disorder in a heterosexual man is different from the symptoms experienced by a gay man suffering with an eating disorder. There have been calls for greater intersectionality with the eating disorder research field previously, and our results further highlight the importance of this (Calzo et al, 2017).

Social comparison theory suggests that the kind of upwards comparisons that we make on social media are likely to have a negative effect on how we feel about and experience our bodies (Engeln-Maddox, 2005). These studies in particular found that selfies were judged as being slimmer than images of the same bodies from different angles. Results indicated that the pattern of judging selfies as slimmer was, in some cases, related to disordered eating thoughts and behaviours. This might suggest a complex relationship between many different factors, as opposed to a simplistic cause and effect. Instead it may be that who use social media and how they use it influences risk factors in the context of other social and biological factors. These results also support a relationship between general social media consumption and vulnerability to viewing fitspiration type images as well as general low body satisfaction and higher risk of disordered eating thoughts and behaviours. Future research should consider in more depth what effects both transient and long-term exposure to this kind of content has on how people feel about and experience their bodies. However, one limitation of these social media-based experiments relates to how representative of social media content our stimuli

were. Stimuli were photos in form-fitting workout style clothes using a pose often seen in fitspiration content; however the photos were not edited at all. Most Instagram users at the time of the experiment use filters or editing apps before posting their content, along with using relevant captions and hashtags. This kind of content may have had a different effect than the photos in isolation on an Instagram profile. It may also be that the editing and posting of photos on social media influences how the user feels about their body, something that future research could consider. It is also worth noting that the models in the images that participants saw were not their peers, and the Tripartite Influence Model along with social comparison theory suggest that peers are especially important in influencing body satisfaction. It may be that seeing images of your peers on social media might have a different effect.

In general, effects found in this series of studies were small to medium in size. It has been suggested that small effect sizes do not give us useful information about thoughts, attitudes, and behaviours that we are part of in our everyday lives. Essentially small effects might not be telling us about important factors that have a big effect on our lives or the phenomena that we are exploring. However more recently researchers have begun to value the information that we can gain from small effect sizes, especially in complex fields such as mental health (Barkham, 2022). Researchers indicate that when we are exploring complicated phenomena, such as body satisfaction and disordered eating thoughts and behaviours, we should pay attention to the small effects that we find (Gotz, Gosling & Rentfrow, 2021). However, we are also cautioned against accepting all effects as important without proper reflection and consideration of how different factors might contribute to the weight of an effect (Anvari et al., 2021). Based on these perspectives, it might be useful to consider the effects mentioned in this thesis as potentially relevant factors that contribute to incredibly complex behaviours,

thoughts, and feelings. It may be that influences like sexuality, gender, or interaction with social media, play some role in how we feel about our bodies, alongside many other relevant factors. For those on the tails of the distribution, such as those experiencing diagnosed eating disorders, they may be especially important, as they seem to be disproportionally affected.

Future research should focus on taking an intersectional standpoint towards questions around disordered eating thoughts and behaviours. Crenshaw (2017) highlights the importance of an intersectional lens when considering how an individuals' identities act in interaction with their experiences. Although here I have considered gender and sexuality in this research, we have not considered race or ethnicity. Research suggests that even clinicians have specific views regarding who gets an eating disorder, such that African-American patients are not routinely recognised as experiencing these problems (Gordon, Brattole, Wingate & Joiner, 2006). It may be that race could intersect with both sexuality and gender in disordered eating thoughts and behaviours, and future research should consider this. A limitation of this research is that our samples were predominantly white, and I did not recruit sufficient participants from other groups to include race as a factor in this analysis. Future research should also explore the experiences of participants of other sexualities. Typically research in this area focuses on gay and heterosexual people, sometimes including bisexual people (though these participants are often grouped with gay participants). There is a lack of research considering how and if disordered eating thoughts and behaviours differ in people of other sexualities, such as asexual or pansexual participants. Research in the past has suggested that our body satisfaction is related to the genders that we are trying to attract, considering other sexualities would allow us to explore this idea further, as pansexual people are not trying to attract people of any particular gender, and asexual people are not trying to sexually attract anybody. Given that sexuality does seem to influence some disordered eating

behaviours, it seems important to consider other sexualities. In these studies we did not recruit large enough sample sizes from these groups to include them in analysis, a problem that future projects should consider. Research thus far has also focused heavily on cisgender participants, however trans participants should also be included, in order to see whether eating disorder symptoms present differently in these groups. There is less research available considering transgender participants experiences (Nagata et al, 2020).

It is also important that future research considers the mechanisms behind how fitspiration (and social media more generally) influences body satisfaction and disordered eating thoughts and behaviours. Based on this research, it seems that social media content has differing effects on individuals depending on their levels of disordered eating. It may be that this content also has different effects on individuals depending on their gender and sexuality, which may go some way to explaining the different experiences of muscularity and disordered eating that gay and heterosexual men have. This research indicates that selfies may be especially important to those struggling with disordered eating, as they are seen as slimmer than other images, and in one condition higher attractiveness ratings for selfies was related to increased disordered eating thoughts and behaviours, potentially leading to more upwards appearance comparisons and poorer body image. Research in the future should work to find out why selfies are preferred in this way and whether they do in fact lead to upwards appearance comparisons and poorer body satisfaction. Based on these findings, this should be considered in terms of long-term effects as well as the effects of short-term exposure to this kind of content. These studies used images that did not include the model's face, so future research could also consider the contribution of different parts of the body. Eye tracking studies may be helpful here to consider whether selfies are perceived differently from other images, due to whereabouts on the body people are looking, and whether this might be

driving the differences we have found in aesthetic judgements made of selfies and selfie-stick images. As part of this thesis I had planned to carry out this study, however this had to be abandoned at recruitment stage in March 2020 due to the pandemic.

Some suggest that fitspiration can have a negative effect on body satisfaction (Robinson et al, 2017; Prichard, McLachlan, Lavis & Tiggeman, 2017). However, there has been less research focussed on the mechanisms underlying this. These results suggest that there may be something about the kind of images associated with fitspiration (e.g. selfies) alongside the context they are seen in on social media, particularly for those with a vulnerability to disordered eating and low body satisfaction. It should be noted that this study used a forced choice option in the EDE-Q questionnaire that participants filled out, however this meant that participants could not skip past a question that they were not comfortable answering, instead having to leave the entire questionnaire. In the future, this should be avoided to ensure that participants do not feel pressure to answer any questions and data is not lost unnecessarily.

In conclusion, the studies conducted in this thesis suggest that the kind of images associated with fitspiration content, such as selfies, are seen as slimmer than other perspectives of the same body. Gender and sexuality of people experiencing these symptoms influences what kind of behaviours and attitudes they may engage in, and clinicians and researchers alike should consider this. Future research should take an intersectional approach to the exploration of eating disorders in order to capture accurately what people living with these conditions experience and vulnerability and risk factors. These experiences may also influence how people engage with social media, which will have different effects on their body satisfaction. The Tripartite Influence Model underlines that body satisfaction is moderated by multiple

factors, and it is possible that the power of these factors is different for different people, depending on their own characteristics and experiences.

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