# From theory to intervention: Exploring perfectionism and self-criticism in the link between social media and eating disorder risk

by

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*Thesis submitted to Flinders University for the degree of*

**Doctor of Philosophy (Clinical Psychology)**

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Flinders University

24th February 2023

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## ABSTRACT

Social media use is associated with poorer body image and disordered eating. As age groups with peak eating disorder onset and higher use of social media, adolescents and young adults are especially vulnerable. Interventions for social media, body image, and disordered eating have been developed for adolescents, yielding mixed results. The few such interventions for young adults have demonstrated little efficacy. This thesis adopts the Medical Research Council framework for developing complex interventions. It investigates causal and longitudinal associations between social media and body image, tests a model exploring the roles of perfectionism and self-criticism in explaining the association, and develops and pilot-tests an intervention for young adults.

The first two studies reviewed the literature to inform theory about impacts of social media. In the first study, experimental and longitudinal data were meta-analysed. Findings indicated that exposure to appearance-ideal social media images significantly, negatively impacts body image compared with exposure to non-appearance-related content or less ideal appearances, and this is modulated to a small extent by social media features. Longitudinally, social media use predicted a small but significant deterioration in body image. In the second study, research about the role of personality in explaining relationships between social media use and body image and disordered eating was systematically reviewed. Results revealed that few studies have examined personality variables as mechanisms in this relationship, with perfectionism one of two variables for which there was prospective evidence of involvement.

The third study evaluated models proposing perfectionism and self-criticism (an active component of perfectionism) as mediators linking social media use to disordered eating in young adults ($N$ = 275). In the final model, appearance-related motivations for social media use were indirectly, positively associated with disordered eating via increased appearance comparison, more self-criticism, and poorer body image flexibility, sequentially.

Participant perspectives indicated that social media affect body image through social comparison and exposure to appearance ideals. They suggested that negative effects could be reduced by changing the content to which they subscribe (i.e., curating their feed).

The final study pilot-tested a novel, self-guided self-criticism intervention for young adults ($N$ = 170). A second active condition, in which participants curated their social media feed, was included as a credible comparison. Both active conditions were compared to a waitlist control condition. The active conditions were found to be feasible and acceptable. Preliminary analysis of efficacy suggested that the self-criticism intervention showed the most promise for producing changes in key risk and protective factors compared to a waitlist control.

The results of this thesis suggest that, while the current evidence is reasonably clear that social media are associated with negative effects on body image and eating, we are less well-informed on the mechanisms through which this relationship occurs. This may hamper the development of effective interventions to disrupt deleterious effects of social media use. The role of personality factors, including self-criticism and perfectionism, merits further attention. Additionally, the self-criticism intervention developed for this thesis shows promise but requires further examination of efficacy through a larger, randomised controlled trial.

## DECLARATION

I certify that this thesis: 1. does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any university; 2. and the research within will not be submitted for any other future degree or diploma without the permission of Flinders University; and 3. to the best of my knowledge and belief, does not contain any material previously published or written by another person except where due reference is made in the text.

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Date: 24th February 2023

## ACKNOWLEDGEMENTS

It seems appropriate to start where this project and my entire research journey began: with my principal supervisor, Professor Tracey Wade. I came to you in 2017 as a new student to Flinders University with lots of questions and subsequently, lots of emails. You took a chance on me then and I will be forever grateful for that. Your expertise in, and dedication to, researching perfectionism and eating disorders have shaped me as a researcher and clinician, and I have appreciated the good humour and patience with which you have guided me through this experience (and a pandemic). To my secondary supervisor, Dr Paul Williamson, I extend my gratitude for your assistance with statistics and feedback on my thesis proposal. I cannot think of my meta-analysis without thinking of you and all your helpful input in getting that completed – a process that spanned several years and multiple statistical programs!

The contributions of other members of the Flinders University academic community also need to be recognised. Before commencing my PhD, I had the pleasure of working for Professor Jennifer Tieman. Jen, I believe you were one of the first people to place the idea of a PhD in my head. Your belief in me, and the research skills I learned from you and your team, gave me an excellent platform from which to commence this PhD. Thank you also to Professor Marika Tiggemann for lending me your wealth of knowledge on all things body image by being involved in my thesis proposal committee. To the wonderful research assistants who have helped me at various points of my candidature – María Gallego-García, Nepheli Beos, and Katelyn Keenan – thank you so much for the work that you did. You are all excellent and I hope you each got something worthwhile out of the experience.

I am fortunate to have had many family members who supported me in getting to this point. Firstly, to Blake, my chosen family. You have been my best friend and number one supporter since my Honours degree. Thank you for everything you have done for me since then, but especially for the final year and a half of my PhD, during which time you have

supported me both emotionally and financially. Your selflessness, sense of humour, and reminders to *please* get up and stretch have made this experience much less stressful and much more fun than it otherwise would have been.

Thank you also to the rest of my family: Mum, Dad, James, Patrick, Thomas, Cecil, Sophie, and Riz. I really appreciate your willingness to listen politely while I prattle on about psychology. Mum, I am especially grateful to you. Thank you for letting me move back in with you for much of the PhD and helping me pick myself back up and dust myself off after some of the harder moments of my candidature. You remain, as ever, my hero. I would be remiss not to acknowledge my feline writing companions, Faker and Mushu, both of whom I love dearly. Though my grandparents (Grandma and Pa, Nanny and Poppy) are no longer alive, I want to recognise the impact they had in shaping who I am today; in particular, the distinct but equally compelling examples of feminine strength I was exposed to in my Grandma and Nanny. I love you and I hope you would be proud of me.

My lovely friends have also helped me along the way. Thank you to the people in the clinical psychology program and the Tracey Wade lab, but especially to my officemates: Larissa and Lizzie. So many of my favourite PhD memories are with you! Thank you for all the laughs, campus walks, coffee breaks, and commiserations. Thank you also to my friends outside of the university who have ridden the highs and lows of my candidature with me: Carmen, Stella, Emily, and Matilda. How lucky I am to have been inspired and motivated by you for so many years. Also, a shoutout to Tania for my three-weekly venting sessions!

Finally, I would like to acknowledge the financial assistance I received throughout this PhD. I am grateful to have been a recipient of an Australian Government Research Training Program Scholarship, which enabled me to undertake this program. I am also grateful to the College of Education, Psychology and Social Work at Flinders University for providing funding that supported me to attend conferences and present my research.

# CHAPTER 1

## Overview, Aims, and Structure

# Overview of Issues Explored in this Thesis

## Background

In Australia, eating disorders are common, with point prevalence rates of 16.3% to 22.2% (Hay et al., 2015; Hay et al., 2017; Mitchison et al., 2020). Most eating disorders emerge between ages 14 and 25 (Solmi et al., 2022). Disordered eating, or symptoms indicating an unhealthy relationship with eating, body weight, and body shape that do not necessarily meet diagnostic criteria for an eating disorder, affect an even greater proportion of people and are reported by up to one in five university students (Alhaj et al., 2022). Eating disorders are associated with higher mortality rates (Arcelus et al., 2011), medical complications affecting almost all bodily systems (Hambleton et al., 2022; Westmoreland et al., 2016), and a high rate of comorbidity with other mental health conditions (Hambleton et al., 2022; Keski-Rahkonen & Mustelin, 2016; Ulfvebrand et al., 2015).

Growing evidence indicates that social media use is a new factor that may increase the risk of developing an eating disorder due to its associations with poorer body image and disordered eating (de Valle et al., 2021; Mingoia et al., 2017; Saiphoo & Vahedi, 2019; Zhang et al., 2021). Especially concerning is the overlap between the vulnerable age period for the development of an eating disorder (i.e., adolescence and young adulthood, the latter defined as ages 17 to 25 for this thesis) and the age groups with the highest rates of social media use (We Are Social & Hootsuite, 2022b). There is therefore a strong impetus for research that can improve understanding of the factors involved in the relationship between social media use and eating disorder risk, to inform the development of effective interventions to disrupt this relationship.

## Risk Factors for Eating Disorders

There is a range of factors already known to be associated with an increased risk of developing an eating disorder. These include disordered eating (Jacobi et al., 2018), negative

body image (Dakanalis, Pla-Sanjuanelo, et al., 2016; Dakanalis, Timko, et al., 2016), perfectionism (i.e., basing self-worth on the achievement of rigid, high personal standards; Egan et al., 2011; Limburg et al., 2017), and self-criticism (Werner et al., 2019; Zelkowitz & Cole, 2020). There are also positive aspects of mental health that may confer protection against the development of an eating disorder, such as positive body image (Linardon, McClure, et al., 2022; Tylka & Wood-Barcalow, 2015) and self-compassion (Braun et al., 2016; Turk & Waller, 2020).

As noted above, social media are emerging as a potential new risk factor for eating disorders. Meta-analyses reveal small cross-sectional and longitudinal associations between social media use and the internalisation of appearance ideals about thinness, negative body image, and disordered eating (de Valle et al., 2021; Mingoia et al., 2017; Saiphoo & Vahedi, 2019; Zhang et al., 2021) as well as small to moderate negative impacts on body image from experimental exposures to appearance ideals on social media (de Valle et al., 2021). Examination of potential explanatory mechanisms for this relationship has yielded the most support for comparison to others as a moderator or mediator between social media use and increases in eating disorder risk factors (see, for example: de Valle et al., 2021; Griffiths, Castle, et al., 2018; Jarman, McLean, et al., 2021; Modica, 2020; Teo & Collinson, 2019), a view that has been reinforced by qualitative research investigating social media users' views on the impacts of use (Anixiadis et al., 2019; Flannery et al., 2020; Rounsefell et al., 2020).

**Social Media, Perfectionism, Self-Criticism, and Eating Disorder Risk**

Though perfectionism and self-criticism are supported as risk factors for the development of eating disorders, they are underrepresented in research aiming to uncover mechanisms to explain the link between social media and eating disorder risk. Where it has been examined, aspects of perfectionism have interacted with exposure to social media to predict stronger negative impacts on body image (Etherson et al., 2022; Jin et al., 2018;

McComb & Mills, 2021; McComb & Mills, 2022; Simon et al., 2022). Outside of the research conducted for this thesis, no published literature has studied self-criticism and how it may be implicated in the link between social media and the risk of developing eating disorders.

Several studies of interventions targeting the relationship between social media use and eating disorder risk have been published; however, none of these (except for a publication arising from this thesis) has addressed perfectionism or self-criticism. Most of the published studies reported on interventions developed for adolescents, to be delivered in classrooms (Bell et al., 2022; Bell et al., 2021; Gordon et al., 2021; Mahon & Hevey, 2022; McLean et al., 2017; Svantorp-Tveiten et al., 2022; Svantorp-Tveiten et al., 2021). Only two interventions have targeted young adults, who are at a similar risk of experiencing adverse impacts of social media use on body image and eating to adolescents, and in neither case did the results suggest that the interventions protected against negative impacts (Danthinne et al., 2021; Misko et al., 2022). So, the literature on interventions for the social media and eating disorder risk link has two pertinent gaps: 1) the potential benefits of targeting perfectionism or self-criticism in interventions; and 2) the development of effective interventions for young adults.

## Aims of the Current Research

Research into the development of disordered eating has been criticised for the lack of progression from theory-building to intervention development, whereby producing and testing models has appeared to be an end in itself (Pennesi & Wade, 2016). With that in mind, the current research was conducted with the explicit goal of progressing beyond theory-building. The approach taken in this thesis was based on earlier versions of the United Kingdom's Medical Research Council framework for developing and evaluating complex interventions (Craig et al., 2008; Craig et al., 2013). These frameworks suggested that ideally,

interventions are developed via progression through four phases: 1) identifying the evidence base and theory, modelling process and outcomes; 2) feasibility and pilot-testing; 3) evaluation; and 4) implementation (although, it was acknowledged that linear progression through these phases is not always possible). The program of research undertaken for this thesis was intended to begin at the first phase and progress to the second phase of this model.

The Medical Research Council framework for developing and evaluating complex interventions has recently been updated (Skivington et al., 2021). It now comprises core elements (including the development, refinement, and testing of theory) that inform four phases (developing or identifying an intervention, feasibility assessment, evaluation, and implementation). The new guidance makes it clearer that the transition between the phases and core elements can be iterative and non-linear. Although the updated guidance was published after the completion of most studies conducted for this thesis, the aims of this thesis remain relevant to the newer framework by addressing its core elements and two of its phases (i.e., developing an intervention and conducting a feasibility assessment). Developing a theory that describes how an intervention is expected to lead to its effect and under what conditions remains a core element.

The first aim of this research was to establish evidence about causality in the relationship between the use of social media and body image outcomes. To this end, the first study used meta-analytic techniques to examine the experimental and longitudinal research, which complements existing meta-analyses of cross-sectional data (Mingoia et al., 2017; Saiphoo & Vahedi, 2019). The second aim was to evaluate the extent to which the current literature addresses the role of personality factors (including self-criticism and perfectionism) in linking the use of social media and eating disorder risk factors. This second aim was addressed through a systematic review, which was intended to inform theory development and identify gaps in knowledge. The third aim was to develop an intervention to reduce the

impact of social media on the risk of developing eating disorders in young adults. This was conducted across two studies. In the first study, models to explain the relationship between social media use and eating disorder risk that suggested roles for self-criticism and perfectionism were tested, and young adult social media users' perspectives were qualitatively explored. In the second study, two sets of self-help modules designed to mitigate the negative impacts of social media on eating disorder risk, informed by the best-fitting theoretical model and social media users' feedback from the previous study, were developed and pilot-tested for feasibility and acceptability in a sample of young adults.

## Summary of Chapters

**Chapter 2** provides a review of literature pertinent to the research described in the subsequent chapters of the thesis. The research summarised in this chapter covers the features, prevalence, comorbidities, and treatment of eating disorders, risk factors for developing an eating disorder (including self-criticism and perfectionism), quantitative and qualitative studies of the relationship between social media and eating disorder risk, theories that inform understanding of how social media can be connected to risk for eating disorders, and interventions for the link between social media and eating disorder risk factors.

The first study in this thesis consists of a series of meta-analyses, which are presented in **Chapter 3**. This study has been published in *Body Image* (de Valle et al., 2021), providing a substantial contribution to knowledge because the other meta-analyses of social media and risk for eating disorders have only included cross-sectional data (Mingoia et al., 2017; Saiphoo & Vahedi, 2019; Zhang et al., 2021). The current study addresses whether social media casually impact risk by conducting four meta-analyses of research on social media and body image. The first three meta-analyses comprise experimental studies, grouped by the following themes: 1) the effect of appearance-ideal social media images versus non-appearance-related conditions; 2) the effect of higher- versus lower-risk contextual features

(e.g., comments and captions) accompanying appearance-ideal social media images; and 3) the effect of appearance-ideal images versus other appearance images on social media. The fourth meta-analysis is of longitudinal data, addressing the prospective relationship between the use of social media and body image. The findings of this study advance the field by providing the first meta-analytic evidence that social media, specifically exposure to appearance-ideal images, has an immediate adverse impact on body image. Other novel contributions include elucidating the moderating roles of contextual features and the extent to which appearances in social media images meet ideals and addressing prospective links between social media and body image.

**Chapter 4** describes a systematic review of research on the role of personality in the relationship between social media use and body image and disordered eating. Prior research has tended to focus on appearance-related mechanisms that address how social media may increase risk factors for eating disorders, such as appearance comparison (Griffiths, Castle, et al., 2018; Hendrickse et al., 2017; Jarman, Marques, et al., 2021b; Rodgers et al., 2020; Saunders & Eaton, 2018; Seekis et al., 2020), internalisation of appearance ideals (Jarman, Marques, et al., 2021b; Rodgers et al., 2020; Wang, Fardouly, et al., 2019), and self-objectification (Niu et al., 2019; Saunders & Eaton, 2018; Seekis et al., 2020; Seekis et al., 2021b). In comparison, there has been less focus on personality variables that might inform why some people are more vulnerable to harmful impacts of social media use than others, which would produce a greater range of targets for intervention. The review found that, although a range of personality variables has been considered, evidence was often limited to cross-sectional correlations with social media and body image or eating. Only two variables were prospectively supported as being involved: narcissism and perfectionism. Findings highlight the dearth of research investigating personality factors in social media and eating disorder risk, despite a review finding that personality factors contribute to several models of

the development of disordered eating that inform effective interventions (Pennesi & Wade, 2016), suggesting that this is a pertinent area for research aiming to support intervention development.

The third study took a mixed methods approach, using quantitative data to test theoretical models and qualitative data to elucidate young adult social media users' perspectives on connections between social media and body image, presented in **Chapter 5**. Addressing the lack of research on personality factors described in the prior chapter, the theoretical models tested in this study examine potential mediating effects of perfectionism variables (perfectionistic strivings, perfectionistic concerns, and perfectionistic self-presentation) and self-criticism. Three key conclusions were drawn from the quantitative results: 1) appearance-related motivations for social media use were more pertinent than the frequency of appearance-related social media behaviours; 2) body image flexibility was retained in the model over body shape concerns due to the potential redundancy of the latter; and 3) self-criticism was a stronger candidate for mediating the link between appearance-motivated social media use and disordered eating than the perfectionism variables. Qualitative data addressed the ways in which social media can affect body image and revealed potential avenues to mitigate these effects. Social media were considered to impact body image primarily by encouraging comparison to others, promoting appearance ideals, and emphasising appearance. The most common suggestions for reducing negative impacts on body image concerned reducing idealised content and changing the content that one is exposed to on social media by being selective about the content to which one is subscribed, and with which one engages (i.e., "curating" the social media feed). Taken together, the quantitative and qualitative results can be applied in the progression of theory and the creation of interventions targeting the social media-eating disorder risk link.

The fourth study, reported in **Chapter 6**, was a pilot study of two sets of modules informed by the results of the third study and tested in a sample of young adult social media users. One set of modules was an intervention designed to reduce self-criticism and increase self-compassion. The other set was a comparison condition in which participants were encouraged to curate their social media feed in a way that would maximise their exposure to content that could support their well-being and minimise their exposure to content that could adversely impact their well-being. The primary outcomes were feasibility (measured by the extent of module completion) and acceptability (based on qualitative feedback) rather than impact on variables of interest, though preliminary analysis of the latter was also conducted. Results suggested that both sets of modules were feasible, with high rates of module and homework completion, and well-accepted by participants, who enjoyed aspects such as the opportunity for self-reflection and insight, the structure, the format, and the content. Group-by-time interactions were significant for the secondary outcomes of appearance motivations for social media use, self-criticism, and disordered eating, which were clarified by between-groups effect sizes indicating greater improvements in the self-criticism intervention group than the waitlist control group. Overall, the self-criticism modules represent a promising intervention strategy and are unique compared to other interventions by targeting self-criticism, as well as being one of only three interventions designed for young adults, and the only one of these that showed significant positive effects. This study was published in the *International Journal of Eating Disorders* (de Valle & Wade, 2022).

Finally, **Chapter 7** concludes the thesis by summarising and synthesising the results and implications of the research in the earlier chapters to present overall conclusions. It begins with a review of the aims of the thesis and how these were addressed. Following this, the theoretical and clinical implications of the findings, the limitations of the research in this thesis, and suggestions for future research directions are discussed.

## Structure and Presentation of the Thesis

The studies described in **Chapters 3 to 6** were originally written in the format of journal manuscripts, all of which have been submitted for publication and two of which have been published (the other two were not accepted for publication and are not currently in the submission process to any journal). In each case, reviewer feedback received through the submission process has informed revisions to the chapters. Chapters describing studies that have been published in a journal include details of the publication on the chapter title page. The submitted manuscripts have been edited for inclusion in this thesis, such that the chapters resemble but are not exact copies of the manuscripts. The literature review in **Chapter 2** and the synthesis of results in **Chapter 7** were not prepared or submitted as manuscripts but contain content from published manuscripts. Though efforts have been made to reduce the repetition of content, there is some repetition across the Introduction sections of chapters to justify the aims of the studies, and across Discussion sections when addressing the implications of findings. Tables and Figures are included in the main body of each chapter, appearing when they are first referenced. A complete reference list for the whole thesis is included after **Chapter 7**. The 7$^{th}$ edition of the American Psychological Association referencing style (American Psychological Association, 2019) is used for in-text citations and the reference list. Following the reference list are the **Appendices**.

# CHAPTER 2

## Literature Review[1]

[1] This chapter contains content from two published papers that appear in *Body Image* (de Valle et al., 2021), provided in **Appendix A**, and the *International Journal of Eating Disorders* (de Valle & Wade, 2022), provided in **Appendix B**.

## Overview

Reviews and meta-analyses have consistently concluded that social media use is associated with increased body image disturbance and disordered eating (de Valle et al., 2021; Fardouly & Vartanian, 2016; Fioravanti et al., 2022; Frost & Rickwood, 2017; Holland & Tiggemann, 2016; Mingoia et al., 2017; Rodgers & Melioli, 2016; Rounsefell et al., 2020; Ryding & Kuss, 2019; Saiphoo & Vahedi, 2019; Zhang et al., 2021). An aspect of the relationship between social media and risk for eating disorders that has received relatively little research attention is the effect of individual difference characteristics (Rodgers & Melioli, 2016). Perfectionism and self-criticism are two individual difference variables with established links to eating disorders (Egan et al., 2011; Limburg et al., 2017; Zelkowitz & Cole, 2019; Zelkowitz & Cole, 2020) but there is a dearth of research on their role in the link between social media and eating disorder risk. Addressing this gap in the literature is the overall aim of this thesis. The subsequent sections of this chapter summarise research on five areas that inform the research described in subsequent chapters of the thesis: 1) the features, prevalence, comorbidities, and treatment of eating disorders; 2) risk factors for the development of eating disorders; 3) quantitative and qualitative studies investigating the relationship between social media and eating disorder risk; 4) theoretical explanations for the relationship between social media and eating disorder risk; and 5) current evidence for interventions targeting the impact of social media on eating disorder risk.

## Features, Prevalence, Comorbidities, and Treatment of Eating Disorders

### Diagnoses

The revised fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5-TR) includes six distinct feeding and eating disorders as well as two further categories of Other Specified Feeding or Eating Disorders (OSFED) and Unspecified Feeding and Eating Disorders (American Psychiatric Association, 2022). This thesis will focus on

eating disorder risk as it pertains to the diagnoses of anorexia nervosa and bulimia nervosa, and OSFED diagnoses related to these. These diagnoses are defined by both behavioural and cognitive symptoms. This thesis will not address the remaining four diagnostic groups: pica, rumination disorder, avoidant/restrictive food intake disorder, and binge eating disorder.

### *Anorexia Nervosa*

Three criteria must be met for a diagnosis of anorexia nervosa: 1) restrictive eating, causing the person to be at a significantly low weight with regard to their age, sex, developmental trajectory, and physical health; 2) intense fear of gaining weight or becoming fat, or continuing to engage in behaviours that undermine weight gain despite being at a significantly low weight; and 3) body image disturbance, overvaluation of weight and shape in determining self-worth, or persistent failure to appreciate the seriousness of the low body weight. There are two subtypes of anorexia nervosa. In the restricting subtype, there has been no recurrent binge eating (i.e., eating an amount of food that is unusually large in a short period, accompanied by a sense of loss of control over eating) or purging (i.e., attempts to lose weight or mitigate weight gain through self-induced vomiting or misuse of laxatives, diuretics, or enemas) over the previous three months, such that the primary means of effecting weight loss or maintaining low body weight is through dieting, fasting, and/or excessive exercise. In the binge eating/purging subtype, there has been recurrent binge eating or purging over the previous three months.

The severity of the illness is judged according to the person's current body mass index (BMI) for adults, or BMI percentile for children and adolescents. For adults, the severity is considered to be "mild" when their BMI is equal to or more than 17, "moderate" when their BMI is between 16 and 16.99, "severe" when their BMI is between 15 and 15.99, and "extreme" when their BMI is below 15. To date, research has yielded limited validation of these severity distinctions (Smith et al., 2017).

### *Bulimia Nervosa*

There are five criteria for diagnosis of bulimia nervosa: 1) recurrent binge eating episodes; 2) recurrent use of inappropriate compensatory behaviours intended to prevent weight gain (e.g., purging, fasting, or excessive exercise); 3) average occurrence of binge eating and compensatory behaviours of at least once a week for three months; 4) overvaluation of weight and shape in determining self-worth; and 5) the other criteria are not met exclusively during episodes of anorexia nervosa. There are shared symptoms across anorexia nervosa and bulimia nervosa; in both disorders, there can be restricted energy intake, binge eating, use of compensatory behaviours, and a disproportionate influence of control over body shape or weight on self-evaluation.

The severity of bulimia nervosa is assessed by the average frequency of compensatory behaviours. The severity is considered “mild” if these occur one to three times per week, “moderate” if they occur four to seven times per week, “severe” if they occur eight to 13 times per week, and “extreme” if they occur more than 14 times per week. Research has also found limited validation for these severity distinctions (Smith et al., 2017).

### *Other Specified Feeding or Eating Disorders*

OSFED can be diagnosed when a person presents with symptoms of an eating disorder that are associated with clinically significant distress or psychosocial impairment but do not meet the criteria for any of the six feeding and eating disorders. The DSM-5-TR outlines three examples of OSFED presentations that are related to anorexia nervosa and bulimia nervosa. In atypical anorexia nervosa, the person meets the criteria for anorexia nervosa but although they have lost a significant amount of weight, their BMI remains within or above the “normal” range or developmental trajectory. When someone meets the criteria for bulimia nervosa except for the required frequency of binge eating and compensatory behaviours, and/or the required duration of disturbance, this is labelled bulimia nervosa of

low frequency and/or limited duration. Finally, in purging disorder, there is recurrent purging behaviour but no objective binge eating.

**Onset and Prevalence**

The typical age of onset for anorexia nervosa and bulimia nervosa is between early adolescence and early adulthood (Attia & Walsh, 2007; Hudson et al., 2007; Solmi et al., 2022; Zipfel et al., 2015). A recent meta-analysis of global epidemiological research found that the peak age of onset for both anorexia nervosa and bulimia nervosa was 15.5 years, with 78.7% of anorexia nervosa cases and 82.9% of bulimia nervosa cases emerging by age 25 (Solmi et al., 2022). For both disorders, there can be early (which has been defined as below age 14 for anorexia nervosa and below age 16 for bulimia nervosa; Day et al., 2011; van Noort et al., 2018) and late onset (i.e., at 25 years of age or older; Bueno et al., 2014; Morris et al., 2022; Shian Ming et al., 2017).

Australian prevalence rates for anorexia nervosa have been estimated through interviews at 0% to 2.0% for point and three-year prevalence, respectively (Fairweather-Schmidt & Wade, 2014; Hay et al., 2017), and by self-report with a point prevalence of 0% to 3%, with higher rates for females than males (Allen et al., 2013; Hay et al., 2015; Mitchison et al., 2020). For bulimia nervosa, interview methods suggest point prevalence rates of 1.1% to 1.2% (Hay et al., 2017) with higher rates for females than males (Bagaric et al., 2020), three-year prevalence of 1% in adolescent females (Fairweather-Schmidt & Wade, 2014), and a lifetime prevalence of 1.21% for males and 2.59% for females (Bagaric et al., 2020). Based on self-report, point prevalence rates for bulimia nervosa have ranged from 0.4% to 8.7%, with higher prevalence in females than males and increased prevalence observed from early to late adolescence (Allen et al., 2013; Hay et al., 2015; Mitchison et al., 2020).

In Australia, OSFED diagnoses have shown prevalence rates of 5% over three years by interview (Fairweather-Schmidt & Wade, 2014), and point prevalence rates by self-report

of 0.6% to 0.9% in males and 2.7% to 4.1% in females (Allen et al., 2013). For atypical anorexia nervosa specifically, interviews have produced estimates of a point prevalence of 2.5% (Hay et al., 2017) and three-year prevalence of 1.9% (Fairweather-Schmidt & Wade, 2014), whilst self-report data indicates point prevalence rates of 1.2% to 7.5%, which were higher in females than males (Mitchison et al., 2020). Estimates for bulimia nervosa of low frequency and/or duration were estimated by interview at 0.5% and 2.6% for point and three-year prevalence, respectively (Fairweather-Schmidt & Wade, 2014; Hay et al., 2017), and by self-report at a point prevalence of 0.70% to 2.7%, with higher prevalence in females than males (Hay et al., 2015; Mitchison et al., 2020). For purging disorder, interviews have indicated point and three-year prevalence rates of 0.3% and 0.6%, respectively (Fairweather-Schmidt & Wade, 2014; Hay et al., 2017), and self-report data have suggested point prevalence rates of 0.58% to 4.8%, with higher rates in females than males (Hay et al., 2015; Mitchison et al., 2020).

**Physical, Psychological, and Social Complications**

Eating disorders carry significant medical risks. They are associated with elevated standardised mortality ratios (i.e., observed deaths divided by expected deaths according to demographics) of approximately 5.86 for anorexia nervosa, 1.93 for bulimia nervosa, and 1.92 for eating disorders not otherwise specified (Arcelus et al., 2011). Anorexia nervosa and bulimia nervosa are also linked to considerable medical complications (Hambleton et al., 2022; Westmoreland et al., 2016). Complications associated with anorexia nervosa are attributed to the effects of weight loss and malnutrition and include impacts on gastrointestinal, cardiovascular (for a review and meta-analysis, see: Smythe et al., 2021), haematology, musculoskeletal, neurologic, reproductive, and dermatologic systems. For bulimia nervosa, they are attributed to micronutrient malnutrition (Treasure et al., 2020) and the mode and frequency of purging. Self-induced vomiting is linked to severe imbalances in

electrolytes (particularly potassium) and acid base and oral and dental issues, whereas misuse of laxatives is also associated with electrolyte imbalance, as well as adverse gastrointestinal symptoms (Westmoreland et al., 2016).

Alongside these medical risks, eating disorders are linked to a high rate of healthcare utilisation. Children and adolescents with eating disorders had higher healthcare utilisation than the general public and higher non-mental health-related admissions and non-mental health-related emergency department visits than those with diabetes (Couturier et al., 2022). Likewise, the baseline severity of eating disorder symptoms in a sample of community women was significantly associated with greater healthcare use two and seven years later (odds ratios of 1.8 and 1.5 after two and seven years, respectively; Holtzhausen et al., 2021). The significant social and economic costs attributable to eating disorders in Australia, the UK, and the US have been summarised in recent analyses (Deloitte Access, 2012; PwC, 2015; Streatfeild et al., 2021), with the cost in Australia (where the research for this thesis was conducted) estimated 10 years ago at $69.7 billion (Deloitte Access, 2012). Though many studies have focused on the impacts of anorexia nervosa and bulimia nervosa, it has been highlighted that the OSFED disorders also present a high burden of disease accompanied by a higher prevalence (Santomauro et al., 2021). All eating disorders have been associated with poorer health-related quality of life compared to a population mean (Winkler et al., 2014).

Contributing to the higher mortality rates observed in eating disorders are higher rates of suicidality. In their meta-analysis, Preti et al. (2011) reported considerably elevated standardised mortality ratios for suicide in anorexia nervosa (31.0) and bulimia nervosa (7.5), while A. R. Smith et al. (2018) reported that death by suicide was 18 times more likely in individuals with anorexia nervosa, and seven times more likely in people with bulimia nervosa than gender- and age-matched comparison groups. Another review also highlighted

increased rates of suicide attempts and deaths in people with eating disorders (Keski-Rahkonen & Mustelin, 2016), and rates of suicide attempt or death were higher for women with a history of any eating disorder than those without (Pisetsky et al., 2013). Likewise, higher eating disorder symptoms, even at subthreshold levels, corresponded to greater odds of attempting suicide in university students, especially where purging was present (Lipson & Sonneville, 2020); in support of the latter finding, purging was also found to be a better predictor of suicidal ideation than restricting or binge eating in people with eating disorders (Joiner et al., 2022).

Other psychological comorbidities are also common. Anxiety disorders, mood disorders, self-harm, and substance use disorders often coincide with eating disorders (Hambleton et al., 2022; Keski-Rahkonen & Mustelin, 2016; Ulfvebrand et al., 2015). Commonly comorbid anxiety disorders include social anxiety disorder (for a systematic review and meta-analysis, see: Kerr-Gaffney et al., 2018), generalised anxiety disorder, panic disorder, specific phobias, and obsessive-compulsive disorder (Hambleton et al., 2022; Swinbourne et al., 2012; Ulfvebrand et al., 2015). Of the mood disorders, major depressive disorder is the most common comorbidity (Ulfvebrand et al., 2015). High comorbidity with posttraumatic stress disorder (Hambleton et al., 2022; Rijkers et al., 2019) and autism spectrum disorder (Hambleton et al., 2022; Huke et al., 2013) has likewise been noted. Alongside psychological comorbidities, eating disorders are also associated with psychosocial impairment (Bentley et al., 2015; Bohn et al., 2008; Linardon, Susanto, et al., 2020) and poorer quality of life (Jenkins et al., 2011). Their associations with significant physical and psychological harm and overlap in symptoms make anorexia nervosa, bulimia nervosa, and the related OSFED diagnoses prime candidates for shared early intervention and prevention strategies.

**Interventions**

***Prevention***

A systematic review and meta-analysis of eating disorder prevention interventions concluded that media literacy (a universal prevention strategy – i.e., one applied to the whole population irrespective of risk level), cognitive dissonance, and cognitive behaviour therapy (CBT) interventions (selective prevention strategies – i.e., focussing on a subpopulation whose risk is higher than average due to the presence of some risk factor such as body dissatisfaction) were effective at reducing eating disorder risk factors or symptoms, with small to moderate effects (Le et al., 2017). Media literacy interventions aim to improve participants' ability to critically analyse media content to reduce the influence of unhelpful media messages about weight and shape (Levine, 2015), while cognitive dissonance interventions target reductions in the internalisation of societal ideals about the value of thinness (Becker et al., 2013). A meta-analysis subsequently suggested that cognitive dissonance but not CBT interventions (media literacy interventions were not examined) reduced the future onset of eating disorders, producing reductions of up to 77% compared to controls (Stice, Onipede, et al., 2021).

Watson and colleagues' (2016) systematic review and meta-analysis of universal, selective, and indicated prevention of eating disorders highlighted the best approaches in each category of prevention, producing similar results to those of Le et al. (2017). For universal prevention, media literacy had the most support (mean age 13.0 years, 55% female). For selective prevention, dissonance-based interventions had the most support (mean age 17.6 years, 99% female). CBT-based interventions had the most support in indicated prevention (i.e., those targeting individuals who already exhibit symptoms but do not meet diagnostic criteria) where the mean age across studies was 20.1 years and all participants were female.

A meta-analysis of eating disorder prevention programs in university samples found that groups receiving interventions (of varying types, primarily dissonance- and CBT-based)

demonstrated a 38% lower onset of eating disorders (Harrer et al., 2020). Moreover, there were moderate reductions in dieting, body dissatisfaction, and drive for thinness, as well as small reductions in overall eating disorder symptoms, weight concerns, and affective symptoms. Moderator analyses examining the effects of prevention type (universal, selective, or indicated), compensation (yes or no), type of control group (active, no intervention, or waitlist), guidance (discussion group, unguided, or guided), guidance provider (unguided, students, or professional), setting (online or group), intervention type (CBT, dissonance, or other), and risk of bias (high or low) found that none of these moderated eating disorder symptom outcomes.

***Treatment***

Various treatment guidelines exist around the world, endorsing the main empirically validated treatment approaches with considerable agreement (Hilbert et al., 2017). One of the most influential guidelines comes from the National Institute for Health and Care Excellence (2020) in the United Kingdom. Based on these guidelines, for anorexia nervosa, the recommended outpatient psychological treatments for adults are individual CBT for eating disorders (CBT-ED), Maudsley Anorexia Nervosa Treatment for Adults (MANTRA), and specialist supportive clinical management (SSCM). For children and young people, anorexia-nervosa-focused family therapy is recommended as the first approach, with CBT-ED as an alternative if family therapy is not accepted, contraindicated, or ineffective.

Though there are several varieties of CBT included under the umbrella of CBT-ED, broadly they are designed to reduce cognitive and behavioural mechanisms that can present across eating disorder diagnoses, including overvaluation of weight and shape in determining self-worth, strict dieting and other compensatory and non-compensatory weight control behaviours, binge eating, significantly low body weight, and mood intolerance (Fairburn et al., 2003). MANTRA targets perpetuating factors of cognitive rigidity, avoidance of strong

emotions, positive beliefs about anorexia nervosa, and how others respond to the person with the eating disorder (Wade et al., 2011). SSCM includes elements of clinical management (providing education, developing therapeutic rapport, encouraging normalisation of eating patterns and restoration of weight, and monitoring core eating disorder symptoms), and supportive psychotherapy, which involves the development of a supportive relationship in which therapist and patient work collaboratively to effect changes (McIntosh et al., 2006). Family therapy is delivered primarily to carers of children and young people with eating disorders and proceeds through three phases. In the first phase, the focus is on helping the family to develop skills to help the child or young person to gain weight (if needed), interrupt any inappropriate compensatory behaviours, and work towards more normal eating patterns. In the second phase, the family is supported to transition control over the child's eating back to the young person and tackle issues outside of the eating disorder that could not previously be addressed. In the final phase, there is an emphasis on facilitating the child or young person's independence and autonomy, as developmentally appropriate (Kosmerly et al., 2015). CBT-ED is designed to encourage the adolescent, rather than their parent, to take control of the problem, but has adapted therapy for greater involvement of parents, to help create a family environment that allows for recovery (Dalle Grave et al., 2020). A non-randomised effectiveness study found no difference in outcomes between CBT-ED and family therapy for adolescents with eating disorders (Le Grange et al., 2020).

For bulimia nervosa, the National Institute for Health and Care Excellence (2020) recommends that adults be offered bulimia-nervosa-focused guided self-help initially, and individual CBT-ED if bulimia-nervosa-focused guided self-help is not accepted, contraindicated, or ineffective. The frontline treatment for children and young people with bulimia nervosa is bulimia-nervosa-focused family therapy, with CBT-ED as an alternative if family therapy is not accepted, contraindicated, or ineffective. It should be noted, however,

that there is some disagreement in treatment guidelines related to adolescents, given the evidence of a randomised controlled trial comparing family therapy and CBT guided self-care showing the latter offers the slight advantages of producing a faster reduction in bingeing, at lower cost, and with greater acceptability for adolescents with bulimia nervosa or eating disorder not otherwise specified (Schmidt et al., 2007). For OSFED presentations, practitioners are advised to follow the recommendations for treatment for the full criteria eating disorder that the presentation most closely resembles.

## Risk Factors for Eating Disorders

For anorexia nervosa and bulimia nervosa, the strongest and most reliable risk factors are female sex, body image issues (including concerns over body weight and shape and body dissatisfaction), dieting, and psychological symptoms pertaining to negative affect, neuroticism, and more general psychological ill health (Jacobi & Fittig, 2010; Jacobi et al., 2018). Other pertinent, established risk factors that inform this thesis are disordered eating (including dieting), perfectionism, and self-criticism. Moreover, emerging evidence indicates that social media use can also increase risk. A brief overview of the risk factors relevant to this thesis is provided in the subsections that follow.

### Disordered Eating

Disordered eating is related to but distinguishable from eating disorders. It is a broader term that refers to a range of symptoms that represent an unhealthy relationship with eating, body weight, and body shape, but do not necessarily meet the criteria for an eating disorder diagnosis (Alhaj et al., 2022). Though the phrase disordered eating has not been consistently defined in the literature, it has been considered to include a combination of the cognitive (e.g., body image disturbance, overvaluation of weight and shape, drive for thinness) and behavioural (e.g., restricted eating, binge eating, compensatory behaviours) symptoms that contribute to an eating disorder diagnosis (Alhaj et al., 2022).

While disordered eating cognitions and behaviours are, naturally, symptoms of eating disorders (American Psychiatric Association, 2022), they can also present prior to and increase the risk for the development of diagnosable eating disorders (Jacobi et al., 2018). In the absence of a widely accepted definition of disordered eating, it is difficult to report accurate prevalence rates, but research suggests that disordered eating symptoms are widespread in a range of samples (Alfalahi et al., 2021; Alhaj et al., 2022; Chan et al., 2021; Hecht et al., 2022; Karrer et al., 2020; Ortega-Luyando et al., 2015; Peters et al., 2022; Watson et al., 2017). Disordered eating is associated with other aspects of psychopathology, including body-checking, body image avoidance, depression, self-criticism, and the use of maladaptive emotion regulation strategies (Prefit et al., 2019; Puccio, Fuller-Tyszkiewicz, et al., 2016; K. E. Smith, T. B. Mason, & J. M. Lavender, 2018; Walker et al., 2018; Zelkowitz & Cole, 2019).

## Body Image

### *Negative Body Image*

Negative body image, also referred to as body image disturbance, encompasses a continuum of body image issues, including persistent dissatisfaction, concern, and distress about an aspect of one's appearance, which results in impairment to psychosocial functioning (Thompson et al., 1999). There is a range of variables that contribute to negative body image; examples include overvaluation of weight and shape, body dissatisfaction, preoccupation with weight and shape, body-checking, and body image avoidance (Messer et al., 2022). It has been suggested that the components of negative body image can be broken down into evaluative (i.e., judgements of one's body), perceptual (i.e., disturbance in sensory experience of one's body), cognitive-affective (i.e., maladaptive thoughts and feelings about one's body), and motivational (i.e., wanting a specific type of body) categories (Prnjak et al., 2022).

Body dissatisfaction, or “negative subjective evaluations of one's physical body, such as figure, weight, stomach and hips” (Stice & Shaw, 2002, p. 985), is a commonly researched variable that contributes, but is not equivalent, to body image disturbance (Cash et al., 2004). It is considered an evaluative component of body image (Prnjak et al., 2022). Body dissatisfaction is positively correlated with anxiety and depression (Barnes et al., 2020), and people with higher body dissatisfaction show increased cognitive bias towards appearance-related stimuli (Rodgers & DuBois, 2016). Personality also appears to be related to body dissatisfaction, with greater body dissatisfaction observed in people who are higher on neuroticism and lower on extraversion and conscientiousness (Allen & Robson, 2020). Body dissatisfaction is also a well-established predictor of the onset of eating disorders (Dakanalis, Pla-Sanjuanelo, et al., 2016; Prnjak et al., 2021; Stice, 2016; Stice & Desjardins, 2018; Stice, Desjardins, et al., 2021; Stice et al., 2011; Stice & Shaw, 2002). In female adolescents with a mean age of 14 years, the importance of weight and shape (i.e., the degree to which control over these influences self-evaluation) predicts the presence of a lifetime diagnostic threshold level of disordered eating behaviours one year later (Wilksch & Wade, 2010). Increases in dieting and negative affect may mediate the pathway from body dissatisfaction to eating disorders (Stice & Shaw, 2002; Stice & Van Ryzin, 2019), and body dissatisfaction may also interact with other risk factors (e.g., low BMI for anorexia nervosa, over-eating for bulimia nervosa) to predict eating disorder onset (Stice & Desjardins, 2018).

### *Positive Body Image*

There has recently been a greater research focus on protective factors, including positive body image. Positive body image is multidimensional and includes variables such as body appreciation, body acceptance, and body image flexibility (Tylka & Wood-Barcalow, 2015). Positive body image constructs are positively associated with self-esteem, self-compassion, and sexual satisfaction, and negatively associated with disordered eating, body

image disturbance, depression, and anxiety (Halliwell, 2015; Linardon, McClure, et al., 2022; Tylka & Wood-Barcalow, 2015). It has been argued that positive body image is a separate construct from negative body image, representing distinct continua rather than existing as extremes on the same continuum (Tylka & Wood-Barcalow, 2015). However, recent evidence has challenged this, finding evidence that body appreciation and body dissatisfaction are located on the same dimension (More et al., 2022). The notion of positive body image has increasingly been challenged on online fora over recent years as being unrealistic and unhelpful for some individuals, with the concept of body neutrality being promoted as an alternative approach to self-acceptance that focuses on accepting your body as it is and for what it can do, not what it looks like (see, for example: Eating Disorder Solutions, 2022; Pugle, 2022).

**Body Image Flexibility.** For this thesis, body image flexibility is the key positive body image construct of interest. It is defined as the ability to place body-related thoughts and feelings in a larger context, rather than allowing life to be directed by those feelings (Sandoz et al., 2013). It is highly correlated with the diagnostic criterion of overvaluation of weight and shape in determining self-worth ("Has your weight/shape influenced how you think about [judge] yourself as a person"), $r$ = .68 (Wade, Pennesi, et al., 2021). Though the relationship between the two is yet to be empirically explored, the principles of body image flexibility are also consistent with those of body neutrality. So, striving for increased body image flexibility, compared to other positive body image variables, may address some of the criticisms levelled against body positivity concepts.

The concept of body image flexibility is based on that of cognitive flexibility, which refers to awareness of and willingness to experience the present moment coupled with a commitment to acting intentionally in line with one's values, which is a focus of acceptance and commitment therapy. Sandoz et al. (2013) suggest that this body image-focused aspect of

cognitive flexibility may help to explain why, despite body dissatisfaction being widespread, not everyone who experiences negative thoughts and feeling about their body will go on to develop disordered eating or an eating disorder. Instances where there is progression to behavioural symptoms might reflect low body image flexibility, whereas someone with greater flexibility may be able to notice those thoughts and feelings without engaging in maladaptive behaviours.

Body image flexibility is a robust construct, showing moderate, negative correlations with body image disturbance and eating pathology, and small to large positive correlations with positive aspects of body image (Linardon, Anderson, et al., 2021). It is slightly higher in males than females, in common with other aspects of positive body image, and it improves with intervention (Linardon, Anderson, et al., 2021). It has been found to mediate the relationship between aspects of body image and disordered eating, supporting the assertion that it may play an important role in determining whether an individual can regulate experiences of appearance-related distress without using maladaptive coping behaviours (Linardon, Anderson, et al., 2021; Rogers et al., 2018). Likewise, in adolescent girls undergoing a school-based body image intervention, reductions in eating disorder symptoms were mediated by improvements in body image flexibility (Svantorp-Tveiten et al., 2022).

**Perfectionism**

Clinically relevant perfectionism is defined as "the overdependence of self-evaluation on the determined pursuit of personally demanding, self-imposed, standards in at least one highly salient domain, despite adverse consequences" (Shafran et al., 2002, p. 778). The requirement that there be adverse consequences is pertinent because it is intended to distinguish perfectionism from more functional efforts towards achievement (discussed more below). Perfectionism has increased in youth over the period between 1989 and 2016 (Curran

& Hill, 2019), alongside increases in young people's perceived parental expectations and criticisms (Curran & Hill, 2022).

Some factor analyses find two higher-order factors across perfectionism measures (Dunkley et al., 2000; Frost et al., 1993; Smith et al., 2015; Stoeber & Otto, 2006). These have been given various names but, in this thesis, will be referred to as "perfectionistic concerns" and "perfectionistic strivings". Perfectionistic concerns include tendencies to harshly, negatively self-evaluate, fixate on other people's evaluations and expectations, and be dissatisfied even when one's standards are met (Sirois & Molnar, 2016; Sirois et al., 2017). Perfectionistic strivings refer to having and pursuing personal standards that are rigid and excessive for the individual, necessitating unrealistic or extreme efforts to be successfully realised (Sirois & Molnar, 2016; Sirois et al., 2017).

Inconsistent findings have been reported with respect to the outcomes of perfectionism. The terminology used has varied but has in essence tried to distinguish between purportedly adaptive and maladaptive perfectionism presentations. Adaptive outcomes have been reported to be associated with higher perfectionistic strivings than perfectionistic concerns, and maladaptive outcomes with higher perfectionistic concerns than perfectionistic strivings (see, for example: Dahlenburg et al., 2019; Gotwals et al., 2012; Hill & Curran, 2016; Madigan, 2019; Stoeber et al., 2020; Stoeber & Otto, 2006). In this context, it has been proposed that a theoretical and linguistic distinction be made between perfectionism and healthier, more functional efforts towards high achievement, labelled "excellencism" (Gaudreau, 2019; Gaudreau et al., 2022).

The key aspects differentiating perfectionism from excellencism are the difficulty and nature of the goals the person pursues (goal-setting), and the intensity and way in which a person pursues these (goal-striving; Gaudreau, 2019). Someone who is perfectionistic sets goals that are extremely rigid and difficult or impossible to reach, and works towards these

with relentless intensity, without pausing to savour successes reached on the path to their goals. In contrast, a person with excellencism sets goals that are high but realistic, pursues these vigorously, and can appreciate moments of success. Emerging evidence supports the distinction between these two variables, finding that they can be extracted as separate constructs in factor analyses, perfectionism is not associated with positive outcomes or reduced negative outcomes after controlling for excellencism, and excellencism is associated with better academic outcomes than perfectionism (Gaudreau et al., 2022).

Perfectionism is a risk factor that increases vulnerability to and maintains eating disorders, and it has strong associations with eating disorder pathology (Culbert et al., 2015; Dahlenburg et al., 2019; Egan et al., 2011; Fairburn, 2008; Fairburn et al., 2003; Limburg et al., 2017). It has even been suggested that anorexia nervosa and bulimia nervosa may in some cases be a specific expression of clinical perfectionism that focuses on eating, shape, or weight (Shafran et al., 2002). Both perfectionistic concerns and strivings are associated with higher levels of psychopathology related to depression, anxiety, suicidal ideation, and psychological distress. Generally, stronger associations with perfectionistic concerns are observed compared to perfectionistic strivings, whilst both perfectionism factors have particularly strong associations with eating disorders and disordered eating symptoms (Limburg et al., 2017). Interventions targeting perfectionism also produce moderate to large reductions in disordered eating, alongside small to moderate reductions in depression and anxiety (Galloway et al., 2021; Lloyd et al., 2015; Robinson & Wade, 2021).

Evidence suggests that perfectionism may increase eating disorder risk through both mediating and moderating effects. It has been found to mediate relationships between various variables and eating disorder psychopathology, including sociocultural influences, parental psychological control, parenting characteristics, insecure attachment, depressed mood, and alexithymia (Cortes-Garcia et al., 2019; Costa et al., 2016; Dakanalis et al., 2014; Dryer et

al., 2016; García-Villamisar et al., 2012; Marsero et al., 2011; Reilly et al., 2016). Longitudinally, ineffectiveness (i.e., a sense of being inadequate, insecure, or worthless, low self-efficacy, or finding it difficult to cope with life and strong emotions) mediates the relationship between baseline perfectionistic concerns and increasing levels of importance of weight and shape in girls aged 13 years (Wade et al., 2015). Other research indicates that perfectionism moderates the effects of body dissatisfaction, social anxiety, alexithymia, and insecure attachment on eating disorder symptoms (Dakanalis et al., 2015; Dakanalis et al., 2014; Marsero et al., 2011; Rosewall et al., 2018; Silgado et al., 2009).

**Self-Criticism**

Self-criticism occurs when someone consistently scrutinises themselves harshly, is unnecessarily critical of their behaviour, cannot be satisfied even when they succeed, experiences ongoing worry about making mistakes, or is hostile to oneself in the face of setbacks (Löw et al., 2020). Self-criticism is a transdiagnostic mechanism that has positive associations with depression, anxiety, non-suicidal self-injury, personality disorders, and eating disorders (Porter et al., 2018; Werner et al., 2019; Williams & Levinson, 2022; Zelkowitz & Cole, 2019). Pre-treatment self-criticism is associated with poorer response to psychological therapies targeting a range of mental health problems (Löw et al., 2020).

Self-criticism is linked to disordered eating with a moderate to large effect (Werner et al., 2019; Zelkowitz & Cole, 2019), and it predicts increased disordered eating behaviours longitudinally (Zelkowitz & Cole, 2020). The extent of self-criticism appears to be similar across eating disorder diagnoses, with no differences observed between people with anorexia nervosa, bulimia nervosa, and binge eating disorder (Duarte et al., 2016). It is positively associated with appearance comparison and unfavourable social comparisons (Duarte et al., 2016; Gilbert et al., 2006; Gilbert et al., 2010; Sturman & Mongrain, 2005), suggesting a possible interaction between self-criticism and comparison to others in increasing risk for

eating disorders. Self-criticism appears to mediate increases in risk for eating disorders, having been found to mediate the relationships between emotional abuse/childhood trauma and body dissatisfaction, overvaluation of shape/weight/eating and shame, body image shame and binge eating, and lack of early positive emotional experiences or childhood trauma and disordered eating (Duarte et al., 2016; Duarte et al., 2014; Dunkley et al., 2010; Gois et al., 2018; Momeñe et al., 2022; Rabito-Alcon et al., 2021). Compared to treatment for other disorders, pre-treatment self-criticism has a stronger negative relationship with psychotherapy outcomes when treating eating disorders (Löw et al., 2020).

Self-compassion is suggested as an alternative, more adaptive way to relate to oneself than self-criticism. It comprises three main facets: 1) being kind and understanding with oneself instead of self-critical; 2) viewing one's experiences as something shared with all of humanity rather than aspects that isolate oneself from others, and 3) being mindful of thoughts and feelings without overidentifying with them (Neff, 2003). Higher self-compassion is associated with higher well-being, adaptive coping, and self-efficacy, and lower depression, anxiety, stress, self-harm, suicidal ideation, sleep problems, and maladaptive coping (Brown et al., 2020; Cleare et al., 2019; Ewert et al., 2021; Liao et al., 2021; MacBeth & Gumley, 2012; Marsh et al., 2018; Zessin et al., 2015). Self-compassion interventions are effective at reducing self-criticism, with a moderate effect (Wakelin et al., 2022). Moreover, in contrast to self-criticism, self-compassion has negative associations with eating disorder symptoms and body image concerns, and self-compassion interventions for disordered eating and body image have a moderate, positive impact on these domains, though the exact role of self-compassion (i.e., moderating, mediating, or protective factor) is unclear (Braun et al., 2016; Turk & Waller, 2020). Self-compassion may be related to lower eating disorder pathology in part by reducing comparative self-criticism (Turk et al., 2021).

Perfectionism and self-criticism are strongly linked, so it is convenient to investigate them together. People with clinical perfectionism routinely self-criticise because their self-evaluation is too strongly predicated on meeting demanding standards, which by their nature are difficult to achieve and hence often unmet, resulting in negative self-evaluation (Shafran et al., 2002; Shafran et al., 2010). Self-criticism is the aspect of perfectionism that most robustly predicts maladjustment (Dunkley et al., 2006), it partially mediates the relationship between perfectionism and psychological distress (James et al., 2015), and it may underlie the comorbidity between eating, depressive, and anxiety disorders (Williams & Levinson, 2022).

**Social Media**

Social media are online platforms that enable users to engage in opportunistic interaction with, and real-time or asynchronous self-managed self-presentation to, a range of audience types, alongside the opportunity to view and participate in the generation of user-derived content (Carr & Hayes, 2015). Over half of the world's population uses social media, with higher rates of penetration in Australia, Europe, and the Americas (We Are Social & Hootsuite, 2022a, 2022b). The most used social media platforms in 2022 are Facebook, YouTube, Whatsapp, Instagram, WeChat, and TikTok, each of which has at least one billion active users. Users spend an average of two and a half hours per day on social media, representing a third of their average time online, with users aged 16 to 24 spending more time on social media per day than older cohorts ranging from 25 to 64 years of age (We Are Social & Hootsuite, 2022b).

Despite burgeoning research interest in the effects of social media, little seems to be known about precisely what users do when on social media. There are a variety of activities users can engage in, including viewing images or videos posted by others, uploading their own images or videos, and interacting with content (e.g., "liking" or commenting) or with other users via forum and messaging features. To date, there is no information about how

much time users typically spend on each activity, nor on the amount of time spent interacting with particular types of content when engaging in these activities (e.g., viewing appearance-ideal images, viewing images of people the user knows as opposed to strangers or public figures). Each type of social media activity is likely to affect eating disorder risk differently.

Viewing images of others on social media may be more like to increase eating disorder risk than other social media activities, given evidence that exposure to appearance ideals in traditional media images deleteriously impacts body image in males and females (Barlett et al., 2008; Grabe et al., 2008). An image-based platform, Instagram, is the fourth most popular social media platform in the world as of 2022 (We Are Social & Hootsuite, 2022b). Instagram has higher user engagement for images containing faces, and #Fashion and #Beautiful are two of the most popular hashtags applied to posts on the platform (Aslam, 2021). As noted by Brown and Tiggemann (2020), many of the most popular Instagram accounts belong to celebrities who meet appearance ideals (i.e., youthful, thin, and toned bodies; Statista, 2022a). Models or "influencers" who forged a career on Instagram are now so prevalent and popular that they are being sought out by modelling agencies for their skills in cultivating their content (Criddle, 2021). Similarly, anecdotal evidence suggests that TikTok, a video-sharing platform that has enjoyed an enormous rise in popularity since the advent of the COVID-19 pandemic (Cyca, 2022; Koetsier, 2020), also exposes users to appearance-ideal content (Hahn, 2020; Kaufman, 2020). Examination of the top 10 most popular TikTok accounts as of August 2022 reveals that young people meeting appearance ideals dominate (see, for example: Charli d'Amelio [@charlidamelio], Addison Rae [@addisonre], and Bella Poarch [@bellapoarch]; Statista, 2022b).

A body of literature now suggests that social media use, primarily as examined in samples of young people, is related to disordered eating and poorer body image (de Valle et al., 2021; Fardouly & Vartanian, 2016; Fioravanti et al., 2022; Frost & Rickwood, 2017;

Holland & Tiggemann, 2016; Mingoia et al., 2017; Rodgers & Melioli, 2016; Rounsefell et al., 2020; Saiphoo & Vahedi, 2019; Zhang et al., 2021). Social media are used extensively by the age groups in which eating disorders are most likely to develop: adolescents (Anderson & Jiang, 2018; Lenhart, 2015) and young adults (Pew Research Center, 2019; Sensis, 2018). This intersection between age groups with heightened social media use and the typical age of onset for eating disorders underscores the need to improve understanding of the relationship between social media use and eating disorder risk and the factors contributing to the relationship to support the development of effective preventative programs and interventions.

## Social Media, Body Image, and Disordered Eating

### Quantitative Research

Meta-analyses indicate that social media use has a small, positive cross-sectional association with body image disturbance and disordered eating behaviours across a range of samples (Saiphoo & Vahedi, 2019; Zhang et al., 2021) and thin-ideal internalisation in females (Mingoia et al., 2017). Similarly, meta-analyses of experimental and longitudinal studies found that exposure to social media images of people meeting appearance ideals has a small to moderate immediate, negative effect on body image outcomes, and social media use more generally has a small, negative relationship with body image longitudinally when controlling for baseline body image (see **Chapter 3** and de Valle et al., 2021). Across meta-analyses and systematic reviews, appearance-related use (i.e., exposure to appearance-ideal images; posting photos of oneself; viewing, liking, or commenting on others' photos; and appearance-related social media motivations) has shown stronger associations with negative outcomes than other types of social media use (Holland & Tiggemann, 2016; Mingoia et al., 2017; Rounsefell et al., 2020; Ryding & Kuss, 2019; Saiphoo & Vahedi, 2019).

Many models to explain the relationship between social media and negative body image or disordered eating have been proposed, most of which have been examined with

cross-sectional designs. The great majority have operationalised social media in terms of frequency or quantity of use (see, for example: Ahadzadeh et al., 2017; de Vries et al., 2016; Gao et al., 2021; Griffiths, Castle, et al., 2018; Hanna et al., 2017; Jarman, McLean, et al., 2021; Pedalino & Camerini, 2022; Rodgers et al., 2020; Rousseau et al., 2017; Seekis et al., 2020; Seekis et al., 2021b; Skowronski et al., 2021; Wang, Fardouly, et al., 2019; Wu et al., 2022; H. Yang et al., 2020). Measures of the intensity of or the extent of involvement with social media use have also been common (see, for example: Imperatori et al., 2021; Jarman, Marques, et al., 2021b; Jung et al., 2022; Manago et al., 2015; Modica, 2020; Seekis et al., 2020; Seekis et al., 2021b; Teo & Collinson, 2019).

A diverse range of mediators has been explored, but the two most examined have been appearance/social comparison (see, for example: Donovan et al., 2020; Griffiths, Castle, et al., 2018; Hanna et al., 2017; Jarman, Marques, et al., 2021b; Jarman, McLean, et al., 2021; Jung et al., 2022; Modica, 2020; Pedalino & Camerini, 2022; S. R. Roberts et al., 2022; Rodgers et al., 2020; Rousseau et al., 2017; Seekis et al., 2020; Seekis et al., 2021b; Teo & Collinson, 2019; H. Yang et al., 2020) and internalisation of appearance ideals (including thin-, muscular-, and social media-ideals; see, for example: Donovan et al., 2020; Duan et al., 2022; Jarman, Marques, et al., 2021b; Jarman, McLean, et al., 2021; Jung et al., 2022; Puccio, Kalathas, et al., 2016; S. R. Roberts et al., 2022; Rodgers et al., 2020; Skowronski et al., 2021; Wu et al., 2022; H. Yang et al., 2020). Studies have typically found support for these as mediators; however, results have more consistently supported comparison than the internalisation of appearance ideals. When examining disordered eating outcomes, body dissatisfaction has also appeared in several studies, with evidence suggesting it plays a mediating role (see, for example: Donovan et al., 2020; Puccio, Kalathas, et al., 2016; Rodgers et al., 2020).

Most models have had aspects of body image as their outcome. The body image outcomes examined have primarily been negative, with many studies investigating body dissatisfaction in this role (see, for example: de Vries et al., 2016; Duan et al., 2022; M. Kim, 2020; Modica, 2020; Rousseau et al., 2017; Seekis et al., 2020; Wang, Fardouly, et al., 2019). In fewer cases, the outcome has been a positive body image construct, such as body satisfaction (see, for example: Ahadzadeh et al., 2017; Jarman, Marques, et al., 2021b; Jarman, McLean, et al., 2021) or appearance/body esteem (see, for example: Jung et al., 2022; S. R. Roberts et al., 2022; H. Yang et al., 2020). Several models have also investigated disordered eating variables as an outcome, such as dieting/dietary restraint, bulimic symptoms, emotional over-eating, compulsive exercise, muscle-building behaviours, and measures of general disordered eating (see, for example: Donovan et al., 2020; Gao et al., 2021; Griffiths, Castle, et al., 2018; Imperatori et al., 2021; Lee-Won et al., 2020; Puccio, Kalathas, et al., 2016; Rodgers et al., 2020; Teo & Collinson, 2019; Wu et al., 2022).

Compared to negative body image variables, the positive body image construct of body image flexibility has received very little attention in research concerning social media and their relationship to body image and disordered eating, having been investigated in only four studies. One found that body image flexibility moderated the positive association between photo-related activities on social media and body dissatisfaction in female adolescents, such that the relationship was stronger for people with lower body image flexibility (Wu et al., 2019). In the others, interventions addressing the link between social media and body image/disordered eating had positive effects on body image flexibility (de Valle & Wade, 2022; Svantorp-Tveiten et al., 2021), with body image flexibility mediating improvements in disordered eating in female participants who underwent one of these interventions (Svantorp-Tveiten et al., 2022).

**Qualitative Research**

A range of qualitative studies has been conducted with users of social media to better understand their perspectives on the relationship between social media use and body image or disordered eating. Findings of these studies can broadly be categorised into: 1) why social media affect body image or eating behaviours; 2) responses to or strategies employed when engaging with social media; 3) there being both positive and negative aspects to social media; and 4) factors that may moderate the relationship.

Users have suggested several ways in which social media may negatively affect body image and eating. Especially common are comments about social media as a format that encourages and facilitates comparison with others (Anixiadis et al., 2019; Cavazos-Rehg et al., 2020; Flannery et al., 2020; Popat & Tarrant, 2022; Rounsefell et al., 2020; Young et al., 2022), perpetuates appearances pressures and ideals (Ando et al., 2021; Cavazos-Rehg et al., 2020; Flannery et al., 2020; O'Gorman et al., 2019; Paddock & Bell, 2021; Popat & Tarrant, 2022; Young et al., 2022), and fuels a need for validation (Cavazos-Rehg et al., 2020; Flannery et al., 2020; Moreton & Greenfield, 2022; Paddock & Bell, 2021; Popat & Tarrant, 2022; Rounsefell et al., 2020; Young et al., 2022). Factors that have been raised less often include prompting negative evaluations of oneself and one's body (Cavazos-Rehg et al., 2020; Easton et al., 2018; Rounsefell et al., 2020; Young et al., 2022), motivating or triggering disordered eating behaviours (Cavazos-Rehg et al., 2020; Flannery et al., 2020), and causing concerns about weight, shape, or eating (Cavazos-Rehg et al., 2020; Easton et al., 2018).

Concerning responses to or strategies employed when using social media, two studies examined responses that may be protective, and one study investigated thoughts women experienced when viewing thin-ideal Instagram images. Potentially protective responses include critiquing appearance ideals or appearance-ideal imagery, appreciating one's own or others' bodies, focusing on the values and personality of people in the appearance-ideal

images, considering negative consequences that have previously been associated with appearance-ideal images, avoiding negative content, actively seeking out positive content or alternative platforms, distancing oneself from content, and reframing (Evens et al., 2021; Mahon & Hevey, 2021). The thoughts that women experienced when exposed to thin-ideal Instagram images included comments on the body of the person in the image, comparing themselves to the person, thoughts about fitness and health, assumptions about the person, and considerations associated with media literacy (e.g., it being an advertisement, the impacts of posing, the motivations for posting, or the image looking unrealistic/edited; Anixiadis et al., 2019).

In several studies, users emphasised both positive and negative facets of social media. Reported positive effects include fostering social connection (engagement and support), getting positive social feedback, the ability to self-express, motivation (though in some cases, this appeared to be motivation to engage in disordered eating), being able to seek and share information, and entertainment. Deleterious effects that have been reported include trying to live up to social media ideals (e.g., around only posting positives about their lives, setting appearance ideals, and photo editing), the potential downsides of social feedback, promoting a need for validation and comparison with others, exposure to bullying and harmful types of content (e.g., self-harm), negative impacts to emotional well-being, access to unrealistic or untrustworthy content, and creating pressure to stay connected with others (Cavazos-Rehg et al., 2020; Easton et al., 2018; Moreton & Greenfield, 2022; Popat & Tarrant, 2022).

Social media users have indicated that there are individual difference factors that may moderate the impact of social media. Age has been commonly raised, with users indicating that younger people are likely to be more vulnerable to deleterious effects (Easton et al., 2018; Evens et al., 2021; Flannery et al., 2020). Mood and media literacy skills have also been highlighted, with being in a poor mood before using social media proposed as a

vulnerability factor and being in a good mood before accessing social media or having better media literacy skills (i.e., engaging critically and being selective about the content followed) suggested as protective factors (Easton et al., 2018; Evens et al., 2021; Flannery et al., 2020).

## Social Media Use, Perfectionism, and Self-Criticism

### *Social Media and Self-Criticism*

Outside of the research conducted for this thesis, only one publication has investigated the relationship between social media use and self-criticism. Consistent with the clinical perfectionism model (Shafran et al., 2002), it found that people who had higher trait self-criticism responded with negative affect when presented with a hypothetical negative scenario on Instagram (i.e., receiving an unsatisfactory number of "likes" on a post, or "following" someone the participant knows without this "follow" being reciprocated), and were not affected by a positive scenario (Jackson & Luchner, 2018). A publication arising from this thesis (see **Chapter 6**) reported that using social media for appearance-related motivations was correlated with higher self-criticism and disordered eating, and lower body image flexibility in young adults, each with a moderate to large effect (de Valle & Wade, 2022). These studies examined pre-existing self-criticism, but one can extrapolate from other findings to suggest that using social media might also provoke self-criticism and thereby increase eating disorder risk.

Viewing images of others on social media can incite appearance comparisons, which are associated with negative effects on body image, disordered eating, and mood in men and women (see, for example: Fardouly et al., 2015b; Fardouly et al., 2017; Fardouly & Vartanian, 2015; Kim & Chock, 2015; Modica, 2020; Rodgers et al., 2020; Tiggemann & Zaccardo, 2015). The evaluative component of such comparisons may provoke self-criticism, with studies finding a moderate to large correlation between weight-focused and physical appearance-based social comparison and self-criticism (Duarte et al., 2016; Duarte et al.,

2017). So, by inciting upward appearance comparisons, social media use may also provoke self-criticism, leading to an increased risk of developing an eating disorder.

### *Social Media and Perfectionism*

Compared to self-criticism, there has been somewhat more research attention on how perfectionism relates to social media use. Thematic analysis of websites about perfectionism identified social media as perpetuating perfectionism (Wade, Egan, et al., 2021), and self-compassion was found to buffer negative effects on subjective well-being associated with perfectionistic self-presentation (i.e., the desire to present oneself to others as perfect; Hewitt et al., 2003) on social media (Keutler & McHugh, 2022). Two studies have considered perfectionism and problematic social media use (i.e., preferring to interact online, using social media to relieve distress, poor self-regulation when using social media, and negative personal and social outcomes associated with social media use). People with higher perfectionistic strivings had a stronger preference for online social interactions, which in turn was related to more problematic social media use (Fioravanti et al., 2020). Aspects of perfectionistic concerns and strivings had small, positive correlations with problematic Facebook and Instagram use, and each perfectionism factor contributed to predicting social media burnout (i.e., less interest in using social media and desire to reduce social media use; Harren et al., 2021). Another two studies have investigated how perfectionism interacts with social media use in mothers, finding that mothers with parenting perfectionism may experience more anxiety and depression as a result of social comparison (Padoa et al., 2018) and new mothers who were higher on societal-oriented parenting perfectionism (i.e., the belief that society has excessively high parenting standards) had stronger reactions to comments posted on images of their children and were more frequently active on Facebook (Schoppe-Sullivan et al., 2017).

Seven studies have considered perfectionism in relation to the use of social media and body image, two of which indicate that perfectionism may have a relationship with appearance comparison on social media. Perfectionistic concerns interacted with upward appearance comparisons (primarily made on social media) to predict lower body appreciation in female adolescents (Etherson et al., 2022). Perfectionism was also moderately correlated with physical appearance comparison on Facebook and Facebook-based fat talk in college-aged women (Walker et al., 2015).

Three studies investigated physical appearance perfectionism (i.e., worries about imperfections in appearance and desires for a perfect appearance) in different roles relating to social media. In one, young women higher on physical appearance perfectionism had worse body image outcomes after comparing their appearance to Instagram models, which was mediated by the cognitive responses of rumination and catastrophising (McComb & Mills, 2021). In another, physical appearance perfectionism moderated the effect of exposure to different types of appearance-ideal Instagram content on young women's body image, such that those with higher physical appearance perfectionism experienced stronger negative outcomes when exposed to slim-thick (i.e., a body type comprising sizeable curves in the buttocks, breasts, and thighs, accompanied by a slim waist and flat stomach) images than those containing thin or fit ideals (McComb & Mills, 2022). In the final study, physical appearance perfectionism mediated the negative link between Instagram addiction and body esteem in both sexes (Simon et al., 2022).

Finally, a more general measure of perfectionism moderated outcomes of exposure to Instagram images in two studies. In one, perfectionism moderated responses to viewing images posted by a "foodie" (i.e., a person whose social media account is concerned with food and food trends) on Instagram (Jin, 2018). The responses of women low on perfectionism did not differ based on the foodie's body type or popularity. However, women

with high perfectionism responded with more envy when the foodie was skinny or popular than when they were fat or unpopular. In the other study, male and female Instagram users were exposed to selfies, group selfies, photos taken by others, or appearance-neutral photos on Instagram and there was a significant interaction, whereby dieting intention was similar at all levels of perfectionism in the group exposed to selfies, but for the groups exposed to other image types, dieting intention increased as perfectionism increased. (Jin et al., 2018). In summary, the current evidence, which has mostly used female samples, suggests that perfectionism interacts with exposure to appearance-related content on social media to negatively impact body image.

## Theoretical Explanations for the Impact of Social Media Use

Because at least some content that users are exposed to on social media may be similar to the appearance-ideal images disseminated through traditional media (see discussion above under Risk Factors for Eating Disorders), theories that have previously been applied to traditional media can inform our understanding of how social media could cause body image disturbance. The term “traditional media” refers to media formats that predate social media, including television, movies, magazines, fashion outlets, and toys. Meta-analyses indicate that exposure to these formats is associated with small to moderate negative effects on body image in men and women (Barlett et al., 2008; Grabe et al., 2008). Social media users can curate their online appearance in a way that mimics the curation of traditional media content; editing images before posting them (Chua & Chang, 2016; Fox & Rooney, 2015; Fox & Vendemia, 2016; Lonergan et al., 2019; McLean et al., 2015), using filters on photos (Choi & Behm-Morawitz, 2018; Fox & Vendemia, 2016; McLean et al., 2015), and manipulating aspects such as setting, lighting, posing, and angles (Choi & Behm-Morawitz, 2018). Hence, social media enable users to present an idealised version of themselves using similar processes to those previously applied in traditional media.

**Sociocultural and Social Comparison Theories**

The tripartite influence model from sociocultural theory (Thompson et al., 1999) has three main propositions: 1) people experience pressure about appearance from the media, family members, and peers, leading to 2) the internalisation of societal ideals about appearance, 3) which result in comparisons between one's own appearance and those ideals. There is substantial evidence demonstrating the utility of this model in explaining the development of poor body image and disordered eating in a range of populations (see, for example: Burke et al., 2021; Keery et al., 2004; Papp et al., 2013; Rodgers et al., 2011; Schaefer et al., 2020; Shroff & Thompson, 2006; Tylka, 2011; van den Berg et al., 2002; Yamamiya et al., 2008). In particular, the internalisation of appearance ideals and social comparisons are well-established correlates of body dissatisfaction (Myers & Crowther, 2009; Paterna et al., 2021), and they have been found to predict the onset of eating disorder pathology (Arigo et al., 2014; Dakanalis, Pla-Sanjuanelo, et al., 2016; Dakanalis, Timko, et al., 2016; Stice, 2016).

Viewed through the lens of sociocultural theory, social media are a new avenue through which societal ideals of beauty can be disseminated (Rodgers & Melioli, 2016). In contrast to traditional media, social media users are not just recipients of content but also creators (Holland & Tiggemann, 2016; Perloff, 2014). Users can present an idealised identity online (Fox & Vendemia, 2016; Mendelson & Papacharissi, 2010), and content analyses have determined that several social media trends perpetuate appearance ideals. These include fitspiration (i.e., promotion of exercise and diet regimes to improve health, appearance, and lifestyle; Boepple et al., 2016; Carrotte et al., 2017; Deighton-Smith & Bell, 2018; Simpson & Mazzeo, 2017) and thinspiration (i.e., promotion of thinness and weight loss; Alberga et al., 2018; Talbot et al., 2017; Wick & Harriger, 2018). When users compare themselves to

that ideal and find that they do not meet it, they are likely to experience negative feelings about their bodies, leading to the development of body image pathology.

The interactive nature of social media content (i.e., the "social" aspect of social media) means that users are not just posting but also receiving idealised content. Users can then provide feedback on it using likes and comments, which may give signals to other viewers about its social desirability. As noted by Tiggemann et al. (2018), the proposition of social comparison theory that people seek out comparisons with more similar others (Festinger, 1954) suggests that comparisons made to peers on social media could be more impactful than those made to models and celebrities in traditional media, and feedback features such as likes may serve to reinforce appearance ideals where they indicate social approval of those ideals.

Moderating and mediating effects of appearance comparison and internalisation of appearance ideals in the relationship between social media use and eating disorder risk have been examined in a range of samples. Appearance comparison has consistently been supported as a mediator cross-sectionally (Chang et al., 2019; Chansiri et al., 2020; Fardouly et al., 2015a; Fardouly & Vartanian, 2015; Fardouly, Willburger, et al., 2018; Feltman & Szymanski, 2018; Griffiths, Castle, et al., 2018; Jarman, Marques, et al., 2021b; Kim, 2018; Kim & Chock, 2015; Lee & Lee, 2021; Modica, 2020; Nagl et al., 2021; Rodgers et al., 2020; Scully et al., 2020; Seekis et al., 2020; Seekis et al., 2021a; Teo & Collinson, 2019; H. Yang et al., 2020). Appearance comparison has also broadly been supported as a mediator or moderator in experimental and longitudinal designs (de Valle et al., 2021; Fioravanti et al., 2022; Jarman, McLean, et al., 2021). In contrast, although internalisation of appearance ideals has often emerged as a mediator in cross-sectional research (Fardouly, Willburger, et al., 2018; Feltman & Szymanski, 2018; Jarman, Marques, et al., 2021b; Lee & Lee, 2021; Nagl et al., 2021; Rodgers et al., 2020; Scully et al., 2020; Strubel et al., 2018; Wang,

Fardouly, et al., 2019), experimental and longitudinal research has tended not to find support for it as a moderator or mediator (de Valle et al., 2021).

**Objectification Theory**

Objectification theory (Fredrickson & Roberts, 1997) suggests that visual media formats foster the internalisation of an observer's view of one's body by highlighting bodies or body parts to the exclusion of focussing on the head and face (or by excluding the face altogether). That is, by indicating that bodies are objects to be looked at and evaluated for sexual appeal, media can cause people to self-objectify. The result of self-objectification is habitual body monitoring in the form of self-consciousness about physical appearance (i.e., body surveillance), leading to shame and anxiety. A meta-analysis of 53 cross-sectional studies reported that self-objectification is positively, moderately correlated with disordered eating (Schaefer & Thompson, 2018), and self-objectification is predictive of the onset of eating disorder pathology (Dakanalis, Pla-Sanjuanelo, et al., 2016; Dakanalis, Timko, et al., 2016).

Applying objectification theory, social media provide opportunities to sexually objectify one's own and other people's bodies through posting and viewing body-focused images, which can cause internalisation of an observer's view of the self. Supporting this contention, self-objectification, body surveillance, and body shame have been positively associated with Facebook use and investment (Manago et al., 2015; Trekels et al., 2018), Instagram use (Fardouly, Willburger, et al., 2018), frequency of appearance-related conversations on social media (Trekels et al., 2018; Wang et al., 2020), willingness to modify social media profile pictures to unrealistic levels (Chen et al., 2022), and posting sexualised photos of oneself to social media (Bell et al., 2018; Ruckel & Hill, 2017). Young adult females were also found to attend more to bodies than faces in Instagram images of other young females, based on eye-tracking measures (Scott et al., 2023). Additionally, content and

thematic analyses of social media posts characteristic of the fitspiration trend revealed that these often demonstrate people in sexualised ways that conform to dominant appearance ideals, and both text and images encourage users to self-objectify by idealising a fit body as being desirable due to it being more sexually attractive (Deighton-Smith & Bell, 2018).

Self-objectification has been investigated less often than appearance comparison and appearance-ideal internalisation as an explanatory mechanism for the relationship between social media use and eating disorder risk. Rather, self-objectification, body surveillance, and body shame have often been conceptualised as predictors of social media use (see, for example: Boursier et al., 2020; Fox & Rooney, 2015; Gioia et al., 2020; Veldhuis et al., 2020) or outcomes (see, for example: Choukas-Bradley et al., 2018; Cohen, Fardouly, et al., 2019; de Vries & Peter, 2013; Fardouly et al., 2015a; Feltman & Szymanski, 2018; Meier & Gray, 2014; Nelson et al., 2022; Qi & Cui, 2018; Salomon & Brown, 2020; Vandenbosch & Eggermont, 2012; Wang, Xie, et al., 2019; Zheng et al., 2019). However, a handful of cross-sectional studies support self-objectification in a mediating role between the use of or exposure to social media and body image or restrained eating (Chansiri et al., 2020; Hanna et al., 2017; Karsay et al., 2021; Niu et al., 2019; Sun, 2021). It has also been suggested that self-objectification moderates the impact of viewing appearance-ideal images on social media, though results of studies investigating this have been mixed (Prichard et al., 2017; Tiggemann & Barbato, 2018).

**Uses and Gratification Theory**

Uses and gratifications theory asserts that users of mass media actively interact with media by selecting particular types of media to satisfy particular needs (Blumler & Katz, 1974; Katz et al., 1973). It has previously been applied to inform the understanding of user interactions with diverse media, including newspapers, radio, and television (Ruggiero, 2000). This theoretical perspective has the advantage of providing a more nuanced approach

to the broad ground covered by the concept of "social media use" by suggesting that it is the *motivations* driving social media use that may identify problematic use and how this relates to body image and eating disorder risk (rather than, for example, frequency or quantity of use).

Evidence suggests that different motivations for social media use have unique relationships to types of social media activities, body satisfaction, and psychological well-being (Frison & Eggermont, 2016; Jarman, Marques, et al., 2021a; Lee et al., 2014; Rae & Lonborg, 2015; Smock et al., 2011). Appearance-motivated social media use may be particularly risky, based on the stronger associations with negative outcomes for appearance-related social media use (i.e., posting photos of yourself, viewing, liking, or commenting on others' photos, and comparing your appearance to other people's appearance in photos) than other types of use (Holland & Tiggemann, 2016; Mingoia et al., 2017; Rounsefell et al., 2020; Ryding & Kuss, 2019; Saiphoo & Vahedi, 2019).

Research on appearance-related motivations for social media use is nascent. Two studies of adolescents found that appearance motivations for social media use were positively correlated with the internalisation of media appearance ideals and Instagram use, and negatively correlated with self-esteem (Rodgers et al., 2021), and appearance feedback motivations were associated with poorer body satisfaction and well-being (Jarman, Marques, et al., 2021a). In undergraduate students from the USA and South Korea, using social media for information-seeking about body image was negatively related to body image evaluation, whilst social media use for self-status seeking about body image was positively related to body image evaluation in only the South Korean students (Lee et al., 2014). These findings suggest that the role of appearance-related motivations for social media use merits further attention.

## Interventions for Social Media, Body Image, and Disordered Eating

### Current Interventions

To date, ten interventions have been evaluated that seek to interrupt the relationship between social media, appearance comparison, and body image/disordered eating, one of which was developed for this thesis (see **Chapter 6** and de Valle & Wade, 2022). Six were classroom interventions targeting adolescents: two social media literacy interventions (Gordon et al., 2021; McLean et al., 2017); two single-session interventions challenging engagement in appearance commentary (Bell et al., 2021) and social media appearance ideals (Bell et al., 2022); a self-compassion intervention (Mahon & Hevey, 2022); and a three-workshop intervention comprising one workshop about social media (Svantorp-Tveiten et al., 2022; Svantorp-Tveiten et al., 2021). Overall, the interventions for adolescents have shown some favourable results, but effect sizes were generally negligible to small, with few moderate and only one large (the latter related to thin-ideal internalisation at post-intervention in the intervention group compared to control from Bell et al., 2021). No improvements were observed on some key variables, and in one study there were poorer outcomes for the intervention group than the control group on some variables (Gordon et al., 2021).

Except for the intervention developed for this thesis and now published, there have been only three interventions not delivered to adolescents in classrooms. One was a brief self-compassion writing task trialled with adult women before exposure to thin-ideal Instagram images, which found no significant interactions between group and time on weight or appearance dissatisfaction, but some significant effects of time suggestive of a possible small buffering effect of the intervention against negative effects of exposure to the images (Gobin et al., 2022). Two studies tested interventions hypothesised to protect against the negative effects of exposure to appearance-ideal social media images in young adult women (one involving watching a video, the other viewing a content disclaimer), neither of which suggested that the interventions conferred protection against appearance comparison or deleterious impacts on body and facial satisfaction (Danthinne et al., 2021; Misko et al.,

2022). In summary, the interventions developed for adolescents have been somewhat effective, whilst the interventions developed for adults have shown minimal promise.

**The Case for Developing Interventions for Young Adults**

Young adults could experience greater vulnerability to the detrimental impacts of social media use on body image and eating than other groups. In common with adolescents, they consume social media at a high rate (Pew Research Center, 2019; Sensis, 2018) and are at a greater risk of developing an eating disorder, especially disorders with binge and purge features (Hudson et al., 2007). One in five undergraduate university students report clinically concerning symptoms of disordered eating on screening measures (Alhaj et al., 2022). However, in contrast to adolescents, young adults are in a developmental stage characterised by increasing agency and independence from their families, which may include the transition from secondary schooling to work or tertiary education and/or moving out of the family home, so their social media use is less likely to be monitored by their parents (Alhaj et al., 2022; Maheux et al., 2022; Tanner, 2006). Greater parental control of social media use was related to higher appearance satisfaction in preadolescents, mediated by lower social media use and fewer appearance comparisons (Fardouly, Magson, et al., 2018). Hence, their increased autonomy may increase the risk for young adults. Improving understanding of the factors that contribute to eating disorder risk in this group would inform the use of appropriate intervention strategies in prevention programs and clinical practice.

Young adults and university students report barriers to accessing intervention for their mental health. Factors that have commonly been reported to limit university students' access to mental healthcare generally include accessibility, financial costs, lacking time, being unaware of mental health symptoms/their severity or available supports, long waitlists, preferring alternatives to on-campus options (e.g., online self-help), stigma or embarrassment, and preferring to handle the problem alone (Broglia et al., 2021; Dunley &

Papadopoulos, 2019; Ebert et al., 2019; Weissinger et al., 2022). Young adults report that these barriers also inhibit access to interventions for disordered eating (Ali et al., 2020; Byrom et al., 2022). So, while young adults may require support to ameliorate the negative impacts of their social media use, there are currently no interventions developed for this age group that are efficacious. Any interventions developed will need to address the barriers to accessing mental health and eating disorder support that are commonly reported in this group.

## Conclusions

Eating disorders are prevalent conditions, with significant associated health risks. There is a range of established risk factors for the development of an eating disorder, including disordered eating, body image disturbance, perfectionism, and self-criticism, whilst facets of positive body image may play a protective role. Social media use, particularly where this involves appearance-related content, is emerging as a potential new risk factor, but previous meta-analyses have used cross-sectional data, such that causality cannot be inferred.

Addressing the lack of meta-analytic evidence about causality in the social media and eating disorder risk relationship is one aim of this thesis. Also, there is currently a very limited understanding of the role that self-criticism and perfectionism may play in this relationship, so elucidating the potential role of these and other personality variables is another aim of this thesis. Finally, despite evidence to suggest that young adults may be especially vulnerable to deleterious impacts of social media use on body image and eating, most of the current interventions for the influence of social media on eating disorder risk were developed for adolescents. The few interventions for young adults have not been effective, and those for adolescents have yielded mixed results. Hence, the final aim of this thesis was to develop and pilot-test an intervention designed for young adults, informed by an understanding of the most relevant risk factors for young adults who use appearance-related social media and the barriers that commonly impede their access to interventions.

# CHAPTER 3

## Social Media, Body Image, and the Question of Causation: Meta-Analyses of Experimental and Longitudinal Evidence[2]

[2] The study described in this chapter was published and can be found in **Appendix A**. Madelaine de Valle contributed 80%, 80%, and 85%, María Gallego-García contributed 0%, 10%, and 2.5%, Paul Williamson contributed 0%, 5%, and 2.5%, and Tracey Wade contributed 20%, 5%, and 10% to the research design, data collection and analysis, and writing and editing, respectively.

de Valle, M. K., Gallego-García, M., Williamson, P., & Wade, T. D. (2021). Social media, body image, and the question of causation: Meta-analyses of experimental and longitudinal evidence. *Body Image, 39*, 276-292. https://doi.org/10.1016/j.bodyim.2021.10.001

## Abstract

This study presents four meta-analyses that can inform causality in the relationship between social media and body image; 24 experimental samples comparing the effect of appearance-ideal social media images to non-appearance-related conditions ($n$ = 3816); 21 experimental samples examining the effect of contextual features (e.g., comments and captions) accompanying appearance-ideal social media images ($n$ = 3482); 14 experimental samples investigating the effect of appearance-ideal images versus other appearance images on social media ($n$ = 2641); and 10 longitudinal samples on social media use and body image ($n$ = 5177). Across the experimental studies, social media appearance-ideal images had a moderate negative effect on body image (Hedges' $g$ = -0.61, $p$ <.01), were more damaging in higher- than lower-risk contexts (Hedges' $g$ = -0.12, $p$ <.01), and were moderately more impactful than other social media appearance images (Hedges' $g$ = -0.68, $p$ = .05). These effects were smaller but significant with outliers removed. Social media use had a very small, negative correlation with body image longitudinally (Fisher's $Z$ = -0.08, $p$ <.001). No significant moderators emerged. Qualitative synthesis suggested that comparison to others is the most credible candidate as a moderating or mediating variable.

Two meta-analyses have previously examined the cross-sectional association between social media use and body image concerns. One found that social media use had a small, positive relationship with body image disturbance, with stronger effects for appearance-focused use than general use (Saiphoo & Vahedi, 2019). The other found a small, positive association between thin-ideal internalisation and social media use, which was stronger for appearance-related use than general use (Mingoia et al., 2017). The ability to draw conclusions about causality remains limited because of a reliance on cross-sectional research. It is therefore impossible to ascertain whether social media cause a deterioration in body image, whether people with poorer body image are more avid users of social media, or whether the relationship is due to some unknown, third factor that confounds results. A better understanding of causality can be obtained by examining experimental and longitudinal research. No meta-analyses of such research exist.

The aim of the current investigation is therefore to conduct a meta-analysis of the experimental and longitudinal research examining the association between social media use and body image, and to generate causal hypotheses about this relationship that can inform the development of theoretical models and interventions. Because cross-sectional evidence indicates a stronger relationship between body image disturbance and appearance-focused social media use than general use (Mingoia et al., 2017; Saiphoo & Vahedi, 2019) and most of the experimental research has focused on the impact of viewing appearance-ideal images on social media, the analysis of the experimental evidence will be limited to studies investigating appearance-focused social media activity. To provide further information that can support the inclusion of relevant components in models and interventions, a brief qualitative synthesis of moderators or mediators addressing individual differences or vulnerability factors that were examined in articles included in the meta-analyses is also provided.

A range of comparison conditions has been used in the experimental studies, which can create considerable heterogeneity. To increase homogeneity in this analysis, four meta-analyses were conducted that grouped comparisons that addressed a similar underlying question. Category 1 includes experimental comparisons of the effects of viewing social media appearance-ideal images to non-appearance-related conditions (i.e., neutral images or no stimuli). Category 2 comprises experiments comparing the impact of viewing social media appearance-ideal images with higher-risk contextual features (e.g., comments praising the person's appearance) vs lower-risk contextual features (e.g., disclaimer captions highlighting the unrealistic nature of the images). This allows us to understand key features unique to social media that can be manipulated to moderate the impact of appearance-ideal imagery. Category 3 examines experiments comparing the effects of viewing appearance-ideal images to other appearance images on social media, giving insight into whether the type of appearance in a social media image moderates the impact on body image.

Compared to the experimental research, the longitudinal research has included a broader range of measures of social media use than just exposure to appearance-ideal images. These longitudinal studies form Category 4. This category is intended to answer the question of whether using social media in a more general way than that investigated in the experimental analyses predicts later body image disturbance. Although such evidence cannot demonstrate causality, it would satisfy two of the three necessary criteria for establishing causation (i.e., association and temporal precedence), and this would provide a clear rationale for further research investigating the mechanisms involved.

## Method

### Search Strategy and Selection of Studies

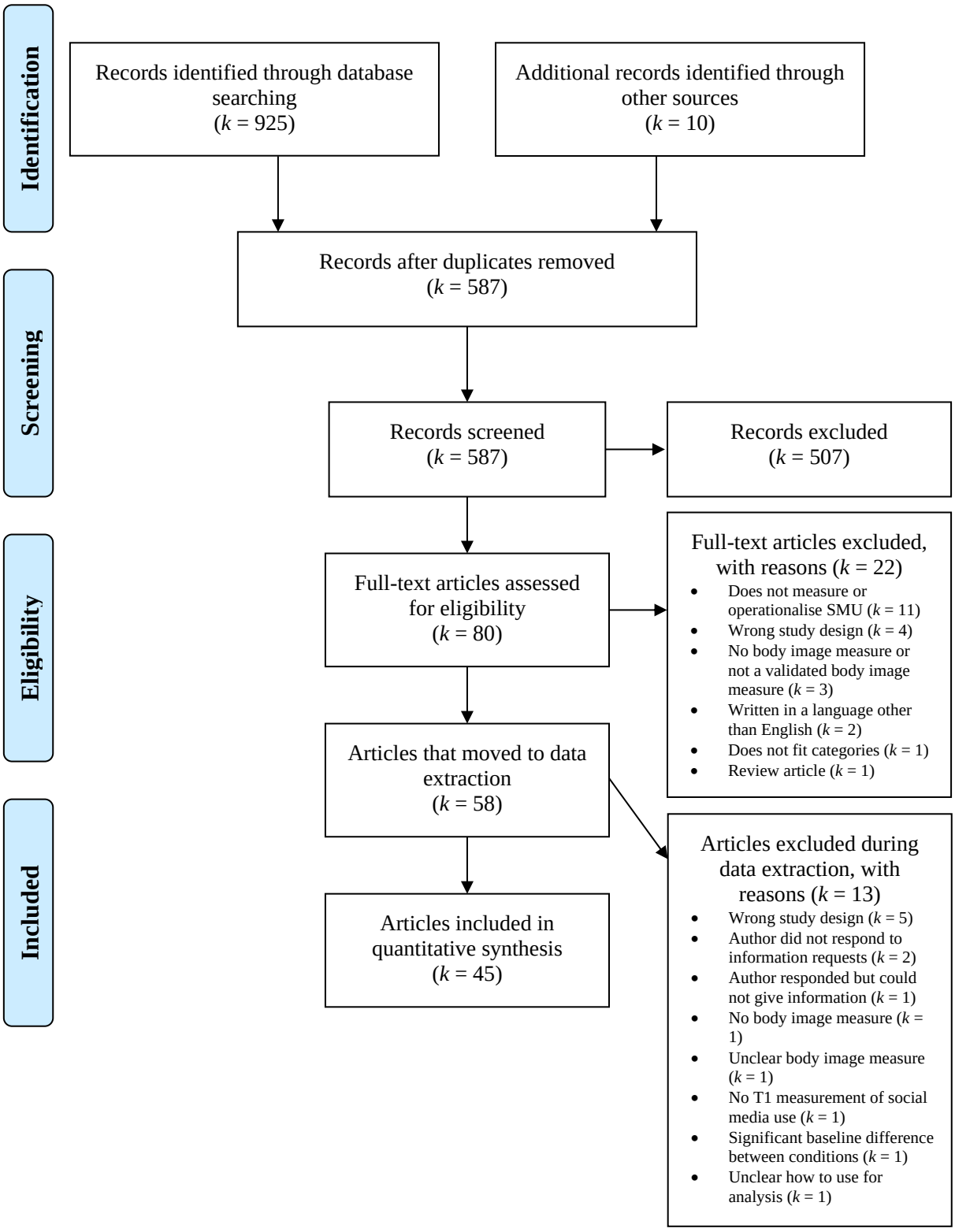
The review was conducted according to the PRISMA statement (Moher et al., 2009). Searches were conducted on June 24th 2019, January 22nd 2020, May 28th 2020, and February

12th 2021 in the PsycINFO, MEDLINE, and Scopus online databases. The search terms for PsycINFO and MEDLINE, produced after reviewing terms used in related published reviews, were: *(social media or social networking site* or facebook or instagram or snapchat or youtube or pinterest or tumblr or twitter or myspace or flickr or fitsp* or thinsp* or bopo or bodypositiv*) and (eating disorder* or disordered eating or bulimi* or anorexi* or EDNOS or OSFED or orthorexi* or purg* or binge eat* or binge-eat* or eating behavi* or body image or body dysmorph* or body inflexib* or body flexib* or body satisf* or body dissatisf* or body surveillance or body esteem or thin ideal or thin-ideal or body ideal or body shame or body positiv* or body accept* or weight satisf* or body bash* or body size or body neutral* or size accept* or weight bias* or shape concern* or self objectif* or self-objectif* or drive for muscularity or drive for thinness)*. Terms were adapted for Scopus. PsycINFO results were limited to quantitative studies in peer-reviewed journals with search terms in the title or abstract. Scopus results were filtered by source type "journal". Six reviews were scanned to locate extra articles (Fardouly & Vartanian, 2016; Frost & Rickwood, 2017; Holland & Tiggemann, 2016; Lupton, 2017; Mingoia et al., 2017; Rodgers & Melioli, 2016).

Title and abstract screening was conducted by two independent reviewers (including the author of this thesis), with a third reviewer resolving conflicts. There was 92.5% inter-reviewer agreement at the title and abstract screening stage. Full-text articles were then assessed for eligibility by the original two independent reviewers, who resolved disagreements through discussion (2019 searches) or referral to the third reviewer (2020 and 2021 searches). There was 87.4% inter-reviewer agreement at the full-text screening stage. **Figure 3.1** is a flow diagram describing the stages of study selection for the analyses.

**Figure 3.1**

*PRISMA Flow Diagram*




*Note*. SMU = social media use. T1 = time one (i.e., first measurement point).

**Inclusion and Exclusion Criteria**

Inclusion criteria included: (a) experimental or longitudinal peer-reviewed research on original data; (b) inclusion of at least one experimental operationalisation or quantitative measure of social media use and at least one validated outcome measure of body image; (c) presentation of at least one analysis examining the link between the two; and (d) the design fits into one of the meta-analysis categories. To be included in the three meta-analyses of experimental designs, which required that at least one condition was exposed to appearance-ideal images, this included images described as generally meeting ideals (e.g., "attractive" people or people with "ideal" appearances or bodies), or more specific variants comprising images of people meeting thinness ideals (i.e., thinspiration) or fitness ideals (i.e., fitspiration). For Category 1, the comparison condition had to be unrelated to appearance (e.g., exposure to nature, architecture, or travel images or no exposure). To be included in Category 2, both the experimental and comparison conditions had to be exposed to appearance-ideal images, but features surrounding the images (e.g., accompanying images, captions, comments, slogans, likes, and follows) had to be more likely to increase risk of negative effects on body image in the experimental condition (e.g., comments praising the person's appearance) and/or less likely to increase risk of negative effects on body image in the comparison condition (e.g., body-positive captions). For inclusion in Category 3, the comparison condition had to be exposed to appearance images that were less likely to be damaging to body image (e.g., body-positive images, average- or plus-sized people, or unedited images) than those in the appearance-ideal experimental condition.

Exclusion criteria were: (a) published in languages other than English; (b) experimental operationalisations of social media use that did not clearly situate the exposure in a social media context (e.g., where images were taken from social media but presented to participants as standalone images without social media features such as profiles, borders,

likes, or comments); and (c) unclear measures of either social media use or body image (i.e., where they were not clearly described or where social media measures were too broad; for example, including general app usage). The criterion requiring that images in experimental operationalisations be clearly situated in a social media context was designed to maximise the ecological validity (Barron et al., 2021; Chansiri et al., 2020; Cohen, Fardouly, et al., 2019; Dignard & Jarry, 2021; H. M. Kim, 2020; Tamplin et al., 2018) and minimise the heterogeneity of the exposures. It was also informed by experimental evidence comparing the effects of thin-ideal images presented in conventional media and Facebook contexts, in which there was a significantly greater increase in body dissatisfaction in the latter compared to the former group (Cohen's $d$ = 0.35, 95% CIs = 0.06, 0.63; Cohen & Blaszczynski, 2015). This suggests that the social media context itself may be harmful.

For Category 4 (i.e., longitudinal studies), ecological momentary assessment and experience sampling designs were excluded because they differ from the standard prospective designs in that they address whether a specific instance or instances of exposure to social media within a short, prescribed timeframe are associated with an immediate change in body image. In comparison, the standard prospective designs that comprise most longitudinal research explore the relationship between markers of general social media use (e.g., frequency of access), or trends in the use of social media in a specific way (e.g., for monitoring attractive peers) at one point and body image at a later point. Hence, there are crucial differences in the specificity of the relationship and the timeframe in which the relationship is examined that make examining them together inappropriate.

**Allocation of Comparisons to Categories for Experimental Studies**

Comparisons were allocated to categories, and allocations were discussed and agreed upon between two reviewers (including the author). Reference is made to the allocation of comparisons to categories rather than articles to categories because some articles examined

more than two conditions (e.g., A, B, and C), so that the comparison between one pair of conditions (e.g., A and B) addressed a different question, and hence fit within a different category, to the comparison between another pair of conditions (e.g., A and C). Additionally, some articles with more than two conditions allowed for comparisons that addressed the same question, so all comparisons that met inclusion criteria for that category were included (e.g., A vs B and A vs C). Hence, some articles are represented in more than one category, or multiple times within a single category.

Comparisons were included in Category 1 when one group (designated the "experimental group" for this category) was exposed to social media appearance-ideal images (including specific variations on this such as fitspiration and thinspiration), and the other group (designated the "comparison group" for this category) was exposed to either appearance-neutral images (e.g., travel or nature images) or did not undergo any exposure.

Comparisons were included in Category 2 when both groups were exposed to appearance-ideal images but one group (the "experimental group" for this category) was exposed to a version with contextual features that were deemed more likely to deleteriously impact body image, whilst the other group (the "comparison group" for this category) viewed a version with contextual features deemed less likely to damage body image. Exposures were deemed more likely to negatively impact body image if they involved a standard appearance-ideal image: 1) without additional, potentially protective contextual features, but the comparison group was exposed to an image that *did* include such potentially protective features; or 2) with additional, potentially damaging contextual features. Similarly, exposures were deemed less likely to negatively impact body image if they: 1) included potentially protective contextual features; 2) involved a standard appearance-ideal image without additional, potentially damaging contextual features, but the experimental group was exposed to an image that *did* include such potentially damaging features

For Category 2, the following were considered to be potentially protective contextual features: self-compassion quote/travel/non-idealised (i.e., "reality") images presented alongside the appearance-ideal image, disclaimer comments or captions (i.e., those highlighting the idealised nature of the images), body-positive comments or captions, empowering slogans, comments rejecting the appearance ideal, a low number of likes/follows, weight loss discouragement messages, and icons indicating that photo manipulation had taken place. The following were considered potentially damaging contextual features: idealising comments (i.e., those reinforcing the ideals present in the image), fitspiration comments or captions, objectifying slogans, a high number of likes/follows, weight loss encouragement messages, and hashtags indicating that the person in the image did not enhance their appearance (i.e., implying that they naturally meet ideals).

For Category 3, comparisons had to include one group (the "experimental group" for this analysis) that was exposed to appearance-ideal images and another group (the "comparison group" for this analysis) that was exposed to appearance-related images that were less likely to deleteriously impact body image. For this category, the images participants were exposed to that were deemed less likely to damage body image included body-positivity, plus-sized models, people in a larger body, people not wearing makeup, unedited images, parody versions of idealised images, and people of average size.

**Data Extraction Process**

Data were extracted by two reviewers (including the author of this thesis) and effect sizes were placed into a table that was used to populate the meta-analysis data file. For both experimental and longitudinal studies, this table included the mean age of participants, the number of participants in the analyses of interest, the percentage of female participants, the proportion of participants identifying as White or Caucasian, the country in which the research was based, the type of sample, and the measures used in the analysis. Details of any

analysis of moderators or mediators that addressed individual difference or vulnerability factors were also extracted. For the experimental studies, the table included information about the experimental and comparison conditions in the analysis, Cohen's *d* and Hedges' *g* for the comparison between the conditions, and 95% confidence intervals for Cohen's *d* and Hedges' *g*. For the longitudinal studies, the table included the time between measurement points and Fisher's *Z* with 95% confidence intervals. Because there was no common time point to examine among the longitudinal studies, only the relationship from the first (i.e., T1) to the second time point (i.e., T2) was included, and any additional time points were excluded. The duration between time points ranged from four weeks to two years.

Where further information was needed about articles for screening decisions or to calculate effect sizes, this information was requested from the corresponding authors of those articles. In total, 37 requests for information were made, 32 of which were responded to and 30 of which resulted in the requested information being obtained.

**Risk of Bias and Quality Assessment**

Risk of bias and quality assessments were conducted by a research assistant, in consultation with the author of this thesis. The Revised Cochrane Risk of Bias Tool for Randomized Trials (RoB 2; Higgins et al., 2011) was used for the risk of bias assessment of the experimental studies. This tool is designed to identify features of randomised trials in healthcare that might limit the extent to which causal inferences can be drawn from their findings. Its relevance to research on psychological experiments examining the effects of one-off exposures is somewhat limited because it was designed to assess trials of interventions; however, a more suitable tool could not be located. The RoB 2 evaluates the risk of bias in studies based on the following domains, using 22 questions: the randomisation process, the effect of assignment to interventions, missing outcome data, measurement of the outcome, selection of the reported result, and overall (based on judgements in the previous

categories). The domains for the effect of assignment to intervention and the selection of the reported result (Domains 2 and 5) were not very relevant to the experiments included in this analysis (the former because it focusses on interventions, the latter because pre-specified analysis plans were unlikely to be available – these are more commonly available as part of pre-registration of intervention trials). Hence, these domains were excluded from the assessment. Overall ratings for each domain are derived using algorithms based on responses for each question in that domain. Response options per question are Yes, Probably Yes, No, Probably No, and No Information. Overall domain ratings are Low Risk, Some Concerns, and High Risk.

The IHE Quality Appraisal Checklist for Case Series Studies (Guo et al., 2016) was used for the quality assessment of the longitudinal studies. This checklist includes 20 questions about the study objective, study design, study population, intervention and co-intervention, outcome measures, statistical analysis, results and conclusions, and competing interests and sources of support. The checklist includes a recommendation that researchers review the items before beginning the quality assessment to ensure that they are all relevant to the studies of interest and that reviewers discuss and decide on the important aspects of criteria for certain items. The author and research assistant decided that 15 of the items were relevant to the longitudinal studies in this review (Items 4, 7, 9, 11, and 18 were deemed irrelevant) and that the important characteristics of the participants to be reported were age (*M* and *SD*), gender (percentage or *n*), and ethnicity (percentage or *n*; for Item 5). Response options for each item include Yes, No, and either Partial or Unclear (depending on the item).

## Statistical Analyses

### *Calculation of Effect Sizes*

Between-groups Cohen's *d* and 95% CIs for the experimental studies were calculated using the Campbell Collaboration tool (https://www.campbellcollaboration.org/research-

resources/effect-size-calculator.html), inputting sample sizes, means or adjusted means, and standard deviations or standard errors (where both were provided, preference was given to adjusted means and standard errors that accounted for baseline levels of outcome measures). Cohen's *d* values were then transformed into Hedges' *g* values.

For longitudinal studies, an Excel file developed by a statistician was used to produce the partial correlations between social media use at T1 and body image at T2 (controlling for baseline body image), Fisher's *Z*, the standard error for Fisher's *Z*, and 95% CIs for Fisher's *Z*, using the correlations between T1 social media use and T1 body image, T1 social media use and T2 body image, and body image at T1 and T2. Formulae used were obtained from Cohen and Cohen (1983, pp. 88-108) and Pennsylvania State University (2021). Effect sizes were calculated such that a negative sign indicates poorer body image, and a positive sign indicates improved body image.

### *Meta-Analyses*

Meta-analyses were conducted in R, a free software environment for statistical analyses (R Core Team, 2021). Multi-level meta-analyses were conducted, to account for non-independence of effect sizes where more than one effect was reported from a single sample (i.e., those with multiple body image outcomes or comparisons of interest), using the approach outlined by Harrer et al. (2021). The metafor package (Viechtbauer, 2010) was used to run the multi-level models and produce forest plots and funnel plots.

### *Moderator Analyses*

Moderator analyses were conducted in categories with at least 20 samples, investigating whether age and proportion of female participants were related to outcomes. Categories 1 and 2 met this threshold. The mean age and percentage of self-reported females in the sample were included as continuous, quantitative predictors. The time between measurements (operationalised as months between measurements, also a continuous,

quantitative variable) was investigated as a moderator of outcomes in the longitudinal studies (i.e., Category 4) to assess whether the variability in the timespans examined posed a methodological concern. The analyses were run according to the steps outlined by Harrer et al. (2021), which use the metafor package (Viechtbauer, 2010).

### *Testing Heterogeneity*

*Q* and $I^2$ statistics were used to assess heterogeneity, the former obtained through the metafor package (Viechtbauer, 2010) and the latter through the dmetar package (version 0.0.9000; Harrer et al., 2019). The *Q* statistic is a measure of weighted squared deviations around the mean, and a significant result suggests that variability is unlikely to be due to chance (Laird et al., 2017). The $I^2$ statistic is a measure of the proportion of total study variation that is due to heterogeneity. A value of 0 indicates that no variance between study estimates is due to heterogeneity, mild heterogeneity is indicated by values of 30 or less, and notable heterogeneity is suggested by values above 50 (Higgins & Thompson, 2002).

### *Publication Bias*

Evidence of publication bias was tested using Egger's regression intercept (Egger et al., 1997), in which the standardised effect sizes are regressed against their precisions and a regression intercept of zero is expected if there is no publication bias, whereas a significant result suggests that publication bias may be present. Because there is no function in any R package designed to run Egger's test for multilevel meta-analyses, the advice from Viechtbauer (2015) to include sample variance as a moderator to extend the test to the present models was implemented. Evidence of significant moderation would suggest possible publication bias. A similar approach was used by Habeck and Schultz (2015).

## Qualitative Synthesis of Moderators and Mediators

The extracted information about moderating and mediating mechanisms in articles included in the meta-analysis was reviewed. The frequency with which variables were analysed, and the results of such analyses, were recorded.

## Results

### Characteristics of Articles

Data were extracted for 53 samples (43 experimental, 10 longitudinal) from 45 articles (36 experimental, 9 longitudinal). Samples were based in 13 countries, with Australia (*k* = 18, 34.0%) and the USA (*k* = 15, 28.3%) emerging as the most highly represented countries. The average mean (i.e., the mean mean) of participant age was 21.49 years (*SD* = 2.06; range = 15.92 – 26.79) for the experimental studies and 14.83 years (*SD* = 2.29; range = 10.51 – 18.72) at T1 for the longitudinal studies. Females were highly represented, comprising a mean of 82.69% (*SD* = 33.76; range = 0 – 100) of the experimental samples and 54.33% (*SD* = 43.92; range = 0 – 100) of the longitudinal samples. Similarly, where information on this was available, the included studies tended to report that most of their participants were White or Caucasian, comprising a mean of 60.58% (*SD* = 25.79; range = 0 – 100; *k* = 34) of the experimental samples. Statistics on the proportion of White or Caucasian participants were only available in one of the longitudinal studies, but the longitudinal studies were likely to have a high proportion of participants identifying as White or Caucasian, given the countries in which they were based (i.e., Australia, Belgium, Croatia, Germany, Norway, the Netherlands, and the USA). The experimental samples typically comprised college or university students (*k* = 29, 67.44%) or young adults (*k* = 12, 27.9%). In the longitudinal designs, high school students (*k* = 5, 50.0%) were the most common sample type. See **Tables 3.1 and 3.2** for information about included articles on a study-by-study basis.

**Table 3.1**

*Summary of Characteristics of Experimental Studies*

| Reference | Country | *N* | Age *M* (*SD*) | % Female | Culture/Ethnicity/Race | Sample | Social Media Platform | Types of Social Media Image Exposure | Moderator(s) & Mediator(s) |
|---|---|---|---|---|---|---|---|---|---|
| Barron et al., 2021: Study 1 | USA | 180 | 19.12 (1.81) | 65.6 | 53.3% White, 21.2% Asian, 9.4% Black or African American, 8.4% identified as Latino or Hispanic, 5.4% biracial, <1% Native Hawaiian or Pacific Islander | Undergraduate students | Instagram | Fitspiration; Self-compassion; Fitspiration + self-compassion; Neutral | **Trait appearance comparison (moderator) [a];** Sex (moderator) |
| Barron et al., 2021: Study 2 | USA | 296 | 26.79 (2.65) | 41.6 | 66.9% White, 14.9% Black or African American, 10.1% Asian, 5.7% Latino, 1.4% American Indian or Alaska Native | Young adults | Instagram | Fitspiration; Self-compassion; Fitspiration + self-compassion; Neutral | Trait appearance comparison (moderator); Sex (moderator) |
| Brichacek et al., 2018 | Australia | 189 | 22.6 (6.6) | 75.0 | 71% Caucasian, 13% Asian, 5% Australian Aboriginal or Torres Strait Islander, 3% African, 7% other | University students | Facebook | Appearance-ideal; Neutral | N/A |
| Brown & Tiggemann, 2020 | Australia | 256 | 20.23 (3.04) | 100 | 72.7% Caucasian, 15.6% Asian, 1.2% African, 0.8% Aboriginal/Torres Strait Islander, 9.4% other/unspecified | Undergraduate students | Instagram | Appearance-ideal (captions: body-positive, disclaimer, none); Neutral | **State appearance comparison (mediator); Trait appearance comparison (moderator) [b]** |
| Casale et al., 2019: Females | Italy | 65 | 23.22 (1.73) | 100 | 100% Caucasian | College students | Instagram | Appearance-ideal; No exposure | N/A |
| Casale et al., 2019: Males | Italy | 65 | 23.29 (1.77) | 0 | 100% Caucasian | College students | Instagram | Appearance-ideal; No exposure | N/A |

**Table 3.1 (Continued)**

| Reference | Country | *N* | Age *M* (*SD*) | % Female | Culture/Ethnicity/Race | Sample | Social Media Platform | Types of Social Media Image Exposure | Moderator(s) & Mediator(s) |
|---|---|---|---|---|---|---|---|---|---|
| Chansiri et al., 2020 | USA | 221 | 21 (1.75) | 100 | 60.2% Caucasian, 20.4% Asian, 6.8% Hispanic, 2.5% Black, 10.4% other | College students | Instagram | Fitspiration; Thinspiration; Neutral | **State appearance comparison (mediator);** State ideal body internalisation (mediator) |
| Cohen et al., 2019 | Australia | 195 | 21.69 (3.49) | 100 | 52.8% Caucasian, 34.9% Asian, 5.6% Middle Eastern, 1% Aboriginal or Torres Strait Islander, 0.5% African, 5.1% other | University staff and students | Instagram | Appearance-ideal; Body-positive; Neutral | N/A |
| Couture Bue & Harrison, 2020 | USA | 181 | 23.42 (5.05) | 100 | 70% White (non-Hispanic), 7% Biracial/Multiracial, 3% African American/Black, 9% Hispanic/Latino/a, 7% Asian/Asian-American, 1% Pacific Islander/Native Hawaiian, 3% other | Young adults | Instagram | Appearance-ideal (captions: idealised, disclaimer) | N/A |
| Davies et al., 2020 | UK | 109 | 21.58 (1.54) | 100 | N/A | Young adults | Instagram | Fitspiration (captions: fitspiration, body-positive, neutral) | N/A |
| Dignard & Jarry, 2021 [c] | Canada | 331 | 20.61 (2.64) | 100 | 77.7% Caucasian/European, 9.3% Arab, 6.6% African, 5.4% South Asian, 2.7% East Asian, 2.7% First Nations, 1.5% Hispanic, 0.6% Caribbean, 2.1% mixed race | Undergraduate students | Instagram | Fitspiration; Thinspiration; Neutral | **State appearance comparison (mediator) [d]; Positive body image (moderator) [e]** |
| Fardouly & Holland, 2018 | USA | 164 | 23.09 (1.69) | 100 | 76.8% Caucasian, 9.8% African American, 6.1% Asian, 3.7% American Indian, 3.7% other | Young adults | Instagram | Appearance-ideal (captions: disclaimer, none); Neutral | Thin-ideal internalisation (moderator); **Appearance comparison tendency (moderator)** |

**Table 3.1 (Continued)**

| Reference | Country | *N* | Age *M* (*SD*) | % Female | Culture/Ethnicity/Race | Sample | Social Media Platform | Types of Social Media Image Exposure | Moderator(s) & Mediator(s) |
|---|---|---|---|---|---|---|---|---|---|
| Flynn, 2016 | USA | 501 | 19.98 (2.22) | 65.9 | 80.8% Caucasian, 11.6% African American, 1.6% Hispanic, 1.6% Asian, 0.4% Native American, 4.0% other | Undergraduate students | Facebook | Appearance-ideal; Neutral | **Pre-dispositional body satisfaction (moderator)** [f] |
| Hendrickse et al., 2020 | USA | 202 | 20.80 (2.05) | 100 | 66.8% Caucasian, 18.3% Hispanic/Latino, 6.9% African American, 3.5% Asian, 4.5% other | Undergraduate students | Instagram | Appearance-ideal (slogan: objectifying, empowering); Plus-sized | **Trait actual-ideal body discrepancy (moderator)** |
| Kim, 2020 | USA | 330 | 21.73 (2.99) | 47.0 | 58.2% White/Caucasian, 15.8% Hispanic, 12.7% African American, 10.9% Asian, 2.4% other | Young adults | Instagram | Appearance-ideal (comments: favourable, unfavourable, none) | **Ideal perception of body posting (mediator); Self-discrepancy (moderator)** |
| Kleemans et al., 2018 | The Netherlands | 144 | 15.92 (1.16) | 100 | N/A | Secondary school students | Instagram | Appearance-ideal (manipulation: present, absent) | **Social comparison tendency (moderator)** |
| Lee et al., 2013: South Korea | South Korea | 137 | 20.57 (1.95) | 100 | 100% ethnically Korean | Undergraduate students | Facebook | Appearance-ideal; Plus-sized | N/A |
| Lee et al., 2013: USA | USA | 159 | 20.59 (3.04) | 100 | 42.8% Asian, 29% Caucasian, remainder were Latin, African American, and multi-ethnic | Undergraduate students | Facebook | Appearance-ideal; Plus-sized | N/A |
| Livingston et al., 2020 | Australia | 201 | 18.93 (1.24) | 100 | 50.2% Asian, 37.3% Caucasian | Undergraduate students | Instagram | Appearance-ideal (captions: disclaimer, none); Neutral | N/A |
| Lowe-Calverley & Grieve, 2021 | Australia | 111 | 23.39 (6.49) | 100 | N/A | Adults | Instagram | Appearance-ideal (likes & follows: high, low); Neutral | N/A |
| Paulson, 2020 | USA | 47 | 19.4 (N/A) | 0 | N/A | College students | Instagram | Appearance-ideal; Neutral | N/A |

**Table 3.1 (Continued)**

| Reference | Country | *N* | Age *M* (*SD*) | % Female | Culture/Ethnicity/Race | Sample | Social Media Platform | Types of Social Media Image Exposure | Moderator(s) & Mediator(s) |
|---|---|---|---|---|---|---|---|---|---|
| Politte-Corn & Fardouly, 2020 | USA | 394 | 23.29 (1.60) | 0 | 62.4% Caucasian, 10.9% African American, 7.3% Asian, 6.6% Hispanic, 4.1% multiracial, 2.9% biracial, 1.5% Native American, 0.7% other | Young adults | Instagram | Appearance-ideal (comments: appearance-related, appearance-neutral; makeup & editing: high, low) | N/A |
| Prichard et al., 2020 | Australia | 108 | 20.24 (1.86) | 100 | 64.8% Caucasian, 27.8% Asian, 3.7% Indian, 0.9% African, 2.8% other | Undergraduate students | Instagram | Fitspiration; Neutral | N/A |
| Qi & Cui, 2018: Study 1 | China | 64 | 20.78 (1.46) | 100 | N/A | Undergraduate students | WeChat | Appearance-ideal; Neutral | N/A |
| Qi & Cui, 2018: Study 2 | China | 159 | 20.49 (2.05) | 100 | N/A | Undergraduate students | WeChat | Appearance-ideal (SES: high, low); Neutral | N/A |
| Rounds & Stutts, 2020 | USA | 283 | 20.17 (1.25) | 100 | 67.8% Caucasian, 6.0% African American, 6.0% Asian American, 4.2% biracial, 2.2% other | College students | Instagram | Fitspiration; Fitspiration + neutral; Neutral | N/A |
| Sampson et al., 2020 | UK | 132 | 20.5 (2.21) | 60.6 | 47.0% White, 25.8% Asian, 11.3% Mixed, 3.0% Black, 12.9% other | Undergraduate students | Instagram | Appearance-ideal; Neutral | N/A |
| Sherlock & Wagstaff, 2018 | Australia | 129 | 24.60 (4.54) | 100 | N/A | Young adults | Instagram | Fitspiration; Beauty; Neutral; None | N/A |
| Slater et al., 2019 | UK | 102 | 23.55 (2.33) | 100 | 93.1% White, 4.9% mixed race, 2% Asian | Young adults | Instagram | Appearance-ideal; Parody | Trait thin-ideal internalisation (moderator) |

**Table 3.1 (Continued)**

| Reference | Country | *N* | Age *M* (*SD*) | % Female | Culture/Ethnicity/Race | Sample | Social Media Platform | Types of Social Media Image Exposure | Moderator(s) & Mediator(s) |
|---|---|---|---|---|---|---|---|---|---|
| Tamplin et al., 2018: Females | Australia | 187 | 24.6 (3.7) | 100 | N/A | Young adults | Unspecified | Appearance-ideal; Neutral | Internalisation of appearance ideals (moderator); Appearance comparison tendency (moderator); **Commercial social media literacy (moderator);** Peer social media literacy (moderator) |
| Tamplin et al., 2018: Males | Australia | 187 | 22.8 (3.9) | 0 | N/A | Young adults | Unspecified | Appearance-ideal; Neutral | Internalisation of appearance ideals (moderator); Appearance comparison tendency (moderator); Commercial social media literacy (moderator); Peer social media literacy (moderator) |
| Taniguchi & Lee, 2012: Japan | Japan | 103 | 19.86 (3.02) | 100 | 100% ethnically Japanese | University students | Facebook | Appearance-ideal (comments: weight loss encouraging, discouraging); Plus-sized | N/A |
| Taniguchi & Lee, 2012: USA | USA | 96 | 21.02 (4.87) | 100 | 48.2% Asian, 22.5% Caucasian, 11% (part) Hawaiians/Samoan, 4.4% Hispanic/Black, 13.9% interethnic | University students | Facebook | Appearance-ideal (comments: weight loss encouraging, discouraging); Plus-sized | N/A |

**Table 3.1 (Continued)**

| Reference | Country | *N* | Age *M* (*SD*) | % Female | Culture/Ethnicity/Race | Sample | Social Media Platform | Types of Social Media Image Exposure | Moderator(s) & Mediator(s) |
|---|---|---|---|---|---|---|---|---|---|
| Tiggemann & Anderberg, 2019 | Australia | 305 | 25.34 (2.98) | 100 | 69.2% Caucasian, 11.8% Latino/Hispanic, 10.2% African American, 6.6% Asian, 0.3% Native American, 2.0% other | Young adults | Instagram | Appearance-ideal; Appearance-ideal vs realistic; Realistic | N/A |
| Tiggemann & Anderberg, 2020 | Australia | 300 | 24.94 (2.96) | 0 | 61.3% Caucasian/White, 12.7% African American, 11.7% Latino/Hispanic, 10.3% Asian, 2.0% Native American, 2.0% other | Young adults | Instagram | Appearance-ideal; Fitspiration; Neutral | State appearance comparison (mediator); Muscular-ideal internalisation (moderator) |
| Tiggemann & Barbato, 2018 | Australia | 128 | 20.12 (2.46) | 100 | 59.4% Caucasian/White, 32.0% Asian, 3.1% African, 5.5% other | Undergraduate students | Instagram | Appearance-ideal (comments: appearance-related, appearance-neutral) | Trait self-objectification (moderator) |
| Tiggemann & Velissaris, 2020 | Australia | 192 | 20.11 (1.98) | 100 | 63.5% Caucasian/White, 31.8% Asian, 1.0% Aboriginal/Torres Strait Islander, 0.5% African, 3.1% other | Undergraduate students | Instagram | Appearance-ideal (comments: appearance-positive, appearance-positive + disclaimer, none) | State appearance comparison (mediator); Thin-ideal internalisation (moderator) |
| Tiggemann & Zinoviev, 2019 | Australia | 204 | 20.26 (2.62) | 100 | 75.5% Caucasian/White, 22.5% Asian, 1.5% African, 0.5% other | Undergraduate students | Instagram | Appearance-ideal (hashtag: enhancement-free, none; manipulation: present, absent) | Self-photo investment (moderator); **Self-photo manipulation (moderator)** [g] |
| Tiggemann et al., 2018 | Australia | 220 | 20.13 (2.58) | 100 | 67.3% Caucasian/White, 23.2% Asian, 2.3% African, 1.4% Aboriginal or Torres Strait Islander, 5.9% other | Undergraduate students | Instagram | Appearance-ideal (likes: high, low); Average-sized | Instagram involvement (moderator) |

**Table 3.1 (Continued)**

| Reference | Country | *N* | Age *M* (*SD*) | % Female | Culture/Ethnicity/Race | Sample | Social Media Platform | Types of Social Media Image Exposure | Moderator(s) & Mediator(s) |
|---|---|---|---|---|---|---|---|---|---|
| Tiggemann et al., 2020a | Australia | 384 | 20.27 (2.52) | 100 | 68.8% Caucasian, 19.1% Asian, 4.2% Indian, 1.3% Middle Eastern, 0.8% Aboriginal/Torres Strait Islander, 0.5% African, 5.2% other/unspecified | University students | Instagram | Appearance-ideal (captions: body-positive, none); Average-sized | **Thin-ideal internalisation (moderator)** [h] |
| Tiggemann et al., 2020b | Australia | 130 | 21.17 (2.85) | 100 | 62.3% Caucasian, 33.1% Asian, 4.6% other | Undergraduate students | Instagram | Appearance-ideal; Average-sized | N/A |
| Vendemia & DeAndrea, 2018 | USA | 360 | 20.34 (2.74) | 100 | 79% Caucasian/White, 9% Asian/Asian American, 7.5% African American/Black, 1% Hispanic/Latina, 3% other | Undergraduate students | Instagram | Appearance-ideal (type: models, peers; manipulation: high, low) | **Perceived photo modification (mediator)** |

*Note*. N/A = not available. Bolded items in the Moderator(s) & Mediator(s) are those that were statistically significant.

[a] Trait appearance comparison was a significant moderator in one of the three analyses in which it was tested in this role.

[b] Trait appearance comparison moderated the effect of exposure to images on body appreciation but not body dissatisfaction.

[c] Descriptive statistics were provided for the Caucasian and non-Caucasian samples together.

[d] This effect was only found in the Caucasian sample.

[e] Positive body image moderated the mediating role of appearance comparison in three of the six analyses in which it was tested in this role.

[f] Pre-dispositional body satisfaction moderated the effect of exposure to body ideal pictures but not exposure to comments.

[g] Self-photo manipulation moderated the effect of exposure to images on facial dissatisfaction but not body dissatisfaction.

[h] Thin-ideal internalisation moderated the effect of exposure to images on body appreciation but not body dissatisfaction.

**Table 3.2**

*Summary of Characteristics of Longitudinal Studies*

| Reference | Country | *N* | Age *M* (*SD*) at T1 | % Female | Culture/Ethnicity/Race | Sample | Social Media Platform | Type(s) of Social Media Use | Moderator(s) & Mediator(s) |
|---|---|---|---|---|---|---|---|---|---|
| de Vries et al., 2014, 2016 [a] | The Netherlands | 604 | 14.70 (1.70) | 50.7 | 97.7 % of participants' parents were born in the Netherlands | Children of members of an online access panel | Hyves.nl | Frequency of use | Sex (moderator); **Appearance investment (mediator)**; Peer appearance-related feedback (mediator) |
| Rousseau et al., 2017 | Belgium | 1840 | 14.76 (1.41) | 48.0 | N/A | High school students | Facebook | Passive use; Comparison to others | **Sex (moderator); Comparison (mediator)** |
| Sevic et al., 2020 | Croatia | 743 | 15.90 (0.54) | 0 | N/A | High school students | Multiple platforms | Daily hours of use | N/A |
| Skowronski et al., 2020 | Germany | 660 | 15.09 (1.26) | 50.6 | 91.1% German nationals | High school students | Instagram | Exposure to sexualised images | Sex (moderator); Appearance comparison (mediator); Thin-ideal internalisation (mediator); Muscular-ideal internalisation (mediator); **Self-objectification (mediator)** |
| Smith et al., 2013 | USA | 232 | 18.72 (1.60) | 100 | 76.3% Caucasian, 9.5% African American, 2.6% Asian, 9% Hawaiian/other Pacific Islander, 17% other | University students | Facebook | Maladaptive use | N/A |

**Table 3.2 (Continued)**

| Reference | Country | *N* | Age *M* (*SD*) at T1 | % Female | Culture/Ethnicity/Race | Sample | Social Media Platform | Type(s) of Social Media Use | Moderator(s) & Mediator(s) |
|---|---|---|---|---|---|---|---|---|---|
| Steinsbekk et al., 2021 | Norway | 725 | 10.51 (0.17) | 51.9 | 92.1% of participants' biological mothers were of "Western" origin (Western Europe, USA, Canada, Australia, New Zealand), 7.9% of other origins (e.g., African and Asian) | Children | Multiple platforms | Self-oriented use; Other-oriented use | **Sex (moderator)** [b] |
| Tiggemann & Slater, 2016 | Australia | 438 | 13.60 (0.70) | 100 | N/A | High school students | Facebook | Time using; Number of friends | N/A |
| Vandenbosch & Eggermont, 2016 | Belgium | 1,041 | 15.35 (1.47) | 43.4 | 95% born in Belgium | Adolescents | Multiple platforms | Frequency of use; Monitoring of attractive peers | **Sex (moderator)** [c] |

*Note*. T1 = time 1; N/A = not available. Bolded items in the Moderator(s) & Mediator(s) are those that were statistically significant.

[a] Descriptive statistics were provided for the female and male samples together.

[b] Sex moderated the relationship between other-oriented social media use and appearance self-esteem (such that the relationship was only significant in girls). There was no main effect of self-oriented social media use, and mediation was not tested for this relationship.

[c] Sex was a significant moderator for the relationship between T2 frequency of social media use and T3 self-objectification. It did not significantly moderate the relationship between T2 frequency of social media use and T3 body surveillance nor between T2 monitoring of attractive peers on social networking sites and T3 self-objectification or body surveillance.

## Risk of Bias and Quality Assessment

### *Risk of Bias Assessment of Experimental Studies*

The risk of bias assessment for the experimental studies is summarised in **Table 3.3** and **Figure 3.2**. No study was assessed as having a "high risk" of bias due to the randomisation process, but 17 studies (47.2%) were rated as having "some concerns", most commonly due to there being insufficient information to determine whether the allocation sequence was concealed before participants enrolled and were assigned to a condition or to determine whether assignment to conditions was random. For the missing outcome data domain, 22 (61.1%) studies were considered "low risk", whilst the remaining 14 (38.9%) were rated as "high risk", most frequently because it was unclear whether all randomised participants were accounted for in the presentation of the results. For the domain related to the risk of bias in the measurement of the outcome, all studies received a rating of "low risk". Regarding the overall ratings, 14 (38.9%) studies were rated "high risk" because they were rated as such in the domain for risk of bias due to missing outcome data. A further 10 studies (27.8%) were rated as having "some concerns" because they received this rating for the domain related to the risk of bias in the randomisation process but were rated "low risk" in the other domains. The 12 (33.3%) studies rated "low risk" overall received this rating in every domain.

**Table 3.3**

*Risk of Bias Summary for Experimental Studies*

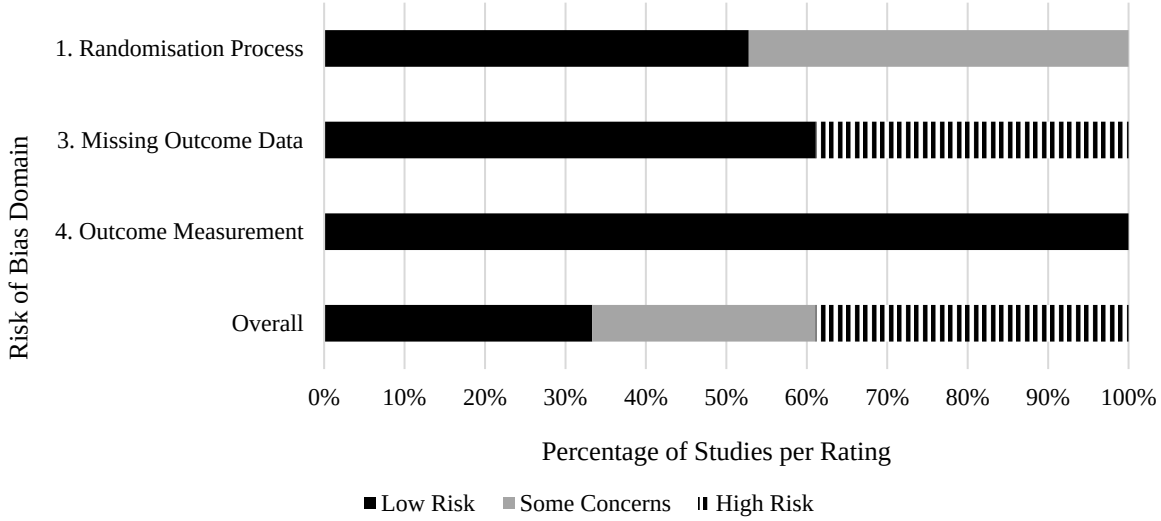
| Reference | Risk of bias assessment for randomisation process | Risk of bias assessment for missing outcome data | Risk of bias assessment for outcome measurement | Overall risk of bias assessment for the whole study |
|---|---|---|---|---|
| Barron et al., 2021 | Low risk | Low risk | Low risk | Low risk |
| Brichacek et al., 2018 | Some concerns | Low risk | Low risk | Some concerns |
| Brown & Tiggemann, 2020 | Some concerns | High risk | Low risk | High risk |
| Casale et al., 2019 | Some concerns | Low risk | Low risk | Some concerns |
| Chansiri et al., 2020 | Some concerns | High risk | Low risk | High risk |
| Cohen et al., 2019 | Low risk | Low risk | Low risk | Low risk |
| Couture Bue & Harrison, 2020 | Some concerns | High risk | Low risk | High risk |
| Davies et al., 2020 | Some concerns | Low risk | Low risk | Some concerns |
| Dignard & Jarry, 2021 | Low risk | Low risk | Low risk | Low risk |
| Fardouly & Holland, 2018 | Some concerns | Low risk | Low risk | Some concerns |
| Flynn, 2016 | Low risk | Low risk | Low risk | Low risk |
| Hendrickse et al., 2020 | Some concerns | Low risk | Low risk | Some concerns |
| Kim, 2020 | Low risk | High risk | Low risk | High risk |
| Kleemans et al., 2018 | Some concerns | High risk | Low risk | High risk |
| Lee et al., 2013 | Some concerns | High risk | Low risk | High risk |
| Livingston et al., 2020 | Some concerns | Low risk | Low risk | Some concerns |
| Lowe-Calverley & Grieve, 2021 | Some concerns | High risk | Low risk | High risk |
| Paulson, 2020 | Low risk | Low risk | Low risk | Low risk |
| Politte-Corn & Fardouly, 2020 | Low risk | High risk | Low risk | High risk |
| Prichard et al., 2020 | Low risk | Low risk | Low risk | Low risk |
| Qi & Cui, 2018 | Some concerns | Low risk | Low risk | Some concerns |
| Rounds & Stutts, 2020 | Low risk | Low risk | Low risk | Low risk |
| Sampson et al., 2020 | Low risk | Low risk | Low risk | Low risk |

**Table 3.3 (Continued)**

| Reference | Risk of bias assessment for randomisation process | Risk of bias assessment for missing outcome data | Risk of bias assessment for outcome measurement | Overall risk of bias assessment for the whole study |
|---|---|---|---|---|
| Sherlock & Wagstaff, 2018 | Some concerns | Low risk | Low risk | Some concerns |
| Slater et al., 2019 | Some concerns | Low risk | Low risk | Some concerns |
| Tamplin et al., 2018 | Low risk | High risk | Low risk | High risk |
| Taniguchi & Lee, 2012 | Some concerns | Low risk | Low risk | Some concerns |
| Tiggemann & Anderberg, 2019 | Low risk | Low risk | Low risk | Low risk |
| Tiggemann & Anderberg, 2020 | Low risk | High risk | Low risk | High risk |
| Tiggemann & Barbato, 2018 | Low risk | Low risk | Low risk | Low risk |
| Tiggemann & Velissaris, 2020 | Low risk | High risk | Low risk | High risk |
| Tiggemann & Zinoviev, 2019 | Low risk | High risk | Low risk | High risk |
| Tiggemann et al., 2018 | Low risk | High risk | Low risk | High risk |
| Tiggemann et al., 2020a | Low risk | Low risk | Low risk | Low risk |
| Tiggemann et al., 2020b | Some concerns | High risk | Low risk | High risk |
| Vendemia & DeAndrea, 2018 | Low risk | Low risk | Low risk | Low risk |

**Figure 3.2**

*Risk of Bias Assessment for Each Domain as a Percentage of All Experimental Studies*



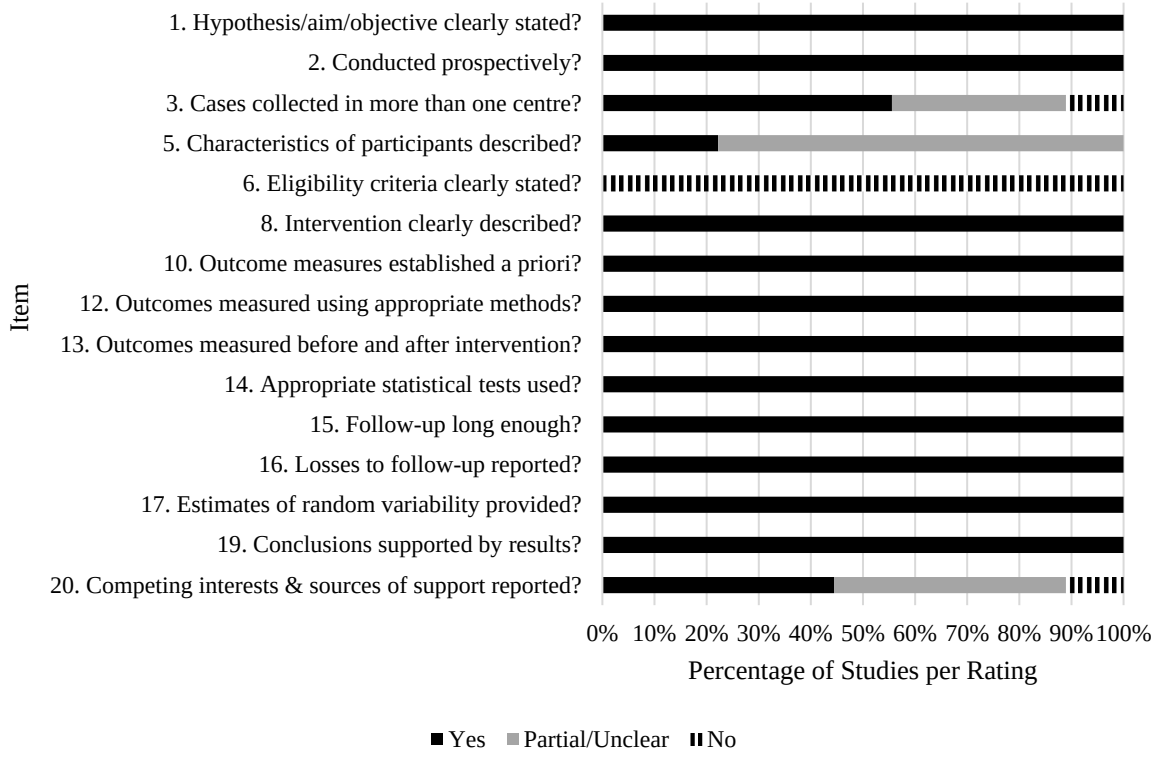

*Note*. Missing domains were deemed irrelevant to the assessment and therefore not used.

### *Quality Assessment of Longitudinal Studies*

The overall quality of the longitudinal studies was fair, with all studies receiving the most positive rating possible on 11 of the 15 items (see **Figure 3.3** and **Table 3.4**). The key quality issue with the included studies was a lack of transparency in the inclusion criteria, with no study rated as having adequately outlined eligibility criteria. Other, less common issues identified included recruitment appearing to be based at only one site, insufficient detail in the reporting of participant characteristics, and unclear reporting of competing interests.

**Figure 3.3**

*Quality Assessment for Each Item as a Percentage of All Longitudinal Studies*




*Note*. Missing items were deemed irrelevant to the assessment and therefore not used.

**Table 3.4**

*Quality Assessment Summary for Longitudinal Studies*

| Reference | 1. Was the hypothesis/aim/objective of the study clearly stated? | 2. Was the study conducted prospectively? | 3. Were the cases collected in more than one centre? | 5. Were the characteristics of the participants included in the study described? | 6. Were the eligibility criteria (i.e. inclusion and exclusion criteria) for entry into the study clearly stated? | 8. Was the intervention of interest clearly described? | 10. Were relevant outcome measures established a priori? | 12. Were the relevant outcomes measured using appropriate objective/subjective methods? | 13. Were the relevant outcome measures made before and after the intervention? | 14. Were the statistical tests used to assess the relevant outcomes appropriate? | 15. Was follow-up long enough for important events and outcomes to occur? | 16. Were losses to follow-up reported? | 17. Did the study provide estimates of random variability in the data analysis of relevant outcomes? | 19. Were the conclusions of the study supported by results? | 20. Were both competing interests and sources of support for the study reported? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| de Vries et al., 2014 | Yes | Yes | Unclear | Partial | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Partial |
| de Vries et al., 2016 | Yes | Yes | Unclear | Partial | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Partial |
| Rousseau et al., 2017 | Yes | Yes | Yes | Partial | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Partial |
| Sevic et al., 2020 | Yes | Yes | Yes | Partial | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Skowronski et al., 2020 | Yes | Yes | Yes | Partial | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Partial |
| Smith et al., 2013 | Yes | Yes | No | Yes | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Steinsbekk et al., 2021 | Yes | Yes | Unclear | Yes | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Tiggemann & Slater, 2017 | Yes | Yes | Yes | Partial | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| Vandenbosch & Eggermont, 2016 | Yes | Yes | Yes | Partial | No | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

*Note*. Missing checklist item numbers in the top row indicate those items that were deemed irrelevant to the assessment and therefore omitted.

## Meta-Analyses

### *Category 1: Appearance-Ideal Images vs Non-Appearance-Related*

Category 1 included 24 experimental samples, comprising 3816 participants (**Table 3.5** shows information used in the analysis). The pooled effect size suggested that viewing appearance-ideal images on social media has an immediate, moderate, detrimental effect on body image, compared to non-appearance-related conditions (Hedges' $g$ = -0.61, 95% CIs = -1.06, -0.15, $p$ <.01; see **Figure 3.4**). Heterogeneity was very high ($Q$ = 477.87, $p$ <.001; $I^2$ = 98.63), which was predominantly due to within-study variance ($I^2$ = 88.98), rather than between-study variance ($I^2$ = 9.65). The percentage of females in the sample and age were not significant moderators ($p$s = .35 and .60, respectively).

Three outlier effect sizes were identified by viewing the forest plot and scanning the Hedges' $g$ values; their confidence intervals had no overlap with those from the other studies in the analysis. All three outliers were self-objectification effects from the studies by Qi and Cui (2018). Removing these outliers from the analysis resulted in a small, revised pooled effect size of Hedges' $g$ = -0.28, 95% CIs = -0.35, -0.20, $p$ <.001, and a considerable improvement in heterogeneity, such that it was now mild to moderate ($Q$ = 81.83, $p$ = .02; $I^2$ = 34.79), with most of this heterogeneity attributed to between-study variance ($I^2$ = 33.98), and very little within-study variance ($I^2$ = 0.82). See **Figure 3.5** for a revised forest plot. Again, the percentage of females in the sample and age were not significant moderators ($p$s = .28 and .74, respectively).

**Table 3.5**

*Category 1 Meta-Analysis Input*

| Reference | Groups | *n* | Outcome Measure: Between-Groups Cohen's *d* (95% CI) |
|---|---|---|---|
| Barron et al., 2021: Study 1 (undergraduates) | Experimental: Exposure to gender-matched fitspiration images | 46 | Fitspo vs Neutral:<br>SBA: -0.20 (-0.60, 0.20)<br>SBS: -0.16 (-0.56, 0.24)<br>Fitspo vs Self-compassion:<br>SBA: -0.38 (-0.80, 0.04)<br>SBS: -0.32 (-0.74, 0.09) |
| | Comparison 1: Exposure to architecture images | 51 | |
| | Comparison 2: Exposure to self-compassion quote images | 43 | |
| Barron et al., 2021: Study 2 (young adults) | Experimental: Exposure to gender-matched fitspiration images | 80 | Fitspo vs Neutral:<br>SBA: -0.27 (-0.59, 0.05)<br>SBS: -0.21 (-0.53, 0.10)<br>Fitspo vs Self-compassion:<br>SBA: -0.20 (-0.54, 0.13)<br>SBS: -0.25 (-0.59, 0.08) |
| | Comparison 1: Exposure to architecture images | 74 | |
| | Comparison 2: Exposure to self-compassion quote images | 61 | |
| Brichacek et al., 2018 | Experimental: Exposure to gender- and ethnicity-matched ideal body images | 152 | BISS: -0.22 (-0.59, 0.14) |
| | Comparison: Exposure to travel images | 36 | |
| Brown & Tiggemann, 2020 | Experimental: Exposure to images of thin and attractive female celebrities with no caption | 64 | SBA: -0.48 (-0.83, -0.13)<br>SBD: -0.55 (-0.90, -0.20) |
| | Comparison: Exposure to travel images | 64 | |
| Casale et al., 2019: Females | Experimental: Exposure to profiles of attractive women | 27 | ASI-R SES: -0.61 (-1.11, -0.10)<br>CDRS: -0.63 (-1.14, -0.13) |
| | Comparison: No exposure | 38 | |
| Casale et al., 2019: Males | Experimental: Exposure to profiles of attractive men | 27 | ASI-R MS: -0.53 (-1.03, -0.03)<br>ASI-R SES: -0.35 (-0.85, 0.15)<br>FSM: -0.14 (-0.63, 0.36)<br>MSM: -0.47 (-0.97, 0.03) |
| | Comparison: No exposure | 38 | |
| Chansiri et al., 2020 | Experimental 1: Exposure to fitspiration images of women | 79 | Fitspo vs Neutral:<br>SATAQ-I: -0.09 (-0.42, 0.24)<br>SOQ: 0.02 (-0.31, 0.35)<br>SBD: -0.45 (-0.78, -0.12)<br>Thinspo vs Neutral:<br>SATAQ-I: 0.29 (-0.05, 0.62)<br>SOQ: 0.14 (-0.19, 0.47)<br>SBD: -0.20 (-0.54, 0.13) |
| | Experimental 2: Exposure to thinspiration images of women | 77 | |
| | Comparison: Exposure to scenery images | 65 | |

**Table 3.5 (Continued)**

| Reference | Groups | *n* | Outcome Measure: Between-Groups Cohen's *d* (95% CI) |
|---|---|---|---|
| Cohen et al., 2019 | Experimental: Exposure to profiles of thin-ideal females | 65 | SBA: -0.18 (-0.52, 0.17) |
| | Comparison: Exposure to appearance-neutral profiles | 65 | SBS: -0.28 (-0.62, 0.07) |
| Dignard & Jarry, 2021: Caucasians | Experimental 1: Exposure to fitspiration images of women | 76 | Fitspo vs Neutral: BAS-2: -0.57 (-0.90, -0.24) BISS: -0.34 (-0.66, -0.01) |
| | Experimental 2: Exposure to thinspiration images of women | 78 | Thinspo vs Neutral: BAS-2: -0.40 (-0.72, -0.07) BISS: -0.23 (-0.56, 0.09) |
| | Comparison: Exposure to travel images | 71 | |
| Dignard & Jarry, 2021: Non-Caucasians | Experimental 1: Exposure to fitspiration images of women | 40 | Fitspo vs Neutral: BAS-2: -0.02 (-0.48, 0.44) BISS: -0.50 (-0.97, -0.03) |
| | Experimental 2: Exposure to thinspiration images of women | 33 | Thinspo vs Neutral: BAS-2: -0.04 (-0.52, 0.45) BISS: -0.27 (-0.76, 0.21) |
| | Comparison: Exposure to travel images | 33 | |
| Fardouly & Holland, 2018 | Experimental: Exposure to images of attractive women | 53 | SBD: -0.35 (-0.72, 0.03) |
| | Comparison: Exposure to travel-focused images | 58 | |
| Flynn, 2016 | Experimental: Exposure to body ideal profile pictures on a status page | 259 | BASS: 0.07 (-0.11, 0.24) |
| | Comparison: Exposure to scenery/landscape profile pictures on a status page | 242 | |
| Livingston et al., 2020 | Experimental: Exposure to images of an attractive woman | 67 | SBD: -0.25 (-0.59, 0.09) |
| | Comparison: Exposure to appearance-neutral images | 66 | |
| Lowe-Calverley & Grieve, 2021 | Experimental 1: Exposure to appearance-ideal images of women with high likes/follows | 37 | Ideal-popular vs Neutral: SBD: -0.68 (-1.15, -0.21) Ideal-less popular vs Neutral: SBD: -0.52 (-0.98, -0.05) |
| | Experimental 2: Exposure to appearance-ideal images of women with low likes/follows | 37 | |
| | Comparison: Exposure to nature images | 37 | |
| Paulson, 2020 | Experimental: Exposure to a feed of images of mesomorph ideal males | 26 | DMS: -0.43 (-1.01, 0.16) SBS: -0.29 (-0.87, 0.28) SFU: 0.15 (-0.42, 0.73) |
| | Comparison: Exposure to a feed of images of buildings, travel, and furniture | 21 | |
| Prichard et al., 2020 | Experimental: Exposure to a profile of fitspiration images of women | 53 | SBD: -0.64 (-1.03, -0.26) |
| | Comparison: Exposure to a profile of travel images | 55 | |
| Qi & Cui, 2018: Study 1 | Experimental: Exposure to profile of a thin-ideal woman | 32 | BAS-2: -0.15 (-0.64, 0.34) |
| | Comparison: Exposure to profile of product-only images | 32 | SOQ: -10.25 (-12.09, -8.41) [a] |

**Table 3.5 (Continued)**

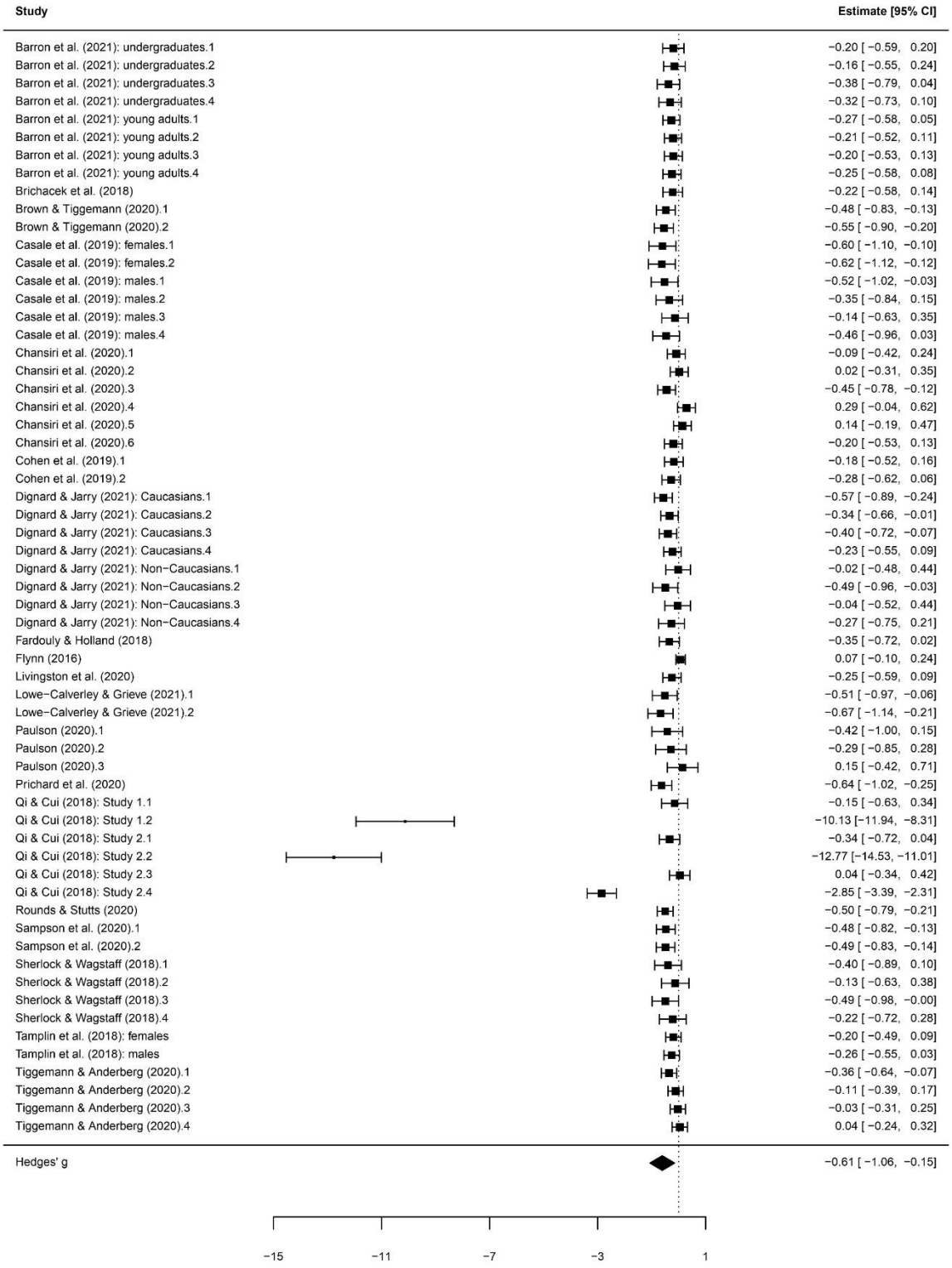
| Reference | Groups | *n* | Outcome Measure: Between-Groups Cohen's *d* (95% CI) |
|---|---|---|---|
| Qi & Cui, 2018: Study 2 | Experimental 1: Exposure to profile of a thin-ideal woman with high-perceived SES | 53 | Ideal-high SES vs Neutral:<br>BAS-2: -0.34 (-0.73, 0.04)<br>SOQ: -12.86 (-14.63, -11.08) [a]<br>Ideal-low SES vs Neutral:<br>BAS-2: 0.04 (-0.34, 0.42)<br>SOQ: -2.87 (-3.41, -2.33) [a] |
| | Experimental 2: Exposure to profile of a thin-ideal woman with parallel-perceived SES | 53 | |
| | Comparison: Exposure to profile of product-only images | 53 | |
| Rounds & Stutts, 2020 | Experimental: Exposure to fitspiration images of women | 92 | SBS: -0.50 (-0.79, -0.20) |
| | Comparison: Exposure to travel images | 93 | |
| Sampson et al., 2020 | Experimental: Exposure to idealised smile images | 71 | BSS: -0.48 (-0.83, -0.13)<br>FSS: -0.49 (-0.84, -0.14) |
| | Comparison: Exposure to nature images | 61 | |
| Sherlock & Wagstaff, 2018 | Experimental 1: Exposure to fitspiration images of women | 28 | Fitspo vs Neutral:<br>PASTAS-S: -0.40 (-0.90, 0.11)<br>Fitspo vs None:<br>PASTAS-S: -0.13 (-0.64, 0.38)<br>Ideal vs Neutral:<br>PASTAS-S: -0.50 (-1.00, 0.00)<br>Ideal vs None:<br>PASTAS-S: -0.22 (-0.73, 0.28) |
| | Experimental 2: Exposure to beauty (makeup) images of women | 30 | |
| | Comparison 1: Exposure to travel images | 35 | |
| | Comparison 2: No exposure | 31 | |
| Tamplin et al., 2018: Females | Experimental: Exposure to appearance-ideal images of female celebrities, models, or peers consuming or advertising alcoholic drinks | 99 | SBS: -0.20 (-0.49, 0.09) |
| | Comparison: Exposure to images of alcohol or alcoholic drinks only | 88 | |
| Tamplin et al., 2018: Males | Experimental: Exposure to appearance-ideal images of male celebrities, models, or peers consuming or advertising alcoholic drinks | 94 | SBS: -0.26 (-0.55, 0.02) |
| | Comparison: Exposure to images of alcohol or alcoholic drinks only | 93 | |
| Tiggemann & Anderberg, 2020 | Experimental 1: Exposure to bare-chested fitspiration images of appearance-ideal men | 94 | Fitspo vs Neutral:<br>SBS: -0.36 (-0.65, -0.08)<br>SFS: -0.11 (-0.39, 0.18)<br>Ideal vs Neutral:<br>SBS: -0.03 (-0.31, 0.26)<br>SFS: 0.04 (-0.24, 0.33) |
| | Experimental 2: Exposure to clothed, fashion images of appearance-ideal men | 95 | |
| | Comparison: Exposure to scenery images | 95 | |

*Note*. Conditions are referred to as experimental where they use an exposure judged as more likely to deleteriously impact body image than the exposure used in the comparison condition. The same condition may appear in multiple categories and its designation may change across categories depending on the features of interest in each analysis. SBA = state body appreciation, measured by Visual Analogue Scale; SBS = state body satisfaction, measured by Visual Analogue Scale; BISS = Body Image States Scale; SBD = state body dissatisfaction, measured by Visual Analogue Scale; ASI-R SES = Self-Evaluative Salience subscale of the Appearance Schemas Inventory-Revised; CDRS = Contour Drawing Rating Scale; ASI-R MS = Motivational Salience subscale of the Appearance Schemas Inventory-Revised; FSM = Fat Silhouette Measure; MSM = Muscle Silhouette Measure; SATAQ-I = Internalisation subscale of the Sociocultural Attitudes Toward Appearance Questionnaire; SOQ = Self-Objectification Questionnaire; BAS-2 = Body Appreciation Scale-2; BASS = Body Areas Satisfaction Scale, from the Multidimensional Body-Self Relations Questionnaire-Appearance Scales; DMS = Drive for Muscularity Scale; SFU = state feelings of unattractiveness, measured by Visual Analogue Scale; BSS = Body Satisfaction Scale; FSS = Facial Satisfaction Scale; PASTAS-S = state version of the Physical Appearance State and Trait Anxiety Scale; SFS = state facial satisfaction, measured by Visual Analogue Scale.

[a] Effect sizes identified as outliers.

**Figure 3.4**

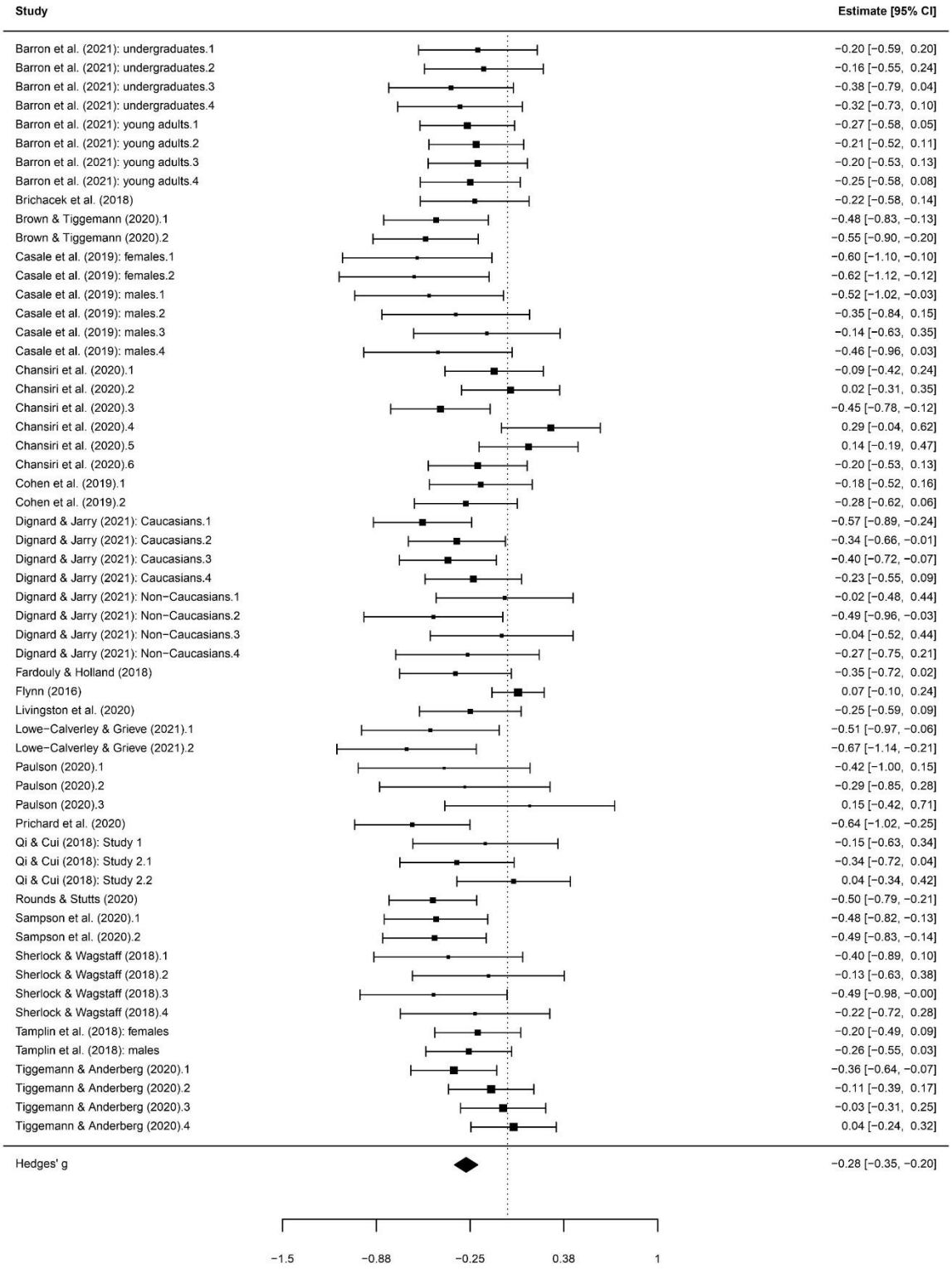
*Category 1 Forest Plot*




*Note*. Some samples contributed more than one effect size; these are indicated where numbers follow the study name.

**Figure 3.5**

*Category 1 Forest Plot with Outliers Removed*




*Note*. Some samples contributed more than one effect size; these are indicated where numbers follow the study name.

***Category 2: Appearance-Ideal Images with More vs Less Risky Context***

Category 2 included 21 experimental samples, comprising 3482 participants (see **Table 3.6** for the meta-analysis input). The pooled effect size indicated that contextual features have a very small immediate impact, whereby body image is worse after viewing appearance-ideal social media images in higher-risk than lower-risk contexts (Hedges' $g$ = -0.12, 95% CIs = -0.20, -0.04, $p$ <.01). An overview of these results is provided in **Figure 3.6**. Heterogeneity was mild but not significant ($Q$ = 48.54, $p$ = .08; $I^2$ = 30.73). All the observed heterogeneity was attributable to between-study heterogeneity ($I^2$ = 30.73), not within-study heterogeneity ($I^2$ = 0.00). Percentage of females in the sample and age were not significant moderators ($p$s = .42 and .98, respectively).

**Table 3.6**

*Category 2 Meta-Analysis Input*

| Reference | Groups | *n* | Outcome Measure: Between-Groups Cohen's *d* (95% CI) |
|---|---|---|---|
| Barron et al., 2021: Study 1 (undergraduates) | Experimental: Exposure to gender-matched fitspiration images | 46 | SBA: -0.23 (-0.65, 0.20)<br>SBS: -0.18 (-0.61, 0.24) |
| | Comparison: Exposure to a mixture of gender-matched fitspiration images and self-compassion quote images | 40 | |
| Barron et al., 2021: Study 2 (young adults) | Experimental: Exposure to gender-matched fitspiration images | 80 | SBA: -0.11 (-0.42, 0.20)<br>SBS: -0.09 (-0.39, 0.22) |
| | Comparison: Exposure to a mixture of gender-matched fitspiration images and self-compassion quote images | 81 | |
| Brown & Tiggemann, 2020 | Experimental: Exposure to images of thin and attractive female celebrities with no caption | 64 | Ideal vs Ideal w/ body positivity:<br>SBA: 0.05 (-0.30, 0.40)<br>SBD: -0.23 (-0.58, 0.12) |
| | Comparison 1: Exposure to images of thin and attractive female celebrities with body-positive captions | 64 | Ideal vs Ideal w/ disclaimer:<br>SBA: 0.02 (-0.33, 0.37)<br>SBD: -0.02 (-0.37, 0.33) |
| | Comparison 2: Exposure to images of thin and attractive female celebrities with captions highlighting how the images are unrealistic or enhanced | 64 | |
| Couture Bue & Harrison, 2020 | Experimental: Exposure to thin-ideal images of a woman with captions romanticising the image | 94 | PASTAS-S: -0.19 (-0.48, 0.09) |
| | Comparison: Exposure to thin-ideal images of a woman with captions highlighting how the images are unrealistic and/or objectifying | 92 | |
| Davies et al., 2020 | Experimental: Exposure to fitspiration images of women with fitspiration captions | 34 | Fitspo w/ fitspo vs Fitspo w/ body positivity:<br>BES: -0.49 (-0.97, -0.02) |
| | Comparison 1: Exposure to fitspiration images of women with body-positive captions | 36 | Fitspo w/ fitspo vs Fitspo w/ neutral:<br>BES: 0.09 (-0.37, 0.55) |
| | Comparison 2: Exposure to fitspiration images of women with neutral captions | 39 | |
| Fardouly & Holland, 2018 | Experimental: Exposure to images of attractive women | 53 | SBD: 0.08 (-0.30, 0.46) |
| | Comparison: Exposure to images of attractive women with comments highlighting how the images are unrealistic, enhanced, or advertisements | 53 | |
| Hendrickse et al., 2020 | Experimental: Exposure to advertisement featuring a thin model with an objectifying slogan | 51 | SBS: -0.05 (-0.43, 0.33) |
| | Comparison: Exposure to advertisement featuring a thin model with an empowering slogan | 54 | |

**Table 3.6 (Continued)**

| Reference | Groups | *n* | Outcome Measure: Between-Groups Cohen's *d* (95% CI) |
|---|---|---|---|
| Kim, 2020 | Experimental: Exposure to appearance-ideal images with comments favourable to the depicted body | 86 | Ideal w/ favourable vs Ideal w/ unfavourable:<br>BIIQ: -0.11 (-0.41, 0.18)<br>SBS: 0.21 (-0.09, 0.50)<br>Ideal w/ favourable vs Ideal alone:<br>BIIQ: -0.06 (-0.32, 0.21)<br>SBS: 0.14 (-0.12, 0.41) |
| | Comparison 1: Exposure to appearance-ideal images with comments unfavourable to the depicted body | 148 | |
| | Comparison 2: Exposure to appearance-ideal images with no comments | 96 | |
| Livingston et al., 2020 | Experimental: Exposure to images of an attractive woman | 67 | SBD: -0.09 (-0.43, 0.25) |
| | Comparison: Exposure to images of an attractive woman with captions highlighting how the images are unrealistic or enhanced | 68 | |
| Lowe-Calverley & Grieve, 2021 | Experimental: Exposure to appearance-ideal images of women with a high number of likes/follows | 37 | SBD: -0.16 (-0.62, 0.29) |
| | Comparison: Exposure to appearance-ideal images of women with a low number of likes/follows | 37 | |
| Politte-Corn & Fardouly, 2020 | Experimental: Exposure to images of appearance-ideal women with positive appearance-related comments | 201 | SFAS: -0.01 (-0.20, 0.19)<br>SOAS: -0.03 (-0.23, 0.17) |
| | Comparison: Exposure to images of appearance-ideal women with positive appearance-neutral comments | 193 | |
| Rounds & Stutts, 2020 | Experimental: Exposure to fitspiration images of women | 92 | SBS: -0.14 (-0.43, 0.14) |
| | Comparison: Exposure to half fitspiration images of women and half travel images | 93 | |
| Taniguchi & Lee, 2012: Japan | Experimental: Exposure to profiles of "underweight" females with weight loss encouragement messages | 26 | EDI-BS: -0.74 (-1.31, -0.17) |
| | Comparison: Exposure to profiles of "underweight" females with weight loss discouragement messages | 25 | |
| Taniguchi & Lee, 2012: USA | Experimental: Exposure to profiles of "underweight" females with weight loss encouragement messages | 24 | EDI-BS: 0.04 (-0.52, 0.59) |
| | Comparison: Exposure to profiles of "underweight" females with weight loss discouragement messages | 26 | |

**Table 3.6 (Continued)**

| Reference | Groups | *n* | Outcome Measure: Between-Groups Cohen's *d* (95% CI) |
|---|---|---|---|
| Tiggemann & Anderberg, 2019 | Experimental: Exposure to appearance-ideal images of women | 99 | SBA: -0.16 (-0.44, 0.11)<br>SBD: -0.33 (-0.61, -0.05) |
| | Comparison: Exposure to appearance-ideal images of women side-by-side with more realistic images of the same women | 102 | |
| Tiggemann & Barbato, 2018 | Experimental: Exposure to images of attractive women in attractive places with a brief positive comment about the woman's appearance | 64 | SBD: -0.36 (-0.71, -0.01) |
| | Comparison: Exposure to images of attractive women in attractive places with a brief positive comment about the place or background | 64 | |
| Tiggemann & Velissaris, 2020 | Experimental: Exposure to images of thin, attractive women with a positive comment about her appearance | 64 | Ideal w/ compliment vs Ideal alone:<br>SBD: -0.30 (-0.65, 0.05)<br>Ideal w/ compliment vs Ideal w/ compliment and disclaimer:<br>SBD: -0.41 (-0.76, -0.06) |
| | Comparison 1: Exposure to images of thin, attractive women with no comment | 64 | |
| | Comparison 2: Exposure to images of thin, attractive women with a positive appearance comment and a comment challenging the realism or attainability of the woman's appearance | 64 | |
| Tiggemann & Zinoviev, 2019 | Experimental: Exposure to enhancement-free images of thin, attractive women with hashtags indicating that they are enhancement-free | 68 | SBD: -0.15 (-0.49, 0.19)<br>SFD: -0.43 (-0.77, -0.09) |
| | Comparison: Exposure to enhancement-free images of thin, attractive women | 68 | |
| Tiggemann et al., 2018 | Experimental: Exposure to images of thin-ideal women with a high number of likes | 55 | SBD: 0.12 (-0.26, 0.49)<br>SFD: 0.43 (0.05, 0.81) |
| | Comparison: Exposure to images of thin-ideal women with a low number of likes | 55 | |
| Tiggemann et al., 2020a | Experimental: Exposure to images of thin-ideal women with no captions | 96 | SBA: 0.13 (-0.15, 0.42) |
| | Comparison: Exposure to images of thin-ideal women with body-positive captions | 95 | SBD: -0.11 (-0.40, 0.17) |
| Vendemia & DeAndrea, 2018 [a] | Experimental 1: Exposure to mock pages of thin-ideal images of female models without icons indicating photo editing had taken place | 89 | Ideal-model low edit icon vs Ideal-model high edit icon:<br>IT: -0.34 (-0.63, -0.05)<br>Ideal-peer low edit icon vs Ideal-peer high edit icon:<br>IT: -0.22 (-0.52, 0.07) |
| | Comparison 1: Exposure to mock pages of thin-ideal images of female models with icons indicating photo editing had taken place | 89 | |
| | Experimental 2: Exposure to mock pages of thin-ideal images of female peers without icons indicating photo editing had taken place | 91 | |
| | Comparison 2: Exposure to mock pages of thin-ideal images of female peers with icons indicating photo editing had taken place | 91 | |

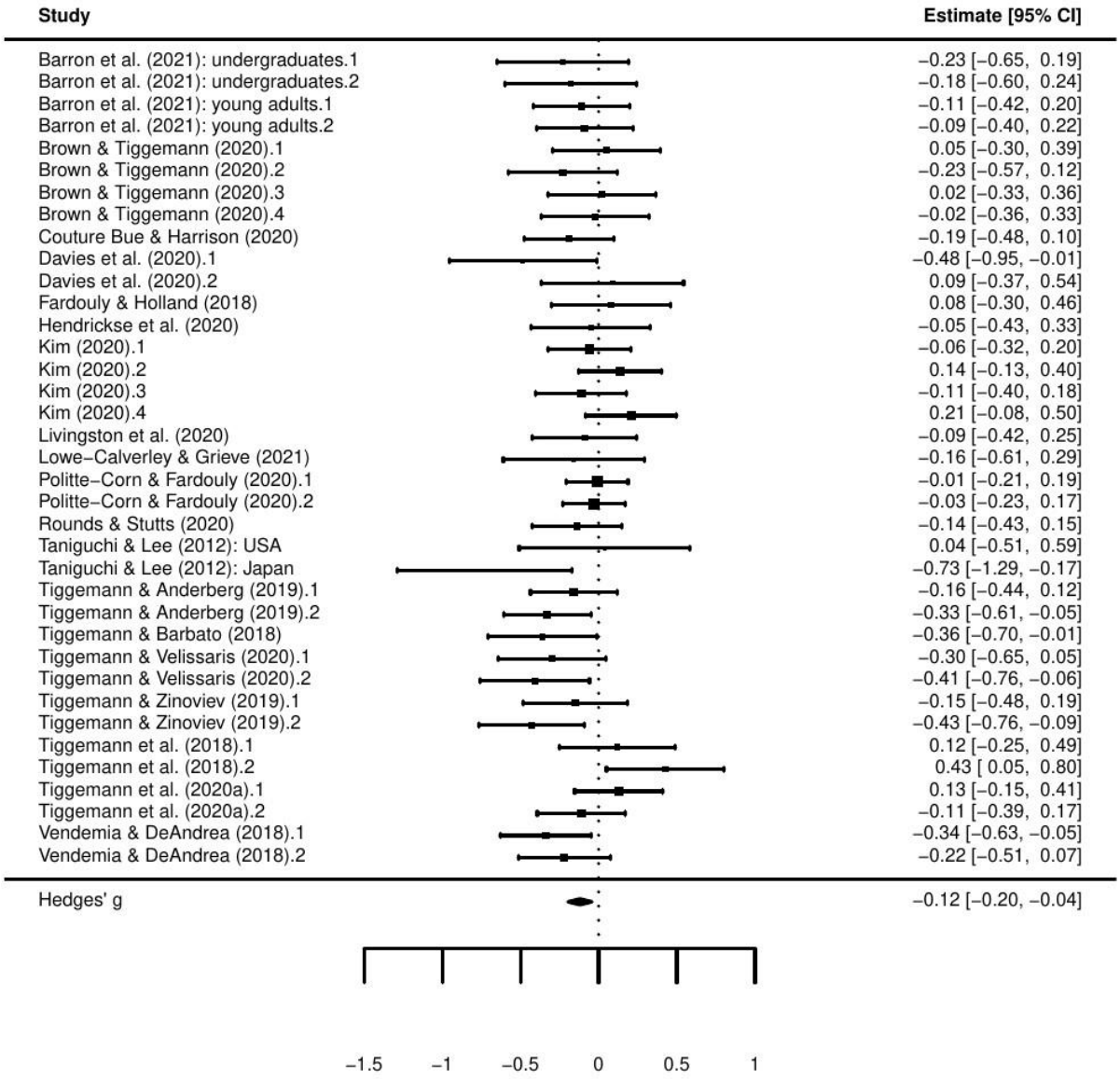
*Note*. Conditions are referred to as experimental where they use an exposure judged as more likely to deleteriously impact body image than the exposure used in the comparison condition. The same condition may appear in multiple categories and its designation may change across

categories depending on the features of interest in each analysis. SBA = state body appreciation, measured by Visual Analogue Scale; SBS = state body satisfaction, measured by Visual Analogue Scale; SBD = state body dissatisfaction, measured by Visual Analogue Scale; PASTAS-S = state version of the Physical Appearance State and Trait Anxiety Scale; BES = Body Esteem Scale; BIIQ = Body-Image Ideals Questionnaire; SFAS = state facial appearance satisfaction, measured by Visual Analogue Scale; SOAS = state overall appearance satisfaction, measured by Visual Analogue Scale; BAS-2 = Body Appreciation Scale-2; SOQ = Self-Objectification Questionnaire; EDI-BS = Body Satisfaction subscale of the Eating Disorder Inventory; SFD = state facial dissatisfaction, measured by Visual Analogue Scale; IT = Importance of Thinness subscale of the "Endorsement of Western beauty ideals and practices measure".

[a] Only comparing Experimental 1 to Comparison 1 and Experimental 2 to Comparison 2 so the groups being compared were exposed to the same images.

**Figure 3.6**

*Category 2 Forest Plot*




*Note*. Some samples contributed more than one effect size; these are indicated where numbers follow the study name.

### *Category 3: Appearance-Ideal Images vs Less Triggering Appearance Images*

Category 3 included 14 experimental samples, comprising 2641 participants (see **Table 3.7** for input details). Of note, 100% of the participants in this analysis were female. The pooled effect size suggested that viewing appearance-ideal social media images has an

immediate, moderate, negative effect on body image compared to viewing other appearance images on social media (Hedges' $g$ = -0.68, 95% CIs = -1.38, 0.01, $p$ = .05; see **Figure 3.7** for the forest plot). Heterogeneity in this analysis was high ($Q$ = 254.04, $p$ <.001; $I^2$ = 99.15), and was attributed to within-study variance ($I^2$ = 99.15), not between-study variance ($I^2$ = 0.00).

Two outlier effect sizes were identified when viewing the forest plot and scanning the Hedges' $g$ values. These were the body satisfaction effect from the South Korean sample in Lee et al. (2013) and the self-objectification effect from Study 2 by Qi and Cui (2018). As with the outliers in Category 1, the confidence intervals for these outliers had no overlap with those from the other studies in the analysis. Removing these outliers from the analysis (thereby reducing the number of samples to 13) resulted in a small, revised pooled effect size of Hedges' $g$ = -0.29, 95% CIs = -0.40, -0.18, $p$ <.001 and a reasonable improvement in heterogeneity, although it remained moderately high ($Q$ = 33.24, $p$ = .03; $I^2$ = 48.98). Heterogeneity was due to between-study variance ($I^2$ = 48.98), rather than within-study variance ($I^2$ = 0.00). **Figure 3.8** is the revised forest plot.

**Table 3.7**

*Category 3 Meta-Analysis Input*

| Reference | Groups | *n* | Outcome Measure: Between-Groups Cohen's *d* (95% CI) |
|---|---|---|---|
| Cohen et al., 2019 | Experimental: Exposure to profiles of thin-ideal females | 65 | SBA: -0.46 (-0.81, -0.11) |
| | Comparison: Exposure to body-positive profiles of women | 65 | SBS: -0.54 (-0.89, -0.19) |
| Hendrickse et al., 2020 | Experimental: Exposure to advertisement featuring a thin model | 105 | SBS: -0.51 (-0.79, -0.23) |
| | Comparison: Exposure to advertisement featuring a plus-sized model | 97 | |
| Kleemans et al., 2018 | Experimental: Exposure to manipulated selfies of teenage girls | 72 | BISS: -0.34 (-0.67, -0.01) |
| | Comparison: Exposure to untouched selfies of teenage girls | 72 | |
| Lee et al., 2013: South Korea | Experimental: Exposure to an "underweight" woman's fat talk on a mock profile | 78 | EDI-BS: -1.61 (-2.00, -1.23)[a] |
| | Comparison: Exposure to "overweight" woman's fat talk on a mock profile | 59 | |
| Lee et al., 2013: USA | Experimental: Exposure to an "underweight" woman's fat talk on a mock profile | 83 | EDI-BS: 0.03 (-0.29, 0.34) |
| | Comparison: Exposure to "overweight" woman's fat talk on a mock profile | 76 | |
| Politte-Corn & Fardouly, 2020 | Experimental: Exposure to appearance-ideal images of women | 197 | SFAS: -0.22 (-0.42, -0.02)<br>SOAS: -0.26 (-0.46, -0.07) |
| | Comparison: Exposure to images of women who meet appearance ideals but without makeup and with minimal editing | 197 | |
| Qi & Cui, 2018: Study 2 | Experimental: Exposure to profile of a thin-ideal woman with high-perceived socioeconomic status | 53 | BAS-2: -0.39 (-0.77, 0.00)<br>SOQ: -9.01 (-10.28, -7.74)[a] |
| | Comparison: Exposure to profile of a thin-ideal woman with parallel-perceived socioeconomic status | 53 | |
| Slater et al., 2019 | Experimental: Exposure to thin-ideal images of women | 48 | SBA: -0.06 (-0.45, 0.33)<br>SBS: -0.27 (-0.66, 0.12) |
| | Comparison: Exposure to images of a woman doing parody versions of the images used in the experimental condition | 54 | |
| Taniguchi & Lee, 2012 | Experimental: Exposure to profiles of "underweight" females | 101 | EDI-BS: 0.17 (-0.11, 0.45) |
| | Comparison: Exposure to profiles of "overweight" females | 98 | |
| Tiggemann & Anderberg, 2019 | Experimental: Exposure to appearance-ideal images of women | 99 | SBA: -0.26 (-0.54, 0.02) |
| | Comparison: Exposure to more realistic images of women | 99 | SBD: -0.20 (-0.48, 0.08) |
| Tiggemann & Zinoviev, 2019 | Experimental: Exposure to images of thin, attractive women | 68 | SBD: -0.19 (-0.53, 0.15) |
| | Comparison: Exposure to enhancement-free images of thin, attractive women | 68 | SFD: -0.39 (-0.73, -0.05) |
| Tiggemann et al., 2018 | Experimental: Exposure to images of thin-ideal women | 110 | SBD: -0.40 (-0.67, -0.13) |
| | Comparison: Exposure to images of average-sized women | 110 | SFD: -0.18 (-0.44, 0.09) |

**Table 3.7 (Continued)**

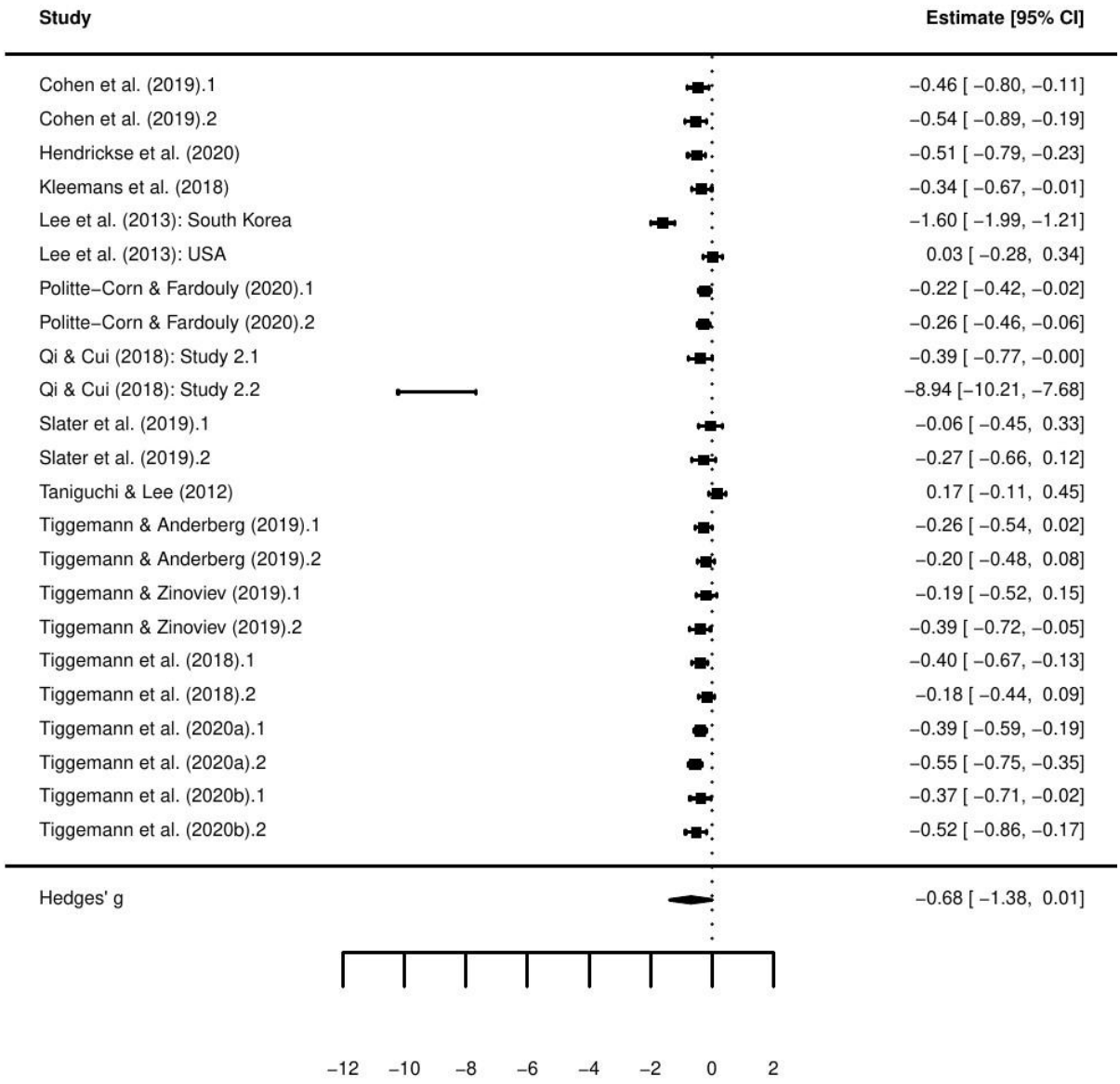
| Reference | Groups | *n* | Outcome Measure: Between-Groups Cohen's *d* (95% CI) |
|---|---|---|---|
| Tiggemann et al., 2020a | Experimental: Exposure to images of thin-ideal women | 191 | SBA: -0.39 (-0.59, -0.19) |
| | Comparison: Exposure to images of average-sized women | 193 | SBD: -0.55 (-0.76, -0.35) |
| Tiggemann et al., 2020b | Experimental: Exposure to images of thin women | 65 | SBD: -0.37 (-0.72, -0.02) |
| | Comparison: Exposure to images of average-sized women | 65 | SFD: -0.52 (-0.87, -0.17) |

*Note*. Conditions are referred to as experimental where they use an exposure judged as more likely to deleteriously impact body image than the exposure used in the comparison condition. The same condition may appear in multiple categories and its designation may change across categories depending on the features of interest in each analysis. SBA = state body appreciation, measured by Visual Analogue Scale; SBS = state body satisfaction, measured by Visual Analogue Scale; BISS = Body Image States Scale; EDI-BS = Body Satisfaction subscale of the Eating Disorder Inventory; SBD = state body dissatisfaction, measured by Visual Analogue Scale; SFD = state facial dissatisfaction, measured by Visual Analogue Scale.

[a] Effect sizes identified as outliers.

**Figure 3.7**

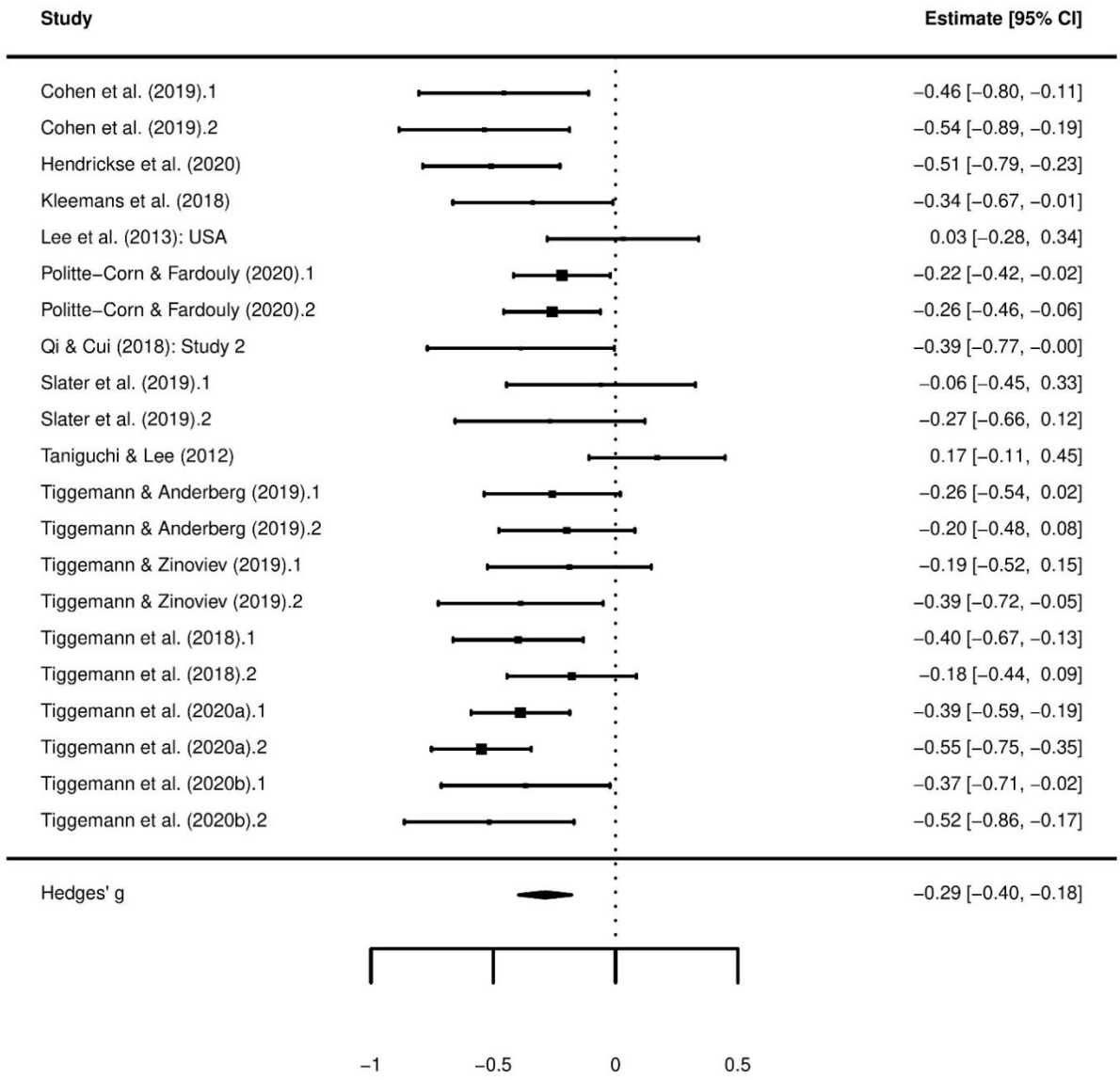
*Category 3 Forest Plot*




*Note*. Some samples contributed more than one effect size; these are indicated where numbers follow the study name.

**Figure 3.8**

*Category 3 Forest Plot with Outliers Removed*




*Note*. Some samples contributed more than one effect size; these are indicated where numbers follow the study name.

### *Category 4: Longitudinal Studies*

Category 4 included 10 longitudinal samples, comprising 5177 participants (**Table 3.8** provides the details used in the analysis). Overall, there was a statistically significant but very small negative partial (controlling for baseline body image) correlation between social media use and body image (Fisher's $Z$ = -.08, 95% CIs = -.11, -.06, $p$ <.001). **Figure 3.9** is

the forest plot for this analysis. There was evidence of moderate heterogeneity ($Q$ = 51.74, $p$ <.01; $I^2$ = 47.40), which was attributed to within-study variance ($I^2$ = 47.40), not between-study variance ($I^2$ = 0.00). No outliers were identified. The time between measurement points was not a significant moderator ($p$ = .62).

**Table 3.8**

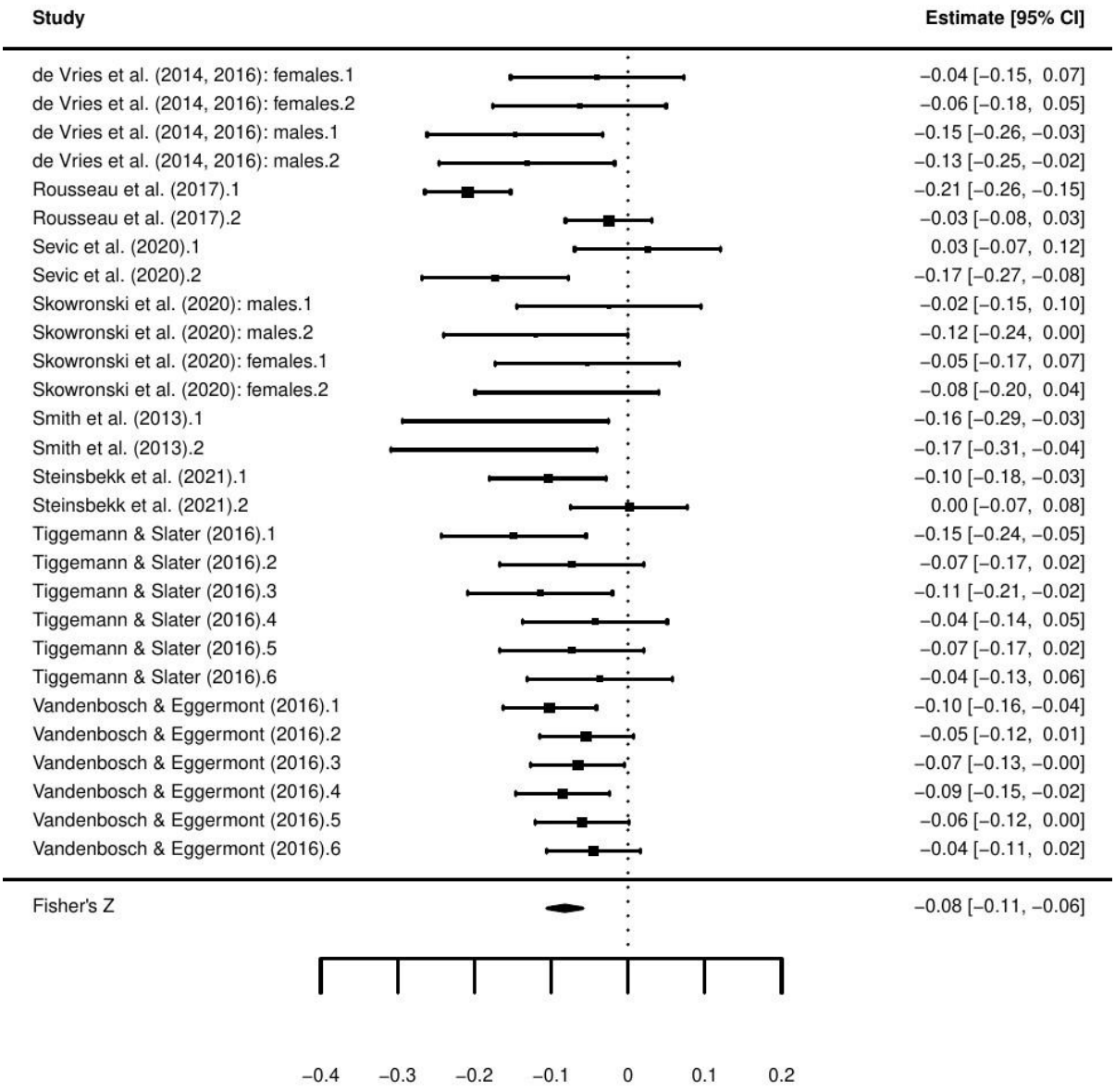
*Category 4 Meta-Analysis Input*

| Reference | *n* | Measurement Period | Measure of Social Media Use | Outcome Measure: Fisher's *Z* (95% CI) |
|---|---|---|---|---|
| de Vries et al., 2014, 2016: Girls | 306 | 18 months | Frequency of Hyves.nl use over the past 6 months | BASS: -.04 (-.15, .07)<br>MBSRQ-AO: -.06 (-.17, .05) |
| de Vries et al., 2014, 2016: Boys | 298 | 18 months | Frequency of Hyves.nl use over the past 6 months | BASS: -.15 (-.26, -.03)<br>MBSRQ-AO: -.13 (-.24, -.02) |
| Rousseau et al., 2017 | 1235 | 6 months | Passive Facebook Use subscale of the Multidimensional Scale of Facebook Use | BAT-BD: -.03 (-.08, .03) |
| | | | Comparison to others on Facebook | BAT-BD: -.21 (-.26, -.15) |
| Sevic et al., 2020 | 428 | 5 months | Daily use of social networking sites in hours | SATAQ-I: -.17 (-.26, -.07)<br>OBCS-Y-BS: .03 (-.07, .12) |
| Skowronski et al., 2020: Females | 274 | 6 months | Frequency of exposure to sexualised Instagram images | SOQ: -.08 (-.20, .04)<br>OBCS-BS: -.05 (-.17, .07) |
| Skowronski et al., 2020: Males | 270 | 6 months | Frequency of exposure to sexualised Instagram images | SOQ: -.12 (-.24, .00)<br>OBCS-BS: -.02 (-.14, .10) |
| Smith et al., 2013 | 219 | 4 weeks | Maladaptive Facebook Usage Scale | EDEQ-SC: -.16 (-.29, -.03)<br>EDI-BD: -.17 (-.30, -.04) |
| Steinsbekk et al., 2021 | 668 | 2 years | Self-oriented social media use (posting) | PASE: .00 (-.08, .08) |
| | | | Other-oriented social media use (interacting) | PASE: -.10 (-.18, -.03) |
| Tiggemann & Slater, 2016 | 438 | 2 years | Time on Facebook | EDI-DT: -.04 (-.14, .05)<br>SATAQ-I3: -.04 (-.13, .06)<br>OBCS-Y: -.07 (-.17, .02) |
| | | | Number of Facebook friends | EDI-DT: -.15 (-.24, -.06)<br>SATAQ-I3: -.11 (-.21, -.02)<br>OBCS-Y: -.07 (-.17, .02) |
| Vandenbosch & Eggermont, 2016 | 1041 | 6 months | Frequency of social network site use | SATAQ-I: -.05 (-.12, .01)<br>SOQ: -.07 (-.13, .00)<br>OBCS-Y-BS: -.10 (-.16, -.04) |
| | | | Monitoring of attractive peers on social network sites | SATAQ-I: -.06 (-.12, .00)<br>SOQ: -.04 (-.11, .02)<br>OBCS-Y-BS: -.09 (-.15, -.02) |

*Note*. BASS = Body Areas Satisfaction Scale; MBSRQ-AO = Appearance Orientation subscale of the Multidimensional Body-Self Relations Questionnaire; BAT-BD = Body Dissatisfaction subscale of the Body Attitude Test; SATAQ-I = Internalisation subscale of the Sociocultural Attitudes Toward Appearance Questionnaire; OBCS-Y-BS = Body Surveillance subscale of the Objectified Body Consciousness Scale for Adolescents; SOQ = the Self-Objectification Questionnaire; OBCS-BS = Body Surveillance subscale of the Objectified Body Consciousness Scale; EDEQ-SC = Shape Concern subscale of the Eating Disorder Examination Questionnaire; EDI-BD = Body Dissatisfaction subscale of the Eating Disorder Inventory; PASE = physical appearance self-esteem, measured at age 10 using the physical appearance subscale of the Self Description Questionnaire and at age 12 using the corresponding subscale of the Revised Self-Perception Profile for Adolescents; EDI-DT = Drive for Thinness subscale of the Eating Disorder Inventory; SATAQ-I3 = three internalisation items from the Sociocultural Attitudes Toward Appearance Questionnaire; OBCS-Y = Objectified Body Consciousness Scale–Youth.

**Figure 3.9**

*Category 4 Forest Plot*




*Note*. Some samples contributed more than one effect size; these are indicated where numbers follow the study name.

## Publication Bias

The funnel plots for all categories are available in **Figures 3.10 through 3.13**. Egger's regression test was significant for Categories 1 ($Q$ = 278.43, $p$ <.001) and 3 ($Q$ = 166.78, $p$ <.001), but not Categories 2 ($Q$ = 1.15, $p$ = .28) or 4 ($Q$ = 0.60, $p$ = .44). In the

models excluding outliers, Egger's regression test was not significant for Categories 1 ($Q$ = 3.03, $p$ = .08) or 3 ($Q$ = 0.02, $p$ = .90). Thus, there was no evidence of publication bias amongst the longitudinal studies, but mixed findings amongst the experimental studies, in which outlier effect sizes strongly influenced the test used to assess publication bias.

**Figure 3.10**

*Category 1 Funnel Plot*

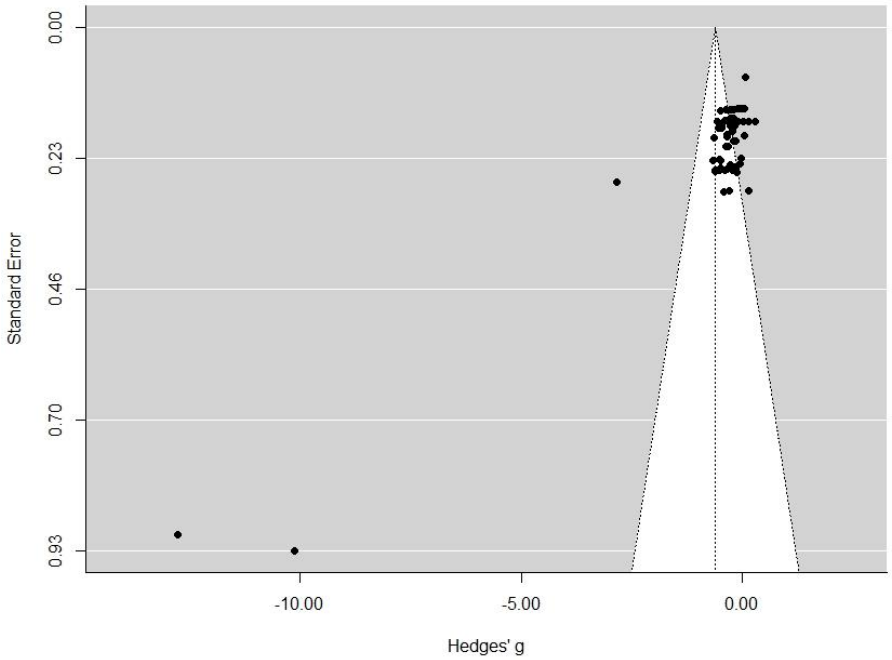


**Figure 3.11**

*Category 2 Funnel Plot*

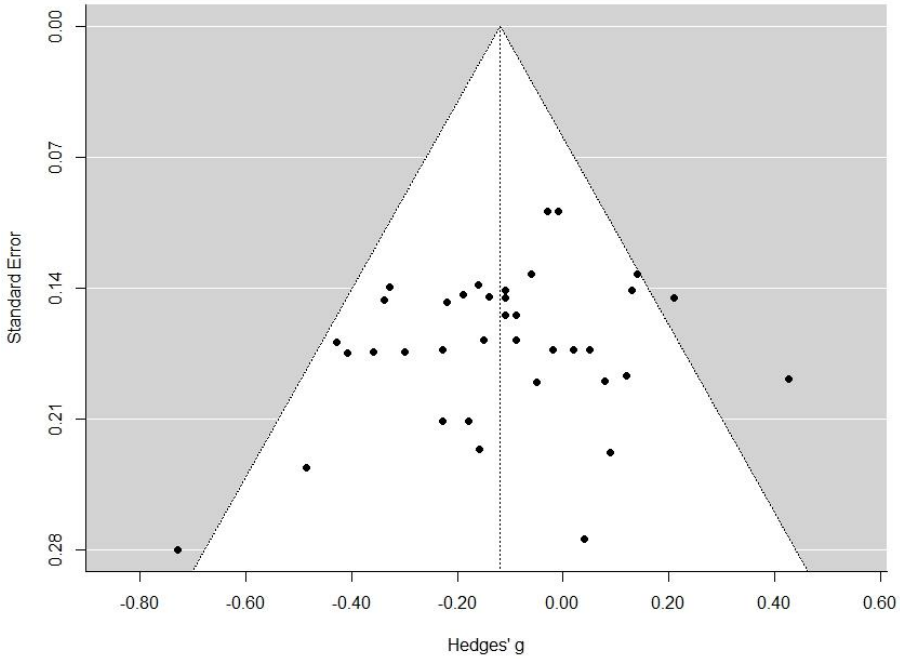



**Figure 3.12**

*Category 3 Funnel Plot*

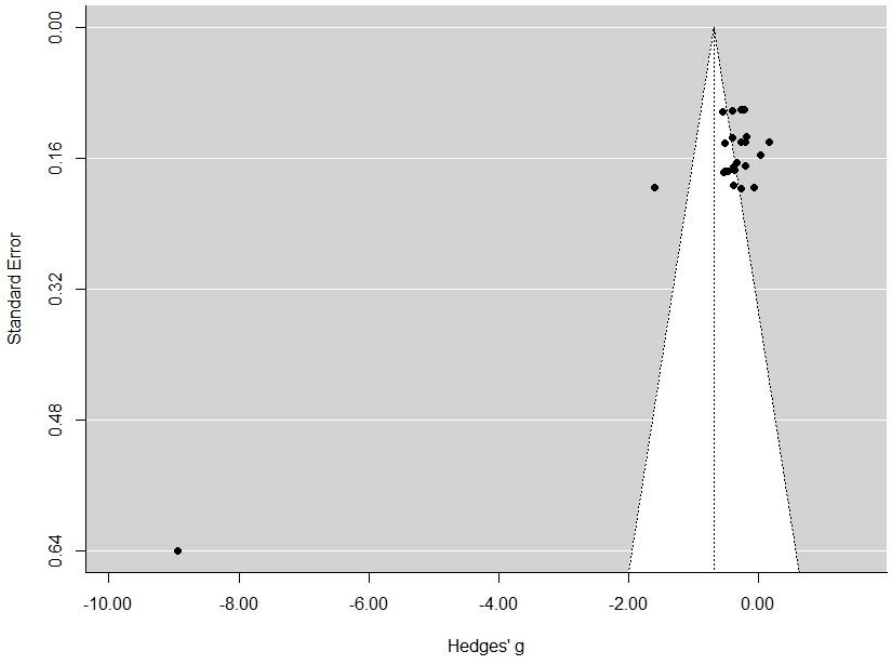
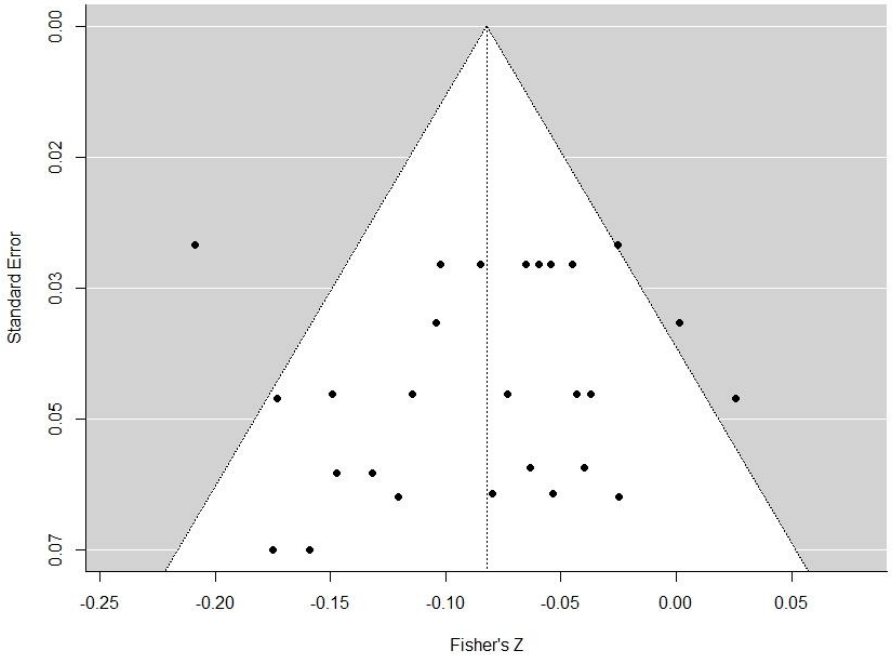


**Figure 3.13**

*Category 4 Funnel Plot*




## Qualitative Synthesis of Moderators and Mediators

A summary of findings from the articles included in the meta-analyses concerning moderating and mediating factors is provided in **Tables 3.1 and 3.2**. Comparison to others was the most investigated mechanism ($n$ = 13 samples), being conceptualised alternatively as a moderator and mediator in experimental research. It demonstrated a statistically significant moderating or mediating role in four and three samples, respectively. Similarly, it was examined as a mediator twice in the longitudinal studies, once being found significant and once not. Where significant relationships were found, it was generally the case that engaging in more comparisons conferred greater risk to body image; although, in one study, participants with higher trait appearance comparison showed more benefit to body appreciation after exposure to self-compassion quote images than those with low trait appearance comparison (Barron et al., 2021).

Next most frequently examined was appearance-ideal internalisation (encompassing thin, muscular, and general ideals), which was typically conceptualised as a moderator in experimental research ($n$ = 8 samples), and a mediator in longitudinal research ($n$ = 1 sample). Despite being a common target for enquiry, appearance-ideal internalisation only showed a significant role once, as a moderator. In this case, women with stronger thin-ideal internalisation reported more body appreciation after viewing images of average-sized women with a body-positive caption compared to when there was no caption, but the reverse was true when they were exposed to thin-ideal images of women (Tiggemann et al., 2020a).

Other mechanisms were examined less often. "Gender" was investigated as a moderator in seven samples (two experimental, five longitudinal). Because it was described as a binary variable, it is referred to here as sex. Sex was a significant moderator in three longitudinal studies. Briefly, passive Facebook use predicted more appearance comparison in boys but not girls (Rousseau et al., 2017), other-oriented social media use predicted decreases in appearance self-esteem for girls but not boys (Steinsbekk et al., 2021), and social network site use predicted increased self-objectification in girls but not boys (Vandenbosch & Eggermont, 2016). While other moderators or mediators were examined, these did not appear in enough studies to enable conclusions to be drawn about their effects.

## Discussion

The meta-analyses in this study support the suggestion that social media negatively impact body image, particularly when used to view appearance ideals, which shows an immediate, negative effect. Effects were of a similar size to those obtained in meta-analyses of the cross-sectional research, in which appearance-focused social media use had a stronger relationship with body image disturbance than general social media use (Saiphoo & Vahedi, 2019), and social media use had a small cross-sectional association with thin-ideal internalisation that was stronger when use was appearance-related (Mingoia et al., 2017). The

key novel findings from the present meta-analyses are that viewing appearance-ideal social media images in experimental settings has a causal, negative impact on body image, contextual features make a very small difference to this impact, appearance-ideal social media images are more detrimental to body image than other types of appearance images on social media, and social media use is prospectively associated with slightly poorer body image.

**Category 1: Appearance-Ideal Images vs Non-Appearance-Related**

Appearance-ideal social media images had a moderate, immediate detrimental impact on body image compared to appearance-neutral conditions, or a small effect with outliers removed. Effects were of a similar size to those produced by traditional media, *d* = -.19 to -.39 (Barlett et al., 2008; Grabe et al., 2008). Although there was a modest impact, this is based on experiments using single, brief exposures, whereas users typically access social media multiple times per day for an average total of almost two and a half hours (We Are Social & Hootsuite, 2022b; Yellow, 2020). The cumulative effect of these multiple exposures may be cause for concern, although it should be noted that there is no evidence demonstrating that the effects of exposure are additive. It also raises concerns about the potential impact of using image- and video-based social media platforms such as Instagram (which most articles in this category were investigating), Tumblr, and TikTok, where users can access a constant stream of appearance-ideal imagery from “influencers”, models, and celebrities, depending on the accounts they follow and what the platforms’ algorithms suggest for them.

The results observed in this category may be explained by sociocultural theory in that these images promote appearance ideals to the viewer, who compares their appearance to that ideal and typically finds that they do not meet it, and hence feels worse about their appearance. They may also be explained by self-objectification theory in that viewing images

of others' appearance may incite self-conscious feelings that others are observing and evaluating one's own body. Indeed, both theories may be applicable (Seekis et al., 2020).

This category included a range of appearance ideals, including people simply described as meeting ideals, as well as the more specific variations of fitspiration and thinspiration. Given that heterogeneity was only mild (once outliers were removed), one might suggest that each of these image types is similarly impactful, although when more studies are available, moderator analyses may be used to determine whether different types of appearance-ideal image have a different impact.

**Category 2: Appearance-Ideal Images with More vs Less Risky Context**

Contextual features such as comments, captions, and the inclusion of other image types in addition to the appearance-ideal images made a small but significant impact on how strongly appearance-ideal social media images impacted viewers' body image immediately following exposure, with stronger deleterious effects observed when images were presented in higher- than lower-risk contexts. Almost all the samples in this category were female, so it is unclear whether the same effect would be observed in other genders.

The second category examined the effect of contextual features characteristic of social media that are not present in traditional media. The results suggest that these features can be manipulated with a small effect on the impact on body image, indicating that the effects of social media appearance-ideal images on body image may be different to when those same images are presented in traditional media because these cues may moderate the impact. This can be interpreted through the lens of social reinforcement theory, such that when significant figures in socialisation such as family, peers, and the media appear to support or approve of appearance ideals through comments or actions (e.g., "likes"), this establishes expectations about the benefits of meeting these ideals, which can serve to reinforce the notion that those ideals are desirable (Thompson & Stice, 2001). The internalisation of such ideals has a

moderate to very large association with body dissatisfaction (Paterna et al., 2021). Hence, some of the "riskier" conditions may have had a stronger impact on body image because they implied social support for appearance ideals.

However, social reinforcement theory would not explain all the effects observed in this category. Comparisons from Barron et al. (2021), Rounds and Stutts (2020), and Tiggemann and Anderberg (2019) saw one group (the "experimental group" for this category) being exposed to appearance-ideal images, whilst the comparison groups were also exposed to these images, but with the additional context of less risky images (i.e., self-compassion quote, travel, non-idealised) accompanying the appearance-ideal images. It has been suggested that the inclusion of additional such images may serve as a buffer, reducing the negative effects of being exposed to appearance ideals (Barron et al., 2021; Slater et al., 2017; Tiggemann & Anderberg, 2019). This is likely to depend on the type of additional image presented; images that actively counteract the appearance ideals (e.g., self-compassion quotes or non-idealised images) may be more protective than neutral images (e.g., travel images; Rounds & Stutts, 2020).

The smaller size of the pooled effect in this category than that observed in Category 1 suggests that contextual features may be processed less deeply than the images they accompany. In support of this, Couture Bue and Harrison (2020) found that although participants exposed to appearance-ideal images with disclaimer comments spent longer viewing the comments than those exposed to comments romanticising the image, post-exposure body anxiety did not differ between conditions. Those in the disclaimer comment condition spent less time viewing the models on average but this difference was not significant. Moreover, one study of disclaimer labels in traditional media found that they did not protect against the detrimental effects of viewing appearance-ideal images and may paradoxically increase some viewers' attention to the images, thereby increasing body

dissatisfaction (Tiggemann et al., 2013). More research on how contextual features are processed would help to illuminate under what circumstances and how these features impact the effect of viewing the images with which they are presented.

**Category 3: Appearance-Ideal Images vs Less Triggering Appearance Images**

Appearance-ideal social media images had an immediate, moderate, detrimental impact on body image compared to viewing other appearance images, or a small effect when outliers were removed. The effects observed in this category were very similar to those observed in Category 1. This implies that it is the appearance ideals that are harmful, rather than being exposed to appearance images more generally.

Upwards social comparisons to the appearance ideals, which sociocultural theory proposes as a mechanism of effect, offer a logical explanation for this. From the perspective of self-objectification theory, it has been proposed that exposure specifically to appearance-ideal social media images may provoke women to internalise these as the appearance standards to which they should aspire, affecting their perspective on and monitoring of their own bodies (Feltman & Szymanski, 2018). Indeed, Feltman and Szymanski (2018) also found that upwards appearance comparisons mediate the relationship between Instagram use and self-objectification, supporting the idea that both sociocultural and self-objectification theories are useful for understanding the relationship between social media and body image.

Two features of this category should be noted. First, all the participants were female, so again it is not possible to determine what the effect would be in other genders. Second, heterogeneity remained moderately high even after removing outliers. This may be related to the diversity in the types of comparisons included in this category, which included comparing appearance-ideal images with images of body-positivity, plus-sized models, people in larger bodies, average-sized people, and parody versions of appearance-ideal images. Some comparisons also involved both groups viewing appearance-ideal images but with the

comparison group viewing a potentially less impactful version (i.e., unedited, no makeup, more realistic, or lower socio-economic status versions) than the experimental group.

In all, there has been comparatively little focus on appearance images on social media that do not contain appearance ideals. This would be a fruitful avenue for further exploration, given the potential for some of these image types to not only not be harmful, but possibly even protective for body image. Examples of potentially protective variants include body-positive images, images of plus-sized models, parody versions of appearance-ideal images, Instagram vs reality images, and enhancement-free images (Cohen, Fardouly, et al., 2019; Hendrickse et al., 2020; Slater et al., 2019; Tiggemann & Anderberg, 2019; Tiggemann & Zinoviev, 2019). If further research supports these image types as being protective, clinicians could recommend that clients follow platforms that share them, and they could be included in preventative body image interventions.

**Category 4: Longitudinal Studies**

The pooled effect size for the longitudinal studies suggests that social media use is associated with a very small increase in eating disorder risk, a smaller effect than those found in the experimental analyses. The time between measurement points varied between the studies (from four weeks to two years), but this did not moderate outcomes, and the heterogeneity in outcomes was attributed to within-study rather than between-study variance, suggesting that the differences in effects may be related to how social media use was operationalised, which aspect of body image was measured, or a combination of these. At present, there are not enough longitudinal studies available for appropriately powered moderator analyses to investigate these potential explanations statistically.

Across the longitudinal studies, the only clear trend was that social media use was almost exclusively linked with deterioration in body image, with only one effect size out of 28 suggesting it was related to improvement in body image, and just one other suggesting no

relationship at all. Regarding the body image outcome examined, no specific outcome appears to be more strongly related on face value; though, evidence of this may be inhibited by the use of a diverse range of outcomes within a relatively small pool of studies. Likewise, there was not a clear difference in the strength of association when comparing measures of the quantity of social media use (e.g., frequency of access, time spent, number of friends) and measures addressing exposure to images of others (e.g., comparison on Facebook, exposure to sexualised images, monitoring attractive peers). When more longitudinal research is available, moderator analyses that can illuminate some of the reasons for the heterogeneity observed here would be an important addition to the literature.

Moreover, although the results from this category might hint at a causal link, they cannot demonstrate causation. It is also possible that there is a reciprocal relationship, whereby people who already have or are predisposed to poor body image seek out more appearance-related content on social media, and this in turn worsens their body image. In support of this theory, some researchers have already proposed that poor body image might predict increased social media use or engagement with appearance-related social media activities (Caso et al., 2020; Fox & Rooney, 2015; Veldhuis et al., 2020; Wang, 2019). There have been mixed results when longitudinal studies have tested this opposite relationship (i.e., body image predicting later social media use), with some findings supporting this relationship and others not. Overall, the limited information available suggests that body image may not predict general social media use at a later point (de Vries et al., 2016; Steinsbekk et al., 2021; Tiggemann & Slater, 2016; Vandenbosch & Eggermont, 2016), but that it may predict specific other-oriented social media behaviours such as social comparison (Rousseau et al., 2017), adding friends (Tiggemann & Slater, 2016), and monitoring attractive peers (Vandenbosch & Eggermont, 2016).

**Moderators and Mediators**

In these meta-analyses, neither the percentage of self-reported females in the sample nor age moderated outcomes. The former result accords with the moderator analyses from the meta-analysis of cross-sectional evidence on social media use and body image; however, the latter result contradicts their finding that the relationship was weaker as age increased (Saiphoo & Vahedi, 2019). The present analyses included considerably fewer samples than the meta-analysis by Saiphoo and Vahedi (2019), accompanied by a somewhat narrower range of ages (although, even in their analysis, there was a strong representation of child to young adult samples), so it is possible that the present study was underpowered to detect age-related effects. Alternatively, the moderating effect of age observed in the cross-sectional research may be spurious. Recent evidence suggests that, in most age groups, body satisfaction improves with age (Hockey et al., 2021), whilst the extent of social media use appears to be reasonably similar across teens and young adults (Pew Research Center, 2018, 2021). So, it may not be that there is a weaker association between social media use and body image disturbance as age increases, but that social media use stays constant as teens grow into young adults, whilst there is an unrelated improvement in body image during this period.

Regarding the mechanisms investigated in studies included in these analyses, the evidence most strongly supports comparison to others as either a moderator or mediator that may increase the risk for negative impacts on body image due to social media use. This finding supports the assertion of sociocultural theory that comparison to others can be harmful to body image (Thompson et al., 1999). Yet, the finding that appearance-ideal internalisation was only once supported as a moderator despite being examined reasonably frequently is seemingly at odds with sociocultural theory. A tentative explanation could be that appearance-ideal images are so impactful to body image that the extent to which a person had already internalised the ideals in the image is irrelevant, but further research is needed to

explore explanations for these null findings. It also underscores the need for more research that can iteratively link theory with the testing of interventions that can in turn modify theory.

**Limitations**

Several limitations of this study should be considered. There were indicators of possible bias in the experimental studies, over a third of which were rated as being at high risk of bias. Similarly, there was evidence of possible publication bias in Categories 1 and 3, which may have led to an exaggerated estimation of effect sizes. Because the test for publication bias was not significant in the models that excluded outliers, these may provide more accurate estimates of the pooled effect size. There were several outlier effect sizes in the experimental studies, but it is unclear why these effects were so different to the others. One characteristic they all shared was that they came from samples in Asia, which could point to a cultural effect, with some evidence suggesting that body dissatisfaction may be even more prevalent in some Asian countries, including China and Japan, than in Western ones (Cummins et al., 2005). However, given that so few studies have been conducted assessing the impact of social media in Asian samples, there is not yet enough information to determine whether the effects differ by culture. Moreover, the experimental studies in the present meta-analyses all involved exposure to appearance-ideal images of strangers or celebrities, so it is unclear whether these findings would generalise to appearance-ideal images of known peers (e.g., friends, acquaintances, and family members).

The diversity of ways in which social media use was operationalised in longitudinal studies meant that it was not possible to obtain more specific estimates of the relationship between, for example, specific activities on social media and later body image. Similarly, the time points between measurements were of varying lengths, precluding precise estimates of the time course of this relationship. Finally, the high representation of young participants, females, and people from Western countries in both the experimental and longitudinal

research makes it unclear whether the effects of social media use differ in older samples, people from non-Western countries, males, or people of diverse genders.

## Conclusions

Findings suggest that viewing appearance-ideal images on social media detrimentally impacts body image. Effects were small to moderate, similar to meta-analyses of cross-sectional research in this area (Mingoia et al., 2017; Saiphoo & Vahedi, 2019) and the effects of traditional media (Barlett et al., 2008; Grabe et al., 2008). The evidence suggests that it is exposure to appearance ideals specifically, rather than to appearance content generally, that is damaging, and features of the social media context (e.g., likes, comments, and hashtags) can make a small difference to the impact of viewing appearance-ideal images. Social media use predicts a very small increase in body image disturbance longitudinally, but it is not yet clear what kind of use is most strongly related to body image nor the timeframe in which this relationship emerges.

# CHAPTER 4

## A Systematic Review of the Role of Personality in the Relationship Between Social Media Use and Eating Disorder Risk

## Abstract

This systematic review examines research on the role of personality in the relationship between social media use and variables associated with eating disorders (i.e., body image disturbance and disordered eating). It aims to complement existing models to inform prevention and intervention approaches. A systematic search of the PsycINFO, MEDLINE, and Scopus databases resulted in the inclusion of 37 articles. Inclusion criteria were: peer-reviewed; reported original data; examined social media use, eating disorder risk, and personality; and presented at least one analysis linking these three components. Overall, there was a relative lack of research on the role of personality and in many cases, only correlations could be extracted. Personality variables that had been investigated were self-esteem, social insecurity, narcissism, trait anxiety, self-compassion, emotion regulation difficulties, extraversion, impulsivity, perfectionism, self-efficacy, and self-monitoring. Self-esteem and social insecurity were most often examined, and cross-sectional evidence suggests they are pertinent. Only narcissism and perfectionism were prospectively supported, and there was preliminary cross-sectional evidence for self-compassion, self-monitoring, and emotion regulation difficulties. It is suggested that future research further examines those personality variables that have already been found to play a role and those that have supported the development of effective interventions for disordered eating. Further experimental and longitudinal research would progress the understanding of the interactive effects of personality and the temporal sequencing of relationships.

Theoretical models propose that individual difference factors affect engagement with social media and its relationship to eating disorder risk (Filice et al., 2019; Perloff, 2014). Investigating whether personality variables inform who is more strongly affected by social media can help match interventions to those who will benefit most from them. This is consistent with meta-analyses showing improved treatment outcomes for eating disorder prevention programs targeting high-risk (i.e., body dissatisfied) than general audiences (Stice & Shaw, 2004; Stice et al., 2007). Preliminary evidence suggests that personality factors impact eating disorder treatment outcomes and that treatments that address personality pathology result in greater reductions in eating disorder symptoms (Simpson et al., 2022).

Personality variables also offer the potential for benefits beyond reducing eating disorder risk, which may differentiate them from the appearance-focused variables that have typically been included in models of social media effects. As a case in point, interventions targeting perfectionism improve not only perfectionism but also anxiety, depression, and disordered eating (Galloway et al., 2021; Robinson & Wade, 2021); that is, they have a transdiagnostic effect. Social media use is associated with detriments to psychological health beyond risk for eating disorders (Frost & Rickwood, 2017; Huang, 2022; Keles et al., 2019; Webster et al., 2021), so personality variables may be an efficient target for intervention. The aim of the present review was therefore to systematically scope the information currently available about personality in the relationship between social media use and eating disorder risk factors (focussing on body image and disordered eating), to inform the development and testing of models that can form the basis of prevention and intervention programs.

## Method

### Search Strategy and Selection of Studies

This review was conducted according to the PRISMA statement (Moher et al., 2009). Searches were conducted using the procedure outlined in **Chapter 3**, including the same

search dates, databases, and search terms, with an additional, final search conducted on the 14th of May 2021. Google Scholar alerts and six previous reviews of related literature (Fardouly & Vartanian, 2016; Frost & Rickwood, 2017; Holland & Tiggemann, 2016; Lupton, 2017; Mingoia et al., 2017; Rodgers & Melioli, 2016) were scanned to locate additional articles. In contrast to the procedure in **Chapter 3**, only one reviewer (the author of this thesis) screened articles. **Figure 4.1** describes the study selection process.

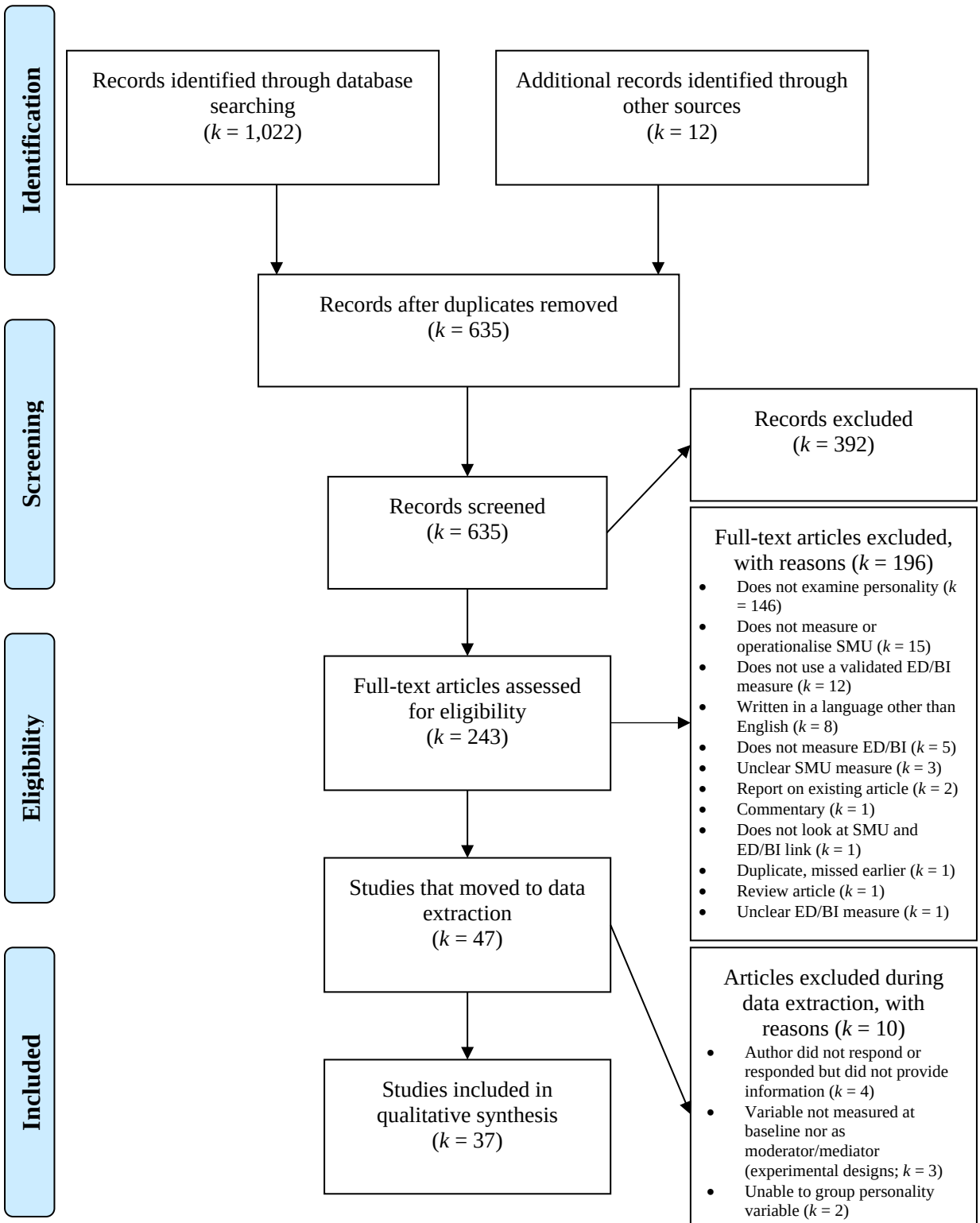
**Inclusion and Exclusion Criteria**

Inclusion criteria included: peer-reviewed research of original data; inclusion of three variables: (1) a quantitative measure or experimental operationalisation of social media use, (2) a validated measure of eating disorder risk, and (3) a personality measure; and at least one analysis linking these. Articles were excluded if they were not in English, correlations for the three variables (at baseline for experimental designs) or statistics on moderation or mediation could not be obtained, or they could not be grouped by the personality variable under examination.

For this review, the following definition of personality was used: "the enduring configuration of characteristics and behaviour that comprises an individual's unique adjustment to life, including major traits, interests, drives, values, self-concept, abilities, and emotional patterns" (American Psychological Association, n.d.). Because of the focus on general personality variables, as opposed to variables that are specific to appearance or the social media context, appearance-related variables (e.g., appearance comparisons) and social media-specific variables (e.g., negative feedback-seeking on Facebook) were not included. In line with the definition of personality as comprising enduring characteristics, state variables (e.g., state anxiety, depression, and mood) were not included unless the state variable was examined as a trait variable in other articles to enable comparison.

**Figure 4.1**

*PRISMA Flow Diagram*




*Note*. SMU = social media use. ED/BI = eating disorders or body image.

Body image and disordered eating outcomes were included as indices of eating disorder risk. Body image outcomes encompassed both positive (associated with less eating disorder risk) and negative (associated with more eating disorder risk) facets. Positive facets of body image were body satisfaction, body esteem, perceived physical attractiveness, and body appreciation. Negative facets of body image included those indicating poorer body satisfaction (e.g., body, appearance, or weight dissatisfaction, self-discrepancy, and body shame), internalisation of appearance ideals (e.g., thin- or muscular-ideal internalisation and drive for thinness), aspects of self-objectification (e.g., self-objectification, body surveillance and objectified body consciousness), and weight and shape concerns. Disordered eating outcomes included global measures of disordered eating behaviours and cognitions and more specific measures of dieting intention, dietary restraint, bulimic symptoms, and over-eating.

**Data Extraction Process**

A qualitative review approach was taken because the available research comprises diverse measures, constructs, study designs, and hypothesised relationships among variables, precluding other approaches such as meta-analysis. The data extraction table included descriptive information, the measures of social media use, eating disorder risk, and personality that were used, and a summary of the key results. When desired information was not available in the articles, that information was requested from the corresponding authors. In total, 16 requests for information were made, of which 11 received a response and seven resulted in the requested information being obtained.

In most cases, personality variables were grouped by collating studies that measured constructs by the same name or with related underlying characteristics (e.g., the narcissism grouping included narcissism, narcissistic vulnerability, narcissistic grandiosity, and narcissistic personality). For other groupings, the relationships between characteristics were less immediately apparent, but they were collated together if they were considered to

represent a common underlying construct. For example, the social insecurity grouping included the need for popularity, reassurance-seeking, attachment anxiety/avoidance, self-worth contingency on others' approval, sociotropy, and imaginary audience ideation.

### Quality Appraisal

The quality appraisal of the included articles was conducted using the AXIS Appraisal Tool for Cross-Sectional Studies (Downes et al., 2016), which uses 20 items to assess studies based on design, reporting, and risk of bias. This tool was designed for cross-sectional studies, which comprised the majority of the included papers, but it has previously been applied to longitudinal designs with additional items (White et al., 2021). The tool was applied to all articles and four items concerning participant recruitment and follow-up were added to assess the two longitudinal studies, taken from IHE Quality Appraisal Checklist for Case Series Studies (Guo et al., 2016). Four items about randomisation and missing outcome data were also added to the assessment of the experimental and mixed methods designs (each study of the latter design comprised a cross-sectional and experimental component), sourced from the Revised Cochrane Risk of Bias Tool for Randomized Trials (Higgins et al., 2011).

## Results

### Characteristics of Included Articles

Thirty-seven articles (28 cross-sectional, 5 experimental, 2 longitudinal, and 2 mixed methods) were included, comprising 48 samples (38 cross-sectional, 6 experimental, 2 longitudinal, and 2 mixed methods) and 27,141 participants. Samples were from 15 countries, most commonly the USA ($k$ = 17, 35.4%). The average mean (i.e., the mean mean) of participant age was 20.63 ($SD$ = 5.50; range = 12.44 – 35.79; $k$ = 42). Most participants were female, comprising a mean of 75.54% ($SD$ = 36.01; range = 0 – 100; $k$ = 48) and where information on this was available, samples were predominantly White or Caucasian, comprising a mean of 53.53% ($SD$ = 25.71; range = 0 – 91.00; $k$ = 22). Of the 26 samples for

which information on the proportion of White or Caucasian participants was not available, the majority ($k$ = 19) were from countries where a high rate of such participants is likely (i.e., Australia, Austria, Belgium, Croatia, Iceland, Ireland, Italy, Spain, the Netherlands, and the USA), whilst the remaining samples ($k$ = 7) were likely to have a high rate of Asian participants, being from China, Malaysia, and South Korea. Very few articles ($k$ = 9) provided information on socioeconomic status, precluding the extraction of trends. See **Table 4.1** for details on an article-by-article basis.

**Table 4.1**

*Characteristics of Included Articles*

| Reference | Country | Study design | Sample size | % female | Age of participants | Culture/ethnicity/nationality | SES | Type(s) of SMU | ED risk factor(s) | Personality variable(s) |
|---|---|---|---|---|---|---|---|---|---|---|
| Ahadzadeh et al., 2017 | Malaysia | Cross-sectional | 273 | 62.3 | *M* = 20.09 *SD* = 1.12 | 83.9% Chinese, 7.0% Malay, 2.6% Indian, 6.6% other | N/A | Daily Instagram usage | Self-discrepancy; Self-schema; Body image satisfaction | Self-esteem |
| Boursier et al., 2020 | Italy | Cross-sectional | Females: 381<br>Males: 189 | 66.8 | *M* = 24.4 *SD* = 3.60 | N/A | N/A | Selfie engagement | Body surveillance; Body shame; Appearance control beliefs | Narcissism *(narcissistic vulnerability and narcissistic grandiosity)* |
| Brichacek et al., 2018 | Australia | Experimental | 189 | 75 | *M* = 22.6 *SD* = 6.6 | 71% Caucasian, 13% Asian, 5% Australian Aboriginal or Torres Strait Islander, 3% African, 7% other | N/A | Frequency of SNS use; Duration of SNS use; Exposure to ideal body images on Facebook (vs travel images) | Body satisfaction; Thin-ideal internalisation; Muscular-ideal internalisation | Self-efficacy *(autonomy needs satisfaction and competence needs satisfaction)* |
| Caso et al., 2020 | Italy | Cross-sectional | 676 | 100 | *M* = 22.81 *SD* = 2.21 | Only Italian nationals were eligible | N/A | Daily SNS usage; Selfie-editing; Selfie-posting | Thin-ideal internalisation; Self-objectification | Self-esteem |
| Cohen & Blaszczynski, 2015 | Australia | Mixed (cross-sectional and experimental) | 193 | 100 | *M* = 19.32 *SD* = 3.47 | 47.4% Caucasian, 35.8% Asian, 3.7% Middle Eastern, 0.5% Aboriginal/Torres Strait Islander, 0.5% African, 12.1% other | N/A | Facebook use; Exposure to mock Facebook thin-ideal content | Thin-ideal internalisation; Body dissatisfaction; Disordered eating | Self-esteem |

**Table 4.1 (Continued)**

| Reference | Country | Study design | Sample size | % female | Age of participants | Culture/ethnicity/nationality | SES | Type(s) of SMU | ED risk factor(s) | Personality variable(s) |
|---|---|---|---|---|---|---|---|---|---|---|
| Foster et al., 2020: Study 1 (Study 2 irrelevant) | USA | Cross-sectional | 109 | 100 | *M* = 19<br>*SD* = 0.85 | 67.9% Caucasian, 11.0% Latino/Hispanic, 7.3% African American, 5.5% Asian, 2.8% Native American, 5.5% other | N/A | Daily Snapchat usage | Drive for thinness | Self-esteem |
| Fox & Rooney, 2015 | USA | Cross-sectional | 800 | 0 | *M* = 29.29<br>*SD* = 6.52 | 73.1% Caucasian/ European-American/White, 13.3% Black/African/African American, 7.6% Latino/Latina/Hispanic, 6.1% Asian/Asian-American, 1.3% American Indian/Native American, 2.3% multiracial, 2% other | N/A | Daily time on SNSs; Selfie-posting; Photo editing | Self-objectification | Narcissism |
| Hanna et al., 2017 | USA | Cross-sectional | Females: 718<br><br>Males: 449 | 61.53 | Females:<br>*M* = 19.11<br><br>Males:<br>*M* = 19.43<br><br>*SD* N/A | Females:<br>72.8% White/Caucasian, 15.9% Asian American, 4.1% Black/African American, 3.8% Latino/Hispanic, 2.2% Middle Eastern<br><br>Males:<br>70.5% White/Caucasian, 15.7% Asian American, 2.9% Black/African American, 3.6% Latino/Hispanic, 3.1% Middle Eastern | N/A | Daily time on Facebook; Passive Facebook use; Active Facebook use | Body surveillance; Body shame | Self-esteem (*performance and social self-esteem*) |

**Table 4.1 (Continued)**

| Reference | Country | Study design | Sample size | % female | Age of participants | Culture/ethnicity/nationality | SES | Type(s) of SMU | ED risk factor(s) | Personality variable(s) |
|---|---|---|---|---|---|---|---|---|---|---|
| Jin et al., 2018 | USA | Experimental | Experiment 1: 230<br><br>Experiment 2: 322 | Experiment 1: 41.3<br><br>Experiment 2: 39.8 | Experiment 1: *M* = 33.75 *SD* = 10.59<br><br>Experiment 2: *M* = 32.75 *SD* = 9.69 | Study 1: 57.0% White, 23.9% Asian, 7.4% African American, 6.1% American Indian or Alaska Native, 0.9% Native Hawaiian or Other Pacific Islander, 4.8% other<br><br>Study 2: 49.4% White, 37.3% Asian, 4.3% African American, 5.6% American Indian or Alaska Native, 0.3% Native Hawaiian or Other Pacific Islander, 3.1% other | N/A | Exposure to appearance-ideal Instagram images | Dieting intention | Narcissism (*narcissistic personality & narcissistic grandiosity*); Perfectionism |
| Kim, 2020 | South Korea | Cross-sectional | 321 | 100 | *M* = 21.29 *SD* = 1.61 | N/A | N/A | Selfie-posting; Instagram use | Body dissatisfaction | Self-esteem; Social insecurity *(need for popularity)* |
| Lee et al., 2014 | USA & South Korea | Cross-sectional | USA: 502<br><br>South Korea: 518 | USA: 60.1<br><br>South Korea: 62.6 | USA*:* *M* = 21.13 *SD* = 4.50<br><br>South Korea*:* *M* = 22.35 *SD* = 2.15 | USA: 48% Asian, 22% Caucasian, 20.8% multiethnic, 9.8% other<br><br>South Korea: 100% ethnically and culturally Korean | N/A | SMU related to body image for information-seeking; SMU related to body image for self-status seeking; SMU related to body image for socialising | Body esteem | Self-esteem |

**Table 4.1 (Continued)**

| Reference | Country | Study design | Sample size | % female | Age of participants | Culture/ethnicity/nationality | SES | Type(s) of SMU | ED risk factor(s) | Personality variable(s) |
|---|---|---|---|---|---|---|---|---|---|---|
| Lee-Won et al., 2020 | USA | Cross-sectional | 396 | 100 | *M* = 27.76<br>*SD* = 7.90 | Only people from the US were eligible | N/A | Instagram selfie-modification; Daily Instagram use; Instagram usage history | Disordered eating | Self-esteem |
| Lonergan et al., 2019 | Australia | Cross-sectional | Males: 89<br><br>Females: 95 | ~51.6 | Males:<br>*M* = 20.13<br>*SD* = 3.43<br><br>Females:<br>*M* = 19.73<br>*SD* = 3.48 | 87% born in Australia | N/A | Selfie-manipulation; Selfie-investment | Body dissatisfaction | Self-compassion |
| McComb & Mills, 2021 | Canada | Experimental | 142 | 100 | *M* = 19.06<br>*SD* = 1.34 | 26.8% Caucasian, 22.5% South-Asian, 15.5% East-Asian,13.4% Middle Eastern, 7% Black/African Canadian, 4.2% Caribbean, 1.4% Pacific Islander, 0.7% Native, 0.7% West Asian, 0.7% Hispanic/Latino, 6.3% other | N/A | Exposure to appearance-ideal Instagram images | Appearance dissatisfaction; Weight dissatisfaction | Emotion regulation difficulties *(rumination and catastrophising)* |
| Modica, 2019 | USA | Cross-sectional | 232 | 100 | *M* = 35.79<br>*SD* = 11.08 | 73.7% Caucasian, 13.8% African American, 4.7% Hispanic, 4.3% Asian, 0.9% American Indian or Alaska Native, 2.6% other | N/A | Length of Facebook use; Daily Facebook use; Facebook intensity; Facebook appearance exposure | Body esteem; Body surveillance; Appearance-contingent self-worth | Self-compassion |

**Table 4.1 (Continued)**

| Reference | Country | Study design | Sample size | % female | Age of participants | Culture/ethnicity/nationality | SES | Type(s) of SMU | ED risk factor(s) | Personality variable(s) |
|---|---|---|---|---|---|---|---|---|---|---|
| Nesi et al., 2021 | USA | Cross-sectional | 639 | 53.5 | *M* = 17.6 *SD* N/A | 46.5% White, 22.2% Black, 23.9% Hispanic/Latinx, 7.4% other | Recruited from rural, lower-middle-class high schools | Selfie appearance investment; Selfie peer feedback concern; Frequency of selfie-posting | Appearance investment; Body esteem | Social insecurity *(reassurance-seeking)* |
| Peris et al., 2020 | Spain | Cross-sectional | 447 | 56.2 | *M* = 14.90 *SD* = 0.81 | N/A | N/A | SMU | Body satisfaction; Perceived physical attractiveness | Trait anxiety *(neuroticism)*; Extraversion; Impulsivity *(disinhibition)*; Narcissism |
| Powell et al., 2018 | USA | Cross-sectional | 250 | 100 | *M* = 22.27 *SD* = 4.16 | 33.2% Hispanic, 27.1% White, 11.4% African American, 21.8% Asian, 6.5% other | Income: 20.2% low, 28.5% lower middle, 36.8% middle, 12.7% upper middle, 1.8% upper | Pinterest intensity | Thin-ideal internalisation; Body satisfaction | Social insecurity *(attachment anxiety and attachment avoidance)* |
| Prieler et al., 2021 | Austria, Belgium, Spain, and South Korea | Cross-sectional | Austria: 199<br><br>Belgium: 292<br><br>Spain: 306<br><br>South Korea: 184 | 100 | *M* = 13.46 *SD* = 1.10 | N/A | N/A | Appearance comparison on Facebook | Body esteem | Social insecurity *(self-worth contingency on others' approval)* |

**Table 4.1 (Continued)**

| Reference | Country | Study design | Sample size | % female | Age of participants | Culture/ethnicity/nationality | SES | Type(s) of SMU | ED risk factor(s) | Personality variable(s) |
|---|---|---|---|---|---|---|---|---|---|---|
| Puccio et al., 2016 | Australia | Longitudinal | 245 | 100 | *M* = 23.77<br>*SD* = 7.10 | ~50% Caucasian | N/A | Facebook appearance comparison | Thin-ideal internalisation; Pressures to be thin; Body dissatisfaction; Dietary restraint; Bulimic symptoms | Social insecurity *(sociotropy)* |
| Rodgers et al., 2020 | Australia | Cross-sectional | Females: 332<br>Males: 349 | 49 | *M* = 12.76<br>*SD* = 0.74 | 1.8% Aboriginal and/or Torres Strait Islander | 71.6% in high SES areas, 10.5% in low SES areas | Frequency of SMU | Muscular ideal internalisation; Body dissatisfaction; Dietary restraint | Self-esteem |
| Salomon & Brown, 2019 | USA | Cross-sectional | 142 | 69.7 | *M* = 12.44<br>*SD* = 0.61 | 45% White/European American, 22% Latinx/Hispanic, 19% Black/ African American, 1% Asian, 13% multiracial | 49% – 85% of students qualified for lunch assistance across recruitment sites | Weekly frequency of SMU; Self-objectification behaviours on social media | Body surveillance; Body shame | Self-monitoring tendency |
| Salomon & Brown, 2020 | USA | Experimental | 187 | 75.4 | *M* = 19.03<br>*SD* = 1.43 | 82.4% White, 7.5% African American, 4.3% Asian, 3.2% Hispanic/Lati, and 2.1% multiethnic | N/A | Weekly frequency of SMU | Objectified body consciousness | Self-monitoring tendency |
| Scully et al., 2020 | Ireland | Cross-sectional | 210 | 100 | *M* = 15.16<br>*SD* = 1.17 | N/A | No recruitment site receiving government support for social or educational disadvantage | Appearance-related Facebook activity; Appearance comparisons on Facebook; Upward appearance comparisons on Facebook | Thin-ideal internalisation; Body dissatisfaction | Self-esteem |

**Table 4.1 (Continued)**

| Reference | Country | Study design | Sample size | % female | Age of participants | Culture/ethnicity/nationality | SES | Type(s) of SMU | ED risk factor(s) | Personality variable(s) |
|---|---|---|---|---|---|---|---|---|---|---|
| Sherlock & Wagstaff, 2018 | Australia | Mixed (cross-sectional and experimental) | 129 | 100 | *M* = 24.60 *SD* = 4.54 | N/A | N/A | Time spent on Instagram; Accounts followed on Instagram; Followers on Instagram | Physical appearance anxiety; Body image disturbance | Trait anxiety; Self-esteem |
| Smith et al., 2013 | USA | Longitudinal | 232 | 100 | *M* = 18.72 *SD* = 1.60 | 76.3% Caucasian, 9.5% African American, 2.6% Asian, 9% Hawaiian/Other Pacific Islander, 17% other | N/A | Maladaptive Facebook usage | Bulimic symptoms; Body dissatisfaction; Shape concern; Over-eating | Social insecurity *(reassurance-seeking)* |
| Teo & Collinson, 2019 | Singapore | Cross-sectional | 363 | 69.3 | *M* = 22.69 *SD* = 2.10 | 100% Singaporean Chinese | Household income: 17.3% zero, 28.8% $0 – $5,000, 25.4% $5,000 – $10,000, 28.5% over $10,000 | Instagram intensity | Disordered eating | Emotion regulation difficulties *(rumination)* |
| Thorisdottir et al., 2019 | Iceland | Cross-sectional | 10,563 | 50.3 | N/A | N/A | N/A | Daily time on social media; Active SMU; Passive SMU | Poor body image | Self-esteem |
| Vall-Roqué et al., 2021 | Spain | Cross-sectional | 2,601 | 100 | *M* = 24.05 *SD* = 5.04 | N/A | N/A | Social network site use | Drive for thinness; Body dissatisfaction | Self-esteem |

**Table 4.1 (Continued)**

| Reference | Country | Study design | Sample size | % female | Age of participants | Culture/ethnicity/nationality | SES | Type(s) of SMU | ED risk factor(s) | Personality variable(s) |
|---|---|---|---|---|---|---|---|---|---|---|
| Veldhuis et al., 2020 | The Netherlands | Cross-sectional | 179 | 100 | *M* = 21.54 *SD* = 2.05 | Recruited from a predominantly Caucasian population | N/A | Preoccupation with selfies; Deliberate selfie selection; Selfie-editing; Deliberate selfie-posting | Body dissatisfaction; Body appreciation; Self-objectification | Self-esteem |
| Vuković et al., 2018 | Croatia | Cross-sectional | 211 | 100 | *M* = 16.14 *SD* = 0.47 | N/A | Education: 50.2% at gymnasium, 49.8% at vocational school (said to represent family SES) | Frequency of SNS use | Body-surveillance | Self-esteem |
| Walker et al., 2015 | USA | Cross-sectional | 128 | 100 | N/A | 81.3% Caucasian, 6.7% Asian, 9.0% African American, 4.7% Latino, 3.0% other | Average annual household income: $80,000 – $90,000 | Facebook intensity | Disordered eating | Trait anxiety; Disinhibition *(negative urgency)*; Self-efficacy |
| Wang et al., 2020 | China | Cross-sectional | Females: 194<br>Males: 119 | 62 | *M* = 18.89 *SD* = 0.81 | N/A | N/A | Body talk on SNSs | Body surveillance; Body shame | Self-compassion |
| Wang, 2019 | China | Cross-sectional | 589 | 71.1 | *M* = 22.36 *SD* = 4.90 | N/A | N/A | Selfie-editing frequency | Appearance-related body esteem; Others' evaluation-related body esteem; Weight-related body esteem | Narcissism; Extraversion |

**Table 4.1 (Continued)**

| Reference | Country | Study design | Sample size | % female | Age of participants | Culture/ethnicity/nationality | SES | Type(s) of SMU | ED risk factor(s) | Personality variable(s) |
|---|---|---|---|---|---|---|---|---|---|---|
| Wick & Keel, 2020 | USA | Experimental | 80 | ~93 | *M* = 18.71 *SD* = 0.97 | 91% White, 8% Black, 6% Asian, 24% Hispanic, 1% Other | N/A | Posting edited photos frequency; Instagram use; Problematic Instagram use | Disordered eating; Body dissatisfaction | Trait anxiety |
| Yellowlees et al., 2019 | The Netherlands | Cross-sectional | 184 | 100 | *M* = 22.44 *SD* = 5.45 | 95.4% native Dutch | N/A | Daily SNS use; Selfie-posting | ED symptoms; Body dissatisfaction; Body-checking; Body avoidance | Self-esteem |
| Zheng et al., 2019 | China | Cross-sectional | 963 | 100 | *M* = 14.72 *SD* = 1.75 | N/A | Recruitment site described as economically diverse | Selfie-posting on Qzone; General Qzone use time | Self-objectification | Social insecurity *(imaginary audience ideation)* |

*Note*. SES = socioeconomic status. SMU = social media use. ED = eating disorder. N/A = not available. SNS = social networking site. Italicised words in the Personality variable(s) column indicate the specific characteristic investigated where this does not clearly identify the superordinate variable grouping presented first.

**Personality, Social Media Use, and Eating Disorder Risk**

In the following sections, each personality variable is introduced and their relationship to body image or eating disorders is outlined, before reviewing the evidence on how that variable may operate in the relationship between social media use and eating disorder risk. Where standardised beta values are available, these are interpreted such that $\beta = 0.10$ suggests a small effect, $\beta = 0.30$ a medium effect, and $\beta = 0.50$ a strong effect (Acock, 2014, p. 209). Likewise, correlations are interpreted with reference to the guidelines suggested by Cohen (1988), whereby a correlation of .10 indicates a small effect, .30 suggests a moderate effect, and .50 suggests a large effect. **Table 4.2** overviews the information available for each personality variable and **Table 4.3** provides correlations from the included articles between the personality variables and both social media use and eating disorder risk factors.

**Table 4.2**

*Model-Related Information Available for Each Personality Variable*

| Personality variable | Type of information | No. of articles |
|---|---|---|
| Self-esteem | Examines personality, social media use, and eating disorder risk | 16 |
| | Examines mediation | 4 |
| | Examines moderated mediation | 1 |
| | Supports moderation/mediation/moderated mediation | 5 |
| | Model prospectively supported | 0 |
| Social insecurity | Examines personality, social media use, and eating disorder risk | 7 |
| | Examines moderation | 1 |
| | Examines mediation | 2 |
| | Examines moderated mediation | 1 |
| | Supports moderation/mediation/moderated mediation | 4 |
| | Model prospectively supported | 0 [a] |
| Narcissism | Examines personality, social media use, and eating disorder risk | 5 |
| | Examines moderation | 1 |
| | Supports moderation/mediation/moderated mediation | 1 |
| | Model prospectively supported | 1 |
| Trait anxiety | Examines personality, social media use, and eating disorder risk | 4 |
| Self-compassion | Examines personality, social media use, and eating disorder risk | 3 |
| | Examines moderation | 3 |
| | Supports moderation/mediation/moderated mediation | 1 |
| | Model prospectively supported | 0 |
| Emotion regulation difficulties | Examines personality, social media use, and eating disorder risk | 2 |
| | Examines mediation | 1 |
| | Supports moderation/mediation/moderated mediation | 1 |
| | Model prospectively supported | 0 [a] |
| Extraversion | Examines personality, social media use, and eating disorder risk | 2 |
| Impulsivity | Examines personality, social media use, and eating disorder risk | 2 |
| Perfectionism | Examines personality, social media use, and eating disorder risk | 2 |
| | Examines moderation | 1 |
| | Supports moderation/mediation/moderated mediation | 1 |
| | Model prospectively supported | 1 |
| Self-efficacy | Examines personality, social media use, and eating disorder risk | 2 |
| Self-monitoring tendency | Examines personality, social media use, and eating disorder risk | 2 |
| | Examines moderated mediation | 1 |
| | Supports moderation/mediation/moderated mediation | 1 |
| | Model prospectively supported | 0 |

*Note*. [a] Though there were prospective designs including these variables, their relationships to both social media use and eating disorder risk were not examined prospectively.

**Table 4.3**

*Personality Measures Used and their Correlations with Social Media Use and Eating Disorder Risk*

| Study | Personality measure | Correlations with SMU | Correlations with ED risk factors |
|---|---|---|---|
| | | Self-esteem | |
| Ahadzadeh et al. (2017) | Rosenberg Self-Esteem Scale | *Correlations not available* | *Correlations not available* |
| Caso et al. (2020) | Rosenberg Self-Esteem Scale | Daily SNS usage: **-.17**, $p$ <.01<br>Selfie-editing: **-.40**, $p$ <.01<br>Selfie-posting: **-.23**, $p$ <.01 | Thin-ideal internalisation: **-.45**, $p$ <.01<br>Self-objectification: **-.80**, $p$ <.01 |
| Cohen & Blaszczynski (2015) | Rosenberg Self-Esteem Scale | Facebook use: -.07, *ns* | Thin-ideal internalisation: **-.30**, $p$ <.01<br>Body dissatisfaction: **-.57**, $p$ <.01<br>Disordered eating: **-.30**, $p$ <.01 |
| Foster et al. (2020) | Rosenberg Self-Esteem Scale | Daily Snapchat usage: .10, *ns* | Drive for thinness: -.13, *ns* |
| Hanna et al. (2017) – female sample | State Self-Esteem Scale (performance and social self-esteem subscales) | Daily time on Facebook: **-.08**, $p$ <.05 (performance); **-.09**, $p$ <.05 (social)<br>Passive Facebook use: **-.08**, $p$ <.05 (performance); **-.10**, $p$ <.05 (social)<br>Active Facebook use: .06, *ns* (performance); .00, *ns* (social) | Body surveillance: **-.21**, $p$ <.001 (performance); **-.52**, $p$ <.001<br>Body shame: **-.33**, $p$ <.001 (performance); **-.50**, $p$ <.001 (social) |
| Hanna et al. (2017) – male sample | State Self-Esteem Scale (performance and social self-esteem subscales) | Daily time spent on Facebook: **-.13**, $p$ <.01 (performance); **-.19**, $p$ <.001 (social)<br>Passive Facebook use: -.06, *ns* (performance); **-.13**, $p$ <.01 (social)<br>Active Facebook use: .05, *ns* (performance); -.03, *ns* (social) | Body surveillance: **-.29**, $p$ <.001 (performance); **-.52**, $p$ <.001 (social)<br>Body shame: **-.37**, $p$ <.001 (performance); **-.52**, $p$ <.001 (social) |
| Kim (2020) | Rosenberg Self-Esteem Scale | Selfie-posting: **.16**, $p$ <.01<br>Instagram use: .06, *ns* | Body dissatisfaction: **-.29**, $p$ <.01 |

**Table 4.3 (Continued)**

| Study | Personality measure | Correlations with SMU | Correlations with ED risk factors |
|---|---|---|---|
| Lee et al. (2014) – USA sample | Rosenberg Self-Esteem Scale | SMU for information seeking: -.02, *ns*<br>SMU for self-status seeking: .01, *ns*<br>SMU for socialising: .04, *ns* | Body esteem: **.56**, *p* <.01 |
| Lee et al. (2014) – South Korean sample | Rosenberg Self-Esteem Scale | SMU related to body image for information seeking: -.02, *ns*<br>SMU related to body image for self-status seeking: .08, *ns*<br>SMU related to body image for socialising: .04, *ns* | Body esteem: **.50**, *p* <.01 |
| Lee-Won et al. (2020) | Rosenberg Self-Esteem Scale | Instagram selfie-modification: **-.11**, *p* <.05<br>Daily Instagram use: -.08, *ns*<br>Instagram usage history: .06, *ns* | Disordered eating: **-.27**, *p* <.001 |
| Rodgers et al. (2020) – female sample | Single-Item Self-Esteem Scale | Frequency of SMU: **-.29**, *p* <.001 | Muscular-ideal internalisation: **-.31**, *p* <.001<br>Body dissatisfaction: **-.55**, *p* <.01<br>Dietary restraint: **-.55**, *p* <.01 |
| Rodgers et al. (2020) – male sample | Single-Item Self-Esteem Scale | Frequency of SMU: **-.27**, *p* <.001 | Muscular-ideal internalisation: **-.14**, *p* <.01<br>Body dissatisfaction: **-.46**, *p* <.001<br>Dietary restraint: **-.19**, *p* <.001 |
| Scully et al. (2020) | Rosenberg Self-Esteem Scale | Appearance-related Facebook activity: .01, *ns*<br>Appearance comparisons on Facebook: **-.33**, *p* <.01<br>Upward appearance comparisons on Facebook: **-.50**, *p* <.01 | Thin-ideal internalisation: -.12, *ns*<br>Body dissatisfaction: **-.42**, *p* <.01 |
| Sherlock & Wagstaff (2018) | Heatherton Self-Esteem Scale | Time spent on Instagram: **-.47**, *p* <.01<br>Accounts followed on Instagram: **-.24**, *p* <.01<br>Followers on Instagram: **-.18**, *p* <.05 | Physical appearance anxiety: **-.75**, *p* <.01<br>Body image disturbance: **-.65**, *p* <.01 |

**Table 4.3 (Continued)**

| Study | Personality measure | Correlations with SMU | Correlations with ED risk factors |
|---|---|---|---|
| Thorisdottir et al. (2019) | Rosenberg Self-Esteem Scale | Daily time on social media: **-.19**, *p* <.001<br>Active SMU: **-.04**, *p* <.01<br>Passive SMU: **-.06**, *p* <.001 | Poor body image: **-.73**, *p* <.001 |
| Vall-Roqué et al. (2021) | Rosenberg Self-Esteem Scale | Frequency of Instagram use: **-.06**, *p* <.01<br>Frequency of YouTube use: **-.10**, *p* <.001<br>Frequency of TikTok use: **-.09**, *p* <.001<br>Frequency of Twitter use: **-.20**, *p* <.001<br>Frequency of Facebook use: .02, *ns* | Body dissatisfaction: **-.49**, *p* <.001<br>Drive for thinness: **-.38**, *p* <.001 |
| Veldhuis et al. (2020) | Rosenberg Self-Esteem Scale | Preoccupation with selfies: .12, *ns*<br>Deliberate selfie selection: .06, *ns*<br>Selfie-editing: .00, *ns*<br>Deliberate selfie-posting: -.08, *ns* | Body dissatisfaction: **-.46**, *p* <.01<br>Body appreciation: **.93**, *p* <.01<br>Self-objectification: **-.43**, *p* <.01 |
| Vuković et al. (2018) | Self-Description Questionnaire (4-item version) | Frequency of SNS use: -.07, *ns* | Body surveillance: **-.30**, *p* <.001 |
| Yellowlees et al. (2019) | Rosenberg Self-Esteem Scale | Daily SNS use: -.11, *ns*<br>Selfie-posting: .08, *ns* | ED symptoms: **-.38**, *p* <.01<br>Body dissatisfaction: **-.38**, *p* <.01<br>Body-checking: **-.32**, *p* <.01<br>Body avoidance: **-.46**, *p* <.01 |
| Social insecurity | | | |
| Kim (2020) | Peer Pressure, Popularity, Peer Conformity, and General Conformity Items (personality subscale) | Selfie-posting: **.24**, *p* <.01<br>Instagram use: **.14**, *p* <.05 | Body dissatisfaction: **-.11**, *p* <.05 |
| Nesi et al. (2021) – female sample | Revised Excessive Reassurance Seeking Scale | Selfie appearance investment: **.21**, *p* <.001<br>Selfie peer feedback concern: **.37**, *p* <.001<br>Frequency of selfie-posting: **.16**, *p* <.01 | Appearance investment: **.19**, *p* <.01<br>Body esteem: **-.38**, *p* <.001 |

**Table 4.3 (Continued)**

| Study | Personality measure | Correlations with SMU | Correlations with ED risk factors |
|---|---|---|---|
| Nesi et al. (2021) – male sample | Revised Excessive Reassurance Seeking Scale | Selfie appearance investment: **.46**, *p* <.001<br>Selfie peer feedback concern: **.49**, *p* <.001<br>Frequency of selfie-posting: **.16**, *p* <.01 | Appearance investment: **.33**, *p* <.001<br>Body esteem: **-.32**, *p* <.001 |
| Powell et al. (2018) | Experiences in Close Relationships – Short Form | Pinterest intensity: .05, *ns* (attachment anxiety); .09, *ns* (attachment avoidance) | Thin-ideal internalisation: **.16**, *p* <.05 (attachment anxiety); .08, *ns* (attachment avoidance)<br>Body satisfaction: **-.28**, *p* <.001 (attachment anxiety); **-.16**, *p* <.05 (attachment avoidance) |
| Prieler et al. (2021) | Contingencies of Self-Worth Scale (others' approval subscale) [a] | Appearance comparison on Facebook: **.17**, *p* <.01 (Austria); **.38**, *p* <.01 (Belgium); **.29**, *p* <.01 (Spain); .01, *ns* (South Korea) | Body esteem: **-.29**, *p* <.01 (Austria); **-.39**, *p* <.01 (Belgium); **-.30**, *p* <.01 (Spain); **-.37**, *p* <.01 (South Korea) |
| Puccio et al. (2016) | Personal Style Inventory-II | Facebook appearance comparison: **.43**, *p* <.001 | Thin-ideal internalisation: **.17**, *p* <.001<br>Pressures to be thin: **.31**, *p* <.001<br>Body dissatisfaction: **.39**, *p* <.001<br>Dietary restraint: **.36**, *p* <.001<br>Bulimic symptoms: **.30**, *p* <.001 |
| Smith et al. (2013) | Depressive Interpersonal Relationship Inventory (reassurance seeking subscale) | Maladaptive Facebook usage: **.31**, *p* <.01 | Bulimic symptoms: **.29**, *p* <.01<br>Body dissatisfaction: **.28**, *p* <.01<br>Shape concern: **.36**, *p* <.01<br>Over-eating: **.21**, *p* <.01 |
| Zheng et al. (2019) | New Imaginary Audience Scale | Selfie-posting on Qzone: **.28**, *p* <.001<br>General Qzone use time: **.15**, *p* <.001 | Self-objectification: **.18**, *p* <.001 |

**Table 4.3 (Continued)**

| Study | Personality measure | Correlations with SMU | Correlations with ED risk factors |
|---|---|---|---|
| | | Narcissism | |
| Boursier et al. (2020) – female sample | Pathological Narcissism Inventory (narcissistic vulnerability and narcissistic grandiosity second-order scales) | Selfie engagement: **.25**, $p$ <.01 (narcissistic vulnerability); **.25**, $p$ <.01 (narcissistic grandiosity) | Body surveillance: **.31**, $p$ <.01 (narcissistic vulnerability); **.20**, $p$ <.01 (narcissistic grandiosity)<br>Body shame: **.52**, $p$ <.01 (narcissistic vulnerability); **.33**, $p$ <.01 (narcissistic grandiosity)<br>Appearance control beliefs: **-.37**, $p$ <.01 (narcissistic vulnerability); **-.22**, $p$ <.01 (narcissistic grandiosity) |
| Boursier et al. (2020) – male sample | Pathological Narcissism Inventory (narcissistic vulnerability and narcissistic grandiosity second-order scales) | Selfie engagement: **.22**, $p$ <.01 (narcissistic vulnerability); **.25**, $p$ <.01 (narcissistic grandiosity) | Body surveillance: **.21**, $p$ <.01 (narcissistic vulnerability); **.19**, $p$ <.01 (narcissistic grandiosity)<br>Body shame: **.52**, $p$ <.01 (narcissistic vulnerability); **.29**, $p$ <.01 (narcissistic grandiosity)<br>Appearance control beliefs: **-.35**, $p$ <.01 (narcissistic vulnerability); -.11, *ns* (narcissistic grandiosity) |
| Fox & Rooney (2015) | Dirty Dozen (narcissism subscale) | Daily time on SNSs: **.19**, $p$ <.001<br>Selfie-posting: **.19**, $p$ <.001<br>Photo editing: **.19**, $p$ <.001 | Self-objectification: **.25**, $p$ <.001 |
| Jin et al. (2018) | Narcissistic Personality Inventory & Narcissistic Grandiosity Scale | *Correlations not available* | |
| Peris et al. (2020) | Narcissistic Personality Inventory | SMU: .02, *ns* | Body satisfaction: **.10**, $p$ <.05<br>Perceived physical attractiveness: **.26**, $p$ <.001 |
| Wang (2019) | Narcissistic Personality Inventory | Selfie-editing frequency: **.21**, $p$ <.001 | Appearance-related body esteem: .05, *ns*<br>Others' evaluation-related body esteem: **.32**, $p$ <.001<br>Weight-related body esteem: **.11**, $p$ <.01 |
| | | Trait anxiety | |
| Peris et al. (2020) | NEO Five-Factor Inventory (neuroticism subscale) | SMU: **.29**, $p$ <.001 | Body satisfaction: **-.32**, $p$ <.001<br>Perceived physical attractiveness: **-.20**, $p$ <.001 |

**Table 4.3 (Continued)**

| Study | Personality measure | Correlations with SMU | Correlations with ED risk factors |
|---|---|---|---|
| Sherlock & Wagstaff (2018) | State-Trait Anxiety Inventory (trait anxiety subscale) | Time spent on Instagram: **.42**, *p* <.01<br>Number of accounts followed on Instagram: **.30**, *p* <.01<br>Number of followers on Instagram: **.28**, *p* <.01 | Physical appearance anxiety: **.59**, *p* <.01<br>Body image disturbance: **.63**, *p* <.01 |
| Walker et al. (2015) | State-Trait Anxiety Inventory (trait anxiety subscale) | Facebook intensity: .10, *ns* | Disordered eating: **.55**, *p* <.01 |
| Wick & Keel (2020) | State-Trait Anxiety Inventory (trait anxiety subscale) | Posting edited photos frequency: -.11, *ns*<br>Instagram use: .07, *ns*<br>Problematic Instagram use: **.27**, *p* <.05 | Disordered eating: .01, *ns*<br>Body dissatisfaction: **.38**, *p* <.01 |
| | | Self-compassion | |
| Lonergan et al. (2019) | Self-Compassion Scale Short-Form | Selfie-manipulation: **-.16**, *p* <.05<br>Selfie-investment: **-.33**, *p* <.001 | Body dissatisfaction: **-.41**, *p* <.001 |
| Modica (2019) | Self-Compassion Scale | Length of Facebook use: **-.15**, *p* <.05<br>Daily Facebook use: -.08, *ns*<br>Facebook intensity: .04, *ns*<br>Facebook appearance exposure: .05, *ns* | Appearance-contingent self-worth: **-.46**, *p* <.01<br>Body esteem: **.59**, *p* <.01<br>Body surveillance: **-.37**, *p* <.01 |
| Wang et al. (2020) – female sample | Self-Compassion Scale-Short Form | Body talk on SNSs: -.03, *ns* | Body surveillance: **-.25**, *p* <.01<br>Body shame: **-.31**, *p* <.01 |
| Wang et al. (2020) – male sample | Self-Compassion Scale-Short Form | Body talk on SNSs: -.07, *ns* | Body surveillance: **-.27**, *p* <.01<br>Body shame: **-.21**, *p* <.05 |
| | | Emotion regulation difficulties | |
| McComb & Mills (2021) | Cognitive Emotion Regulation Questionnaire (rumination and catastrophizing subscales) | *Correlations not available* | |
| Teo & Collinson (2019) | Ruminative Responses Scale | Instagram intensity: .01, *ns* | Disordered eating: **.14**, *p* <.01 |

**Table 4.3 (Continued)**

| Study | Personality measure | Correlations with SMU | Correlations with ED risk factors |
|---|---|---|---|
| | | Extraversion | |
| Peris et al. (2020) | NEO Five-Factor Inventory (extraversion subscale) | SMU: **.20**, *p* <.001 | Body satisfaction: **.20**, *p* <.001<br>Perceived physical attractiveness: **.25**, *p* <.001 |
| Wang (2019) | NEO Five-Factor Inventory (extraversion subscale) | Selfie-editing frequency: **.19**, *p* <.001 | Appearance-related body esteem: **.26**, *p* <.001<br>Others' evaluation-related body esteem: **.37**, *p* <.001<br>Weight-related body esteem: **.14**, *p* <.001 |
| | | Impulsivity | |
| Peris et al. (2020) | Sensation Seeking Scale | SMU: **.23**, *p* <.001 | Body satisfaction: -.03, *ns*<br>Perceived physical attractiveness: **.22**, *p* <.001 |
| Walker et al. (2015) | UPPS Impulsive Behavior Scale (negative urgency subscale) | Facebook intensity: .17, *ns* | Disordered eating: **.36**, *p* <.01 |
| | | Perfectionism | |
| Jin et al. (2018) | Perfectionism Inventory | *Correlations not available* | |
| Walker et al. (2015) | Frost Multidimensional Perfectionism Scale | Facebook intensity: .17, *ns* | Disordered eating: **.50**, *p* <.01 |
| | | Self-efficacy | |
| Brichacek et al. (2018) | Basic Psychological Need Satisfaction and Frustration Scale (autonomy and competence subscales) | Frequency of SNS use: -.07, *ns* (autonomy); -.08, *ns* (competence)<br>Duration of SNS use: .05, *ns* (autonomy); -.06, *ns* (competence) | Body satisfaction: **.47**, *p* <.001 (autonomy); **.44**, *p* <.001 (competence)<br>Thin-ideal internalisation: **-.22**, *p* <.01 (autonomy); **-.33**, *p* <.001 (competence)<br>Muscular-ideal internalisation: -.02, *ns* (autonomy); -.04, *ns* (competence) |
| Walker et al. (2015) | General Self-Efficacy Scale | Facebook intensity: .04, *ns* | Disordered eating: **-.31**, *p* <.001 |

**Table 4.3 (Continued)**

| Study | Personality measure | Correlations with SMU | Correlations with ED risk factors |
|---|---|---|---|
| | | Self-monitoring | |
| Salomon & Brown (2019) | Junior Self-Monitoring Scale | Weekly frequency of SMU: **.24**, $p$ <.05<br>Self-objectification behaviours on social media: .16, *ns* | Body surveillance: **.63**, $p$ <.001<br>Body shame: **.50**, $p$ <.001 |
| Salomon & Brown (2020) | Junior Self-Monitoring Scale | Weekly frequency of SMU: .08, *ns* | Objectified body consciousness: **.34**, $p$ <.01 |

*Note*. SMU = social media use. ED = eating disorder. SNS = social networking site. Significant correlations are bolded. *ns* = not significant.

[a] = Correlations are reversed here compared to the reporting in the original article, such that higher scores on the self-contingency measure indicate a stronger contingency of self-worth on others' approval.

### *Self-Esteem*

**Self-Esteem, Eating Disorders, and Social Media.** Self-esteem is the subjective evaluation one has of their own worth, which need not correspond to objective measures (e.g., talent or ability, how others see the person), but involves subjective self-acceptance and self-respect (Orth & Robins, 2014). It is reasonably stable over time, showing comparable stability to other personality traits (Trzesniewski et al., 2003).

Low self-esteem is a risk factor for eating disorders (Colmsee et al., 2021). Self-esteem is negatively correlated with body dissatisfaction (Mäkinen et al., 2012), and protects against body dissatisfaction (Beato-Fernandez et al., 2004) and the development of eating disorders (Cervera et al., 2003). Moreover, self-esteem has been found to mediate the relationship between body dissatisfaction and disordered eating (Brechan & Kvalem, 2015; Cruz-Saez et al., 2020). Higher baseline self-esteem predicts better outcomes after treatment for eating disorders (Cooper et al., 2016; Vall & Wade, 2015), self-esteem improves over treatment and follow-up for eating disorders (Chen et al., 2003; Kästner et al., 2019; Linardon, Kothe, et al., 2019; Steele & Wade, 2008), and at follow-up, it predicts short- and long-term remission- or weight-related outcomes for anorexia nervosa (Kästner et al., 2019).

People with poorer self-esteem may be more likely to display addictive social media use because it offers an opportunity to collect data that enhances self-esteem, such as collecting friends and followers, and can facilitate avoidance of thoughts and feelings related to low self-esteem (Andreassen et al., 2017). Regarding body image, it has been suggested that higher self-esteem may buffer people from a tendency to place additional importance on their appearance as a result of viewing idealised social media images (Ahadzadeh et al., 2017). It was also posited that posting selfies on social media can improve self-esteem because the process of taking, selecting, and editing images of oneself that align with one's

internalised appearance standards can assist in developing a positive self-image (M. Kim, 2020).

**Qualitative Synthesis.** Self-esteem was examined in sixteen articles, five of which tested it in models cross-sectionally. Ahadzadeh et al. (2017) found support for a moderated mediation model in university students, in which appearance self-schema (i.e., attributing importance and meaning to one's appearance) and self-discrepancy sequentially mediated the negative relationship between Instagram use and body satisfaction, and self-esteem was a moderator. There was a stronger positive effect of Instagram use on appearance self-schema where self-esteem was lower, and a stronger deleterious relationship between Instagram use and body satisfaction through appearance self-schema and self-discrepancy for people with lower self-esteem.

Most models tested mediating pathways. Caso et al. (2020) found that in young women, self-esteem had a large, negative relationship with self-objectification ($\beta = -0.64$, $p < .01$), which was positively related to editing selfies for social media, with a moderate effect ($\beta = 0.45$, $p < .01$), number of selfies posted, with a small effect ($\beta = 0.27$, $p < .01$), and time spent on social networking sites, with a small effect ($\beta = 0.22$, $p < .01$). In Hanna et al. (2017), Facebook use was positively associated with self-objectification (females: $\beta = 0.38$, $p < .05$; males: $\beta = 0.41$, $p < .05$), which was related to moderately lower self-esteem in males ($\beta = -0.30$, $p < .05$), and slightly but not significantly lower self-esteem in females ($\beta = -0.15$, $p > .05$). They also found a moderate, negative association between self-esteem and body shame in females and males ($\beta$s = -0.33, $p < .05$ for each). M. Kim (2020) found that self-esteem mediated the indirect association between selfie-posting and body dissatisfaction in female college students, with selfie-posting related to higher self-esteem, and higher self-esteem related to lower body dissatisfaction (standardised coefficients not available). Finally, Lee et al. (2014) tested a model whereby social media use was related to self-esteem through body

image. In undergraduates from the USA, they found that social media use for information-seeking (but not for self-status seeking, β = 0.02, *p* =.72, or socialising, β = 0.04, *p* =.32) was significantly, negatively related to body esteem with a small effect (β = -0.15, *p* <.05), and body esteem had a large, positive association with self-esteem (β = 0.56, *p* <.05). In South Korean undergraduates, social media use for information-seeking was negatively related to body esteem with a small effect (β = -0.11, *p* <.05), social media use for self-status seeking was positively related to body esteem with a small effect (β = 0.15, *p* <.05), and body esteem was positively related to self-esteem with a large effect (β = 0.50, *p* <.05). Social media use for socialising was not linked to body esteem (β = 0.07, *p* =.11).

The model posited across studies exhibits fluidity of positioning of variables. In three models the independent variable involves social media use, while one postulates self-esteem. Three models suggest body-related variables as the mediator, while one suggests self-esteem. The dependent variable is variously postulated to be self-esteem (*n* = 2), social media use (*n* = 1) and body dissatisfaction (*n* = 1). Further consideration is required as to the conceptual ordering that makes sense, although the extant literature does not suggest a clear order of effects. Longitudinal research has found that lower self-esteem predicts increased body dissatisfaction, predominantly in female samples (Gilbert & Meyer, 2005; Park & Epstein, 2013; Paxton, Eisenberg, et al., 2006; Quick et al., 2013; Wojtowicz & von Ranson, 2012). Alternatively, body dissatisfaction has been found to predict the development of low self-esteem (Johnson & Wardle, 2005; Paxton, Neumark-Sztainer, et al., 2006; Tiggemann, 2005). Moreover, it has been suggested that body dissatisfaction and low self-esteem may have a reciprocal relationship (Paxton, Neumark-Sztainer, et al., 2006), and evidence has emerged to support this suggestion (Park & Epstein, 2013; Wichstrom & von Soest, 2016). Longitudinal panel modelling that includes social media use, body image, and self-esteem

would assist us to understand the relationships between the variables in terms of precedence more clearly.

Self-esteem generally had small, negative correlations with social media use, although correlations covered the spectrum from small and positive to moderate and negative, and some suggested no relationship existed (see **Table 4.3**). As in previous research, self-esteem exhibited small to large correlations with eating disorder risk, suggesting higher self-esteem corresponds to lower risk.

### *Social Insecurity*

**Social Insecurity, Eating Disorders, and Social Media.** This grouping included personality variables that represented a tendency to experience anxiety in interpersonal relationships, placing too much focus on others' evaluations of the self, and assessing one's worth based on one's relationships with others. Social anxiety and attachment insecurity (i.e., relationships with others characterised by avoidance and/or anxiety) are stable over time, with similar test-retest reliability to other traits like perfectionism (Gautreau et al., 2015; Gros et al., 2012; Hayward et al., 2008; Picardi et al., 2005).

Social insecurity has been viewed as closely related to eating disorders, as evidenced by the Eating Disorder Inventory, which included a Social Insecurity subscale in the second edition, and Interpersonal Insecurity and Interpersonal Alienation subscales in the third edition (Garner, 1991, 2004). Social anxiety is elevated in people with eating disorders compared to healthy controls, and it is associated with more severe eating disorder psychopathology (Kerr-Gaffney et al., 2018). Similarly, attachment insecurity is elevated in people with eating disorders and may be associated with more severe symptoms (Caglar-Nazali et al., 2014; Illing et al., 2010; Tasca & Balfour, 2014). Evidence suggests that people with more social anxiety and attachment insecurity have a poorer response to eating disorder treatment (Illing et al., 2010; K. E. Smith, T. B. Mason, R. C. Leonard, et al., 2018).

The aspects of social insecurity investigated in articles in this review were proposed to interact with social media use in several ways. M. Kim (2020) suggested that people with a stronger need for popularity may present a more idealised version of themselves and might curate their profile in such a way as to maximise the number of likes, followers, and comments their content receives on social media, with Zheng et al. (2019) arguing that imaginary audience ideation may play a similar role. Prieler et al. (2021) proposed that people whose self-worth is more contingent on others' approval will use social media more so that they can monitor others' views and engage in social and appearance comparisons. Sociotropy (i.e., a tendency to over-invest in personal relationships) was likewise considered a potential vulnerability factor for social comparisons on social media (Puccio, Kalathas, et al., 2016).

**Qualitative Synthesis.** Social insecurity was examined in seven articles, four of which tested a model. In two articles, social insecurity moderated the relationship between selfie-posting and body image. Need for popularity moderated the relationship between selfie-posting and self-esteem in female college students; the negative relationship between selfie-posting and body dissatisfaction through self-esteem was only significant for people with a low to moderate need for popularity (M. Kim, 2020). The relationship between posting selfies on Qzone and self-objectification was moderated by imaginary audience ideation; there was a stronger positive relationship between selfie-posting and self-objectification at higher levels of imaginary audience ideation in female adolescents (Zheng et al., 2019).

Two articles examined mediation, suggesting pathways from social insecurity to body image through comparisons made on social media. Prieler et al. (2021) tested a model in adolescent females from Austria, Belgium, Spain, and South Korea, finding that in all but the South Korean sample, social comparisons on Facebook mediated the negative relationship between self-worth contingency on others' approval and body esteem. Self-worth

contingency on others' approval was positively related to social comparisons on Facebook (Austria: β = 0.10, $p$ <.05; Belgium: β = 0.23, $p$ <.01; Spain: β = 0.18, $p$ <.01; South Korea: β = 0.01, $p$ >.05), which were negatively related to body esteem (Austria: β = -0.24, $p$ <.01; Belgium: β = -0.42, $p$ <.01; Spain: β = -0.18, $p$ <.01; South Korea: β = -0.08, $p$ >.05), with small to moderate effects. A revised dual pathway model for bulimic symptoms was tested by Puccio, Kalathas, et al. (2016) in adult women. At Time 1, sociotropy was positively associated with social comparisons on Facebook with a moderate effect, (β = 0.35, $p$ <.001), which were positively associated with body dissatisfaction with a small effect (β = 0.20, $p$ <.01). Sociotropy was also positively associated with pressures to be thin with a small effect (β = 0.21, $p$ <.01), which were positively associated with body dissatisfaction with a small to moderate effect (β = 0.28, $p$ <.001). Body dissatisfaction at Time 1 had a small, positive association with bulimic symptoms at Time 2 (β = 0.12, $p$ <.05). The order of effects tested in these papers accord with prior longitudinal findings that higher social anxiety predicts adverse outcomes for body dissatisfaction (Deboer et al., 2013; Vannucci & Ohannessian, 2018).

Per **Table 4.3**, social insecurity had small to moderate, positive correlations with social media use, and was generally associated with increased eating disorder risk with a small to moderate effect.

***Narcissism***

**Narcissism, Eating Disorders, and Social Media.** Narcissism is a personality feature that includes an exaggerated sense of self-importance, a belief that one is special or unique, a sense of entitlement, and a lack of empathy (American Psychiatric Association, 2022). It is stable over time (del Rosario & White, 2005; Edelstein et al., 2012; Vater et al., 2014).

People with eating disorders demonstrate more narcissism than controls (Sines et al., 2008; Steiger et al., 1997; Waller et al., 2007; Waller et al., 2008). Different narcissistic

defences, which protect self-esteem from threats, have different relationships with eating disorder features. The poisonous pedagogy defence (i.e., someone else did something wrong and needs direction) was associated with increased restrictive eating attitudes and more body-checking thoughts, while the narcissistically abused defence (i.e., others are abusive, their needs are put before one's own in a martyr-like fashion) was linked to more restrictive eating attitudes, eating concerns, body shape concerns, body weight concerns, body-checking behaviours, body-checking thoughts concerning safety beliefs and body control, objective binge eating, laxative use, and excessive exercise (Waller et al., 2007; Waller et al., 2008). Preliminary evidence suggests that the narcissistically abused defence is associated with increased dropout from outpatient CBT for eating disorders (Campbell et al., 2009).

In their review of narcissism and social media use, McCain and Campbell (2018) outlined three theoretical models that predict increased social media use in people with narcissism. Briefly, the models suggest that: 1) people with more narcissism will be attracted to social media because it enables promotion, enhancement, and reinforcement of the self; 2) the diverse but emotionally shallow social networks promoted by social media are a good fit to the interpersonal skills and preferences of narcissistic individuals; or 3) people with grandiose narcissism (i.e., those who are extraverted and open but not very agreeable) will be motivated by the potential social rewards of generating social media content. Their meta-analysis indicated a small to moderate positive association between grandiose narcissism and social media use, although findings were inconclusive as to the most fitting theoretical explanation for this relationship.

**Qualitative Synthesis.** Five articles examined narcissism and one assessed it in a model. Jin et al. (2018) proposed that the relationship between narcissism and dieting intention would be moderated by the type of social media image Instagram users were exposed to (selfies, group selfies, photos taken by others, or appearance-neutral photos). In

Experiment 1, narcissistic grandiosity and narcissistic personality had a positive relationship with dieting intention after viewing appearance-neutral photos but not selfies, and in Experiment 2, there was a stronger positive relationship between narcissistic grandiosity and narcissistic personality and dieting intention in the group selfies condition than the photos taken by other condition. In Experiment 2, the relationship between narcissistic grandiosity and dieting intention was moderated by the fame of the person posting the image; there was a positive relationship between narcissistic grandiosity and dieting intention after exposure to selfies, photos taken by others, and appearance-neutral photos posted from unpopular accounts, but no significant relationship after exposure to photos posted by popular accounts.

Narcissism typically had small, positive associations with social media use (**Table 4.3**). Correlations with eating disorder risk factors suggested narcissism may be associated to a small extent with some risk factors (i.e., self-objectification symptoms) but some protective factors as well (i.e., improved body satisfaction).

### *Trait Anxiety*

**Trait Anxiety, Eating Disorders, and Social Media.** Trait anxiety is a temporally stable characteristic encompassing increased attention to, recall of, and experiences of emotions related to anxiety, wherein the world is experienced as generally threatening (Gidron, 2013; Tian et al., 2016; Usala & Hertzog, 1991). Trait anxiety was elevated and positively correlated with eating disorder psychopathology in children and adolescents with anorexia nervosa (Schulze et al., 2009), and predicted increases in disordered eating in female undergraduates over three months (Davis & Fischer, 2013). Anxiety disorders are commonly comorbid with eating disorders and may have shared aetiology (Pallister & Waller, 2008; Swinbourne et al., 2012). Anxiety tends to improve following residential treatment for eating disorders (Peckmezian & Paxton, 2020), and higher baseline anxiety predicted more end-of-treatment eating disorder psychopathology in an inpatient eating

disorder program (K. E. Smith, T. B. Mason, R. C. Leonard, et al., 2018). Increased worry, an aspect of anxiety, predicted lower eating disorder symptoms at discharge and higher eating disorder symptoms at one-year follow-up in a sample who underwent eating disorder treatment in a residential and partial hospitalisation setting (Fewell et al., 2017).

Authors of a study that found a positive association between social media use and anxiety suggested two possible explanations for this relationship: that social media sites are a source of stress (e.g., because of negative feedback, information overload, and social comparisons), which contributes to anxiety, or that people with greater anxiety may use social media more to engage in reassurance-seeking or emotion regulation (Vannucci et al., 2017). In terms of body image, it has been suggested that posting idealised images of the self to social media and receiving positive social feedback on these images may increase anxiety over the long term because this emphasises the difference between one's actual self and the idealised version one is presenting (Wick & Keel, 2020).

**Qualitative Synthesis.** Trait anxiety was examined in four articles, but not in a model. Correlations suggest small to moderate positive associations between social media use and trait anxiety (**Table 4.3**). Trait anxiety also exhibited correlations with eating disorder risk factors that suggested a small to large association with increased risk.

### *Self-Compassion*

**Self-Compassion, Eating Disorders, and Social Media.** Self-compassion involves responding to negative events with kindness and understanding to oneself, seeing such negative events as something that all humans experience, and not overidentifying with one's negative thoughts and feelings (Neff, 2003), and may be a protective factor against eating disorders. It demonstrates high test-retest reliability, such that its stability has been likened to trait measures (Garcia-Campayo et al., 2014; Neff et al., 2021; Raes, 2011).

A meta-analysis found that higher self-compassion was moderately strongly related to reduced eating disorder pathology and body image concerns, as well as increased positive body image (Turk & Waller, 2020). Lower self-compassion and higher fears of self-compassion were linked to more severe eating disorder pathology before treatment and poorer response to treatment in eating disorder patients (Kelly et al., 2013), and self-compassion interventions appear to be effective in reducing eating pathology and improving body image (Turk & Waller, 2020).

It has been suggested that self-compassion may act as a buffer against the negative effects of exposure to social media by promoting more self-accepting responses in the face of threats to feelings of personal adequacy (Lonergan et al., 2019; Modica, 2019; Slater et al., 2017). On social media, threats to feeling personally adequate may arise in the context of appearance comparisons to images of others as well as social comparisons to the curated lives others present online (Modica, 2019; Phillips & Wisniewski, 2021). Self-compassion may also reduce negative emotional responses to threats encountered on social media, or reduce the tendency toward social media addiction (Phillips & Wisniewski, 2021).

**Qualitative Synthesis.** Self-compassion was examined as a moderator in three articles, consistent with suggestions of it having a potential buffering effect. Wang et al. (2020) found that it moderated the association between body talk on social networking sites and body shame (but not body surveillance) in young adults; there was a significant, negative association in people with low self-compassion, but no significant association in people with high self-compassion. In two other articles, self-compassion did not moderate the relationship between selfie manipulation or investment and body dissatisfaction in men and women (Lonergan et al., 2019), nor the relationship between Facebook appearance comparison and body surveillance in adult women (Modica, 2019). Taken together, correlations suggest that

self-compassion has a small, negative relationship with social media use, and was associated with reduced eating disorder risk with a small to large effect (**Table 4.3**).

### *Emotion Regulation Difficulties*

**Emotion Regulation Difficulties, Eating Disorders, and Social Media.** Emotion regulation refers to the ability to consciously and subconsciously moderate one's emotions to enable effective responses to demands, using strategies to manage the intensity or type of emotional experience or the event precipitating the emotional reaction (Aldao et al., 2010). Measures of emotion regulation difficulties demonstrate good test-retest reliability, suggesting this characteristic is stable over time, and evidence indicates that much of the variance in outcomes can be attributed to a single, general emotion dysregulation factor (Bjureberg et al., 2016; Dan-Glauser & Scherer, 2013; Zhao et al., 2022).

Deficits in the ability to regulate emotions are associated with several types of psychopathologies, including eating disorders (Aldao et al., 2010; Prefit et al., 2019). Maladaptive emotion regulation strategies include suppression, avoidance of emotions, and rumination, each of which is related to disordered eating with similar effects observed across diagnoses, and stronger effects for rumination and suppression observed in clinical than non-clinical groups (Prefit et al., 2019; K. E. Smith, T. B. Mason, & J. M. Lavender, 2018). Emotion regulation difficulties tend to improve over treatment for eating disorders and such improvements are associated with better treatment outcomes (MacDonald & Trottier, 2019; Rowsell et al., 2016; Sloan et al., 2017).

Emotion regulation may be pertinent to explaining *why* someone uses social media (e.g., someone may use features of social media, such as messaging with friends, as an emotion regulation strategy) as well as *how* they respond to social media content (Blumberg et al., 2016). In support of the idea that emotion regulation is relevant both before and after exposure to social media, maladaptive emotion regulation strategies mediated the association

between social anxiety and problematic social media use (Zsido et al., 2021), and skilful emotion regulation is considered to protect the user against deleterious consequences of social media use (Y. Yang et al., 2020; Yue et al., 2022).

**Qualitative Synthesis.** Two articles assessed emotion regulation difficulties, one of which tested a model. McComb and Mills (2021) found that rumination and catastrophising mediated the positive relationship between physical appearance perfectionism and changes in weight and appearance dissatisfaction after female undergraduates compared themselves to thin-ideal Instagram images (standardised coefficients not available). Because correlations were only available from one article, there are no trends to extract, but the available statistics suggested emotion regulation difficulties had a null relationship with Instagram intensity and a small, positive relationship with disordered eating.

### *Extraversion*

**Extraversion, Eating Disorders, and Social Media.** Extraversion includes warmth, gregariousness, assertiveness, higher activity levels, a tendency to experience positive emotions, and sociability (Lucas & Diener, 2001). Extraversion is a stable characteristic over years between measurements (Gale et al., 2013; Renner et al., 2013).

One review suggested that there was little to no association between extraversion and eating disorders (Cassin & von Ranson, 2005), but a later review disagreed (Farstad et al., 2016). Women with eating disorders reported lower extraversion than non-clinical controls (Massoubre et al., 2005; Tasca et al., 2009) and the combination of low extraversion and high neuroticism may put women at higher risk of developing an eating disorder (MacLaren & Best, 2009; Miller et al., 2006), although high neuroticism and high extraversion predicted increased disordered eating in females, with no personality factor predicting disordered eating in males (MacNeill et al., 2017). Extraversion was positively associated with improvement and recovery in adult patients with bulimia nervosa or an eating disorder not

otherwise specified (Levallius et al., 2016), and positively predicted cessation of binge eating following internet-based treatment for bulimia nervosa (Levallius et al., 2020).

Bowden-Green et al. (2020) reviewed the literature on extraversion and social media use. They found that people higher in extraversion post more often on social media, have more social media friends, and use social media more. They also tend to display positivity in their social media activities and have positive views toward social media.

**Qualitative Synthesis.** Two articles assessed extraversion, but none tested it as part of a model. Per **Table 4.3**, extraversion had small, positive correlations with both social media use and positive facets of body image, suggesting a potentially protective role of this characteristic as indicated in prior research.

### *Impulsivity*

**Impulsivity, Eating Disorders, and Social Media.** Impulsivity involves reduced sensitivity to the negative outcomes of one's behaviour, quick reactions before thorough processing of a stimulus, and disregard for the long-term consequences of one's actions (Moeller et al., 2001). Behavioural and self-report measures of impulsivity indicate that it is a stable characteristic (Geurten et al., 2021; Khemiri et al., 2021; Weafer et al., 2013).

Impulsivity is elevated in people with eating disorders, particularly presentations that include bingeing and purging (Mallorqui-Bague et al., 2020; Steward et al., 2017; Waxman, 2009). Negative urgency, (i.e., the tendency to engage in rash or risky actions when distressed) seems to be a key aspect linking impulsivity to bulimic behaviours (Fischer et al., 2008; Wenzel et al., 2014); it predicted increases in global eating pathology and binge eating in undergraduate women (Davis & Fischer, 2013), and females who had fully recovered from an eating disorder and a control group had lower negative urgency than those with a current eating disorder (Bardone-Cone et al., 2016). Impulsivity predicted dropout from treatment for

eating disorders (Peake et al., 2005), and higher baseline negative urgency predicted slower and poorer treatment response for binge eating disorder (Manasse et al., 2016).

Impulse control difficulties have been suggested as a potential vulnerability factor for engaging in problematic social media use (Wartberg et al., 2021). More impulsive people may see social media as an outlet for sensation-seeking, thereby reducing discomfort associated with inadequate stimulation (Peris et al., 2020). Impulsivity was also proposed to increase the likelihood of engaging in self-disclosure on social media, which has been associated with both positive and negative outcomes (Lyvers et al., 2020).

**Qualitative Synthesis.** Two articles assessed impulsivity, although not as part of a model. Correlations indicated a small, positive association between impulsivity and social media use (see **Table 4.3**). Correlations between impulsivity and eating disorder risk were ambiguous; it exhibited a null relationship with body satisfaction, a positive relationship with perceived physical attractiveness, and a positive association with disordered eating.

### *Perfectionism*

**Perfectionism, Eating Disorders, and Social Media.** Clinically relevant perfectionism involves setting oneself extremely demanding standards in at least one valued area of life, which are resolutely pursued despite negative outcomes, and the attainment of which unduly influences one's self-evaluation (Shafran et al., 2002). It represents a stable characteristic (Gautreau et al., 2015; Rice et al., 2012; Sherry et al., 2014).

Perfectionism can increase and maintain eating disorder symptoms (Egan et al., 2011; Limburg et al., 2017). People with anorexia nervosa have higher maladaptive perfectionism (i.e., high standards and self-criticism) than non-clinical controls, with no significant difference in maladaptive perfectionism between people with anorexia nervosa and bulimia nervosa (Dahlenburg et al., 2019). Interventions for perfectionism can improve outcomes in areas other than perfectionism, including eating disorders (Galloway et al., 2021; Robinson &

Wade, 2021). Higher perfectionism may predict poorer prognosis, response to treatment, and therapeutic alliance, as well as an increased rate of treatment dropout in people with eating disorders (Bardone-Cone et al., 2010; Bizeul et al., 2001; Johnston et al., 2018; Sutandar-Pinnock et al., 2003; van der Kaap-Deeder et al., 2016).

Social media may be attractive to perfectionistic people because they allow them to present themselves in a way that accords with their perfectionistic standards (Fioravanti et al., 2020). Regarding body image, evidence suggests that people with perfectionistic self-presentation use maladaptive coping strategies to cope with appearance comparisons to appearance-ideal social media images (McComb & Mills, 2021), and that body image may be adversely affected by exposure to appearance-ideal social media images because this increases awareness of one's flaws and fosters the development of perfectionistic tendencies that promote these ideals as standards to aspire to (Simon et al., 2022).

**Qualitative Synthesis.** Of the two articles that investigated perfectionism, only one assessed a theoretical model. Jin et al. (2018) hypothesised that the type of social media image Instagram users were exposed to (selfies, group selfies, photos taken by others, or appearance-neutral photos) would moderate the relationship between perfectionism (classed in their study as a dimension of eating disorder) and dieting intention. One significant interaction was detected, whereby dieting intention was similar at all levels of perfectionism in the selfies condition, but in the other conditions, dieting intention increased as perfectionism increased. Correlations were only reported in one article, indicating perfectionism had a small, positive association with Facebook intensity and a large, positive association with disordered eating.

### *Self-Efficacy*

**Self-Efficacy, Eating Disorders, and Social Media.** Self-efficacy is the extent to which one believes oneself capable of doing what is required to achieve a desired outcome

(Bandura, 1978). It appears to be a reasonably stable characteristic (Ohno et al., 2017; Yildirim & Ozgür Ilhan, 2010).

Self-efficacy predicted positive body image and lower disordered eating in female undergraduates (Kinsaul et al., 2014). Likewise, undergraduate students with poorer self-efficacy reported more eating disorder attitudes and behaviours (Macneil et al., 2012), and patients with eating disorders had poorer self-efficacy than controls without an eating disorder (Jauregui Lobera et al., 2009). Lower self-efficacy or higher ineffectiveness have also been related to poorer treatment outcomes for eating disorders, including frequency of binge eating, overvaluation of weight and shape, and general eating disorder pathology at post-treatment (Steele et al., 2011), purging behaviours at follow-up (Ackard et al., 2011), 5 to 10-year prognosis (Bizeul et al., 2001), and treatment dropout (Keshen et al., 2017).

Brichacek et al. (2018) proposed that basic psychological needs (i.e., autonomy, competence, and relatedness, the former two of which were used as a marker of self-efficacy in this study) may provide protection against the adverse effects of exposure to social media appearance-ideal images by fostering self-worth that is based on internal factors instead of physical appearance. Because people with greater self-efficacy have more confidence to take action to reduce threats (Mahmood et al., 2021), self-efficacy could also promote more adaptive emotion regulation in response to threats to the self (including threats related to body image) that are presented on social media.

**Qualitative Synthesis.** Self-efficacy was not tested as part of a model in the two articles that examined it; although, Brichacek et al. (2018) found that autonomy and competence did not protect university students' body satisfaction from negative impacts following exposure to body-ideal Facebook images. The correlations in **Table 4.3** do not support an association between self-efficacy and social media use but suggest that greater self-efficacy is associated with lower eating disorder risk.

### *Self-Monitoring*

**Self-Monitoring, Eating Disorders, and Social Media.** Self-monitoring refers to the tendency to observe and control one's self-presentation and expressive behaviour in response to others' self-presentation and expression in social situations to portray oneself to others in a personally desired way (Snyder, 1974; Snyder & Gangestad, 1986). Test-retest reliability of self-monitoring measures suggests this characteristic is stable over time (Myszkowski et al., 2014; Paredes et al., 2015).

Self-monitoring related positively to the importance placed on one's physical appearance and engaging in behaviours related to physical appearance in undergraduates (Sullivan & Harnish, 1990), and other-directed self-monitoring (i.e., trying to present oneself as others would expect in social situations) was positively correlated with disordered eating in a sample of women with a current or past eating disorder diagnosis (Bachner-Melman et al., 2009). In qualitative research, self-monitoring was highlighted by inpatients aged 12 to 17 with anorexia nervosa as a part of social functioning they struggled with (Patel et al., 2016).

It is suggested that people who have a stronger tendency to self-monitor may be more sensitive and vulnerable to the appearance ideals shared on social media, and hence more likely to experience negative impacts on their body image (Salomon & Brown, 2019). They may also be at greater risk of adverse outcomes due to an increased sensitivity to the social feedback they may receive on social media (Salomon & Brown, 2020).

**Qualitative Synthesis.** Two articles measured self-monitoring, one of which examined it in a model. Salomon and Brown (2019) found support for a moderated mediation model in a sample of early adolescents, such that body surveillance mediated the positive association between self-objectified social media use and body shame, and self-monitoring moderated this mediation; the mediating effect was stronger at higher levels of self-monitoring. Body surveillance was a mediator at all levels of self-monitoring in females but

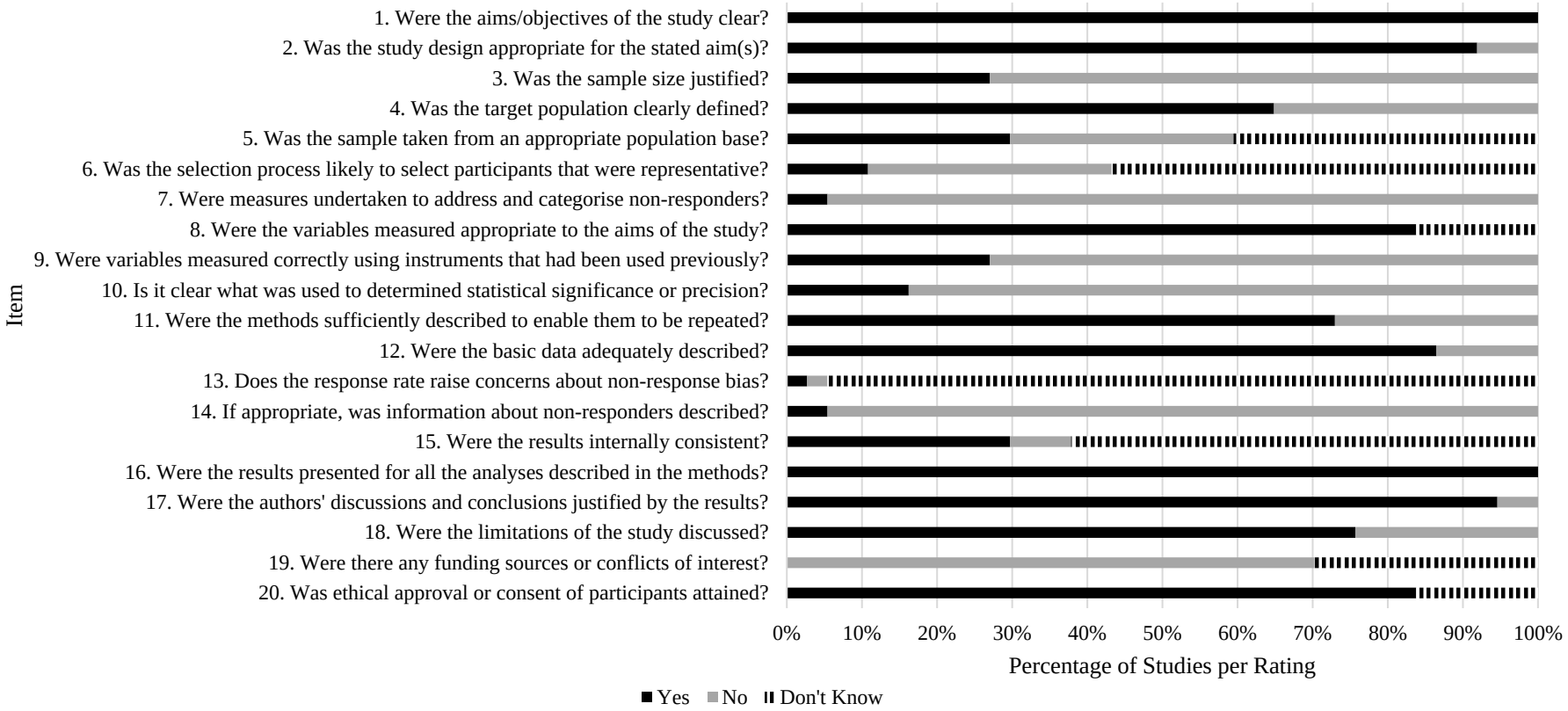
was only a significant mediator at high levels of self-monitoring in males. Regarding the correlations reported in **Table 4.3**, self-monitoring had small, positive associations with social media use, and moderate to large positive associations with eating disorder risk.

**Quality Appraisal**

Whilst the articles in this review were of a reasonable quality, areas in which quality could be improved were identified (see **Figure 4.2**). Cross-sectional studies were appraised as having not chosen a design appropriate for their aims when they used causal language in hypotheses. Most studies did not report a power analysis to justify their sample size or their sample size was smaller than that suggested by their power analysis, and in approximately a third of the articles, it was not clear what the target/reference population was. Even when this was clear, articles tended to use convenience samples that did not necessarily represent the whole population of interest; however, this limitation was commonly acknowledged. Only two studies attempted to address non-responders, and in both cases, comparisons were made between people who responded to other measures in the larger study design but not the analyses of interest, rather than to people who were not recruited at all. However, the authors of the tool acknowledge that it is difficult, and in some cases impossible, to gain information about non-responders. Social media measures were commonly created for the study and not trialled or piloted beforehand. This is likely due to there being few validated measures of social media use, particularly for measuring frequency/amount of use (validated measures for specific behaviours on or ways of using social media have been more forthcoming). Most articles did not state alpha levels *a priori* but generally, methods were described well enough that they could be repeated. Internal consistency of reporting was difficult to determine in many cases, but no article prompted concerns about selective reporting or missing data. Most studies addressed the limitations of their designs well but, in some cases, the inability to draw conclusions about causality was not addressed for cross-sectional designs.

**Figure 4.2**

*AXIS Tool Ratings for Each Item as a Percentage of All Studies*



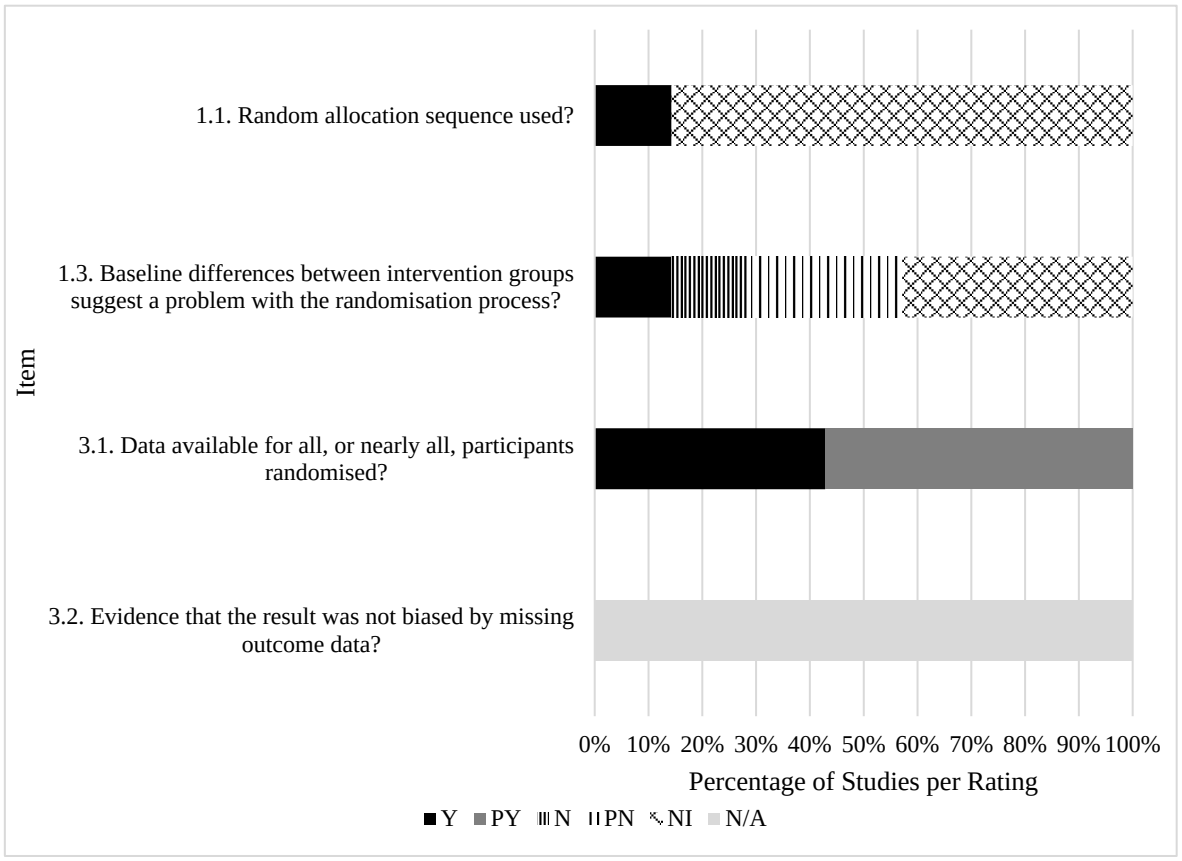

*Note*. Some items have been shortened in this figure to improve legibility.

Additional quality assessment items were applied to the two longitudinal studies and the seven experimental and mixed methods studies. Regarding the longitudinal studies, Puccio, Kalathas, et al. (2016) recruited participants from multiple sites, stated eligibility criteria, and reported losses to follow-up. Smith et al. (2013), reported losses to follow-up but did not recruit through multiple sites or state their eligibility criteria. Neither gave a justification for the period between measurements, making it unclear whether it was long enough for the effects of interest to be observed.

**Figure 4.3** summarises ratings on the additional items applied to the seven experimental and mixed methods studies. A key quality issue here was a lack of information on the randomisation process, with only one study explaining the process used to randomise participants to conditions. The other studies simply stated that randomisation occurred without explaining the randomisation process used. Another key issue was a dearth of exploration of baseline differences between conditions on key variables that may have impacted outcomes. Concerning missing data, it appeared that outcome data were available for all randomised participants, although in several cases this was assumed in the absence of an explicit statement or statistic to this effect.

**Figure 4.3**

*Ratings for Additional Risk of Bias Tool Items as a Percentage of Experimental and Mixed Methods Studies (k = 7)*




*Note*. Y = yes. PY = probably yes. N = No. PN = probably no. NI = no information. N/A = not available.

## Discussion

Although recent years have seen considerable growth in research interest in social media use and its relationship to eating disorder risk factors, comparatively few articles have considered how personality may contribute to explaining this relationship. Only one article has examined the role of personality prospectively, using an experimental design to test for moderation (i.e., Jin et al., 2018). Therefore, almost all the evidence available about the relevance of personality to social media use and eating disorder risk factors cannot demonstrate temporal sequence or causality.

The dearth of information about personality inhibits the development of theory-based preventative or therapeutic interventions addressing the impact of social media use on eating disorder risk. Guidelines for developing complex interventions indicate that the development, refining, and testing of theory is a core element of complex intervention research that informs the phases of identifying/developing an intervention and testing it for feasibility, evaluation, and implementation (Skivington et al., 2021). Regarding the relationship between social media use and eating disorder risk factors, there has been relatively little movement beyond the progression of this core element to the other phases. Of nine interventions that have been produced (not including the intervention developed for this thesis, described in **Chapter 6** and de Valle & Wade, 2022), only three examined personality, finding intervention-related improvements in self-esteem but not self-criticism or self-compassion (Gordon et al., 2021; Mahon & Hevey, 2022; Svantorp-Tveiten et al., 2021). Just one investigated how personality interacted with outcomes, finding that the reduction in eating disorder symptoms observed in female participants was mediated by increases in self-esteem (Svantorp-Tveiten et al., 2022). Improving understanding of how aspects of personality operate in the relationship between social media use and eating disorder risk could inform modifications to the existing programs, which showed promising outcomes. It would also allow us to develop new interventions that may have transdiagnostic benefits, or to direct such interventions to those people most likely to benefit from them.

**Which Personality Variables Merit Further Research?**

Of the personality variables thus far examined, self-esteem and social insecurity were the most common targets of enquiry, accompanied by the most supporting evidence. Self-esteem moderated the relationship between Instagram usage and body satisfaction in the one instance in which it was examined in this role (Ahadzadeh et al., 2017). For mediating relationships, self-esteem was variously proposed as a predictor, mediator, and outcome.

Further research that can clarify the sequence of this relationship will assist in determining whether self-esteem could usefully be targeted in interventions for the link between social media use and eating disorder risk factors, or whether different targets for intervening in this relationship may be warranted at different levels of self-esteem.

The research on social insecurity suggests it can moderate the effect of posting selfies on body image and that it precipitates an increased risk for eating disorders through social comparison on social media. The mediational sequencing of studies in this review suggested that social insecurity precedes social media use in the chain of causation, consistent with the transactional model of social media and body image concerns, which proposes that individual vulnerability factors precede social media in predicting body image concerns (Perloff, 2014). Yet, it is also possible that social media use impacts eating disorder risk by increasing social insecurity; in a review of qualitative research into adolescents' social media use, a key theme concerned the way social media impact relationships with others (Shankleman et al., 2021). Again, this literature is in its infancy, and further research that can test proposed sequences prospectively would provide more compelling evidence that can support the development of interventions.

Of the other personality variables that were examined in fewer studies, the strongest evidence was from the experimental research that found moderating effects of narcissism and perfectionism on dieting intention in people who viewed different types of social media images (Jin et al., 2018). Self-compassion and self-monitoring moderated the relationship between social media use and eating disorder risk cross-sectionally, although the former was not supported as a moderator in two of the three studies examining it. Emotion regulation difficulties were also supported as a potential mediator linking physical appearance perfectionism to body image after exposure to thin-ideal images on Instagram. These

preliminary findings suggest that narcissism, perfectionism, self-compassion, self-monitoring, and emotion regulation difficulties are worthy of further research enquiry.

Established interventions for disordered eating provide further insight into aspects of personality that merit further attention in research examining social media use. Several of the ten theories of the development of disordered eating that have supported the creation of effective interventions include personality variables identified in this review: emotion regulation difficulties ($n$ = 6), interpersonal factors or issues (which can be linked to social insecurity; $n$ = 5), negative affect (which encompasses trait anxiety; $n$ = 4), self-esteem deficits ($n$ = 4), and perfectionism ($n$ = 2; Pennesi & Wade, 2016). Hence, research testing models of the relationship between social media use and eating disorder risk may find these useful starting points for examining the role of personality.

**Limitations**

The generalisability of conclusions is limited because samples from the included articles primarily comprised adolescents to young adults, and people identifying as female and White or Caucasian. Hence, the evidence reviewed in this article may not illuminate how personality operates in the relationship between social media use and eating disorder risk factors in younger children or middle-aged to older adults, people identifying as male or of diverse genders, nor of ethnicities other than White or Caucasian, although there appears to be burgeoning research interest in Asian samples. Additionally, there was very limited information on the socioeconomic status of participants, so it is unclear how well conclusions would generalise across different socioeconomic groups.

There were quality issues identified in the included articles that may limit their capacity to inform understanding. The quality of future research may be improved by: 1) taking care to use language that is appropriate to the research design; 2) conducting a priori power analyses based on effects found in previous research and referring to these in

manuscripts; 3) using measures of social media use that have been used in previous studies or trialled/piloted by the research team previously; 4) being clear about how analyses were conducted to improve replicability, particularly by referring to the statistical packages used; and 5) including means and standard deviations on outcomes variables to enable comparison across groups and assessment of whether the sample is representative of the population of interest. Future experimental designs or mixed methods designs with an experimental component would benefit from clearly articulating the process used to randomise participants to conditions, rather than simply stating that participants were randomised. Higher quality articles will also provide information on baseline characteristics in each experimental condition and run analyses to determine whether these characteristics differ between conditions, to ensure that randomisation was successful or enable appropriate handling of pre-existing differences between conditions.

Finally, several of the personality groupings included measures that were subjectively considered to be assessing a related underlying construct, but which ostensibly measured different characteristics. This was particularly true of the social insecurity, impulsivity, and self-efficacy groupings. Further research on these personality variables is needed to produce a more valid and nuanced understanding of their contributions and whether certain aspects are more relevant or have a different relationship than others.

## Conclusions

Our understanding of how personality operates in the relationship between social media use and eating disorder risk factors is limited, inhibiting intervention development. The most credible personality candidates to date are self-esteem, social insecurity, narcissism, perfectionism, self-compassion, self-monitoring, and emotion regulation difficulties. The establishment of prospective relationships that can inform the development of informative models and effective interventions for disordered eating is required.

# CHAPTER 5

## Investigating a Model of the Relationship Between Social Media Use and Eating Disorder Risk: The Role of Motivations, Self-Criticism, Perfectionism, and Body Image Flexibility

## Abstract

This study investigated a model explaining the relationship between social media and body image by examining the roles of appearance-related motivations for social media use, self-criticism, perfectionism, and body image flexibility in a sample of young adults. Participants' perspectives on this relationship were also analysed, addressing the dearth of qualitative research. University students aged 17 to 25 ($N$ = 275; 80.7% female) completed questionnaires on appearance motivations for social media use, appearance-related social media behaviours, appearance comparison, self-objectification, self-criticism, perfectionistic self-presentation/concerns/strivings, body image flexibility, body shape concerns, and disordered eating. They also responded to qualitative items. After reviewing correlations, structural equation modelling was undertaken on models comprising appearance motivations for social media use, appearance comparison, self-criticism versus alternative perfectionism variables, body image flexibility versus body shape concerns, and disordered eating. All models showed excellent fit. Participants attributed the impacts of social media on body image to appearance comparison, promotion of appearance ideals, and emphasis on appearance. They suggested this could change if there was less idealised content or focus on appearance, and by being more selective about the content they follow. This study provides cross-sectional evidence that appearance motivations for social media use, self-criticism, perfectionism, and body image flexibility may explain the relationship between social media use and eating disorder risk.

Models of the relationship between social media use and eating disorder risk have tended to measure such use in terms of frequency or quantity (see, for example: de Vries et al., 2016; Griffiths, Castle, et al., 2018; Jarman, McLean, et al., 2021; Rodgers et al., 2020). However, uses and gratifications theory (Blumler & Katz, 1974; Katz et al., 1973) suggests that it is the motivations driving social media use that may identify problematic use and how this relates to body image and eating disorder risk. Appearance-related motivations for social media use may be particularly risky, based on prior research examining such motivations (Jarman, Marques, et al., 2021a; Lee et al., 2014; Rodgers et al., 2021) and the results of the meta-analyses described in **Chapter 3**, but have attracted little research attention compared to the broader measures of frequency or quantity of social media use.

As discussed in **Chapters 2 and 3**, prior models have commonly investigated appearance comparison, appearance-ideal internalisation, and self-objectification. The review of mediators and moderators from the experimental and longitudinal research described in **Chapter 3** indicated some support for including appearance comparison, but little support for the inclusion of appearance-ideal internalisation when modelling social media effects. Another potential mechanism, suggested by objectification theory, is self-objectification. It has been examined less often than the other two mechanisms but was supported as a mediator in longitudinal (Skowronski et al., 2020) and cross-sectional models (Chansiri et al., 2020; Hanna et al., 2017; Lee, 2022; Niu et al., 2019; Sun, 2021).

Studies examining moderating and mediating roles of variables that do not relate to appearance have been less forthcoming, but this thesis proposes that self-criticism and perfectionism are two such variables that merit attention. **Chapter 2** described the research supporting self-criticism and perfectionism as risk factors for eating disorders. Regarding their relationship to social media use and eating disorder risk, the systematic review in **Chapter 4** found that there has been no research examining the impact of self-criticism, and

very little investigating the role of perfectionism, though striving for "perfect" body ideals and self-criticism have been identified by social media users as factors involved with the effect of social media on body image (Young et al., 2022).

In the context of a greater focus on protective factors, such as positive body image (Tylka & Wood-Barcalow, 2015), body image flexibility is another potentially useful variable to consider. It may play an important role in determining whether an individual can regulate experiences of appearance-related distress without using maladaptive coping behaviours (Linardon, Anderson, et al., 2021; Rogers et al., 2018), which could be pertinent for modulating the impact of exposure to appearance-related social media content on disordered eating outcomes, as in Wu et al. (2019). However, further research is needed to ascertain what role body image flexibility plays and differentiate it from the negative body image variables that have typically been included in previous models.

Improving our understanding of the perspectives of social media users would also be a useful avenue to inform the development of models, and subsequently interventions based on those models. In contrast to the growing body of quantitative research, there has been much less qualitative research on the link between social media and body image or disordered eating (Burnette et al., 2017; Rodgers & Melioli, 2016; Young et al., 2022). Extrapolating from co-design approaches, in which user feedback informs intervention design, obtaining qualitative feedback from users may serve model and intervention development by increasing the range of available ideas, improving understanding of user needs, and producing a more satisfactory user experience of interventions (Thabrew et al., 2018).

The present study had two aims. The first was to test theoretical models that may help to describe how social media use can increase eating disorder risk within a young adult sample. The second aim of this study was to obtain user perspectives that may inform

research and treatment strategies by asking participants whether and how social media impact their feelings about their appearance.

**Figure 5.1** outlines the proposed structure of the theoretical model alternatives, in which potential components suggested by prior models (i.e., frequency of appearance-related social media behaviours, self-objectification, appearance comparison, and negative body image) and more novel inclusions (i.e., motivations for social media use, self-criticism, perfectionistic self-presentation, concerns, and strivings, and body image flexibility) were considered. The model outlined in **Figure 5.1** only includes mediating relationships, based on relationships discovered in prior research (see **Chapter 2**), but potential moderating effects of self-criticism and perfectionism were also considered, in line with their conceptualisation as personality variables from **Chapter 4**, which suggests that they may have interactive effects. The effect of body mass index (BMI) was adjusted in the models based on the recommendation by Rodgers et al. (2020), acknowledging the relationship that body size can have with outcomes.

Development of the model described in **Figure 5.1** involved consideration of theory and previous models, where possible, as well as extrapolation from logic. Motivations were considered to precede the specific behaviours engaged in on social media, per the predictions of uses and gratifications theory (Blumler & Katz, 1974; Katz et al., 1973). In line with previous models (see, for example: Hanna et al., 2017; Modica, 2020; Rousseau et al., 2017; Seekis et al., 2020; Teo & Collinson, 2019), appearance comparison or self-objectification was proposed as the variable immediately following social media use in the model. As outlined in **Chapter 2**, there is a relative lack of research involving social media, perfectionism or self-criticism, and body image or eating. It was reasoned that an increase in self-criticism or perfectionism may help to explain *why* appearance comparisons lead to negative impacts on body image, which has received little attention in prior models. As

reported in **Chapter 2**, both self-criticism and perfectionism have previously shown robust associations with appearance comparisons. The perfectionism variables and self-criticism were included as alternatives in the same position in the model, as were body image flexibility and body shape concerns, acknowledging the overlap amongst these concepts and in service of producing a parsimonious final model that would include only the most robust alternative mediators. Body image flexibility and body shape concerns were both tested to determine whether conceptualising effects on body image in terms of regulating experiences of distress (as in body image flexibility) or in terms of evaluative experience (as in body shape concerns) would be more informative in understanding effects on disordered eating.

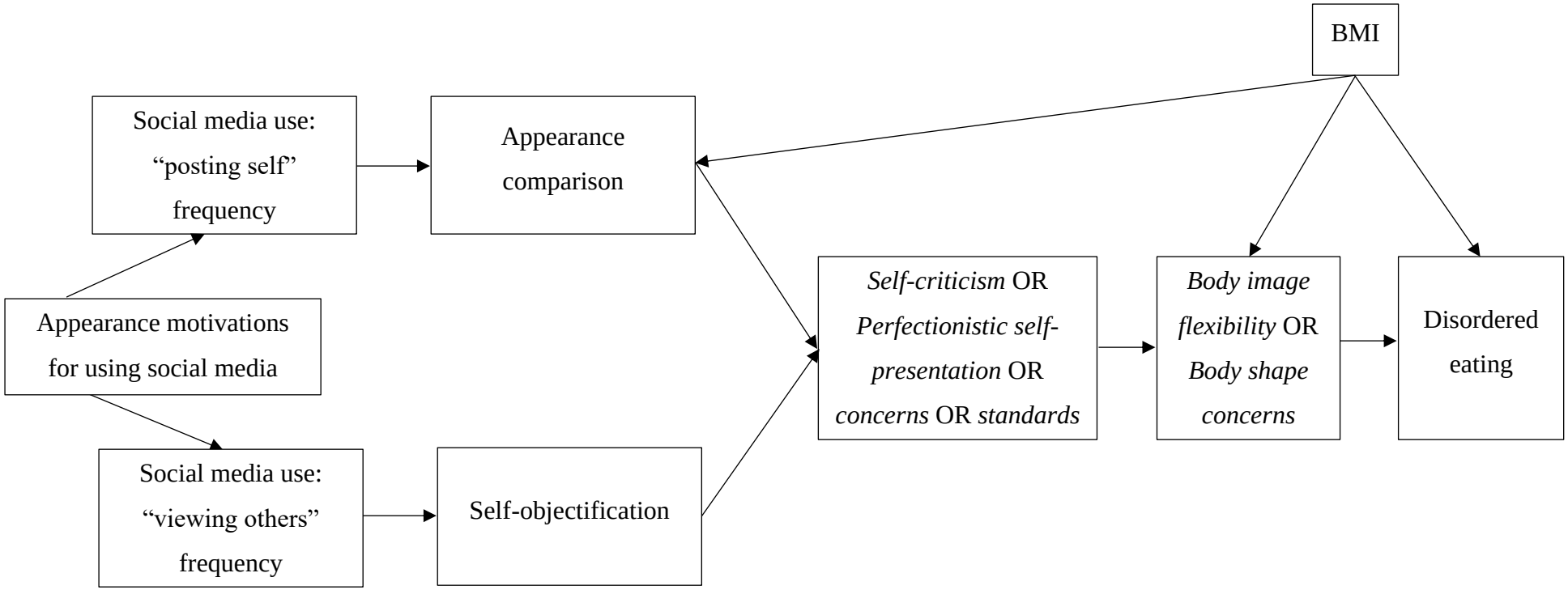
## Method

### Participants

Participants were recruited through advertisements: 1) around the authors' university via the psychology student participant pool (reimbursed with research participation credit – the only group offered reimbursement), a research webpage, and posters; 2) on the author's Twitter account; and 3) on the Blackbird Initiative website. Advertisements explained that the study aimed to assess whether certain characteristics and behaviours help to explain the link between social media use and eating disorder risk in young people.

**Figure 5.1**

*Proposed Mediation Model Structure*




*Note*. Italicised variables indicate alternative potential mediators at that stage of the model. BMI is included as a covariate.

A total of 334 survey responses were received. After removing incomplete (*n* = 24), duplicate (*n* = 41), and ineligible (*n* = 22) responses, the final sample contained 275 participants (some removed responses are represented more than once in the above figures; 59 total responses were removed). Inclusion criteria were: (1) 17 to 25 years of age; (2) currently undertaking university education; (3) fluency in English; and (4) being a current social media user. Most participants (*n* = 245, 89.1%) were recruited via the participant pool and hence reimbursed, whilst the remainder were recruited by other avenues and not reimbursed.

In the final sample, 222 identified as female (80.7%), 48 as male (17.5%), and 5 (1.8%) identified with a gender other than these. The mean age was 19.38 (*SD* = 2.03). Most participants identified as Australian (*n* = 214, 77.8%), followed by Other Caucasian (*n* = 26, 9.5%), Asian (*n* = 17, 6.2%), African (*n* = 2, 0.7%), and "other" (*n* = 16, 5.8%); in this latter group, participants self-reported their ethnicity as Middle Eastern (*n* = 2), multi-ethnic (*n* = 7), or specific countries or ethnic groups (*n* = 7).

Participants' self-reported social media activities suggested they engage with others' photos more often than they post their own; they posted photos of themselves to social media (*n* = 153, 55.6%) and edited photos of themselves for posting to social media (*n* = 156, 56.7%) less than once a month, but looked at photos of others on social media (*n* = 163, 59.3%) and "liked" photos of others on social media (*n* = 142, 51.6%) more than two times a day. The reported frequency of posting comments on others' photos was more variable, though over half of the responses (*n* = 159, 57.8%) were in the range of less than once a month up to two to three times a month.

**Power**

It was decided *a priori* to aim for 20 participants per parameter to be estimated, based on a recommended sample size heuristic (Kline, 2016). The model contained eleven

estimated parameters, necessitating a sample size of 220. Hence, the sample size of 269 for the model analyses appeared adequate.

## Measures

### *Demographics*

Participants self-reported their age, gender, ethnicity, height in centimetres, and weight in kilograms. The latter two were used to calculate BMI.

### *Appearance Motivations for Using Social Media*

The five-item Appearance subscale of the Motivations for Social Media Use Scale (MSMU; Rodgers et al., 2021) is a relatively new measure of the use of social media for reasons related to body image, self-presentation, and feedback on appearance (e.g., "I use social media to know if my pictures look attractive"). Participants respond on a 1 to 5 scale (1 = *Never*, *5 = Always*; note that only 1 and 5 have descriptors attached), and scores are summed such that, for the Appearance subscale, higher scores correspond to stronger appearance-related motivations to use social media. The other three subscales of the MSMU, which were not used in the present study, measure motivations for social media use related to Connection, Popularity, and Values and Interests.

The psychometric properties of the MSMU have previously been investigated just once, in a sample of adolescents, to support scale development (Rodgers et al., 2021). The proposed four-factor structure was supported by confirmatory factor analysis (CFI = .94, SRMR = .06, RMSEA = .06). Internal consistency of the Appearance subscale was high, with Cronbach's alphas (Cronbach, 1951), herein referred to as α, of .91 and .89 for adolescent girls and boys, respectively. Because this is a newer measure that was not previously validated in university students, the internal consistency in the present study was assessed with two statistics, finding in both cases that it was high, with α = .86 and McDonald's omega = .85 (herein referred to as ω; McDonald, 1999; Nájera Catalán, 2018).

Evidence of convergent validity for the Appearance subscale comes from correlations with the internalisation of media appearance ideals, *r*s = .53 and .38 for girls and boys, respectively, self-esteem, *r*s = -.34 and -.17 for girls and boys, respectively, and Instagram use, *r*s = .14 and .18 for girls and boys, respectively (Rodgers et al., 2021). There was also evidence of divergent validity based on very small to null correlations with Twitter use *r*s = .09 and .04 for girls and boys, respectively (correlations were expected to be higher for Instagram, an image-based social media platform, than for Twitter, a text-based platform).

***Frequency of Appearance-Related Social Media Behaviours***

No published instrument measured all aspects of appearance-related social media use that were of interest. So, a five-item questionnaire was generated, comprising two subscales assessing the frequency of Posting Self and Viewing Others on social media. The Posting Self subscale had two items, asking "How often do you post photos of yourself to social media?" and "How often do you edit photos of yourself that you intend to post to social media? (e.g., applying a filter or using software to change the way you look)". The Viewing Others subscale had three items: "How often do you look at photos of other people on social media?", "How often do you post comments on photos of other people on social media?", and "How often do you "like" photos of other people on social media? (i.e., using the "like" function or equivalent)". Participants responded on a scale from 1 to 8 (1 = *Less than once a month*, 2 = *Once a month*, 3 = *Two to three times a month*, 4 = *Once a week*, 5 = *Two to four times a week*, 6 = *Five to six times a week*, 7 = *One or two times a day*, and 8 = *More than two times a day*), based on the anchors used by McLean et al. (2015) in their measure of selfie-taking frequency. After summing the scores for each subscale, higher scores corresponded to greater frequency of that type of social media behaviour.

The internal consistency of this measure was poorer than that of other measures in this study. The Posting Self subscale had a Spearman-Brown internal consistency coefficient

of .65 (a more appropriate measure of internal consistency than α for two-item scales; Eisinga et al., 2013). The Viewing Others subscale had moderate internal consistency (α = .71). Preliminary evidence supporting the convergent validity of these subscales was obtained; they were each significantly, moderately correlated with appearance motivations for social media use in the present study.

***Appearance Comparison***

The 11-item Physical Appearance Comparison Scale-Revised (Schaefer & Thompson, 2014) measured appearance comparison. The original Physical Appearance Comparison Scale (Thompson et al., 1999), which has been very highly utilised in research, was revised to address issues with reliability and correspondence to theory. Respondents rate how often they compare their appearance to the appearance of others in different contexts on a 0 to 4 scale (0 = *Never*, 1 = *Seldom*, 2 = *Sometimes*, 3 = *Often*, and 4 = *Always*; e.g., "When I'm with a group of friends, I compare my weight to the weight of others"). Scores are summed so that higher scores indicate more frequent appearance comparisons.

The psychometric properties of this measure were first investigated during its production, with female undergraduate university students (Schaefer & Thompson, 2014). Subsequently, the properties of translated versions have been investigated: Persian (Atari et al., 2015), Spanish (Senín-Calderón et al., 2020; Vall-Roqué et al., 2022), and Brazilian Portuguese (Claumann et al., 2021). The original, one-factor structure has been replicated in each of these subsequent studies of translated versions. Internal consistency has been very high, with αs of .94 to .97 in previous studies, and .97 in the present study. The Spanish version has shown good internal consistency over three weeks, $r$ = .81 (Senín-Calderón et al., 2020) and one month, intraclass correlation = .89 (Vall-Roqué et al., 2022). Evidence for its convergent validity comes from moderate to large correlations with measures of body image, disordered eating, internalisation of appearance ideals, appearance-related pressures, self-

esteem, and social comparison tendency (Atari et al., 2015; Claumann et al., 2021; Schaefer & Thompson, 2014; Senín-Calderón et al., 2020; Vall-Roqué et al., 2022).

***Self-Objectification***

The 10-item Self-Objectification Questionnaire (SOQ; Fredrickson et al., 1998; Noll & Fredrickson, 1998) measured self-objectification. In the original version of the questionnaire, respondents are asked, when considering their self-concept, what rank from 1 to 10 they assign to various attributes (1 = *greatest impact*, 2 = *next greatest impact*, 9 = *next to least impact*, 10 = *least impact*; note that only 1,2, 9, and 10 have descriptors attached). Five of the attributes are considered to represent Competence (i.e., non-observable, non-objectified qualities): physical coordination, health, strength, energy level (e.g., stamina), and physical fitness level. The remaining five are considered to represent Appearance (i.e., observable, objectified qualities): weight, sex appeal, physical attractiveness, firm/sculpted muscles, and measurements (e.g., chest, waist, hips). A self-objectification score is derived by summing the total rankings assigned to both the Competence and Appearance items, and then subtracting the sum of the Competence items from the sum of the Appearance items, such that the total score can range from -25 to 25. Scores above zero indicate that the respondent places more importance on their appearance than their competence in their self-concept (i.e., they experience self-objectification), with higher scores above zero indicating more self-objectification.

Difficulties with the rank-ordering approach of the SOQ have been highlighted (Calogero, 2011), including respondents misunderstanding the ranking system and assigning the same ranking to multiple attributes, and the inability to obtain standard estimates of internal consistency. To address these, Wollast et al. (2021) advocate using a Likert scale approach. So, in this study, responses were on a Likert scale from 1 to 10 (1 = *Not at All Important*, 10 = *Very Important*; note that only 1 and 10 had descriptors attached), rather than

the original rank-ordering system. This approach was taken in other research concerning social media and self-objectification (Vandenbosch & Eggermont, 2012, 2016). As in the original system, a self-objectification score was derived by subtracting the sum of the Competence subscale from the sum of the Appearance subscale.

The original rank-ordering system has restricted psychometric evaluation of the properties of the SOQ (Wollast et al., 2021). A Likert scale version of the SOQ shows a two-factor structure and good internal consistency in women (αs =.71 to .80), compared to poor findings for internal consistency in the original format (αs =.38 to .67; Wollast et al., 2021). Both subscales demonstrated similarly adequate internal consistency in the present study (αs = .77 each). Relative convergent validity of the original versus Likert scale versions has not yet been established (Wollast et al., 2021). However, across both scoring systems, there has been evidence of convergent validity through moderate correlations with appearance anxiety, body dissatisfaction, internalisation of appearance ideals, body surveillance, body shame and disordered eating, and convergent validity through very small to null correlations with BMI, supporting the assertion that self-objectification can occur regardless of body size (Calogero, 2011; Schaefer & Thompson, 2018; Vandenbosch & Eggermont, 2012, 2016; Xiao et al., 2021).

### *Self-Criticism*

The nine-item Self-Criticism subscale of the Reconstructed Depressive Experiences Questionnaire (RecDEQ; Bagby et al., 1994) measured self-criticism. Respondents rate their agreement with statements on a scale from 1 to 7 (1 = *Strongly Disagree,* 7 = *Strongly Agree;* note that only 1 and 7 have descriptors attached); for example, “Often, I feel that I have disappointed others”. After reverse scoring one item, responses are summed, and higher scores indicate greater self-criticism.

The RecDEQ was developed based on a factor analysis of the 66-item Depressive Experiences Questionnaire (DEQ; Blatt et al., 1976) that was undertaken because of concerns about its validity and reliability. The authors of the RecDEQ extracted two factors comprising 19 items in their analyses of the DEQ with community adult, depressed outpatient, and student samples, representing Dependency (10 items) and Self-Criticism (nine items), with the remaining 47 items excluded from the reconstructed scale. The DEQ uses a complex, weighted scoring method that may be unable to distinguish properly between the measurement of dependency and self-criticism, which was replaced in the RecDEQ with a simpler scoring procedure (Bagby et al., 1994).

The RecDEQ was found to be the version of the DEQ with the best psychometric properties, comparing the original DEQ with six briefer versions, considering model fit, intercorrelation between subscales, and associations with depressive symptoms and interpersonal characteristics (Desmet et al., 2007). Its two-factor structure was supported in subsequent research (Piumatti, 2016). The RecDEQ has demonstrated low to reasonable internal consistency in prior studies (αs = .59 to .80; Bagby et al., 1994; Curran et al., 2017; Yen et al., 2021), and internal consistency in this study was high (α = .88). It also has good test-retest reliability ($r$ = .83 for the Self-Criticism subscale) over four weeks and discriminates between community and depressed samples (Bagby et al., 1994). The convergent validity of the Self-Criticism subscale is supported by moderate correlations with depressive symptoms (Yen et al., 2021) and small to moderate correlations with aspects of perfectionism (Curran et al., 2017; Nealis et al., 2015).

### *Perfectionistic Self-Presentation*

The Perfectionistic Self-Presentation Scale (PSPS; Hewitt et al., 2003) comprises subscales measuring the three facets of perfectionistic self-presentation: Perfectionistic Self-Promotion (10 items related to promoting the appearance of perfection; e.g., “I need to be

seen as perfectly capable in everything I do"), Nondisplay of Imperfection (10 items assessing concerns over and efforts to avoid appearing imperfect; e.g., "I do not want people to see me do something unless I am very good at it"), and Nondisclosure of Imperfection (seven items measuring avoidance of public admissions of imperfection; e.g., "I never let others know how hard I work on things"). Participants respond on a 1 to 7 scale (1 = *Disagree Strongly*, 2, 3, 4 = *Neutral*, 5, 6, 7 = *Agree Strongly*), and five items are reverse scored. Scores are then summed to obtain subscale and total scale scores, such that higher scores represent more perfectionistic self-presentation.

Three different language versions of the PSPS have undergone factor analysis after its development; the original English version that was used in this study (Saulnier et al., 2021), as well as Korean (Lee et al., 2011) and Italian (Borroni et al., 2016) translations. Three-factor solutions had the best fit for the Korean and Italian versions, but in both cases, model fit remained poor (Borroni et al., 2016; Lee et al., 2011). Analysis of the English version suggested that it is better conceptualised as a unidimensional measure (Saulnier et al., 2021), which was the approach taken in this study. The total scale score has demonstrated good internal consistency previously (αs = .87 to .88), and sound internal consistency in the present study (α = .94), with the individual subscales all having evidence of adequate internal consistency as well (αs = .67 to .91; Borroni et al., 2016; Hewitt et al., 2003; Lee et al., 2011; Saulnier et al., 2021). The PSPS has shown robust test-retest reliability over three weeks (*r*s = .74 to .84 across subscales; Hewitt et al., 2003). Its convergent validity has been shown through small to large correlations with other aspects of perfectionism, social anxiety, depression, negative affect, and body dissatisfaction (Casale et al., 2020; Hewitt et al., 2003; Yao et al., 2021).

***Perfectionistic Concerns***

The 12-item Discrepancy subscale of the Almost Perfect Scale-Revised (APS-R; Slaney et al., 2001) measured perfectionistic concerns. Participants rate their agreement with items from 1 to 7 (1 = *Strongly Disagree*, 2 = *Disagree*, 3 = *Slightly Disagree*, 4 = *Neutral*, 5 = *Slightly Agree*, 6 = *Agree*, 7 = *Strongly Agree*); for example, "My performance rarely measures up to my standards". Scores are summed so that higher scores indicate greater perfectionistic concerns. The APS-R also comprises two other subscales, Order and Standards, which were not used in this study.

Several studies have replicated the original three-factor structure of the APS-R across English, Argentinian, Greek, Japanese, Spanish, and Turkish versions (Arana et al., 2018; Diamantopoulou & Platsidou, 2014; Nakano, 2009; Sastre-Riba et al., 2016; Sironic & Reeve, 2015; Ulu et al., 2012). Alternatively, it has been suggested that the Discrepancy subscale of the English version contains two factors measuring both discrepancy and dissatisfaction (Flett et al., 2016), though this has been challenged by subsequent analyses (Rice et al., 2019). The Discrepancy subscale has shown high internal consistency (αs = .87 to .96; Diamantopoulou & Platsidou, 2014; Grzegorek et al., 2004; Nakano, 2009; Rice & Aldea, 2006; Rice et al., 2019; Rice et al., 2006; Sherry et al., 2013; Sironic & Reeve, 2015; Slaney et al., 2001; Ulu et al., 2012), with very high internal consistency in the present study (α = .96). It is temporally stable, with *r*s from .76 to .83 when measured with intervals of three weeks to ten weeks (Grzegorek et al., 2004; Rice & Aldea, 2006; Rice et al., 2006; Sherry et al., 2013). It has shown convergent validity through small to large correlations in theoretically expected directions with other perfectionism variables, depression, anxiety, stress, disordered eating, neuroticism, self-efficacy, worry, and positive and negative academic outcomes (Arana et al., 2018; Nakano, 2009; Osenk et al., 2020; Paulson & Rutledge, 2014; Rice & Aldea, 2006; Rice et al., 2006; Sherry et al., 2013; Sironic & Reeve, 2015; Slaney et al., 2001).

***Perfectionistic Strivings***

The 11-item Personal Standards Perfectionism subscale of the Scale of Perfectionism and Excellence (SCOPE; Gaudreau & Schellenberg, 2018) was used to assess perfectionistic strivings. The SCOPE includes two subscales, with the other measuring Excellencism (not used in this study). Participants rate how well items represent their general goal in life from 1 to 7 (1 = *Not at All*, 2 = *Very Slightly*, 3 = *Slightly*, 4 = *Moderately*, 5 = *Strongly*, 6 = *Very Strongly* 7 = *Totally*). An example item is "As a person, my general goal in life is to be exceptionally productive all the time". Scores are summed and then divided by 11, such that higher scores indicate stronger perfectionistic strivings.

The psychometric properties of the scale were evaluated by Gaudreau et al. (2022), who reported a good fit for the hypothesised two-factor model. The Personal Standards Perfectionism subscale has shown very high internal consistency (ωs = .96 to .97 and αs = .95 to .98; Gaudreau et al., 2022; Goulet-Pelletier et al., 2022; Grieve et al., 2022; Robinson et al., 2022), which was replicated in the present study (α = .96). It also demonstrated good test-retest stability over a period of approximately three and a half months (β = .79; Gaudreau et al., 2022).

In the psychometric evaluation of the SCOPE, Personal Standards Perfectionism positively predicted scores on other perfectionism measures, fear of failure, type-A strivings (i.e., very ambitious goals pursued with impatience), the belief that more should have been done to pursue personal and socially prescribed goals during the previous year, the number of New Year's resolutions that participants intended to set for 2020, progress on socially prescribed goals (but not personal goals), and feeling like an imposter, and it negatively predicted self-compassion and academic achievement (compared to Excellencism, which positively predicted academic achievement; Gaudreau et al., 2022). Other evidence for convergent validity comes from moderate positive correlations with other perfectionism

dimensions, depression, anxiety, and stress, moderate negative correlations with body image flexibility and self-compassion, and small negative correlations with originality, fluency, and openness to experience (Goulet-Pelletier et al., 2022; Grieve et al., 2022). Compared to the APS-R Standards subscale, which is also designed to measure perfectionistic strivings, the SCOPE Personal Standards Perfectionism subscale has shown stronger positive correlations with psychopathology (i.e., depression, anxiety, and stress) and stronger negative correlations with positive aspects of mental health (i.e., body image flexibility and self-compassion; Grieve et al., 2022), suggesting that it may be a preferable measure of maladaptive strivings.

***Body Image Flexibility***

The 12-item Body Image Acceptance and Action Questionnaire (BIAAQ; Sandoz et al., 2013), was used to measure body image flexibility (e.g., "Worrying about my weight makes it difficult for me to live a life that I value"). Participants rate how each item relates to them from 1 to 7 (1 = *Never True*, 2 = *Very Seldom True*, 3 = *Seldom True*, 4 = *Sometimes True*, 5 = *Frequently True*, 6 = *Almost Always True*, 7 = *Always True*). All items are reverse scored and summed, so higher scores correspond to greater body image flexibility.

Factor analyses of English, Mandarin, Greek, and Portuguese language versions of the BIAAQ have typically supported its unidimensional structure (Ferreira et al., 2011; He, Cai, et al., 2021; Karekla et al., 2020; Pellizzer, Tiggemann, et al., 2018; Sandoz et al., 2013; Solomon Kurz et al., 2016; Soulliard & Vander Wal, 2020). In fewer studies, a poor fit for the one-factor model was found for the English (Lee et al., 2017; Linardon, Messer, et al., 2019; Linardon, Messer, et al., 2020) and Brazilian Portuguese versions (Lucena-Santos et al., 2017). Of these, two reported superior, unidimensional fit for a five-item version of the English BIAAQ (Linardon, Messer, et al., 2019; Linardon, Messer, et al., 2020), one reported improved, although still poor fit for the one-factor model with an 11-item version of the English BIAAQ in a clinical sample of females with eating disorders (Lee et al., 2017), and

an 11-item version of the Brazilian Portuguese BIAAQ provided superior fit with a unidimensional structure (Lucena-Santos et al., 2017). Because most of the evidence supports its unidimensional structure, the 12-item BIAAQ was used and is treated as measuring a single factor for this thesis.

The BIAAQ has repeatedly shown high internal consistency (αs = .90 to .95, ω = .95 to .97, composite reliability = .96; Ferreira et al., 2011; He, Cai, et al., 2021; Karekla et al., 2020; Lee et al., 2017; Linardon, Messer, et al., 2019; Lucena-Santos et al., 2017; Pellizzer, Tiggemann, et al., 2018; Sandoz et al., 2013). Internal consistency in this study was likewise very high (α = .96). It also demonstrates good test-retest reliability over two to four weeks (*r*s = .80 to .82, intraclass correlation coefficient = .85; Ferreira et al., 2011; He, Cai, et al., 2021; Sandoz et al., 2013). A systematic review of body image flexibility as measured by the BIAAQ provides robust evidence for its convergent validity; there were small to large correlations in expected directions with body appreciation, body dissatisfaction, disordered eating, psychological distress, and self-compassion (Rogers et al., 2018). Discriminant validity has been supported by null to small correlations with mindfulness facets of observing and describing (Lee et al., 2017), and the BIAAQ has discriminated between community and clinical eating disorder samples (Ferreira et al., 2011; Lucena-Santos et al., 2017) and between people at-risk and not at-risk of having an eating disorder (Sandoz et al., 2013).

***Body Shape Concerns***

Body shape concerns were assessed to examine the role of negative body image. They were measured with the 16-item Body Shape Questionnaire-B (BSQ-16B; Evans & Dolan, 1993) which was derived from the original 34-item Body Shape Questionnaire (BSQ; Cooper et al., 1987). Shortened versions of the original questionnaire were developed for efficiency in studies where body disparagement is not the focus (16-item versions A and B), and where speed and economy must be prioritised (eight-item versions A, B, C, and D).

Respondents rate how often they have had experiences related to their body shape over the past 4 weeks from 1 to 6 (1 = *Never*, 2 = *Rarely*, 3 = *Sometimes*, 4 = *Often*, 5 = *Very Often*, 6 = *Always*); for example, "Have you been particularly self-conscious about your shape when in the company of other people?". Scores are summed, with higher scores indicating more body image concerns.

A minor edit was made to Item 4 of the BSQ-16B, which originally read "Have you noticed the shape of other women and felt that your own shape compared unfavourably?", such that it instead read "Have you noticed the shape of other men/women and felt that your own shape compared unfavourably?". This was based on changes to BSQ item wording that were approved by one of its authors (i.e., Dr Melanie Bash, née Taylor) for using it with men, accessed from the website of one of the authors of the briefer versions (Evans, 2017) on 26/11/2019. With the approved change, this item reads "Have you noticed the shape of other men and felt that your shape compared unfavourably?". The recommendations regarding the use of this questionnaire with different genders have been updated since this study was conducted and as of 01/11/2022, Evans (2022) has explicitly stated that he does not recommend attempting to use the BSQ across genders, including with such item wording as was used in this study, but rather retaining gender-specific forms that align with a binary view of gender, citing theoretical issues.

Factor analyses of the BSQ and its abbreviated versions have produced inconsistent findings. Using the English and Spanish versions, a one-factor structure for the BSQ-16B has been replicated (Franco-Paredes et al., 2021; Warren et al., 2008). Among French, German, and Portuguese translations, outcomes have been less consistent, with one supporting the one-factor model (da Silva et al., 2014), one finding only reasonable fit for the one-factor model (Pook et al., 2008), and two finding different fit within different samples: men compared to women (da Silva et al., 2019) and clinical compared to community (Lentillon-

Kaestner et al., 2014). Though some studies have suggested that one abbreviated version has better psychometric properties than another (da Silva et al., 2014; Franco-Paredes et al., 2021; Lentillon-Kaestner et al., 2014; Pook et al., 2008), the version perceived as superior has varied between studies (covering three of the four 8-item versions), and none used the English version that was used in this study. Because body disparagement was not the focus of the study, there was no compelling need to prioritise speed of completion, the 16B may be the 16-item version with the best psychometric properties (Franco-Paredes et al., 2021), and it has one less item using gendered language than the 16A, the 16B was used for this study.

Across language versions, the BSQ-16B demonstrates sound internal consistency, αs = .82 to .96 (da Silva et al., 2014, 2019; Evans & Dolan, 1993; Lentillon-Kaestner et al., 2014; Pook et al., 2008; Vimalakanthan et al., 2018; Warren et al., 2008; Young & Kotera, 2022). Its internal consistency was very high in the present study (α = .97). When tested with the French translation, all BSQ versions showed very high test-retest reliability over three weeks, *r*s ≥ .97 (Lentillon-Kaestner et al., 2014). The BSQ 16-B has demonstrated convergent validity through moderate to large correlations in expected directions with weight concern, body appreciation, eating disorder-related comparison, restrained eating, disordered eating, self-compassion, mental distress, anxiety, and depression, and slightly smaller correlations with BMI (da Silva et al., 2014; Lentillon-Kaestner et al., 2014; Vimalakanthan et al., 2018; Young & Kotera, 2022). It has also shown divergent validity through null to small correlations with age and aspects of burnout (da Silva et al., 2014; Evans & Dolan, 1993), and it discriminated between patients of higher weight with binge eating disorder and both patients of higher weight without binge eating disorder and community controls (Lentillon-Kaestner et al., 2014).

***Disordered Eating***

Disordered eating was measured via the 22 items of the Eating Disorder Examination Questionnaire 6.0 (EDE-Q; Fairburn, 2008) that are required to calculate the Global (i.e., overall) score. Respondents provide ratings on a scale from 0 to 6 about the following three areas: 1) how often they have engaged in disordered eating behaviours and cognitions (13 items; 0 = *No Days*, 1 = *1-5 Days*, 2 = *6-12 Days*, 3 = *13-15 Days*, 4 = *16-22 Days*, 5 = *23-27 Days*, 6 = *Every Day*; e.g., "Have you gone for long periods of time [eight waking hours or more] without eating anything at all in order to influence your shape or weight?"); 2) the proportion of times they have felt guilty for eating (one item; 0 = *None of the Times*, 1 = *A Few of the Times*, 2 = *Less Than Half*, 3 = *Half of the Times*, 4 = *More Than Half*, 5 = *Most of the Time*, 6 = *Every Time*), and; 3) how strongly they have experienced disordered eating cognitions (eight items; 0 = *Not at All*, 1, 2 = *Slightly*, 3, 4 = *Moderately*, 5, 6 = *Markedly*; e.g., "How much would it have upset you if you had been asked to weigh yourself once a week [no more, or less, often] for the next four weeks?") over the past 28 days. Scores on the 22 items are summed to create the Global score, and higher Global scores indicate more disordered eating symptoms. The full EDE-Q also includes six additional behavioural items that are not used in computing the Global score, which were not used in the present study because they are frequency-based and hence difficult to use in analysis.

Four subscales reflecting Restraint, Eating Concern, Shape Concern, and Weight Concern can be derived from the 22 items that comprise the Global score, but these were not used in the present study. A recent systematic review of studies examining the factor structure of the EDE-Q concluded that the proposed four-factor structure has received little support, with the Shape Concern and Weight Concern items tending to load onto a common factor (Jenkins & Rienecke, 2022). The review authors suggested that a briefer version of the EDE-Q may be a more robust alternative to the full version, highlighting a seven-item, three-factor version (Grilo et al., 2013; Grilo et al., 2015) as especially promising. This briefer

version has been found to discriminate well between female university students at a clinically significant vs not clinically significant level of disordered eating according to responses to the full-length EDE-Q (Wade, Pennesi, et al., 2021). However, the full-length EDE-Q Global items were used for the present study to obtain a comparable score to previous research concerning social media and disordered eating (see, for example: Griffiths, Castle, et al., 2018; Howard et al., 2017; Wilksch et al., 2020).

The Global score on the EDE-Q has shown strong internal consistency reliability, with αs of .83 to .96 (Gideon et al., 2016; Heiss et al., 2018; Machado et al., 2020; Rose et al., 2013; Wade, Pennesi, et al., 2021) and ωs of .88 to .97 (Goel et al., 2022; Machado et al., 2020; Peterson et al., 2020; Rica et al., 2022). Internal consistency in this study was very high ($\alpha = .96$). It has also shown high test-retest reliability over one week, with *r*s of .92 and .90 for male and female university students, respectively (Rose et al., 2013). Test-retest reliability of the four subscales has been more variable; an earlier systematic review reported correlations of .66 to .94 for the subscales across one to 14 days (Berg et al., 2012), and more recently, they showed higher reliability over two to four weeks in female university students (intraclass correlations = .60 to .80) than male university students (intraclass correlations = 43 to .65; Forbush et al., 2019). Regarding convergent validity, the EDE-Q has shown moderate to large correlations with other measures of disordered eating, psychosocial impairment due to disordered eating, muscle dysmorphia, depression, and anxiety (Gideon et al., 2016; Machado et al., 2020; Rica et al., 2022). The EDE-Q also correlates highly with its interview version, the Eating Disorder Examination (Fairburn, 2008), which is used to diagnose eating disorders, though participants tend to score slightly higher on the EDE-Q than on the interview version (Berg et al., 2011). Moreover, the Global score discriminates well between people with and without eating disorders (Aardoom et al., 2012; Ro et al., 2015; Schaefer et al., 2018).

### *User Perspectives on Social Media Use and Appearance*

Items were devised to obtain participants' perspectives on whether and how social media use impacts how they think and feel about their appearance. The first item asked, "Do you believe that using social media changes how you think or feel about your appearance?" (*Yes*, *No*), and the remaining items were in free-text response format. Participants who responded *Yes* to Item 1 were asked, "What is it about social media that you think causes it to change how you think or feel about your appearance?" and "When using social media, what would help it have less impact on your thoughts and feelings about your appearance?". Participants who responded *No* to Item 1 were asked "If not, can you explain why you believe this to be true?". Finally, all participants were asked, "Is there anything else you'd like to say about using social media and how you think and feel about your appearance?".

## Procedure

The Social and Behavioural Research Ethics Committee at Flinders University approved this study (project 8568). Consent to participate was indicated by completing the questionnaires after reading the Information Sheet, presented online on Qualtrics before the questionnaires. After demographics and eligibility items, measures were administered in random order. The questionnaires took approximately 20 to 30 minutes to complete.

## Data Analysis

### *Data Preparation and Preliminary Analyses*

The data were assessed for missing values. A valid BMI score could not be calculated for six participants (i.e., the height or weight was missing, or was highly unlikely to be accurate). There were no other missing data. Mean item scale scores were calculated. Normality was assessed by considering skewness and kurtosis values and examining histograms. The following were identified as not normally distributed: Posting Self (on social media), the SOQ, and the BSQ-16. Hence, Spearman's rank-order correlations (a non-

parametric statistic) were calculated for these variables, whereas Pearson product-moment correlations were calculated for the normally distributed variables. Next, the correlations were reviewed to determine which variables should proceed to model-testing to maximise the parsimony of the final models; in their review of theoretical models for the development of disordered eating, Pennesi and Wade (2016) proposed that testable models include no more than six variables in addition to disordered eating outcomes. The alpha level for all analyses was set at .05 *a priori*.

***Model Analyses***

The models were assessed with structural equational modelling (SEM) in Mplus, version 8.4 (Muthén & Muthén, 2017), using the maximum likelihood (ML) estimator. Models were also tested with maximum likelihood estimation with robust standard errors (MLR), which are more appropriate for non-normal data, for completeness. These approaches yielded almost identical outcomes, so the results using the ML estimator are reported for simplicity. Appearance motivations for social media use and BMI were included as independent variables. Appearance comparison, self-criticism or perfectionistic self-presentation/concerns/strivings, body shape concerns or body image flexibility, and disordered eating were entered as dependent variables in the order proposed by the model, with pathways included for each dependent variable from every prior variable in the model. The models testing moderating relationships followed the procedures outlined by Stride et al. (2016, pp. 795-799; Model number 91), with the alternative variables (self-criticism, perfectionistic self-presentation/concerns/strivings) tested for moderating effects on the relationship between appearance comparison and body image flexibility.

The fit was compared across model alternatives using the Akaike information criterion (AIC), Bayesian information criterion (BIC), root mean square error of approximation (RMSEA), comparative fit index (CFI), standardised root mean square

residual (SRMR), and chi-square test of model fit. The AIC and BIC are used to compare models, with the lowest value indicating the preferred model in terms of fit and parsimony (Maydeu-Olivares & García-Forero, 2010). The RMSEA assesses the fit of a model to the data, where scores below .06 are considered to represent a close fit (Hu & Bentler, 1999; Maydeu-Olivares & García-Forero, 2010). The CFI assesses the relative fit of a model, compared to a baseline model with a poor fit, and a good fit is indicated by CFI values greater than .95 (Hu & Bentler, 1999). The SRMR examines the size of discrepancies between observed and expected covariances, with a value of less than .08 indicating good fit (Hu & Bentler, 1999; Maydeu-Olivares & García-Forero, 2010). The chi-square test of model fit assesses the null hypothesis that the proposed model is correct, such that the absence of a significant result (i.e., failing to reject the null hypothesis) supports the model (Kline, 2016, p. 265). Estimates of indirect effects were also requested.

***Qualitative Analyses***

Content analysis was undertaken on 272 participants' qualitative responses about their perspectives on social media use and appearance; three respondents in the final sample did not provide qualitative data. This proceeded according to the steps outlined by Erlingsson and Brysiewicz (2017), who describe content analysis as a reflective, iterative process of familiarising oneself with the data, abstracting it to different extents, and returning to review the data as needed to refine the analysis. Abstraction of the data can terminate at the level of categories (i.e., short, factual descriptors for groupings of content that are clearly related to one another, requiring little to no interpretation) or themes (i.e., more detailed, higher-order meanings that are extracted through interpretation of the data), the latter being the higher level, depending on the aims of the study and the quality of the data (Erlingsson & Brysiewicz, 2017). This study terminated the analysis at the level of categories because this was deemed sufficient to describe the findings. Responses varied in length and detail, such

that one or more categories could be identified within them. Because the final item requesting any additional comments was not a specific question, content analysis was not completed on responses to this item; instead, novel insights were noted.

## Results

### Descriptive Statistics and Correlations

Mean item scale scores (see **Table 5.1**) indicated that generally, participants were motivated to use social media for appearance-related reasons some of the time, posted images of themselves to social media once a month, viewed images of others on social media two to six times per week, engaged in appearance comparisons fairly frequently, valued their appearance and competence quite equally, were reasonably neutral about having self-criticism, perfectionistic self-presentation, and perfectionistic concerns, reported moderate perfectionistic strivings and body image flexibility, and exhibited small to moderate levels of disordered eating. The mean BMI was within the average range (i.e., $18.5 < BMI < 25$; 69.1% of valid responses), and smaller proportions of participants had BMIs below (6.7%) and above (24.1%) this range.

**Table 5.1**

*Descriptive Statistics (N = 275)*

| Variable (Possible Range) | *M* | *SD* | Range |
|---|---|---|---|
| Appearance motivations for SMU (1 – 5) | 2.28 | 1.03 | 1.00 – 4.80 |
| Posting self on social media (1 – 8) | 2.07 | 1.35 | 1.00 – 7.50 |
| Viewing others on social media (1 – 8) | 5.52 | 1.52 | 1 – 8 |
| Appearance comparison (0 – 4) | 2.38 | 1.16 | 0 – 4 |
| Self-objectification (-10 – 10) | -0.54 | 1.56 | -5.40 – 6.20 |
| Self-criticism (1 – 7) | 4.24 | 1.23 | 1.22 – 7.00 |
| Perfectionistic self-presentation (1 – 7) | 4.25 | 1.06 | 1.37 – 6.63 |
| Perfectionistic concerns (1 – 7) | 4.60 | 1.42 | 1 – 7 |
| Perfectionistic strivings (1 – 7) | 4.18 | 1.38 | 1 – 7 |
| Body image flexibility (1 – 7) | 4.05 | 1.64 | 1 – 7 |
| Body shape concerns (1 – 6) | 3.45 | 1.43 | 1 – 6 |
| Disordered eating (0 – 6) | 2.40 | 1.53 | 0.06 – 5.90 |
| BMI | 23.56 | 5.09 | 16.87 – 57.33 |

*Note*. SMU = social media use.

Data collection occurred from April 10 to November 30, 2020 (i.e., during the first year of the COVID-19 pandemic). Increased disordered eating was observed in Australian female university students after the onset of the pandemic (Zhou & Wade, 2021), and there was an increase in eating pathology from the pre- to peri-COVID-19 period worldwide (Schafer et al., 2022). This may help to explain the slightly elevated level of disordered eating observed in this study.

There were small to large associations between the variables (**Table 5.2**). Except for BMI, frequency of posting images of oneself on social media, and frequency of viewing images of others on social media, all were statistically significant and in the expected directions. Of note, appearance motivations for social media use, which were measured with a relatively new scale, had small to moderate positive correlations with all other variables except BMI.

***Revisions to the Model***

The frequencies of posting images of oneself and viewing images of others on social media were significantly correlated with only some of the model components, and even where correlations were significant, they were small (see **Table 5.2**). Because appearance motivations for social media use demonstrated much stronger correlations with the other model components, the social media posting and viewing behaviours were removed from the model and appearance motivations for use were retained as the only social media variable. Likewise, because appearance comparison had stronger correlations with every other model component than self-objectification and there is much more evidence to support the inclusion of appearance comparison, self-objectification was removed from the model.

**Table 5.2**

*Correlation Matrix (N = 275)*

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1. Appearance motives | - | | | | | | | | | | | |
| 2. Posting self | *.44**** | - | | | | | | | | | | |
| 3. Viewing others | .34*** | *.37**** | - | | | | | | | | | |
| 4. Comparison | .45*** | *.17*** | .21*** | - | | | | | | | | |
| 5. Self-objectification | *.29**** | *.07* | *.08* | *.43**** | - | | | | | | | |
| 6. Self-criticism | .26*** | *.00* | .09 | .53*** | *.31**** | - | | | | | | |
| 7. Self-presentation | .38*** | *.09* | .02 | .50*** | *.38**** | .58*** | - | | | | | |
| 8. Concerns | .29*** | *.07* | .08 | .47*** | *.25**** | .77*** | .59*** | - | | | | |
| 9. Strivings | .38*** | *.22**** | .12 | .33*** | *.20**** | .34*** | .62*** | .44*** | - | | | |
| 10. Image inflexibility | -.34*** | *-.12* | -.14* | -.75*** | *-.39**** | -.62*** | -.49*** | -.57*** | -.35*** | - | | |
| 11. Shape concerns | *.38**** | *.15** | *.17*** | *.79**** | *.36**** | *.64**** | *.52**** | *.56**** | *.40**** | *-.86**** | - | |
| 12. Disordered eating | .35*** | *.14** | .18** | .72*** | *.37**** | .60*** | .50*** | .55*** | .40*** | -.85*** | *.89**** | - |
| 13. BMI | -.04 | *-.04* | -.08 | .24*** | *.01* | .17** | .12 | .12* | -.02 | -.31*** | *.37**** | .29*** |

*Note*. Correlations are two-tailed. Italicised figures are Spearman's rank-order correlations. Appearance motives = appearance motivations for social media use. Posting self = posting self on social media. Viewing others = viewing others on social media. Comparison = appearance comparison. Self-presentation = perfectionistic self-presentation. Concerns = perfectionistic concerns. Strivings = perfectionistic strivings. Image inflexibility = body image inflexibility. Shape concerns = body shape concerns. BMI = body mass index.

**p* < .05. ***p* < .01 ***p* < .001

## Model-Testing

### *Revised Mediation Model*

The revised model necessitated the analysis of eight alternative models (comprising each combination of the four self-criticism and perfectionism variables and the two body image variables). All models demonstrated excellent fit. Examination of outcomes indicated several avenues to improving the parsimony of the model. The path from BMI to disordered eating and the paths from appearance motivations for social media use to disordered eating, body image flexibility, body shape concerns, self-criticism, and perfectionistic self-presentation were not significant in any model. Additionally, the path from body shape concerns to disordered eating was very high (βs = .80 to .83), suggesting that the overlap between body shape concerns and disordered eating was potentially so great as to make the inclusion of body shape concerns redundant. In comparison, body image flexibility had a more moderate path to disordered eating (βs = -.60 to -.63). So, body shape concerns and the pathways that were not significant were removed, producing the final mediation model.

### *Final Mediation Model*

The final model required analysis of four alternative models, with mediating effects of self-criticism, perfectionistic self-presentation, perfectionistic concerns, and perfectionistic strivings, respectively. Model fit information in **Table 5.3** shows that, according to the RMSEA, CFI, SRMR, and chi-square test, all the final mediation models showed excellent fit to the data. AIC and BIC values suggested that the models containing perfectionistic self-presentation and self-criticism had the best combination of fit and parsimony. The models explained almost identical variance in disordered eating of 71% to 72%.

**Table 5.3**

*Model Fit Statistics for Alternative Final Models*

| Model tested | AIC | BIC | RMSEA (90% CIs) | CFI | SRMR | (df) $\chi^2$ test of model fit |
|---|---|---|---|---|---|---|
| Mediation models: Appearance motivations for social media use → appearance comparison (controlling for BMI) → X → body image flexibility (controlling for BMI) → disordered eating | | | | | | |
| X = self-criticism | 2975.45 | 3036.56 | <.01 (<.01, .07) | 1 | .02 | (5) 3.73, *p* = .59 |
| X = perfectionistic self-presentation | 2938.11 | 3002.82 | <.01 (<.01, .07) | 1 | .01 | (4) 2.23, *p* = .69 |
| X = perfectionistic concerns | 3077.65 | 3138.76 | <.01 (<.01, .08) | 1 | .02 | (5) 4.64, *p* = .46 |
| X = perfectionistic strivings | 3110.67 | 3175.38 | <.01 (<.01, .09) | 1 | .02 | (4) 3.93, *p* = .42 |
| Moderated mediation models: Appearance motivations for social media use → appearance comparison (controlling for BMI) → (moderated by X) → body image flexibility (controlling for BMI) → disordered eating | | | | | | |
| X = self-criticism | 2257.71 | 2308.04 | .61 (.57, .65) | .47 | .28 | (7) 710.39, *p* <.001 |
| X = perfectionistic self-presentation | 2292.04 | 2342.36 | .65 (.61, .69) | .42 | .28 | (7) 799.30, *p* <.001 |
| X = perfectionistic concerns | 2265.56 | 2315.88 | .60 (.56, .63) | .48 | .27 | (7) 674.24, *p* <.001 |
| X = perfectionistic strivings | 2288.83 | 2339.16 | .59 (.55, .62) | .47 | .27 | (7) 653.24, *p* <.001 |

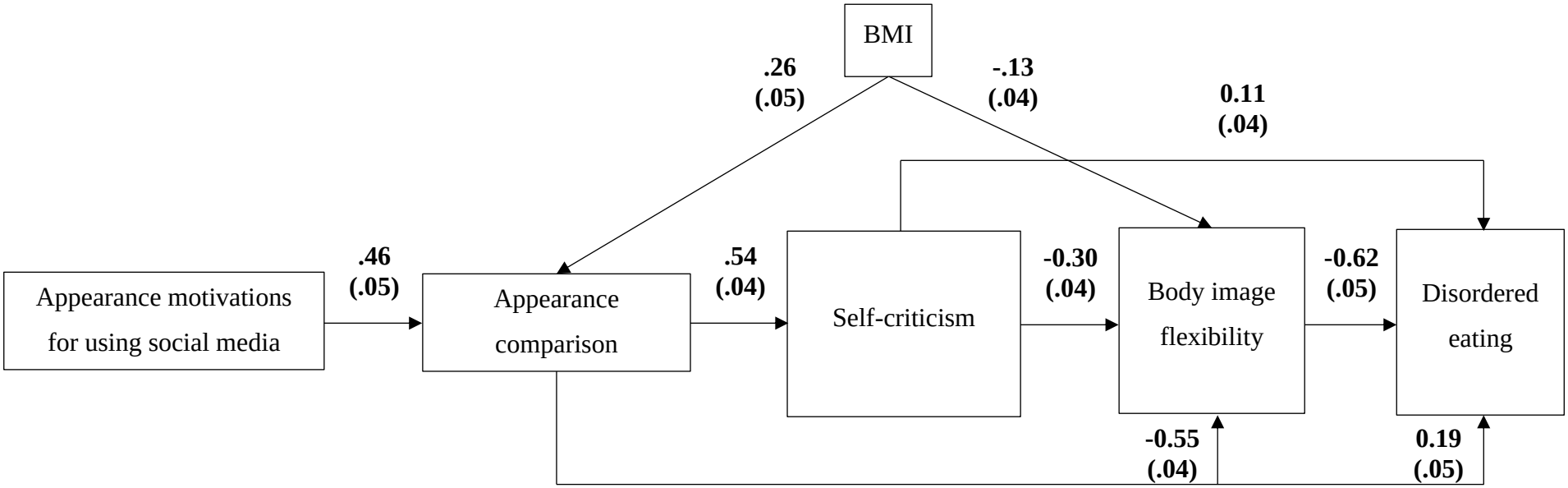
*Note*. The degrees of freedom differed in the final mediation models because there was a significant path from appearance motivations for social media use to perfectionistic self-presentation and perfectionistic strivings, but not to self-criticism or perfectionistic concerns. So, that path was excluded from the models containing self-criticism and perfectionistic concerns.

**Figures 5.2 to 5.5** show that, as predicted, appearance motivations for social media use are associated with more appearance comparison, which is linked to more self-criticism or perfectionism, which is associated with lower body image flexibility, with body image flexibility negatively related to disordered eating. BMI had significant relationships with appearance comparison (positive) and body image flexibility (negative). Other significant, direct pathways were from: appearance comparison, self-criticism, and perfectionism variables to disordered eating (positive); appearance comparison to body image flexibility (negative); and appearance motivations for social media use to perfectionistic self-presentation and strivings (positive). Of the alternative mediators, self-criticism and perfectionistic concerns had the strongest pathways to body image flexibility (hypothesised to be negatively impacted by self-criticism/perfectionism), but the strongest relationship with appearance comparison involved self-criticism.

The indirect effects described in **Table 5.4** indicate that appearance motivations for social media use were associated with disordered eating through several mediation pathways. In support of the proposed model, there was a significant indirect mediation pathway from appearance motivations for social media use to disordered eating through appearance comparison, self-criticism or perfectionism, and body image flexibility in each of the models, with the strongest such indirect pathway favouring the model including self-criticism.

**Figure 5.2**

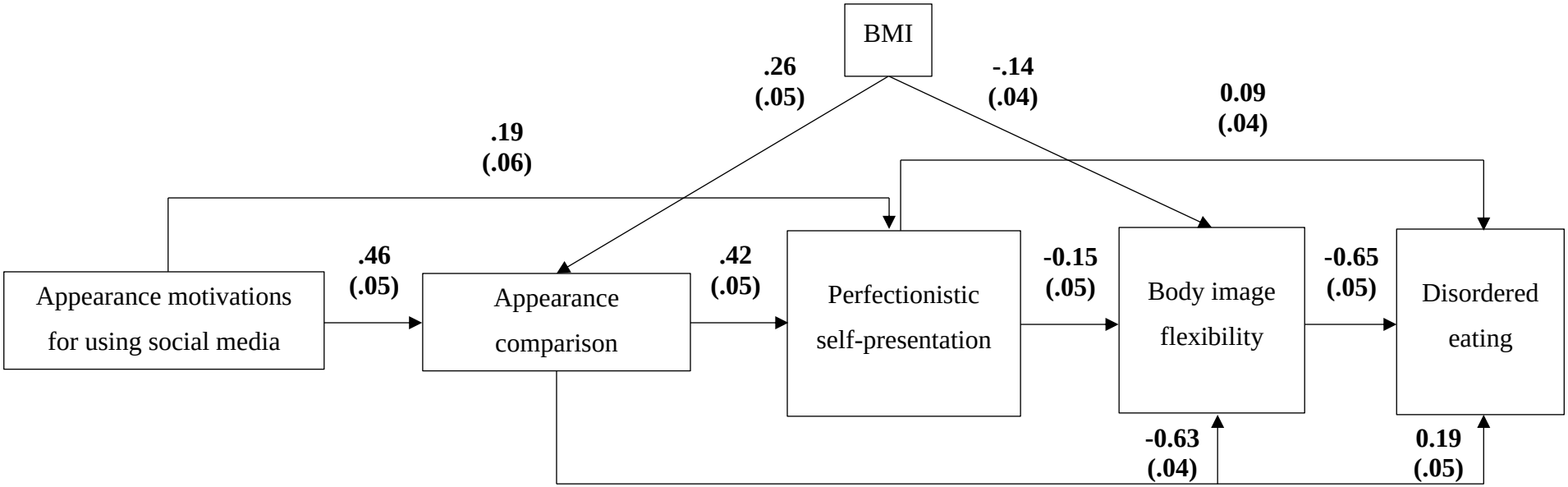
*Self-Criticism Mediation Model*




*Note*. Numbers refer to standardised coefficients, followed by standard errors in parentheses. All included pathways are statistically significant at $p < .01$.

**Figure 5.3**

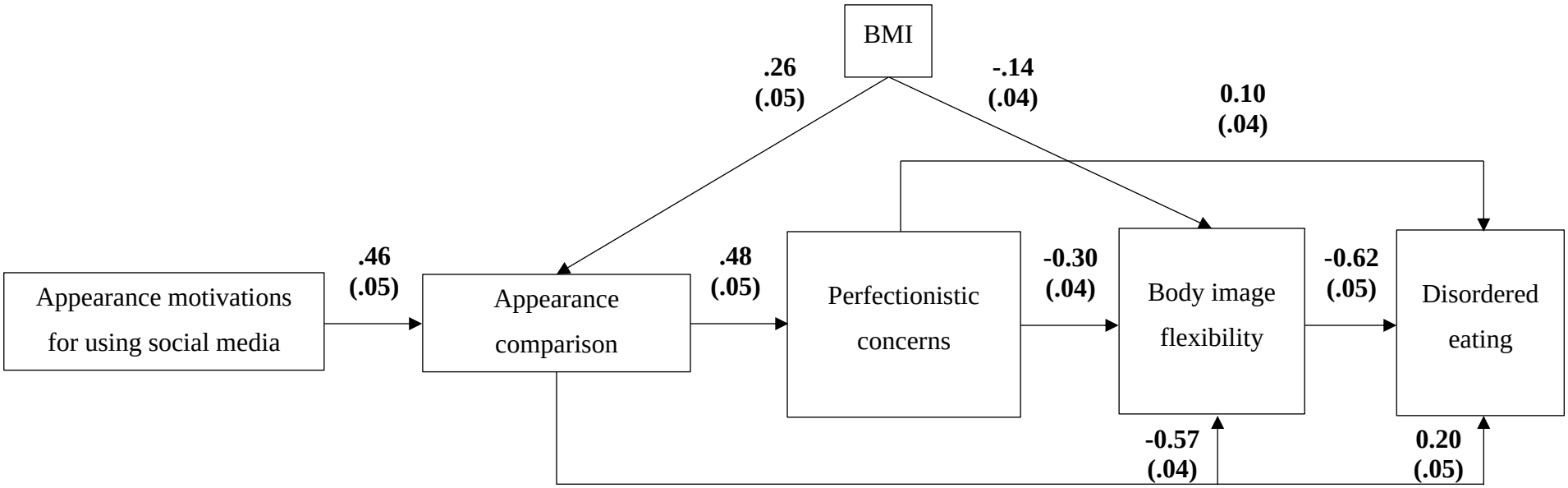
*Perfectionistic Self-Presentation Mediation Model*




*Note*. Numbers refer to standardised coefficients, followed by standard errors in parentheses. All included pathways are statistically significant at $p < .05$.

**Figure 5.4**

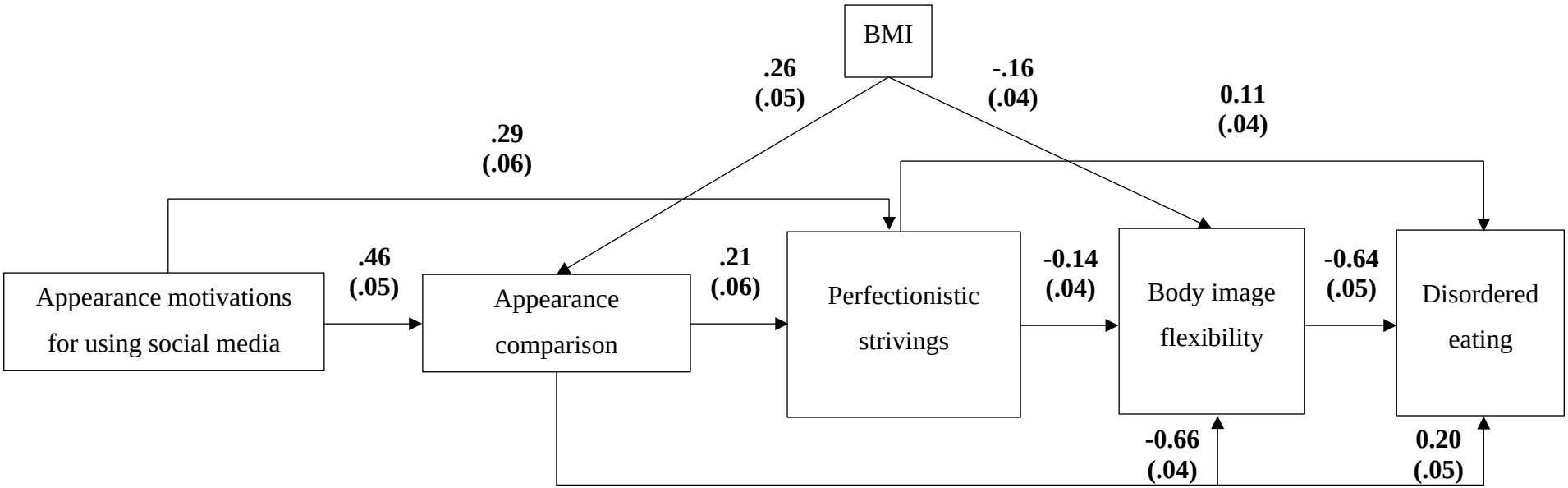
*Perfectionistic Concerns Mediation Model*




*Note*. Numbers refer to standardised coefficients, followed by standard errors in parentheses. All included pathways are statistically significant at $p < .05$.

**Figure 5.5**

*Perfectionistic Strivings Mediation Model*




*Note*. Numbers refer to standardised coefficients, followed by standard errors in parentheses. All included pathways are statistically significant at $p < .01$.

**Table 5.4**

*Standardised Indirect Effects from Appearance Motivations for Social Media Use to Disordered Eating*

| Indirect path | β | SE | *p* |
|---|---|---|---|
| *Self-criticism mediator model* | | | |
| Appearance motives SMU → appearance comparison → disordered eating | .09 | .02 | <.001 |
| Appearance motives SMU → appearance comparison → self-criticism → disordered eating | .03 | .01 | .01 |
| Appearance motives SMU → appearance comparison → body image flexibility → disordered eating | .16 | .02 | <.001 |
| Appearance motives SMU → appearance comparison → self-criticism → body image flexibility → disordered eating | .05 | .01 | <.001 |
| *Perfectionistic self-presentation mediator model* | | | |
| Appearance motives SMU → appearance comparison → disordered eating | .09 | .03 | .001 |
| Appearance motives SMU → appearance comparison → PSP → disordered eating | .02 | .01 | .03 |
| Appearance motives SMU → appearance comparison → body image flexibility → disordered eating | .19 | .03 | <.001 |
| Appearance motives SMU → appearance comparison → PSP → body image flexibility → disordered eating | .02 | .01 | .004 |
| *Perfectionistic concerns mediator model* | | | |
| Appearance motives SMU → appearance comparison → disordered eating | .09 | .03 | <.001 |
| Appearance motives SMU → appearance comparison → PC → disordered eating | .02 | .01 | .02 |
| Appearance motives SMU → appearance comparison → body image flexibility → disordered eating | .16 | .03 | <.001 |
| Appearance motives SMU → appearance comparison → PC → body image flexibility → disordered eating | .04 | .01 | <.001 |
| *Perfectionistic strivings mediator model* | | | |
| Appearance motives SMU → appearance comparison → disordered eating | .09 | .02 | <.001 |
| Appearance motives SMU → appearance comparison → PS → disordered eating | .01 | .01 | .03 |

**Table 5.4 (Continued)**

| Indirect path | β | SE | *p* |
|---|---|---|---|
| Appearance motives SMU → appearance comparison → body image flexibility → disordered eating | .19 | .03 | <.001 |
| Appearance motives SMU → appearance comparison → PS → body image flexibility → disordered eating | .01 | <.01 | .02 |

*Note*. Appearance motives SMU = appearance motivations for social media use. PSP = perfectionistic self-presentation. PC = perfectionistic concerns. PS = perfectionistic strivings.

### *Moderated Mediation Models*

Moderated mediation models based on the final mediation model tested whether self-criticism and the perfectionism variables moderated the relationship between appearance comparison, rather than mediating this pathway. Per the statistics presented in **Table 5.3**, the moderated mediation models showed a poor fit to the data.

## Qualitative Analyses

Of the 275 participants in the final sample, 254 (92.4%) reported that using social media changes how they think and feel about their appearance. There were 251 responses to the item asking what it is about social media that causes these changes. Eleven categories of responses were identified, which are outlined in **Table 5.5**. Over half (57.4%) of the responses mentioned that social media make one compare oneself to others. The other categories indicated that respondents believed that social media promote appearance ideals (39.0% of responses to this item), emphasise appearance (27.1%), set expectations, norms, or trends (17.5%), only present the highlights of people's lives (13.9%), host manipulated images (13.5%), establish unrealistic standards (10.8%), are fake or inauthentic (7.6%), enable social feedback (7.6%), or focus on exercise, weight, and dieting (4.0%).

**Table 5.5**

*Categories for Why Social Media Affect Thoughts and Feelings about Appearance (n = 251)*

| Category | Description | Example quote(s) | *n* |
|---|---|---|---|
| Comparing self | Makes one compare oneself to others (not necessarily appearance comparisons) or feel lesser with reference to an implied other | *"Negatively comparing myself to others whom I believe are better than me in aspects such as size, clothing and lifestyle"* | 144 |
| Appearance ideals | Provides access to images of people who are considered attractive/meet appearance ideals and/or promotes these ideals as desirable | *"Constant images of the 'ideal' body on social media and advertisements"* | 98 |
| Appearance emphasis | Directs the user's focus/attention to appearance (their own or others') or exposes them to content that pertains to appearance | *"Puts a greater emphasis on my appearance and makes me feel unattractive"* | 68 |
| Expectations, norms, trends | Sets standards that one feels pressured to meet or creates an implied audience to satisfy (not unrealistic standards – another category); makes one want to do things that others are doing or be more like others | *"People on social media expect you to be a certain way, post certain things; if you don't post what others want, they are more negative about it, pushing you to be how they want you to be"* | 44 |
| Highlights reel | People only post the best moments of their lives and do not post the negatives; people try to make themselves appear "perfect" online | *"Only shows the perfect side to people's lives normally"*<br>*"People post only the highlights of their lives"* | 35 |
| Photo manipulation | Images are edited (e.g., reference to filters, photoshop, special effects, airbrush, Facetune) or otherwise manipulated (e.g., through lighting, pose) | *"It's become very popular for high profile social media users to photoshop or edit their photos to make themselves look perfect"* | 34 |
| Unrealistic standards | Promotes standards that are not realistic/attainable, including perfection, that users feel pressure to meet (not necessarily specific to appearance) | *"Shows people that idolise perfection and sets unrealistic standards that individuals strive to be/look like"* | 27 |
| Fake or inauthentic | Others present themselves in a way that is not real or not authentic (i.e., it does not represent their true personality, experiences, or appearance) | *"People edit their lives to be the best they can, so when others look at it, they feel inadequate and want to be that even if what they want to be isn't real"*<br>*"Everyone presents themselves the way they would like to think of themselves, which isn't what they're always like"* | 19 |

**Table 5.5 (Continued)**

| Category | Description | Example quote(s) | *n* |
|---|---|---|---|
| Social feedback | The ability to receive feedback from others (e.g., followers, likes comments) or to view what type/quantity of response others get | *"The response I get on my photos (likes and comments)"* *"You see how much love and attention they get and think well, maybe that's what I need to look like for more people to like, love, or accept me"* | 19 |
| Exercise, weight, diet focus | Exposure to content highlighting exercise, weight, or dieting, particularly where this portrays exercise, dieting, and weight loss as desirable | *"You see people posting how much they're working out, especially the celebrities or the fitspo/health accounts, as well as all the before/after pictures of people's "success" in their weight loss journey"* | 10 |

*Note*. Participants' responses could be allocated to multiple categories, hence the sum of the figures in the right column exceeds the total number of responses. Quotes underwent minor edits to spelling and grammar to improve legibility but otherwise, the quotes are presented verbatim.

From the 247 responses to the item asking what would help social media to have less impact on participants' thoughts and feelings about their appearance, 13 categories were identified (detailed in **Table 5.6**). The most common suggestion, present in about a quarter of responses, was for social media to contain fewer edited images or misleading (i.e., idealised) content (25.1% of responses to this item). The next most common were suggestions to curate what appears in the social media feed by "following" content that is less damaging to body image (15.4%), for social media to have less of an emphasis on appearance and appearance ideals (13.4%), to change one's thoughts or approaches to one's body image (12.1%), and for there to be greater exposure to a diversity of appearances (10.9%). Less common were suggestions involving greater exposure to positive content (8.9%), using social media less often or not using it at all (7.7%), removing or hiding "like" counts (6.1%), improving social media literacy (6.1%), exposure to fewer advertisements (2.8%), and if it were easier for users to see when images were manipulated before being posted (2.8%). Moreover, some responses also indicated that participants were unsure what could be done to lessen the impact of social media on body image (6.1%) or that nothing could be done to achieve this (5.3%).

**Table 5.6**

*Categories for How to Reduce Impact of Social Media on Thoughts and Feelings about Appearance (n = 247)*

| Category | Description | Example quote(s) | *n* |
|---|---|---|---|
| Less manipulation or artifice | Reducing or removing editing on photos; posting more natural/truthful/realistic or less artificial/posed/"perfect" content | *"Less editing and filtering of pictures, more 'natural' pictures instead of photoshoots and professional photographers"*<br>*"If everyone was natural and themselves, not putting on a show"* | 62 |
| Curating feed | Seeking out content that does not have damaging effects on body image; reducing exposure to content that does deleteriously impact body image | *"Maybe If I selected what I view on social media more carefully that could help"*<br>*"Possibly following more of the 'inspirational' pages or funny pages to lift your spirit"* | 38 |
| Fewer appearance ideals or less appearance focus | If using social media did not entail exposure to appearance ideals or place as much emphasis on appearance | *"If I didn't see so many pictures of people with perfect bodies. Maybe if people were more open about the fact that your body doesn't have to be perfect for you to be a worthy person."*<br>*"If it was less directed and focused on photos of people's bodies and looks and more on their hobbies and likes"* | 33 |
| Changing thinking | Adjusting or improving one's mindset or habits of thought such that social media content is less impactful to body image, including trying to reduce appearance comparisons | *"Finding self-confidence, without the pressure from social media. Then, when on any social media platform, you might feel less inclined to judge yourself based on what others are doing"*<br>*"Looking at the positives of my own appearance"* | 30 |

**Table 5.6 (Continued)**

| Category | Description | Example quote(s) | *n* |
|---|---|---|---|
| Diverse appearances | Being regularly exposed to people with diverse appearances, including those that do not meet appearance ideals; seeing messages supporting people with diverse appearances | *"Brands and businesses using all kinds of people with different body shapes for brand deals and promotions, and more visibility of people who do not fit the 'ideal' body type"*<br>*"A bigger variety of different weight/ shaped women, specifically going for curvier people to promote that being 'bigger' is okay"* | 27 |
| Positive content | Exposure to content, including body positivity, that is perceived as positive (i.e., is uplifting, pleasant, affirming, or conveys joy) | *"I love seeing accounts where people are just generally happy in themselves and their bodies and are posting raw images of what people consider "ugly or fat" or any other words used to describe the standards in the weight loss industry"*<br>*"Maybe following more positive affirmation/quote pages"* | 22 |
| Less use | Using social media less or not at all | *"If I limited the amount of social media I use"* | 19 |
| Don't know | Don't know or unsure how to reduce the impact | *"I'm not sure. there's nothing I can think to change that would still allow social media to be seen as social media"* | 15 |
| No likes | Removing or hiding "like" counts on social media content | *"The removal of the like count like how Instagram has done"*<br>*"Instagram removed the ability for other people to see how many likes your picture got, which helped me feel less insecure"* | 15 |
| Social media literacy | Improving understanding of the various ways in which social media may not present an accurate/realistic representation of people's bodies and appearance ideals to aspire to | *"I have learned that much of what people portray on social media is false. We do not know what went on behind the scenes to make them look like that."*<br>*"Taking into consideration that it's social media and it's very filtered. People post what they want everyone to see, not the bad."* | 15 |

**Table 5.6 (Continued)**

| Category | Description | Example quote(s) | *n* |
|---|---|---|---|
| Nothing | There is nothing that could help to reduce the impact | *"Nothing in particular – I cannot change what people post"* *"Nothing – there are already a bunch of pages that say, "everyone is beautiful" and stuff like that, but when you are looking at these images of 'perfect bodies' none of that other stuff matters... because you don't look how you want and you aren't that ideal 'attractiveness'"* | 13 |
| Fewer ads | Less exposure to advertisements | *"Less advertising (and brand ambassador) posts. They're usually the ones that make me feel the most unattractive."* *"Less advertisement of diet tea and similar things"* | 7 |
| Highlighting manipulation | Improving the ability for users to detect when images have been edited before being posted | *"It would be good if there was a way to tell if photos have been photoshopped in some way, as this would reassure me that not everything I see on social media is real"* *"It doesn't generally impact me, but I do think that it would help a lot of people if it was required to state whether the photo posted has been edited or retouched in any way."* | 7 |

*Note*. Participants' responses could be allocated to multiple categories, hence the sum of the figures in the right column exceeds the total number of responses. Quotes underwent minor edits to spelling and grammar to improve legibility but otherwise, the quotes are presented verbatim.

Twenty-one participants (7.6%) reported that they did not believe that using social media changes how they think and feel about their appearance, 20 of whom responded to the item asking why they have this view. Five categories were identified in their responses. These included that the respondent does not follow damaging social media content or use social media in a way that would damage their body image (30.0% of responses to this item; e.g., "I've made my social media to be only things that interest me and have filtered out content that makes me feel insecure"), that they don't compare themselves to others (25.0%; e.g., "I'm happy with my body. I can appreciate others on social media but don't compare my body to theirs"), that their body image issues are independent of their social media use (25.0%; e.g., "I have always not liked the way I look, before social media even existed"), that their body image is not impacted by social media content (20.0%; e.g., "when I see celebrities on social media I don't wish I had their body types"), and that not everything on social media is negative (10.0%; e.g., "I think there is a lot of body-positive stuff on there too").

Ninety-one participants responded to the final item, which asked for any additional information they wished to share. These responses largely contained perspectives that are already described in the responses to other items. Many reinforced the perceived negative impacts of social media but notably, there were also 13 responses (14.3% of responses to this item) highlighting perceived positive impacts of social media, such as them being a motivating force for self-improvement (e.g., "I think social media can motivate people at times to try and be healthier and can encourage people to try and better themselves"). Additionally, four responses (4.4%) highlighted that social media can make people feel bad for being underweight or "too skinny", just as it can for people who have other body types.

## Discussion

This study tested models linking social media use to disordered eating among young adult university students. After simplifying the proposed structure based on an examination

of correlations, results supported models whereby appearance-motivated social media use is indirectly associated with more disordered eating via increased appearance comparison, more self-criticism or perfectionism, and poorer body image flexibility. Considering both the fit of the models and the strength of direct and indirect pathways, self-criticism appeared to be a more robust mediator than the perfectionism variables. Results were not consistent with self-criticism or perfectionism having moderating effects. Most participants felt that social media negatively impact their body image, and they articulated ideas about how this impact occurs and what can be done to address it that may contribute to the development of models and interventions.

**Model-Testing**

Consistent with predictions and the evidence that appearance-related use of social media is associated with detrimental effects, appearance motivations for social media use were indirectly related to more disordered eating, mediated by increased appearance comparison and self-criticism/perfectionism, and lower body image flexibility. Appearance motivations for social media use had stronger correlations with model components than the frequency of appearance-related social media activities, suggesting that motivations may be more relevant than frequencies of specific behaviours, despite previous models focussing on the latter. Viewing social media use through the lens of motivations positions users as active participants rather than passive recipients (as is the case with traditional media); it suggests users have needs they aim to fulfil, which inform their approach to social media use. This perspective takes into consideration the myriad ways in which consumers of social media can control, interact with, and produce content (see **Chapter 2** and Rodgers et al., 2021). Moreover, improving understanding of inter-individual differences, such as in motivations, may improve understanding of why outcomes associated with social media differ between people (Rodgers et al., 2021). The results of the present study suggest that working with

young adults to modify their motivations for social media use may be a helpful way to ameliorate negative effects.

The final mediation models showed excellent fit to the data, but when considering the comparative model statistics based on fit and parsimony and the strength of direct and indirect pathways, self-criticism emerged as the preferable mediator compared to the perfectionism variables. This is in line with previous findings suggesting that self-criticism fully accounts for the association between specific perfectionism dimensions and maladjustment (Dunkley et al., 2006), and a theoretical model proposing self-criticism as a transdiagnostic mechanism underlying comorbidities between eating disorder symptoms, depression, and anxiety (Williams & Levinson, 2022). That is, self-criticism may be the most maladaptive aspect of perfectionism for mental health outcomes. Self-criticism has the additional advantage of offering a more discrete target for intervention; it is easier to design interventions addressing one component of perfectionism than addressing them all, and resulting interventions are also likely to be briefer, which may improve engagement. Current evidence suggests that self-compassion interventions are effective in treating self-criticism (Ferrari et al., 2019; Wakelin et al., 2022), and two self-compassion interventions addressing the impact of social media on body image in adolescents and adult women had some promising outcomes, though a lack of significant condition by time interactions (Gobin et al., 2022), and negligible changes on most outcomes, including self-compassion (Mahon & Hevey, 2022), suggest there are limitations of the protocols described in those studies.

The role of body image flexibility in the relationship between social media and eating disorder risk has attracted relatively little research attention. The current results indicate that it may be an important mediating mechanism, exhibiting ties to appearance comparison, self-criticism, perfectionism, and disordered eating. Other models have often included negative body image variables such as body dissatisfaction in this mediating role (Donovan et al.,

2020; Puccio, Kalathas, et al., 2016; Rodgers et al., 2020). Negative body image is likely involved, and indeed body shape concerns and body image flexibility had similarly strong correlations with the other model components in this study. However, body shape concerns were ultimately not included in the model to maximise parsimony, given that they had such a strong path to disordered eating that their inclusion may have been redundant. Negative body image is now so commonplace as to be normative and is a necessary but insufficient precursor alone to explain the development of disordered eating, so some other intermediary variable must exist, with body image flexibility proposed to fulfil this role as an adaptive affect-regulation mechanism (Linardon, Anderson, et al., 2021; Rogers et al., 2018; Sandoz et al., 2013). Body image flexibility was found to be a stronger predictor of disordered eating and quality of life than negative body image behaviours concerning avoidance and checking (Pellizzer, Tiggemann, et al., 2018; Pellizzer, Waller, et al., 2018). Body image flexibility can be improved with treatment, with stronger effect sizes observed for interventions comprising third-wave behavioural strategies (Linardon, Anderson, et al., 2021; Rogers et al., 2018), suggesting these strategies could inform intervention approaches to social media.

The present results add to the body of literature supporting appearance comparison as a key mechanism linking social media use to body image and disordered eating, as would be suggested by the tripartite influence model (Thompson et al., 1999). Therefore, interventions aiming to address this link should target appearance comparisons, and indeed some already have (Gordon et al., 2021; McLean et al., 2017). Promising results from a program targeting appearance comparisons suggest that useful intervention strategies include providing psychoeducation on appearance comparisons, focussing on positive qualities that are not related to appearance, and developing alternative responses to comparisons (McLean et al., 2019).

Though not the focus of this study, there were significant pathways from BMI to both appearance comparison and body image flexibility; the former was positive and the latter negative. This echoes findings from Rodgers et al. (2020), who found that BMI was significantly related to body dissatisfaction, and aligns with the suggestion that BMI be controlled when examining links between body image flexibility and disordered eating (Sandoz et al., 2013). The model in this study differs from that of Rodgers et al. (2020) in that the relationship between BMI and appearance comparison was also accounted for. BMI is positively correlated with appearance comparison (Fox & Vendemia, 2016; Rodgers et al., 2020), and Yao et al. (2021) found a significant association between body image comparison on social media and restrained eating in women with higher but not lower BMIs. It is therefore recommended that future models consider the relationship BMI may have with appearance-related variables being investigated.

**Qualitative Analysis of User Perspectives**

Participants' responses to the items asking why social media affect body image and how this can be changed underscored the roles of appearance comparisons and appearance ideals, providing anecdotal support for two key elements of the tripartite influence model (Thompson et al., 1999). Cross-sectional examinations of models of the relationship between social media use and eating disorder risk have revealed support for both elements as relevant mechanisms (Fardouly, Willburger, et al., 2018; Feltman & Szymanski, 2018; Jarman, Marques, et al., 2021b; Lee & Lee, 2021; Rodgers et al., 2020; Scully et al., 2020). Although, experimental and longitudinal research has produced stronger evidence that comparisons are involved than the internalisation of appearance ideals (see **Chapter 3**).

Qualitative responses also highlighted that social media can be experienced as unrealistic or inauthentic. This perspective has been raised in other qualitative research (Moreton & Greenfield, 2022; Popat & Tarrant, 2022; Young et al., 2022) and observed in

trends like disclaimer labels highlighting the contrived nature of social media posts (Brown & Tiggemann, 2020; Couture Bue & Harrison, 2020; Fardouly & Holland, 2018; Livingston et al., 2020) and "Instagram vs reality" images, which parody the unrealistic ideals disseminated through many social media posts (Tiggemann & Anderberg, 2019). The interventions aiming to improve social media literacy that have been developed (Bell et al., 2022; Gordon et al., 2021; McLean et al., 2017; Svantorp-Tveiten et al., 2021) may be effective in addressing the impact of exposure to unrealistic or idealised content by improving participants' ability to critically analyse and flexibly respond to such content on social media. Indeed, raising social media literacy was one of the suggestions users gave for reducing the impact of social media on body image.

Responses to the item about how social media could change to reduce its impact on body image suggested several other avenues for intervention. One of the most common suggestions was to curate one's social media feed by seeking out content that does not detrimentally impact body image or by reducing exposure to content that does have a negative effect. This strategy has been forwarded by Cohen, Slater, et al. (2019) and Glover (2019). People can curate their feed by using the options available on social media to "follow" and "subscribe", or "unfollow" and "unsubscribe" to particular users or types of content (e.g., certain communities or hashtags). Based on participants' responses, users might consider seeking out content that promotes diverse appearances and positivity, and reducing their exposure to content that promotes appearance ideals or appears manipulated or artificial.

However, salient concerns have been raised about how social media algorithms can produce an echo chamber of content promoting eating disorders, with little users can do to reduce the volume of such content (Dias et al., 2021; Harriger et al., 2022). So, curating one's feed may be insufficient. Suggestions from users to reduce or cease their use of social media offer another pathway, with evidence to support this strategy coming from reductions to self-

objectification in adolescent girls who took a three-day “fast” from social media (T. A. Roberts et al., 2022). Alternatively, cognitive behaviour therapy-based strategies, such as cognitive restructuring, offer a path to implementing the suggestion to change one’s thinking to reduce the impact of social media on body image, given evidence that these are effective in preventing and treating eating disorders (Le et al., 2017; Linardon et al., 2017).

Participants’ responses also suggested several ways for social media platforms themselves to reduce negative effects on body image. One suggestion pertained to the removal or hiding of “like” counts, referring to a test conducted over recent years by Instagram of whether making the number of likes on other users’ posts invisible could reduce feelings of pressure and competition experienced on the platform (Newton, 2021). Though participants in the present study, as well as another (Prichard et al., 2021), reported generally favourable attitudes towards this change, after the period of data collection for this study, Instagram rolled back this change so that users themselves can now choose to hide like counts on others’ posts, but by default they will be visible to all, citing mixed responses from users (Newton, 2021). Giving users the choice about whether to see like counts has the potential to disproportionately affect more vulnerable users; people who did not support the removal of like counts were found to engage in more comparison to others based on likes than those who supported the removal, and greater investment in Instagram likes was associated with increased body dissatisfaction, mediated by greater internalisation of the thin ideal (Prichard et al., 2021). Few studies have explicitly examined the effects of like counts, with available evidence suggesting that the number of likes attached to appearance-ideal social media content does not affect body dissatisfaction but may increase facial dissatisfaction (Lowe-Calverley & Grieve, 2021; Tiggemann et al., 2018).

Other changes that platforms could make that emerged from participants’ responses included reducing the number of advertisements, particularly those relating to appearance,

weight, and dieting, and making it clearer when images uploaded to the platform have been edited or manipulated. Regarding the latter, exposure to edited appearance-ideal social media images was found to be more damaging to body image than unedited versions of those images (Kleemans et al., 2018; Tiggemann & Zinoviev, 2019). Preliminary evidence supports the suggestions made by participants in this study, indicating that a greater perception of photo modification reduces the internalisation of the thin ideal after exposure to thin-ideal Instagram images (Vendemia & DeAndrea, 2018).

**Limitations**

A crucial limitation of this study was its cross-sectional design, which cannot test the temporal sequence proposed by the model. Longitudinal research would provide more compelling evidence about the presence and order of effects (Caruana et al., 2015).

There were several limitations associated with the data analysis. The data analysis plan was not pre-registered, which may reduce confidence in the validity of the results. Moreover, a heuristic-based approach was taken to estimating the required sample size, which is a less robust approach than conducting a power analysis. Although sample size heuristics are commonly used in structural equation modelling due to the challenges associated with running power analysis, their use has been critiqued due to disagreement between different heuristics, lack of empirical support, and limited generalisability across model types (Wang & Rhemtulla, 2021). A new app-based approach to power analysis in structural equation modelling, proposed by Wang & Rhemtulla (2021) may be preferable for use in future designs. Additionally, the qualitative analysis was limited by the use of only one coder. It is often recommended that qualitative analysis be undertaken by multiple coders to maximise the rigour, reliability, and validity of the codes extracted from data (O'Connor & Joffe, 2020). So, it is possible that the qualitative results presented here were impacted by bias or human error.

The predominantly female sample limits the generalisability of the current findings to other genders and prevents potentially clinically relevant examination of gender differences in contributing mechanisms. Gender was not a significant moderator in meta-analytic reviews of the cross-sectional (Saiphoo & Vahedi, 2019), or experimental/longitudinal (see **Chapter 3**) research. However, in both reviews, there was a much higher representation of females than other genders, precluding definitive conclusions. Moreover, even if there are no significant differences in the size of the relationship, there could be gender differences in the intervening mechanisms. Research investigating this in theoretical models has often failed to find such differences (de Vries et al., 2016; de Vries et al., 2014; Griffiths, Castle, et al., 2018; Hanna et al., 2017; Jarman, Marques, et al., 2021b; Jarman, McLean, et al., 2021; Wang, Fardouly, et al., 2019); yet, in several studies, such differences did emerge (Rodgers et al., 2020; Rousseau et al., 2017; Skowronski et al., 2021; Steinsbekk et al., 2021). Because of these ambiguous findings, the potential for gender effects remains a worthwhile consideration for future research.

## Conclusions

The results of the present study align with the previous literature implicating appearance comparison as a mediator in the relationship between social media use and eating disorder risk and extend prior findings by providing evidence that appearance motivations for use, self-criticism or perfectionism, and body image flexibility may also be involved. Given that outcomes were similar when either self-criticism or perfectionism was included and based on the evidence that self-criticism is the most toxic aspect of perfectionism, self-criticism may be a simpler target for intervention than perfectionism whilst being equally likely to produce positive effects. The models indicated that motivations for use, appearance comparison, and body image flexibility are other suitable starting points for intervention. Qualitative analyses emphasised the role of appearance comparisons and unrealistic content,

and implied that taking steps to change what appears in the social media feed or modifying one's responses to social media are other potential avenues to reducing deleterious effects.

# CHAPTER 6

## Targeting the Link Between Social Media and Eating Disorder Risk: A Randomised Controlled Pilot Study[3]

[3] The study described in this chapter was published and can be found in **Appendix B**. Madelaine de Valle contributed 75%, 95%, and 85%, and Tracey Wade contributed 25%, 5%, and 15% to the research design, data collection and analysis, and writing and editing, respectively.

de Valle, M. K., & Wade, T. D. (2022). Targeting the link between social media and eating disorder risk: A randomized controlled pilot study. *International Journal of Eating Disorders*, *55*(8), 1066–1078. https://doi.org/10.1002/eat.23756

## Abstract

This study evaluated the feasibility, acceptability, and preliminary efficacy of a self-criticism intervention addressing the link between appearance-motivated social media use and eating disorder risk. Another condition, designed to help users curate their social media feed to reduce negative impacts on well-being, was also trialled as an active and credible comparison. University students aged 17-25 were screened ($N$ = 170) and randomised ($n$ = 130) to the self-criticism intervention, social media curation, or waitlist control group. The intervention comprised self-guided cognitive behaviour therapy delivered in four modules over one week. The primary outcomes were feasibility and acceptability. The secondary outcomes were appearance motivations for social media use, appearance comparison, self-criticism, body image flexibility, and disordered eating (at baseline, one-week post-randomisation, and two-weeks post-randomisation). Participants completed an average of 82% of the intervention modules and 77% of the homework exercises within the week allocated. The intervention was well-accepted; participants reported a range of positive aspects, alongside suggested modifications to the intervention and study design to improve acceptability. Group-by-time interactions suggested groups changed at a different rate on three secondary outcomes (appearance motivations for social media use, self-criticism, and disordered eating); between-groups effect sizes suggested this was due to greater improvements in the self-criticism intervention group than in the waitlist control group. This was the first study to evaluate an intervention for the link between appearance-related social media use and eating disorder risk for young adults. Positive findings relating to feasibility, acceptability, and preliminary efficacy suggest that a larger randomised controlled trial, with modifications to intervention and study design, is warranted.

Most of the few interventions targeting the relationship between social media, appearance comparison, and body image/disordered eating were developed for classroom delivery to adolescents (Bell et al., 2022; Bell et al., 2021; Gordon et al., 2021; Mahon & Hevey, 2022; McLean et al., 2017; Svantorp-Tveiten et al., 2022; Svantorp-Tveiten et al., 2021). Interventions are also required for young adults, who make considerable use of social media (Pew Research Center, 2019; Sensis, 2018), and are at heightened risk for eating disorders, particularly binge and purge disorders (Hudson et al., 2007). The two interventions thus far tested in young adult women did not protect against negative impacts from exposure to appearance-ideal social media images (Danthinne et al., 2021; Misko et al., 2022).

Hence, a novel intervention for young adults was developed, which was designed to reduce self-criticism and increase self-compassion. The selection of self-criticism as the target was informed by the quantitative results outlined in **Chapter 5**. The intervention was free, brief, self-guided, and did not require a diagnosed eating disorder, to try to circumvent some of the barriers to treatment access described in **Chapter 2** (e.g., accessibility, time, long waitlists, and preferences for handling the problem alone/alternatives to in-person support).

An active comparison condition was also developed, based on the strategy of "curating your social media feed" (i.e., using tools on social media to control the types of content you are exposed to so that it is more conducive to well-being). This has been suggested as a helpful approach to managing pressures experienced on social media (see **Chapter 5** and Cohen, Slater, et al., 2019; Glover, 2019). It has the potential to reduce exposure to an environmental factor that may increase eating disorder risk, whilst the self-criticism intervention aims to reduce risk by promoting more adaptive responses following exposure. The social media curation modules were conceptualised as an active and credible comparison condition due to the lack of research on this strategy compared to the evidence for the beneficial impact of reducing self-criticism on disordered eating.

This was a pilot study, so the primary outcomes were feasibility and acceptability, to inform a future, larger evaluation (see: Leon et al., 2011). Accordingly, preliminary efficacy was a secondary consideration, with a focus on between-groups effect sizes and 95% confidence intervals for appearance-motivated social media use, appearance comparison, self-criticism, body image flexibility, and disordered eating. It was hypothesised that both active conditions (i.e., self-criticism intervention and social media curation) would be engaging, with high levels of module and homework completion, and that between-groups effect sizes comparing the active conditions to waitlist control would indicate that the self-criticism intervention impacts more variables than the social media curation condition, based on evidence supporting the transdiagnostic nature of self-criticism (Werner et al., 2019; Williams & Levinson, 2022; Zelkowitz & Cole, 2019).

## Method

### Ethics and Study Registration

This study was approved by the Flinders University Human Research Ethics Committee (project 2345) and registered with the Australian New Zealand Clinical Trials Registry (ANZCTR; registration number ACTRN12621000353897). Although recorded as retrospectively registered, the information about the trial that was accepted by the ANZCTR was submitted before enrolment commenced, and only one participant had enrolled when registration received approval.

### Participants

Inclusion criteria were: 17 to 25 years old, current university student, English fluency, and using social media for appearance-related reasons. The latter criterion was assessed by asking respondents if they thought one of the primary reasons for their social media use was appearance-related. The exclusion criterion was concurrent treatment for self-criticism, body image, or disordered eating.

Participants were recruited by advertisements through Flinders University on the psychology student participant pool (reimbursed with research participation credit), and via posters presented on campus and the university research webpage (neither attracted reimbursement) between March and October 2021. The total sample size was 170 after removing duplicate responses ($n$ = 32), of which 140 were eligible and 130 were randomised (see **Figure 6.1**), with 94.7% of participants recruited through the participant pool.

Randomised participants were aged 17 to 25 years ($M$ = 19.29, $SD$ = 1.88) and mostly Oceanian ($n$ = 69, 53.1%), followed by North-West European ($n$ = 17, 13.1%), Southern or Eastern European ($n$ = 8, 6.2%), Southern and Central Asian ($n$ = 5, 3.8%), South-East Asian ($n$ = 3, 2.3%), North-East Asian ($n$ = 2, 1.5%), and North African or Middle Eastern ($n$ = 2, 1.5%). Another 24 participants (18.5%) did not identify with these groups. Most identified as women ($n$ = 116, 89.2%), the remainder as men ($n$ = 9, 6.9%) or non-binary ($n$ = 5, 3.8%).

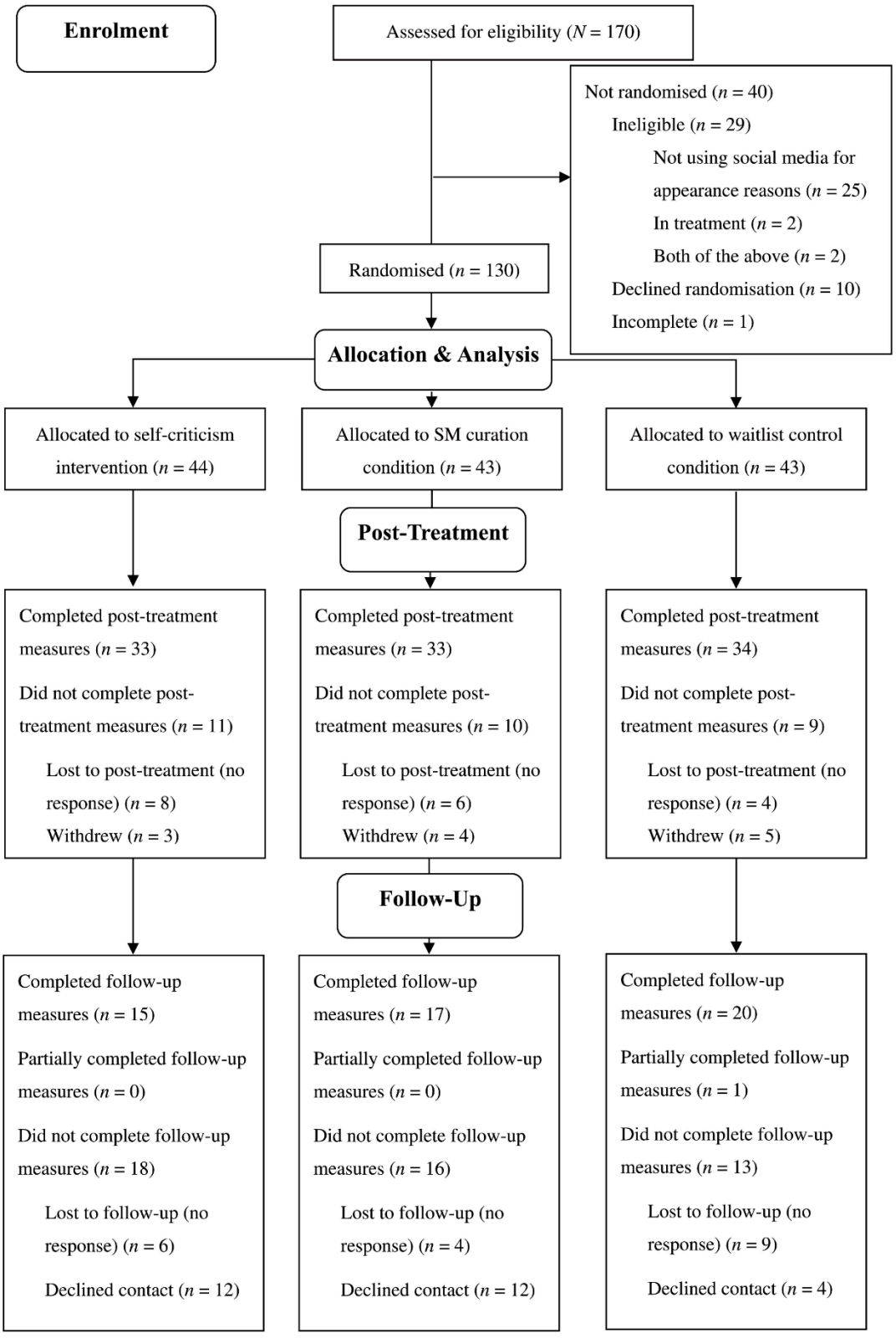
## Materials

### *Active Conditions*

The active conditions were delivered as fillable PDF documents (permitting flexibility in completion location and style – using a device or printed copy), each comprising 14 pages with four modules of cognitive behaviour therapy-based content and homework exercises. **Table 6.1** provides an outline of the modules, which are described in more detail below and presented fully in **Appendices C and D**. The modules are also freely available as PDFs on the Open Science Framework: https://osf.io/xm95n/ (self-criticism intervention) and https://osf.io/r38ef/ (social media curation). They were designed to be completed over one week as one 15-minute module every one to two days. Modules contained text, graphics, links to videos, interactive activities, and references to access further information for interested participants. Both sets of modules were written for this study and neither set had been evaluated previously.

**Figure 6.1**

*Flow Diagram*




*Note*. SM curation condition = social media curation condition.

**Table 6.1**

*Outline of Modules*

| Module | Content Summary |
|---|---|
| | Self-Criticism |
| 1 | Psychoeducation about self-criticism and self-compassion<br>*Homework*: recording instances of self-criticism and self-compassion |
| 2 | Learning more about self-compassion, identifying barriers to self-compassion<br>*Homework*: rating productivity in several areas of life, living one day as usual and the next day actively using self-compassion |
| 3 | Generating personally relevant self-compassion statements, imagery rescripting on a recent memory involving self-criticism about appearance<br>*Homework*: revisiting the rescripted memory |
| 4 | Problem-solving social media use to reduce its potential to impact body image<br>*Homework*: implementing the solution generated through problem-solving |
| | Social Media Curation |
| 1 | Psychoeducation about social media and its relationship to mental health<br>*Homework*: recording time and reason for social media use and feelings after |
| 2 | Discussion of how and why social media content may be idealised/inauthentic, questions to consider about social media content to improve social media literacy<br>*Homework*: recording when and how you noticed inauthenticity on social media |
| 3 | Identifying what you like/dislike about social media, thinking about how to maximise exposure to the former and limit exposure to the latter<br>*Homework*: recording the types of content you see on social media and whether this impacts your well-being positively or negatively |
| 4 | Using reflections from the previous exercises and tools available on social media to produce a plan to curate your feed to improve your well-being<br>*Homework*: implementing this plan and recording its effects |

**Self-Criticism Intervention**. The first module of the self-criticism intervention, "The Tripod for Balance in Life", provided psychoeducation about what self-criticism and self-compassion are and how they are related to mental health outcomes. The homework exercise

involved recording experiences of self-criticism and self-compassion, including what triggered the experiences and how they felt when they occurred.

In the second module, “Self-Criticism and Self-Compassion”, participants reflected on what they learned from the homework exercise, watched a video to see what selective attention looks like and how this relates to self-criticism, completed a questionnaire to help them identify their barriers to using self-compassion (the scale measuring fears of compassion for self by Gilbert et al., 2011), and were given an outline of the components of self-compassion as described by Neff (2003) and Warren et al. (2016). For homework, participants were asked to spend two days rating their productivity in several areas of life (i.e., study, work, hobbies, and social life) and mood, living the first day as usual and the second day actively using self-compassion; that is, to experiment with using self-compassion.

The third module, called “Trying Something New”, comprised a homework reflection, an activity to generate personally relevant self-compassion statements, and an imagery rescripting exercise for a recent memory involving self-criticism about appearance. A single session of imagery rescripting of body-related memories has been found to reduce negative body-related emotions, though not body dissatisfaction (Ghaderi et al., 2022), and a week of rehearsing imagery rescripting of a body-related image for five minutes per day produced improvements in disordered eating psychopathology, body acceptance, self-compassion, and fears of self-compassion compared to a control (Zhou et al., 2020). Participants were asked to revisit their rescripted memory the next day for homework.

Finally, “Tying it All Together”, the fourth module, asked participants to reflect on the imagery rescripting exercise and stepped them through problem-solving their social media use to reduce its potential to impact body image. The problem-solving activity was based on the problem-solving resource from the Centre for Clinical Interventions (n.d.). The

final homework exercise was to implement the solution they generated through problem-solving.

**Social Media Curation Modules**. This set of modules also started with a psychoeducation module, "Learning about Social Media", which provided information on social media use in Australia, research about social media's relationship to mental health, and theories that might help to explain this relationship (i.e., sociocultural and objectification theories). The first homework exercise was to record when and why participants used social media and how they felt afterwards.

In the second module, "Authenticity on Social Media", participants were asked to reflect on what they learned about their social media use through the homework exercise, were invited to consider how and why social media content may be idealised, and were given questions to ask themselves about the content they see on social media to improve their social media literacy. The content of this module was based on the qualitative findings outlined in **Chapter 5** and the preliminary evidence of positive outcomes from social media literacy interventions (Gordon et al., 2021; McLean et al., 2017). For homework, participants recorded when they noticed inauthenticity on social media and the evidence of it being inauthentic, which was reviewed at the beginning of the subsequent module.

The third module, titled "Taking the Good, Leaving the Bad", described research about positive aspects of social media, guided participants to identify the things they like and dislike about social media, and invited them to start thinking about how they could maximise their exposure to the former and limit their exposure to the latter. The homework exercise was to spend two days recording the types of content they were exposed to on social media and whether this impacted their well-being positively or negatively.

In the final module, "Curating Your Feed", the concept of curating your feed was explained, and participants then used their reflections from the previous exercises to produce

a plan to curate their feed to improve their well-being. For homework, they were asked to implement this plan and record its effects on their mental well-being.

### *Demographics*

Participants reported their age, height in centimetres, and weight in kilograms; the latter two to calculate body mass index (BMI), with evidence suggesting this should be controlled for in research about social media and body image (Rodgers et al., 2020). Participants identified their gender using the three inclusive response options by Cameron and Stinson (2019). Ethnicity was collected with 10 options: the nine broad cultural and ethnic groups from the Australian Bureau of Statistics (2019) and one option to self-identify.

### *Outcome Measures*

**Primary Outcomes.** Feasibility and acceptability were the primary outcomes. Feasibility was assessed with two items: “Can you please enter an estimate of how much (as a percentage) of the intervention modules you completed (i.e., how much you read and how many questions you answered in the PDFs)?” and “Can you please enter an estimate of how much (as a percentage) of the homework tasks you completed?”. Acceptability was evaluated via responses to: “What did you like about the intervention?”, “What did you dislike about the intervention?”, and “Do you have any other feedback for us?”.

**Secondary Outcomes.** The secondary outcome measures and their internal consistency in this study are provided in **Table 6.2**. The measures of appearance motivations for social media use, appearance comparison, self-criticism, and body image flexibility are the same as those used in **Chapter 5**, in which they were introduced and evidence supporting their psychometric properties was summarised. A briefer measure of disordered eating was used in this study compared to the one used in the study in **Chapter 5**.

**Table 6.2**

*Secondary Outcomes Measures and Their Internal Consistency at Each Measurement Point*

| Outcome | Measure | Cronbach's α |
|---|---|---|
| Appearance motivations for social media use | Appearance subscale of the Motivations for Social Media Use Scale (Rodgers et al., 2021) | 82, .80, .89 |
| Appearance comparison | Physical Appearance Comparison Scale-Revised (Schaefer & Thompson, 2014) | .95, .96, .96 |
| Self-criticism | Self-Criticism subscale of the Reconstructed Depressive Experiences Questionnaire (Bagby et al., 1994) | .85, .88, .85 |
| Body image flexibility | Body Image Acceptance and Action Questionnaire (Sandoz et al., 2013) | .93, .95, .96 |
| Disordered eating | Short version of the Eating Disorder Examination Questionnaire (Gideon et al., 2016) | .89, .91, .92 |

*Note*. Cronbach's αs are at baseline, one-, and two-weeks post-randomisation, respectively.

The measure of disordered eating that was used in the present study was the 12-item, short version of the Eating Disorder Examination Questionnaire (EDE-QS), which was derived from the full-length Eating Disorder Examination Questionnaire (EDE-Q; Fairburn, 2008) in response to concerns about inconsistent findings about factor structure (for a review, see: Jenkins & Rienecke, 2022), and to create a shorter version that could be used as a weekly sessional measure in clinical practice (Gideon et al., 2016). Unlike the full-length EDE-Q, which was used in the study described in **Chapter 5** and measures symptoms over the past 28 days, the EDE-QS examines the past seven days. This timeframe made it more appropriate for examining changes in symptoms over the course of the one-week intervention. It was also selected for its brevity, to minimise participant burden.

Responses to the EDE-QS are on a scale from 0 to 3, corresponding to how often in the past week respondents experienced disordered eating behaviours and cognitions (10 items; *0 Days*, *1-2 Days*, *3-5 Days*, and *6-7 Days*; e.g., "On how many of the past seven days have you tried to control your weight or shape by making yourself sick [vomiting] or taking laxatives?"), and how strong their disordered eating cognitions were (2 items; *Not at All*, *Slightly*, *Moderately*, and *Markedly*; e.g., "Over the past seven days how dissatisfied have you been with your weight or shape?". Scores are typically summed so that higher scores indicate more disordered eating, though mean item scale scores were used in this study.

The psychometric properties of the EDE-QS have been examined in samples of adult university students and volunteers during development (Gideon et al., 2016; Prnjak et al., 2020), and subsequently in a transgender and gender-diverse community sample (Duffy et al., 2021), Chinese undergraduate university students (He, Sun, et al., 2021), and Iranian university students (Mousavi Asl et al., 2021). Evaluations of the Chinese and Persian language versions of the EDE-QS suggest it has a unidimensional structure (He, Sun, et al., 2021; Mousavi Asl et al., 2021), though factor structure has not been examined with the original, English language version. It has strong internal consistency, αs = .84 to .96 (Duffy et al., 2021; Gideon et al., 2016; He, Sun, et al., 2021; Mousavi Asl et al., 2021), and good test-retest reliability over one to four weeks, intraclass correlations = .82 to .93 (Gideon et al., 2016; He, Sun, et al., 2021; Mousavi Asl et al., 2021). The EDE-QS has good convergent validity with other measures of disordered eating, including very large correlations with the EDE-Q and moderate to large correlations with alternative measures (Duffy et al., 2021; Gideon et al., 2016; He, Sun, et al., 2021; Mousavi Asl et al., 2021). It also shows moderate to large correlations with anxiety, depression, psychological distress, self-compassion, and self-esteem (Gideon et al., 2016; He, Sun, et al., 2021; Mousavi Asl et al., 2021). EDE-QS scores differ significantly between people with and without a suspected or self-reported

eating disorder (Duffy et al., 2021; Gideon et al., 2016). Using a cut-off score of 15, it shows similar discriminatory power to other common measures of disordered eating, including the EDE-Q (Prnjak et al., 2020).

**Procedure**

The website on the advertisements linked to an information sheet and consent form in an online Qualtrics survey. Respondents who consented to participate continued to the demographic and eligibility items. If they did not consent or did not pass the eligibility items, the survey automatically ended. Otherwise, baseline measures of secondary outcomes were presented next in randomised order. After completing these, participants were asked to confirm their interest in undergoing the intervention. If they did not do so, they were not randomised. If they confirmed their interest, they were randomly allocated to one of the three groups using a feature that randomly assigns embedded data. The subsequent pages advised participants of their group allocation and provided contact information for support resources.

Next, participants in the active conditions were emailed the modules and asked to complete them at a rate of one module every one to two days over one week. Those allocated to the control group were emailed to say they would receive the self-criticism intervention after completing post-treatment measures. One week later, all participants were emailed a link to another Qualtrics survey. For participants in the active conditions, this contained the primary and secondary outcome measures. For participants in the control group, the survey only contained the secondary outcome measures. Both surveys ended by asking whether participants consented to being contacted for the optional one-week follow-up measures. A reminder email was sent to participants who had not completed the post-treatment measures one week after being sent the link. For participants recruited through the student participant pool, research credit was allocated after they completed the post-treatment measures. Participants in the control group who did not consent to being contacted for the follow-up

measures were sent the self-criticism intervention after completing the post-treatment measures.

Participants who consented to being contacted for the one-week follow-up measures were emailed a link to a Qualtrics survey containing the secondary outcome measures one week after completing the post-treatment measures. Those who had not completed the follow-up survey one week later were sent a reminder email. Participants in the control group who had consented to being contacted for the follow-up measures were sent the self-criticism intervention after completing the follow-up measures or two weeks after being sent the link to the follow-up measures, whichever occurred first. To minimise respondent burden and mitigate the risk of introducing desirability bias to their use of the modules, participants were not asked to return their completed modules to the researchers.

## Statistical Analyses

### *Data Preparation and Preliminary Analyses*

The data were prepared and analysed with IBM SPSS Statistics (version 28.0.1.0), using an alpha level of .05. Effect sizes were interpreted according to guidelines by Cohen (1988). Mean item scale scores for secondary outcomes were calculated, which are more easily interpreted than total scores. There were no outliers or significant departures from normality on secondary outcomes (assessed by considering skewness and kurtosis values and examining histograms). ANOVAs were used to test for group differences at baseline on the secondary outcomes and BMI, and whether dropout at post-treatment occurred at random.

### *Analysis of Primary and Secondary Outcomes*

Descriptive statistics for feasibility items were calculated. Responses to the acceptability items were examined using content analysis to extract categories, following the steps outlined by Erlingsson and Brysiewicz (2017). The author of this thesis reviewed the data, produced the original categories, and completed the first round of coding. Subsequently,

a research assistant used the categories generated by the author to independently code the data. The author calculated the percentage of inter-coder agreement and Cohen's kappa (Cohen, 1960) as measures of inter-coder reliability. Cohen's kappa is a measure of inter-coder agreement that accounts for chance agreement between coders. Guidelines for its interpretation are: 0 - .20 no agreement; .21 - .39 minimal agreement; .40 - .59 weak agreement; .60 - .79 moderate agreement; .80 - .90 strong agreement; and above .90 almost perfect agreement (McHugh, 2012).

After the first round of coding, five of the 23 categories had inadequate inter-coder reliability, with 80% inter-coder agreement and a Cohen's kappa of .60 as the minimum threshold for adequacy. The five categories that had inadequate inter-coder reliability before the revision of categories and their definitions were: Self-reflection (75.8% inter-coder agreement; Cohen's kappa = .34); Informative/relevant (48.5% inter-coder agreement; Cohen's kappa = .12); New tools (63.6% inter-coder agreement; Cohen's kappa = .34) Non-didactive (54.5% inter-coder agreement; Cohen's kappa = .21); and Time-consuming (78.8% inter-coder agreement; Cohen's kappa = .59). The coders discussed these categories and where differences had arisen in coding them, resulting in revisions to the descriptions of those categories and replacement of two categories: Informative/relevant was replaced by a category called Content and Non-didactive was replaced by a category called Tone.

The coders then independently recoded the data with the revised coding structure, obtaining adequate inter-coder reliability for all categories. Finally, the coders resolved the remaining differences through discussion to obtain the final codes. Responses varied in length and detail, such that more than one category could be identified within them. A handful of responses were not coded to any category because they were unique compared to the other responses. The final item requesting additional comments was not a specific question, so content analysis was not undertaken; instead, any novel insights were noted.

Preliminary efficacy was examined using the secondary outcomes for all randomised participants (i.e., including dropouts) with linear mixed models, which use maximum likelihood estimation, whereby available data are used to produce estimates of the parameters that were most likely to have occurred, enabling estimation of significance when data are missing. Group, time, a two-way interaction between group and time, and BMI were included as fixed effects. Preliminary efficacy was assessed by examining group-by-time interactions, between-groups effects sizes at one- and two-weeks post-randomisation (if randomisation successfully creates equivalent groups at baseline, significant between-groups effects at later points suggest outcomes differed due to group allocation), and line graphs depicting change over time within groups. Between-groups Cohen's *d*s were calculated with the Campbell Collaboration tool (https://campbellcollaboration.org/research-resources/effect-size-calculator.html), inputting sample sizes, means, and standard deviations for completer statistics, and sample sizes, means, and standard errors for intention-to-treat statistics.

## Results

### Participant Flow

**Figure 6.1** describes participant flow. Attrition was 23.1% at one-week post-randomisation and 59.2% at two-weeks post-randomisation. Non-reimbursed participants had slightly lower attrition (16.7% and 50.0% at one- and two-weeks post-randomisation, respectively) than reimbursed participants (23.4% and 59.7% at one- and two-weeks post-randomisation, respectively).

### Descriptive Statistics and Correlations

**Table 6.3** contains baseline descriptive statistics for all randomised participants. Using a total score of ≥15 (i.e., mean item score of ≥1.25) on the EDE-QS as the threshold (Prnjak et al., 2020), 64 participants (49.2%) reported clinically significant disordered eating at baseline. A BMI in the average range (i.e., 18.5-25) was reported by 62.9% of participants,

with 5.7% below and 31.4% above this range. Variables had significant, weak to strong correlations in the expected directions.

**Table 6.3**

*Correlation Matrix and Descriptive Statistics at Baseline (n = 130)*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. Appearance motivations | - | | | | | |
| 2. Appearance comparison | .52*** | - | | | | |
| 3. Self-criticism | .48*** | .50*** | - | | | |
| 4. Body image flexibility | -.44*** | -.69*** | -.70*** | - | | |
| 5. Disordered eating | .38*** | .61*** | .60*** | -.77*** | - | |
| 6. BMI | .20* | .27** | .36*** | -.42*** | .38*** | - |
| *M* | 3.17 | 2.63 | 4.29 | 3.74 | 1.21 | 23.85 |
| *SD* | 0.89 | 0.97 | 1.12 | 1.34 | 0.61 | 5.17 |
| Min | 1.00 | 0.27 | 1.00 | 1.33 | 0.17 | 15.16 |
| Max | 5.00 | 4.00 | 6.11 | 6.83 | 2.75 | 48.33 |

*Note*. Appearance motivations = appearance motivations for social media use. Correlations are two-tailed.

*$p < .05$. **$p < .01$. ***$p < .001$

**Baseline Analyses**

Participants were divided into four groups: waitlist control, self-criticism intervention, social media curation, and those who declined randomisation. Group descriptive statistics are in **Table 6.4** and the results of the ANOVAs assessing for baseline differences in groups appear in **Table 6.5**. Groups did not differ on outcome measures or BMI at baseline.

**Table 6.4**

*Group Descriptive Statistics for Secondary Outcome Measures at Baseline (n = 140)*

| | Group | *M* | *SD* | Min | Max |
|---|---|---|---|---|---|
| Appearance motivations | Control | 3.13 | 1.02 | 1.20 | 5.00 |
| | S-C intervention | 3.20 | 0.84 | 1.00 | 5.00 |
| | SM condition | 3.18 | 0.82 | 1.20 | 4.40 |
| | Declined | 2.90 | 0.80 | 1.60 | 3.80 |
| Appearance comparison | Control | 2.79 | 1.00 | 0.64 | 4.00 |
| | S-C intervention | 2.65 | 0.86 | 0.45 | 4.00 |
| | SM condition | 2.45 | 1.03 | 0.27 | 4.00 |
| | Declined | 2.71 | 0.72 | 1.82 | 4.00 |
| Self-criticism | Control | 4.23 | 1.25 | 1.56 | 6.11 |
| | S-C intervention | 4.46 | 0.95 | 1.56 | 6.11 |
| | SM condition | 4.18 | 1.14 | 1.00 | 6.00 |
| | Declined | 4.29 | 1.04 | 3.00 | 6.56 |
| Body image flexibility | Control | 3.67 | 1.42 | 1.33 | 6.33 |
| | S-C intervention | 3.73 | 1.28 | 1.50 | 6.25 |
| | SM condition | 3.83 | 1.34 | 1.33 | 6.83 |
| | Declined | 3.66 | 1.08 | 1.75 | 5.00 |
| Disordered eating | Control | 1.18 | 0.66 | 0.33 | 2.50 |
| | S-C intervention | 1.22 | 0.60 | 0.17 | 2.42 |
| | SM condition | 1.24 | 0.59 | 0.25 | 2.75 |
| | Declined | 1.07 | 0.59 | 0.42 | 2.42 |
| BMI | Control | 23.01 | 4.24 | 15.16 | 41.18 |
| | S-C intervention | 24.07 | 5.09 | 18.94 | 43.28 |
| | SM condition | 24.45 | 6.04 | 16.65 | 48.33 |
| | Declined | 24.91 | 5.46 | 18.91 | 34.89 |

*Note*. S-C intervention = self-criticism intervention. SM condition = social media curation condition. Declined = declined randomisation.

**Table 6.5**

*Summary of One-Way ANOVAs Evaluating Baseline Group Differences and Dropout*

| | Comparing Groups on Baseline Measures ($n$ = 140) $df$ = 3, 136 | | Baseline Measures as Predictors of Dropout ($n$ = 130) $df$ = 1, 128 | |
|---|---|---|---|---|
| | *F* | *p* | *F* | *p* |
| Appearance motivations | 0.32 | .81 | 0.55 | .46 |
| Appearance comparison | 0.97 | .41 | 0.26 | .62 |
| Self-criticism | 0.52 | .67 | 2.08 | .15 |
| Body image flexibility | 0.11 | .95 | 0.59 | .45 |
| Disordered eating | 0.23 | .87 | 0.87 | .35 |
| BMI | 0.72 | .54 | 2.51 | .12 |

*Note*. Appearance motivations = appearance motivations for social media use.

To examine whether dropout occurred at random, randomised participants were divided into dropouts ($n$ = 30, 23%) and one-week post-randomisation completers ($n$ = 100, 77%). Dropout was not significantly related to baseline measures (see **Table 6.5**), nor was it predicted by group, $F(2, 127) = 0.10$, $p = .91$, suggesting data are missing at random.

## Feasibility and Acceptability

### *Feasibility*

Self-reported module completion was high and comparable across both active conditions. Participants reported completing an average of 82.0% ($SD$ = 19.4) of the self-criticism intervention modules, and 84.0% ($SD$ = 21.9) of the social media curation modules. Thirteen participants in the self-criticism intervention condition (39.4%) and 16 participants in the social media curation condition (48.5%) reported fully completing the modules. Average module completion was 88.0% for the non-reimbursed participants ($n$ = 2) and 82.86% for the reimbursed participants ($n$ = 64).

Participants' self-reported homework completion was high and similar across the active conditions. They reported completing 77.2% (*SD* = 24.6) of the self-criticism intervention homework, and 78.2% (*SD* = 23.7) of the social media curation homework. Eleven participants in the self-criticism intervention condition (33.3%) and 13 participants in the social media curation condition (39.4%) reported completing 100% of the homework exercises. Average homework completion was 84.5% for the non-reimbursed participants and 77.5% for the reimbursed participants.

### *Acceptability*

**Self-Criticism Intervention.** Feedback suggested that participants had favourable opinions of the intervention (see **Table 6.6**). Six specific aspects that participants liked emerged: 1) it prompted self-reflection; 2) the structure and format; 3) the content; 4) that it was easy to understand and complete; 5) it helped them practice new tools and strategies; and 6) its tone. Cohen's kappa values suggested moderate to strong inter-coder agreement for these categories. Another six categories emerged regarding what they disliked about the intervention: 1) it was time-consuming; 2) parts of the information were overwhelming or hard to understand; 3) they did not dislike anything; 4) they experienced challenges with it being self-directed; 5) completing the intervention over several days; and 6) finding it repetitive. Cohen's kappa values indicated moderate to almost perfect inter-coder agreement on these categories. When requesting any additional feedback, amendments to the intervention were proposed: giving more time to complete it, implementing email reminders, and including a daily questionnaire or journal entry.

**Table 6.6**

*Categories Identified in Acceptability Analyses – Self-Criticism Intervention*

| Category | Description | Example Quote | *n* (%) of participants | Inter-coder agreement | Cohen's kappa |
|---|---|---|---|---|---|
| Responses to "What did you like about the intervention?" | | | | | |
| Self-reflection | Helped them notice or put self-criticism in perspective; developed their self-insight; prompted self-reflection | *"It gave me the opportunity to actually consider my automatic self-critical responses and come to the realisation that most of the time self-criticism is disproportionate to the actual mistake or negative thing"* | 19 (57.6%) | 84.8% | .70 |
| Structure/format | Developed in smaller modules; range or use of tasks; prompting questions; interactivity; flow from information to activities | *"That it was an interactive document where I could tick the questionnaire boxes and type my answers into the other boxes"* | 13 (39.4%) | 87.9% | .73 |
| Content | Information provided or the intervention generally was informative or relevant; enjoyed specific tasks or found them relevant, useful, or interesting | *"How informative the intervention was; it had some really useful tasks and information that I wouldn't have thought about before"* | 11 (33.3%) | 87.9% | .64 |
| Clear | Easy to do, understand, or follow | *"The information was straight to the point and easy to understand"* | 9 (27.3%) | 81.8% | .61 |
| New tools | Provided, taught, or helped to develop new strategies to use generally or specifically to deal with self-criticism; helped develop more self-compassion | *"The intervention allowed me to bring awareness to my self-critical thoughts and diminish them. This was very beneficial to my well-being as it allowed me to live my life with greater self-compassion."* | 7 (21.2%) | 97.0% | .90 |

**Table 6.6 (Continued)**

| Category | Description | Example Quote | *n* (%) of participants | Inter-coder agreement | Cohen's kappa |
|---|---|---|---|---|---|
| Tone | Non-judgemental; non-didactive (focus on generating own solutions); engaging; positive | *"I enjoyed coming up with my own solutions because I think that is a great way to impactfully make a change in my thought processes"* | 5 (15.2%) | 97.0% | .89 |
| Responses to "What did you dislike about the intervention?" | | | | | |
| Time-consuming | Lots to do; hard to fit in or prioritise | *"Allocating time often enough to do the full intervention and get the most out of it was hard to prioritise"* | 12 (36.4%) | 100% | 1 |
| Information | Parts were overwhelming or hard to understand | *"Some questions for the tasks were a little difficult to understand"* | 6 (18.2%) | 97.0% | .90 |
| Nothing | Reported not disliking anything | *"Nothing – I really enjoyed the intervention"* | 6 (18.2%) | 100% | 1 |
| Self-directed | Hard to remember to do; difficult to effect changes | *"The lack of interaction or follow-up meant I had to be mindful to incorporate these mindsets into everyday life and remember to regularly check/add to it without reminders"* | 6 (18.2%) | 93.9% | .82 |
| Structure | Being asked to do homework tasks over more than one day between modules; unclear at the start that tasks were carried out over multiple days | *"I hoped to get one module done each day but sometimes I would have to wait a day due to specific tasks"* | 3 (9.1%) | 100% | 1 |
| Repetitive | Tasks or information were repetitive | *"Some of the activities were quite repetitive. I understand this allowed us to reflect back on our progress and allow comparison, however, I did find some of the stuff I was writing was quite repetitive."* | 2 (6.1%) | 97.0% | .78 |

*Note*. Quotes underwent minor edits to spelling and grammar to improve legibility but otherwise, the quotes are presented verbatim.

**Social Media Curation Condition.** Results are based on 32 available responses (see **Table 6.7** for details). Participants demonstrated positive views of the social media curation modules. The six categories observed in their reports as to what they liked were: 1) they promoted insight into social media and their effects; 2) they were informative; 3) they were easy to understand and complete; 4) their structure and format; 5) they helped them make positive changes to their social media use; and 6) they produced additional benefits to them beyond social media. Cohen's kappa values suggested moderate to almost perfect inter-coder agreement on these categories. When asked what they disliked, respondents commonly denied disliking anything. The four other categories were that: they disliked recording their social media use; it was confronting to see the extent of their social media use and how it affects them; it was time-consuming; and it was self-directed. Cohen's kappa values suggested moderate to almost perfect inter-coder agreement on these categories. Participants also made suggestions for improving the modules: including an outline of the modules with a timeline at the beginning of the document and replacing some text with alternative media.

**Table 6.7**

*Categories Identified in Acceptability Analyses – Social Media Curation Condition*

| Category | Description | Example Quote | *n* (%) of participants | Inter-coder agreement | Cohen's kappa |
|---|---|---|---|---|---|
| Responses to "What did you like about the intervention?" | | | | | |
| Insight | Developed insight into own social media habits or effects of social media use; helped develop skills in noticing unrealistic aspects of social media | *"How I got to reflect on how much social media I used as I didn't realise the amount of time I actually spend on it. I also liked how I can see the influence of social media on my feelings and thoughts."* | 22 (68.8%) | 90.9% | .80 |
| Informative | Quantity or type of information; information was detailed or relevant; access to further information provided | *"The amount of informative information and instructions provided for each task ... I also liked the addition of links to other websites if you wanted further information or were simply curious."* | 13 (40.6%) | 84.8% | .71 |
| Clear | Easy to do or understand; written in an accessible way | *"It was easy to understand and had clear instructions"* | 8 (25.0%) | 100% | 1 |
| Structure/format | Developed in modules that build on each other; flexibility in the amount of writing or location of completion | *"That the intervention was developed in stages. It made it a lot easier to follow than it would have been if, say, it had jumped directly to the curating your feed component."* | 6 (18.8%) | 97.0% | .91 |
| Changed use | Helped make useful changes to their social media use | *"The intervention got me thinking what I liked about social media and what I didn't and help me alter these things to benefit me."* | 4 (12.5%) | 93.9% | .80 |

**Table 6.7 (Continued)**

| Category | Description | Example Quote | *n* (%) of participants | Inter-coder agreement | Cohen's kappa |
|---|---|---|---|---|---|
| Extra benefits | Noted benefits beyond their social media use | *"As a result, I cultivated a much nicer social media feed and spend more time reading and doing other things (like study!)"* | 4 (12.5%) | 87.9% | .66 |
| Responses to "What did you dislike about the intervention?" | | | | | |
| Nothing | Reported not disliking anything or did not report any dislikes (e.g., responded "N/A") | *"I didn't dislike anything about it, I thought it was very helpful in addressing the seeing the link between social media and body image concerns"* | 9 (28.1%) | 87.9% | .75 |
| Recording use | Recording social media use for tasks was irritating or hard to do | *"Having to fill in every time I used social media, it was hard to keep up sometimes!"* | 7 (21.9%) | 97.0% | .92 |
| Confronting | Confronting to see the extent or effects of their social media use | *"Coming to terms with how much time I spend on social media"* | 4 (12.5%) | 100% | 1 |
| Time-consuming | Lots to do; long; took a long time to complete | *"I think the content was a lot and activities were somewhat time-consuming (not all)"* | 4 (12.5%) | 97.0% | .89 |
| Self-directed | Hard to remember to do; difficulties motivating self to complete the modules | *"Having to manage it in my own time was a bit difficult as it would often slip my mind"* | 2 (6.3%) | 93.9% | .72 |

*Note*. Quotes underwent minor edits to spelling and grammar to improve legibility but otherwise, the quotes are presented verbatim.

**Preliminary Efficacy**

Estimated group scores across measurement points for all randomised participants are provided in **Table 6.8**. There were significant group-by-time interactions for appearance motivations for social media use, self-criticism, and disordered eating, and significant main effects of time and BMI for all five outcomes.

**Table 6.8**

*Estimated Group Scores on Outcome Measures at Baseline, Post-Treatment, and One-Week Follow-Up for Randomised Participants (n = 130)*

| Outcome (range) | Group | $M_B$ | $SE_B$ | $M_{PT}$ | $SE_{PT}$ | $M_{FU}$ | $SE_{FU}$ |
|---|---|---|---|---|---|---|---|
| Appearance motivations (1-5) | Control | 3.15 | 0.14 | 3.12 | 0.14 | 3.11 | 0.19 |
| | S-C intervention | 3.18 | 0.13 | 2.59 | 0.14 | 2.44 | 0.21 |
| | SM condition | 3.15 | 0.14 | 2.76 | 0.14 | 2.65 | 0.20 |
| Appearance comparison (0-4) | Control | 2.82 | 0.14 | 2.56 | 0.16 | 2.65 | 0.17 |
| | S-C intervention | 2.63 | 0.14 | 2.02 | 0.16 | 1.86 | 0.18 |
| | SM condition | 2.40 | 0.14 | 1.89 | 0.16 | 2.06 | 0.17 |
| Self-criticism (1-7) | Control | 4.27 | 0.16 | 3.99 | 0.19 | 4.23 | 0.20 |
| | S-C intervention | 4.42 | 0.16 | 3.66 | 0.19 | 3.70 | 0.21 |
| | SM condition | 4.11 | 0.16 | 3.95 | 0.19 | 3.82 | 0.21 |
| Body image flexibility (1-7) | Control | 3.61 | 0.19 | 3.85 | 0.21 | 3.79 | 0.25 |
| | S-C intervention | 3.79 | 0.19 | 4.54 | 0.21 | 4.55 | 0.26 |
| | SM condition | 3.93 | 0.19 | 4.20 | 0.21 | 3.94 | 0.26 |
| Disordered eating (0-3) | Control | 1.21 | 0.09 | 1.13 | 0.10 | 1.08 | 0.11 |
| | S-C intervention | 1.20 | 0.09 | 0.81 | 0.10 | 0.85 | 0.12 |
| | SM condition | 1.20 | 0.09 | 0.94 | 0.10 | 0.92 | 0.12 |

*Note*. B = baseline, PT = post-treatment, FU = follow-up. Appearance motivations = appearance motivations for social media use. S-C intervention = self-criticism intervention. SM condition = social media curation condition.

***One-Week Post-Randomisation***

The between-groups effect sizes and 95% confidence intervals (both completer and intention-to-treat; see **Table 6.9**) indicate that at one-week post-randomisation, the self-criticism intervention group had significantly lower appearance motivations for social media use, appearance comparison, and disordered eating, and significantly higher body image flexibility than the waitlist control group, each with a moderate effect. The social media curation group demonstrated significantly lower appearance comparison than the waitlist control group, with a moderate effect. There were no significant differences between the self-criticism intervention group and the social media curation group, although effect sizes above .20 on several outcomes could translate into significant differences favouring the self-criticism intervention in a trial with more power. **Figures 6.2 to 6.6** illustrate changes in each group over measurement points.

**Table 6.9**

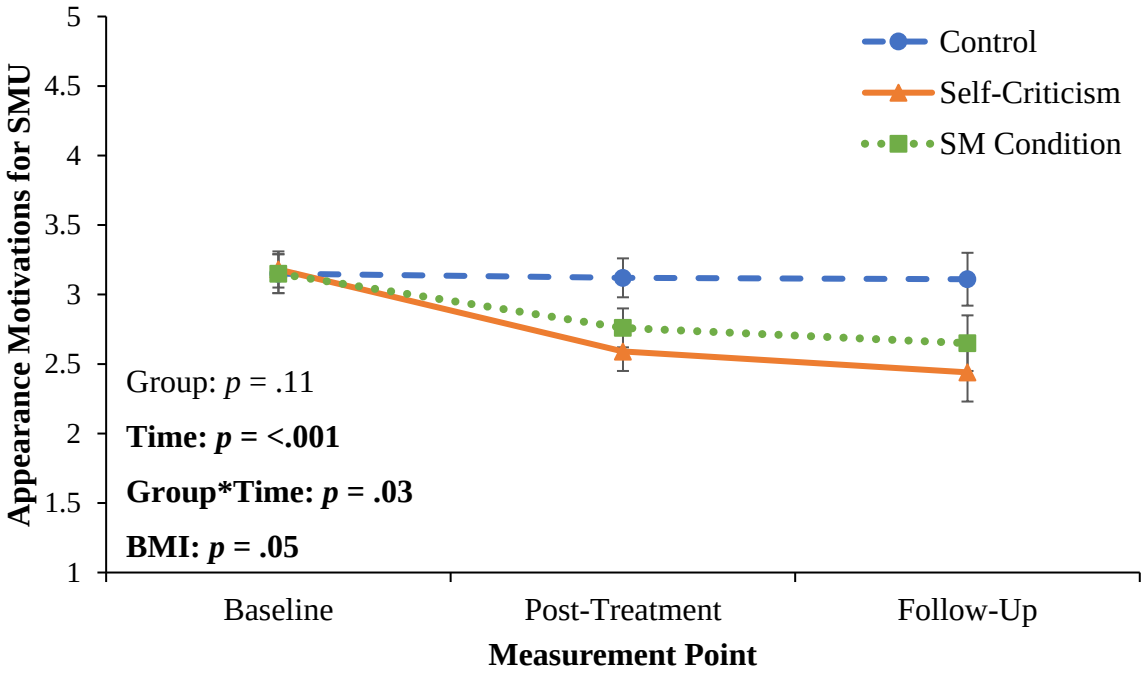
*Between-Groups Cohen's (95% Confidence Intervals) at Post-Treatment for Completers (n = 100; Upper Diagonals) and the Intention-to-Treat Sample (n = 130; Lower Diagonals)*

| | S-C Intervention | SM Condition | Control |
|---|---|---|---|
| *Appearance Motivations for Social Media Use* | | | |
| S-C intervention | – | -0.16 (-0.64, 0.32) | **-0.49 (-0.98, -0.01)** |
| SM condition | -0.18 (-0.60, 0.24) | – | -0.40 (-0.88, 0.09) |
| Control | **-0.57 (-1.00, -0.14)** | -0.39 (-0.82, 0.03) | – |
| *Appearance Comparison* | | | |
| S-C intervention | – | 0.14 (-0.35, 0.62) | **-0.53 (-1.02, -0.05)** |
| SM condition | 0.12 (-0.30, 0.54) | – | **-0.65 (-1.15, -0.16)** |
| Control | **-0.51 (-0.94, -0.08)** | **-0.63 (-1.07, -0.20)** | – |
| *Self-Criticism* | | | |
| S-C intervention | – | -0.40 (-0.89, 0.09) | -0.29 (-0.78, 0.19) |
| SM condition | -0.24 (-0.66, 0.18) | – | 0.06 (-0.42, 0.54) |
| Control | -0.27 (-0.69, 0.15) | -0.03 (-0.45, 0.39) | – |
| *Body Image Flexibility* | | | |
| S-C intervention | – | 0.34 (-0.15, 0.83) | **0.51 (0.02, 0.99)** |
| SM condition | 0.25 (-0.17, 0.67) | – | 0.16 (-0.32, 0.64) |
| Control | **0.51 (0.08, 0.93)** | 0.26 (-0.17, 0.68) | – |
| *Disordered Eating* | | | |
| S-C intervention | – | -0.32 (-0.81, 0.16) | **-0.51 (-1.00, -0.02)** |
| SM condition | -0.21 (-0.63, 0.21) | – | -0.20 (-0.68, 0.28) |
| Control | **-0.51 (-0.94, -0.08)** | -0.30 (-0.73, 0.12) | – |

*Note*. S-C intervention = self-criticism intervention. SM condition = social media curation condition. Bolded results indicate significant effect sizes, evidenced by confidence intervals that do not cross zero.

**Figure 6.2**

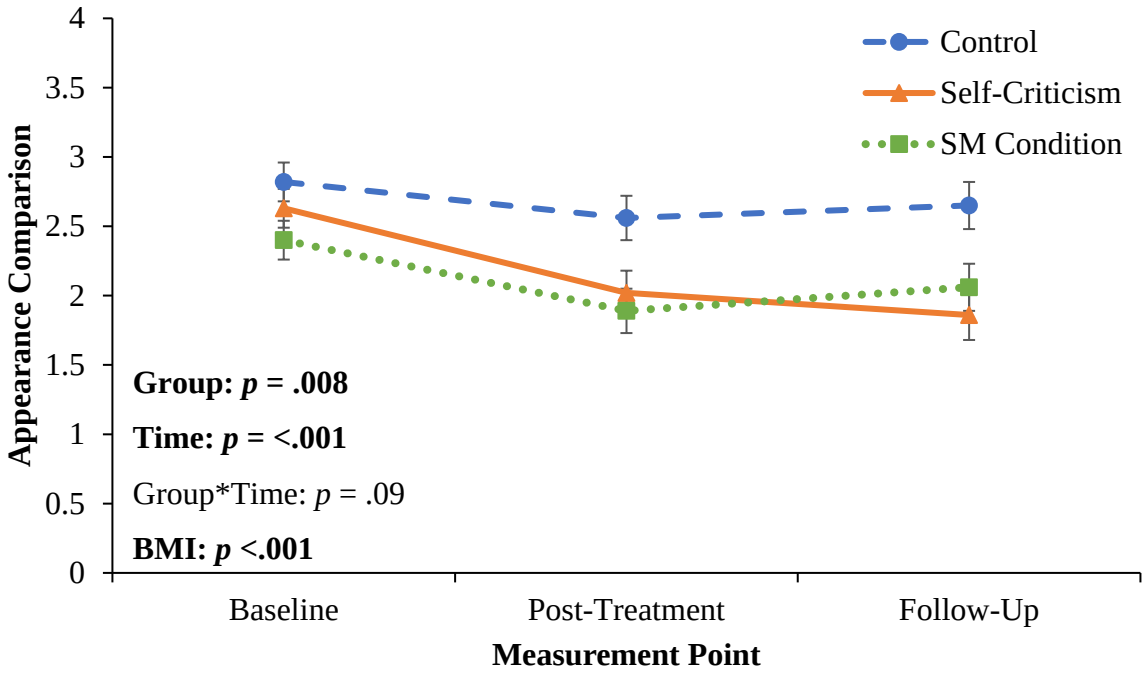
*Line Graph of Appearance Motivations for Social Media Use Across Measurement Points, Controlling for BMI*




*Note*. SMU = social media use. Self-Criticism = self-criticism intervention. SM Condition = social media curation condition. Y axis covers the possible score range. Bolded results indicate significant effects from the linear mixed models. Error bars represent standard errors. There were no significant differences between groups on outcomes at baseline.

**Figure 6.3**

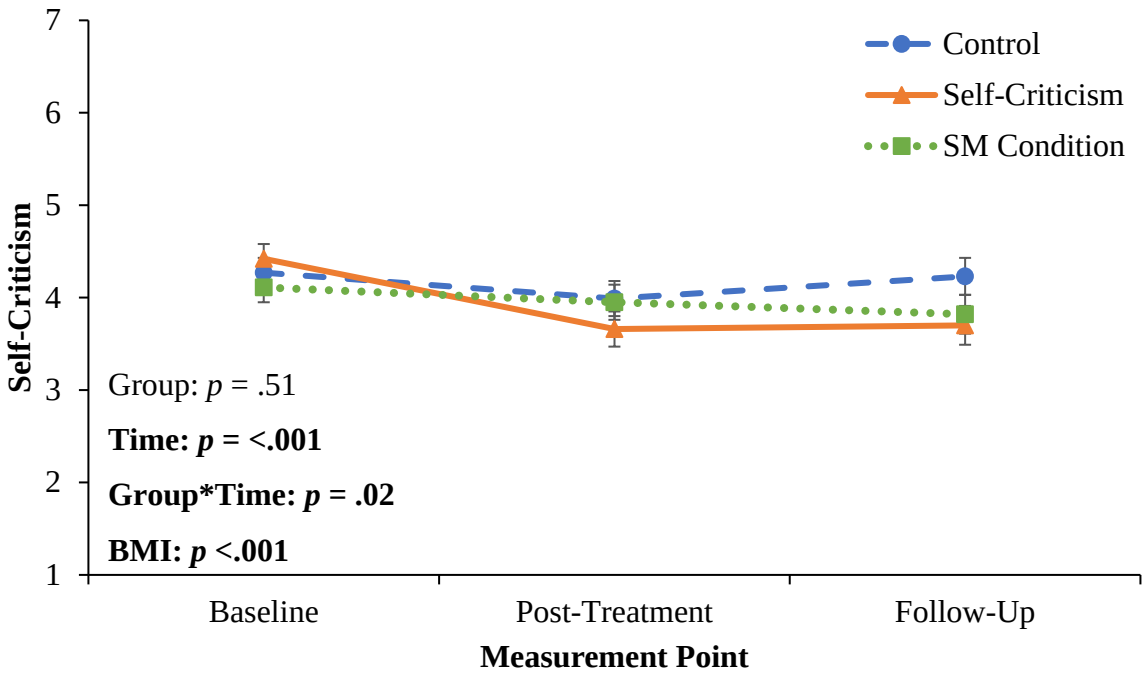
*Line Graph of Appearance Comparison Across Measurement Points, Controlling for BMI*




*Note*. Self-Criticism = self-criticism intervention. SM Condition = social media curation condition. Y axis covers the possible score range. Bolded results indicate significant effects from the linear mixed models. Error bars represent standard errors. There were no significant differences between groups on outcomes at baseline.

**Figure 6.4**

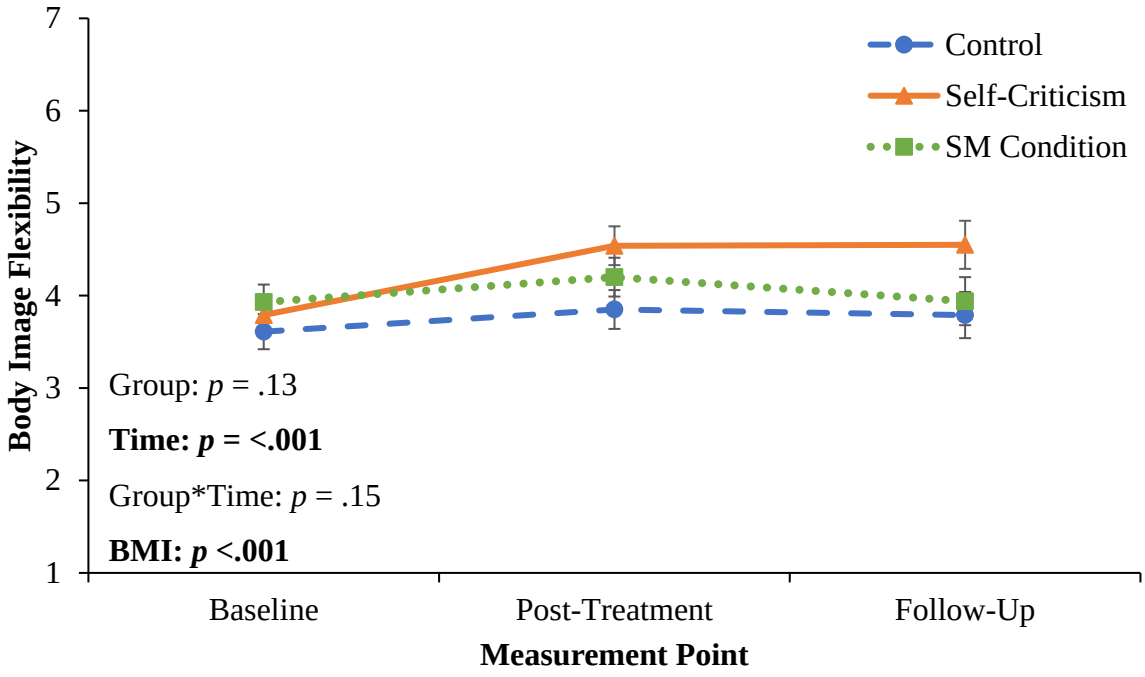
*Line Graph of Self-Criticism Across Measurement Points, Controlling for BMI*




*Note*. Self-Criticism = self-criticism intervention. SM Condition = social media curation condition. Y axis covers the possible score range. Bolded results indicate significant effects from the linear mixed models. Error bars represent standard errors. There were no significant differences between groups on outcomes at baseline.

**Figure 6.5**

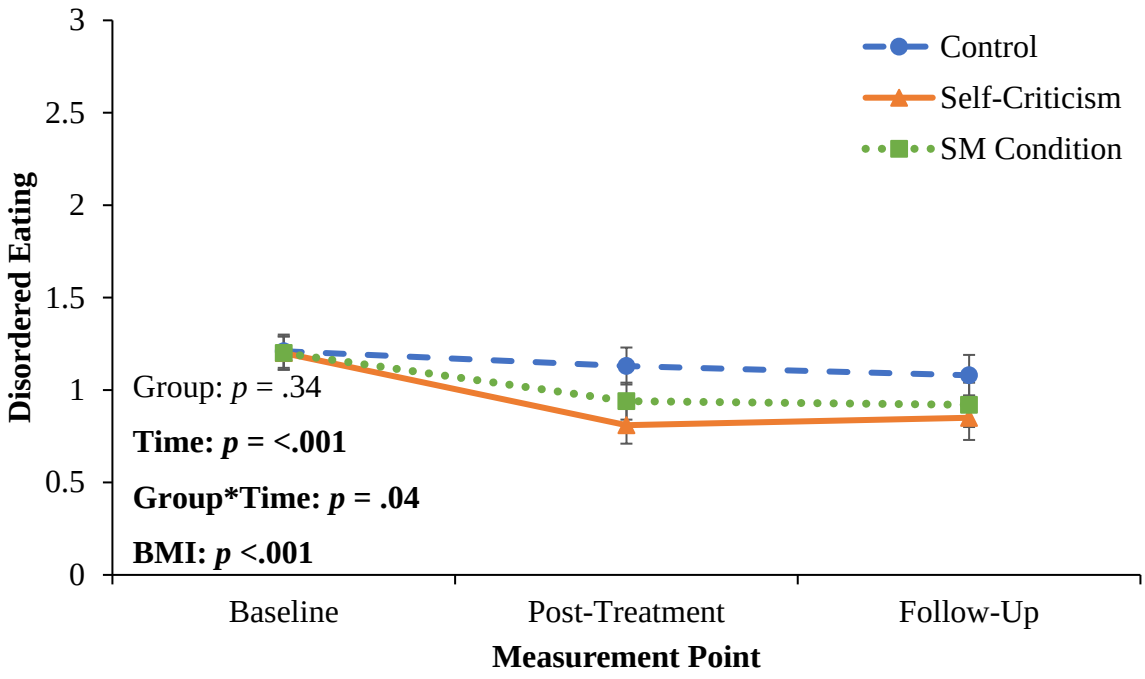
*Line Graph of Body Image Flexibility Across Measurement Points, Controlling for BMI*




*Note*. Self-Criticism = self-criticism intervention. SM Condition = social media curation condition. Y axis covers the possible score range. Bolded results indicate significant effects from the linear mixed models. Error bars represent standard errors. There were no significant differences between groups on outcomes at baseline.

**Figure 6.6**

*Line Graph of Disordered Eating Across Measurement Points, Controlling for BMI*




*Note*. Self-Criticism = self-criticism intervention. SM Condition = social media curation condition. Y axis covers the possible score range. Bolded results indicate significant effects from the linear mixed models. Error bars represent standard errors. There were no significant differences between groups on outcomes at baseline.

### *Two-Weeks Post-Randomisation*

**Table 6.10** provides between-groups effect sizes at two-weeks post-randomisation. Generally, improvements noted in the self-criticism intervention group were still evident, suggesting treatment gains were maintained. The exception to this was in disordered eating, which was no longer significantly different to the waitlist control group. There were fewer significant effects in the completer sample than the intention-to-treat sample, although the size of effects was similar, with power reduced due to attrition at follow-up. The improvement in appearance comparison in the social media curation group compared to the waitlist control group was retained. As seen in **Figures 6.2 to 6.6**, the self-criticism intervention group had the strongest trajectory of positive change on all five outcomes.

### *Moderator Analysis*

Post-hoc analyses examined whether outcomes varied by baseline self-criticism or disordered eating. Baseline self-criticism (coded as high or low using a mean split) and all two-way and three-way interactions between group, time, and baseline self-criticism, were added as fixed effects in four linear mixed models with appearance motivations for social media use, appearance comparison, body image flexibility, and disordered eating as the outcomes, respectively. Likewise, clinically significant baseline disordered eating (coded as present or absent, using the threshold described above) and all two-way and three-way interaction between group, time, and baseline disordered eating, were added as fixed effects in four linear mixed models with appearance motivations for social media use, appearance comparison, self-criticism, and body image flexibility as the outcomes, respectively. There were no significant three-way interactions in either set of models, suggesting that baseline psychopathology did not moderate outcomes.

**Table 6.10**

*Between-Groups Cohen's (95% Confidence Intervals) at One-Week Follow-Up for Completers (n = 52; Upper Diagonals) and the Intention-to-Treat Sample (n = 130; Lower Diagonals)*

| | S-C Intervention | SM Condition | Control |
|---|---|---|---|
| *Appearance Motivations for Social Media Use* | | | |
| S-C intervention | – | -0.01 (-0.71, 0.68) | -0.40 (-1.08, 0.27) |
| SM condition | -0.16 (-0.58, 0.26) | – | -0.43 (-1.09, 0.22) |
| Control | **-0.51 (-0.94, -0.09)** | -0.36 (-0.78, 0.07) | – |
| *Appearance Comparison* | | | |
| S-C intervention | – | -0.39 (-1.09, 0.31) | **-0.82 (-1.52, -0.12)** |
| SM condition | -0.17 (-0.59, 0.25) | – | -0.60 (-1.26, 0.06) |
| Control | **-0.70 (-1.13, -0.26)** | **-0.53 (-0.96, -0.10)** | – |
| *Self-Criticism* | | | |
| S-C intervention | – | -0.39 (-1.09, 0.31) | -0.53 (-1.22, 0.15) |
| SM condition | -0.09 (-0.51, 0.33) | – | -0.27 (-0.92, 0.38) |
| Control | -0.40 (-0.82, 0.03) | -0.32 (-0.74, 0.11) | – |
| *Body Image Flexibility* | | | |
| S-C intervention | – | 0.65 (-0.06, 1.37) | 0.53 (-0.15, 1.20) |
| SM condition | 0.36 (-0.06, 0.78) | – | 0.02 (-0.62, 0.66) |
| Control | **0.46 (0.03, 0.89)** | 0.09 (-0.33, 0.52) | – |
| *Disordered Eating* | | | |
| S-C intervention | – | -0.27 (-0.96, 0.43) | -0.45 (-1.13, 0.23) |
| SM condition | -0.09 (-0.51, 0.33) | – | -0.24 (-0.89, 0.41) |
| Control | -0.30 (-0.72, 0.12) | -0.21 (-0.64, 0.21) | – |

*Note*. S-C intervention = self-criticism intervention. SM condition = social media curation condition. Bolded results indicate significant effect sizes, according to confidence intervals that do not cross zero.

## Discussion

This study represents the first evaluation of an intervention designed for young adults that aims to decrease self-criticism to reduce the detrimental impact of social media on body image and eating. It is one of only four interventions targeting the effects of social media to be delivered outside of classrooms. Findings provided preliminary support for the feasibility and acceptability of the intervention. The low recruitment rate for non-reimbursed participants and considerable attrition at two weeks post-randomisation (for which no reimbursement was offered) suggest that reimbursement will be important for the completion of questionnaires and more complete data in future designs, though there was no evidence that reimbursement affected engagement with the intervention. Approximately half of the participants demonstrated clinically significant disordered eating at baseline, indicating that this intervention can attract people who are at an elevated risk. The preliminary examination of effects on outcomes of interest suggested that the self-criticism intervention shows promise as a potentially effective tool for reducing harmful consequences associated with social media. Further evaluation of the efficacy of the intervention in a larger randomised controlled trial is warranted.

Participants liked the breakdown of the active conditions into modules, the variety of exercises, the interactive elements, and the encouragement to come to their own conclusions. They also suggested modifications: providing longer estimated times and including an outline of the modules and homework exercises at the beginning. Common themes were noted in the analysis of qualitative feedback for a classroom-based self-compassion intervention targeting social media impacts on body image in adolescents, which underscored the importance of these interventions being interesting/informative, easy to understand, and relevant, and of them teaching useful skills (Mahon & Hevey, 2022).

Challenges associated with the self-guided approach, which were also raised by the participants in the Mahon and Hevey (2022) intervention, may be addressed by encouraging participants to institute phone or computer reminders. Information processing may be facilitated by increasing the use of formats other than text (e.g., images and video links) and interactive elements (e.g., quizzes), and evidence suggests that internet-based interventions for eating disorder symptoms have slightly lower dropout when diverse multimedia and interactive functionality are included (Linardon, Messer, et al., 2022). If further research in a larger trial supports the efficacy of the intervention, conversion to an online platform could incorporate these modifications (e.g., via automated reminders, embedding videos, and increasing interactive elements).

Unsurprisingly, there was an overlap between what participants liked and disliked about the interventions. For example, in the social media curation condition, some participants said it was confronting to face their social media use; however, the majority highlighted improving insight into their social media use as a positive. Moreover, confronting social media use is not necessarily associated with negative impacts – this awareness-raising may be the first step to making adaptive changes (see, for example: Prochaska et al., 1992).

The self-criticism intervention showed promise for improving body image and reducing disordered eating. Compared to previous interventions (Bell et al., 2022; Bell et al., 2021; Danthinne et al., 2021; Gobin et al., 2022; Gordon et al., 2021; Mahon & Hevey, 2022; McLean et al., 2017; Misko et al., 2022; Svantorp-Tveiten et al., 2021), where effects were mostly null to small, effects were moderate in this study. Likewise, a meta-analysis of randomised controlled trials of (predominantly unguided) self-help interventions for the prevention and treatment of eating disorders in people aged 13-24 found smaller reductions in eating disorder symptoms at post-intervention (Hedges' $g$ = -0.17) and follow-up (Hedges' $g$ = -0.14; O'Mara et al., 2023) than in the present study. This requires further examination in an

adequately powered trial but suggests that the self-criticism intervention may be at least as effective as previous interventions.

Evaluations of some prior social media interventions included a follow-up period examining a longer timespan than the present study (8 weeks to 12 months; Bell et al., 2022; Bell et al., 2021; Gordon et al., 2021; Mahon & Hevey, 2022; Svantorp-Tveiten et al., 2021). The use of a brief follow-up period and low power at follow-up limited the present study, preventing conclusions about the maintenance of effects or comparison with previous interventions. Yet, it was encouraging to see that improvements observed in the self-criticism intervention group were largely maintained one week after intervention completion. Future trials should adopt a longer follow-up period and maximise power by including follow-up as a main component of the study instead of an optional extra.

Whilst the self-criticism intervention was the primary focus, the social media curation condition was also novel. It yielded similar improvements to the self-criticism intervention on appearance comparison at one- and two-weeks post-randomisation. This condition included a module to increase social media literacy, an approach that has shown some success in previous interventions (Gordon et al., 2021; McLean et al., 2017). The tripartite influence model (Thompson et al., 1999) would suggest that reducing exposure to appearance ideals on social media leads to reduced pressure to meet those ideals and fewer appearance comparisons; curating the social media feed may have achieved this. However, further research is required to explore whether an actual change in exposure to appearance ideals follows the completion of the modules.

Feedback suggested that the social media curation modules were potentially more acceptable than the self-criticism intervention, with more participants reporting there was nothing they disliked and fewer finding it time-consuming or that self-direction was a barrier in the former than the latter group. Hence, intervention length and challenges associated with

the self-directed approach may be the key areas to address in improving the acceptability of the self-criticism intervention. Regarding potential changes to the social media curation modules, it was recently suggested that social media literacy interventions ought to include additional strategies that users can apply to affect the algorithms that produce the content they see in their social media feeds, including reporting or hiding posts, alongside the type of curation strategies covered in the current iteration of the social media curation modules (Harriger et al., 2022). Psychoeducation on the effects of algorithms and these additional strategies to influence algorithms would be a logical addition to future iterations of these modules. However, as discussed in **Chapter 3**, there may be a limit to how much influence users can wield over the algorithms that produce their social media feeds and the extent to which they will be exposed to potentially deleterious content.

**Limitations**

Limitations of this study should be considered. There was a majority female sample, in common with other university samples in intervention studies (see, for example: Grieve et al., 2022; Johnson et al., 2019; Wade et al., 2019), limiting generalisability to other young adults. The underrepresentation of genders other than female also precludes assessment of gender differences in outcomes, which have been observed in previous interventions (Bell et al., 2022; Bell et al., 2021; Gordon et al., 2021; Svantorp-Tveiten et al., 2021). The potential for gender differences is an important avenue for investigation in subsequent evaluations of this intervention.

Whilst attrition at one-week post-randomisation (when data on the primary outcomes of feasibility and acceptability were collected) was at a typical level for self-guided mental health interventions (see: Karyotaki et al., 2018; Karyotaki et al., 2017; Linardon & Fuller-Tyszkiewicz, 2020), the design of future trials examining efficacy should be amended to maximise retention and address the more significant attrition at follow-up; for example, by

offering monetary incentives for completing assessments (Brueton et al., 2014). Participant feedback from this study, discussed above, also suggests avenues for maximising retention in future trials of this and other online interventions. Attracting a larger sample will enable further examination of moderation by baseline psychopathology. Although baseline self-criticism and disordered eating did not moderate outcomes, suggesting that people with elevated psychopathology did not respond differently to other participants based on group allocation, it would be prudent to reanalyse this with more power, since any significant findings would inform the selection of intervention strategies (i.e., enabling a personalised medicine approach).

There were potential measurement issues. Between-groups effect sizes suggested the self-criticism intervention produced modest reductions in self-criticism that were not significantly different to control, despite this being the intervention's focus. There was a significant group-by-time interaction for this outcome and examination of the line graphs suggests this was associated with the self-criticism intervention group having slightly higher self-criticism at baseline than the other groups, but lower self-criticism at subsequent measurements. Hence, the lack of significant between-groups differences at those later measurement points may simply reflect the higher starting point of the self-criticism intervention group and the low power to detect smaller effects. Adjusting for baseline observations and adding alternative measures of self-criticism may aid interpretation in future studies that have adequate power to test for mediation in other outcomes by changes in self-criticism. Also, while the self-criticism intervention was intended to also increase self-compassion, self-compassion was not measured, so it cannot be ascertained whether this aim was achieved. High attrition is common in online interventions (Eysenbach, 2005), and self-criticism was selected as the main variable for this pilot study to reduce respondent burden. However, future evaluations should measure self-compassion to determine whether

improvements in outcomes are related to increases in self-compassion. Moreover, measuring treatment and homework completion via self-report, though not uncommon (see, for example: Cooper et al., 2017; Watts et al., 2013) may have introduced demand characteristics.

A final consideration relates to the comparison of reimbursed and non-reimbursed participants. Rates of recruitment, attrition, and homework and module completion were reported for these groups. However, because so few participants were recruited via non-reimbursed pathways, the present design was underpowered to statistically analyse for group differences based on reimbursement; this should be addressed in future, adequately powered trials.

## Conclusions

The self-criticism intervention evaluated in this study, which had a unique focus, target age group, and delivery format, showed promise as a tool for intervening in the relationship between appearance-motivated social media use and eating disorder risk. It demonstrated reasonable feasibility and acceptability (the primary outcomes), and trends suggest it produced improvements in psychological variables of interest (the secondary outcomes). Future research can expand on the promising findings of this pilot study by conducting a full-scale randomised controlled trial, using feedback from this study to inform modifications to the intervention and the design of the trial, to enable more definitive conclusions about efficacy.

# CHAPTER 7

## Summary and Synthesis of Overall Findings[4]

[4] This chapter contains content from two published papers that appear in *Body Image* (de Valle et al., 2021), provided in **Appendix A**, and the *International Journal of Eating Disorders* (de Valle & Wade, 2022), provided in **Appendix B**.

## Overview

The purpose of this chapter is to review and synthesise the content across the previous chapters and provide a broader context for the results of the studies in this thesis. It is also intended to highlight the novel contributions of this thesis to the literature. The methodological limitations of the research reported in this thesis and potential avenues for further research are considered, and the chapter closes with a summary of the main conclusions of the thesis.

## Summary of Aims and Findings

As explained in **Chapter 1**, this thesis was informed by the United Kingdom's Medical Research Council framework for developing and evaluating complex interventions (Craig et al., 2008; Craig et al., 2013; Skivington et al., 2021) – hereby called the MRC Framework. The current iteration of the MRC Framework (Skivington et al., 2021) consists of six core elements that contribute to intervention development over four phases: understanding context, refining and testing program theory (i.e., how and under what circumstances an intervention will lead to effects), engagement with stakeholders, identifying key uncertainties, refining the intervention, and economic considerations. The four phases of intervention development involve identifying an existing intervention or developing a new intervention, feasibility testing, evaluation, and implementation. Movement back and forth between the core elements and four phases is expected, with intervention development and evaluation considered to be an iterative process.

The focus in this thesis on conducting research explicitly designed to support the development of an intervention was informed by a systematic review by Pennesi and Wade (2016), who evaluated the extent to which models that explain the emergence of disordered eating have informed the development of effective interventions. They found a diverse array of theoretical models in the literature but few that have progressed beyond theory

development to form the basis of an intervention. Likewise, in the literature on how social media use is related to eating disorder risk, theory-building research has substantially outpaced the development and testing of interventions designed to disrupt this relationship. The program of research undertaken for this thesis was designed to produce a novel intervention addressing this relationship, undertaken in steps that align with the MRC Framework.

**Establishing Causality**

The first aim of this thesis was to establish evidence about causality in the relationship between social media use and body image, which was intended to address the MRC Framework core element of refinement and testing of program theory (Skivington et al., 2021). This first aim was achieved through four meta-analyses: three examining experimental studies on the effects of exposure to appearance-ideal social media images and one investigating longitudinal research on the extent to which social media use (broadly defined) is associated with body image, controlling for baseline body image. Additionally, a brief qualitative synthesis of the individual difference factors that were tested as moderators or mediators in the studies included in the meta-analyses was provided.

The study addressing this first aim comprised 36 experimental and 9 longitudinal articles and is described in **Chapter 3**. Results were consistent with meta-analyses of cross-sectional data on social media and body image (Mingoia et al., 2017; Saiphoo & Vahedi, 2019) and effects of exposure to appearance ideals in traditional media formats (Barlett et al., 2008; Grabe et al., 2008), indicating that viewing appearance-ideal social media images has a small to moderate immediate, negative effect on body image, and social media use is prospectively associated with slightly poorer body image. Two of the meta-analyses provided more nuanced information, revealing that contextual features associated with the social media environment modulate the impact of exposure to appearance-ideal images to a small extent

and it is the appearance ideals specifically, rather than exposure to other people's appearance more generally, that negatively impacts body image. The results of the meta-analyses were not moderated by gender or age. Many of the studies included in the meta-analyses assessed whether effects were mediated or moderated by comparison to others and/or internalisation of appearance ideals, finding reasonable evidence to support the former but little to support the latter.

This study advanced the field in several respects. Alongside a recent systematic review of 43 experimental studies by Fioravanti et al. (2022), it is one of the most comprehensive collections of experimental and longitudinal evidence in the field to date, and it went beyond previous meta-analyses of cross-sectional data (Mingoia et al., 2017; Saiphoo & Vahedi, 2019) to show that social media can causally impact body image and precede deterioration of body image. It is also distinguished from previous meta-analyses by addressing the impacts of features unique to the social media environment and of viewing people who meet appearance ideals compared to viewing other types of appearance, providing a more nuanced understanding of how social media effects occur than was previously available.

**Personality, Social Media Use, and Eating Disorder Risk**

The second aim of this thesis was to determine the extent to which current research addresses how personality is implicated in the relationship between the use of social media and eating disorder risk factors, and to identify gaps in knowledge. For this thesis, scoping the evidence currently available about self-criticism and perfectionism was of particular interest. The systematic review addressing this second aim, described in **Chapter 4**, aligns with two core elements from the MRC Framework (Skivington et al., 2021): refinement and testing of program theory and identification of key uncertainties.

The review found 37 articles that contributed information on how personality may be implicated in the relationship between social media use and risk for eating disorders (operationalised as body image disturbance and disordered eating). Most of the articles only provided cross-sectional correlations between personality, social media use, and body image/disordered eating. The few articles that tested personality factors as moderators or mediators in models relied in almost all cases on cross-sectional data, with just one article finding prospective support for narcissism and perfectionism as interacting with Instagram image type to predict dieting intention (Jin et al., 2018). Self-esteem and social insecurity had attracted the most research attention, accompanied by the most supporting evidence, though the role of the former remains ambiguous due to it being conceptualised as a predictor, mediator, and outcome in different models. The review concluded that the current understanding of how personality operates in the relationship between social media and risk for eating disorders is extremely limited in terms of quantity and diversity of research designs, but credible inclusions for future models and interventions are self-esteem, social insecurity, narcissism, perfectionism, self-compassion, self-monitoring, and emotion regulation difficulties.

The focus in this review on personality factors is unique compared to all other reviews on social media and body image/eating. No previous systematic review has focused on intervening mechanisms, though a narrative review examining the roles of thin-ideal internalisation and appearance comparison as mechanisms driving this relationship was recently published (So & Kwon, 2022). Broader reviews of social media and body image/eating that discussed moderating and mediating effects were likewise centred around appearance-related factors (see, for example: Fioravanti et al., 2022; Holland & Tiggemann, 2016; Ryding & Kuss, 2019), likely due to these having been much more often examined in the literature than personality factors. The findings of this review suggest a range of novel

avenues for future research in the area of personality, which can progress theoretical understanding and direct the inclusion of relevant components in new or revised interventions.

**Developing and Pilot-Testing an Intervention**

The third and final aim of this thesis was to develop an intervention to reduce the impact of social media on the risk of developing eating disorders in young adults. This aim was addressed through two studies. In the first of these, a mixed methods approach was taken, whereby quantitative data were used to test alternative theoretical models to aid selection of targets for intervention, and qualitative data were analysed to obtain young adult social media users' perspectives on factors that could be addressed in interventions (described in **Chapter 5**). In the final study, a set of self-guided self-criticism intervention modules that were developed based on the results of the prior study were pilot-tested for feasibility, acceptability, and preliminary efficacy in a young adult sample (see **Chapter 6**). The intervention modules were tested in a randomised controlled trial format, comparing them to a credible alternative set of modules and a waitlist control condition. The mixed methods study addressed the core element of refinement and testing of program theory, the pilot study represented the feasibility phase of intervention development, and both studies advanced the core element of stakeholder engagement from the MRC Framework (Skivington et al., 2021).

The mixed methods study was conducted with a sample of 275 young adult university students. The model-testing process resulted in the selection of a model to inform intervention development in which appearance-motivated social media use is indirectly associated with more disordered eating via the sequential mediating pathways of increased appearance comparison, more self-criticism, and poorer body image flexibility. Qualitative data indicated that participants thought social media affect body image primarily by fostering comparison with others, promoting appearance ideals, and emphasising appearance. Their

most common suggestions for reducing impacts on body image involved reducing the amount of idealised social media content, curating the social media feed, reducing the emphasis on appearance and appearance ideals, and modifying one's mindset.

This study was the first instance of perfectionism and self-criticism being tested as mediators, and one of the very few studies in which the role of body image flexibility in the relationship between social media and risk for eating disorders was examined. Results were consistent with the finding that positive changes to body image flexibility mediated reductions in disordered eating in female adolescents who underwent an intervention addressing the impacts of social media on body image (Svantorp-Tveiten et al., 2022). Outcomes indicated that either self-criticism or perfectionism variables (perfectionistic strivings, concerns, and self-presentation) could be usefully targeted in interventions, but that self-criticism was likely to be the most efficient target. Using motivations for use as the social media predictor variable, as opposed to other variables related to frequency, quantity, or intensity of use, was also unique compared to other models (see, for example: Griffiths, Castle, et al., 2018; Hanna et al., 2017; Jarman, Marques, et al., 2021b; Jarman, McLean, et al., 2021; Pedalino & Camerini, 2022; Rodgers et al., 2020), and motivations were found to be a more useful inclusion to the models than measures related to the frequency of use.

For the pilot study, 130 young adult university students were randomised to either the self-criticism intervention modules, a comparison set of modules about curating the social media feed, or waitlist control. The one-week timeframe to complete the modules appeared to be feasible, with participants reporting high average levels of module and homework completion, though some participants suggested that a slightly longer timeframe may improve acceptability. Qualitative feedback indicated that both interventions were well-accepted, with tentative evidence to suggest that the social media curation modules were the approach preferred by participants. Preliminary analysis of efficacy revealed significantly

different rates of change over time in three of five outcomes, which were clarified by between-groups effect sizes and examination of line graphs. The self-criticism intervention group had the strongest and most consistent trajectory of positive change on all outcomes, with several significant, moderate to large effects compared to waitlist control at one- and two-weeks post-randomisation. There were also trends indicative of benefits associated with completing the social media curation modules, though the only significant effect was in reducing appearance comparison to a moderate extent compared to the waitlist control condition. There were no significant differences between the self-criticism intervention and social media curation conditions, though effect sizes favoured the former with low power to detect smaller effects.

The self-criticism intervention modules developed for and tested in this study diverge from other approaches to intervening in the relationship between social media and eating disorder risk factors in several respects. This was the first intervention targeting self-criticism. Two other interventions have had a similar focus by way of aiming to increase self-compassion, producing smaller effects on outcomes than those observed in this study (Gobin et al., 2022; Mahon & Hevey, 2022). Given the problematic perceptions that can be held about self-compassion (e.g., “Practicing self-compassion is a really difficult thing to do, and something that many people will feel silly doing or not be able to do, and as a result will not practice it”), and the recognition by people with lived experience of mental illness that a move has to be made from self-criticism to self-compassion (Wade, Egan, et al., 2021), it was considered that an intervention focused on dismantling self-criticism may be more initially engaging to young people.

Moreover, this is one of only four studies in which the intervention was not delivered to adolescents in classrooms (for the other three interventions, see: Danthinne et al., 2021; Gobin et al., 2022; Misko et al., 2022), and the only one tested in young adults to produce

clear evidence of efficacy through changes in key outcomes. Because this was a pilot study with feasibility and acceptability as the primary outcomes, it would be premature to conclude based on these results that the self-criticism intervention modules are more effective than other interventions in addressing the impact of social media on body image. However, the positive effects observed here provide a strong rationale for conducting a larger randomised controlled trial with more power to determine whether the promising effects observed in this study can be replicated.

## Integration of Key Findings

### Theoretical Implications

#### *Sociocultural Theory*

Broadly speaking, the results of this thesis are aligned with the propositions of the tripartite influence model; the media exert appearance-related pressures, leading one to compare one's appearance with the perceived ideal appearance (Thompson et al., 1999). The meta-analyses of experimental research presented in **Chapter 3** indicated that exposure to appearance ideals in social media images causes an immediate, negative impact on body image and that it is the appearance ideals specifically, rather than exposure to the appearances of others generally, that causes detrimental effects. Moreover, the qualitative synthesis of studies included in the meta-analyses that investigated moderating and mediating mechanisms found that appearance comparison is likely to be a mechanism driving this relationship. From **Chapter 5**, cross-sectional model-testing supported appearance comparison as a mediator in the relationship between appearance-motivated social media use and body image flexibility/disordered eating, and qualitative analysis revealed that social media users attributed negative effects of social media on body image to social/appearance comparison and the promotion of appearance ideals. Additionally, the social media curation modules tested in **Chapter 6**, which directed participants to modify their social media feeds

in part by reducing the extent to which they subscribed to appearance-related content, produced reductions in appearance comparison relative to the waitlist control condition. Hence, this thesis provides robust evidence to support appearance comparison as a relevant factor in the relationship between social media and body image.

The tripartite influence model also suggests that the internalisation of appearance ideals is a mechanism explaining how social media impact body image, but this was not well supported by the experimental and longitudinal research reviewed in **Chapter 3**. A similar conclusion was reached by Fioravanti et al. (2022) in their systematic review of experimental research. This finding appears to contradict a range of cross-sectional studies supporting the internalisation of appearance ideals as a mediator in this relationship (Fardouly, Willburger, et al., 2018; Feltman & Szymanski, 2018; Jarman, Marques, et al., 2021b; Lee & Lee, 2021; Nagl et al., 2021; Rodgers et al., 2020; Scully et al., 2020; Strubel et al., 2018; Wang, Fardouly, et al., 2019), theoretical models that have been proposed to explain this relationship (see, for example: Choukas-Bradley et al., 2022; Rodgers, 2015), and the reports of social media users themselves in **Chapter 5**. A potential explanation for these seemingly conflicting findings is that social media do indeed perpetuate and reinforce appearance ideals, but this process and any resulting internalisation of these ideals do not materially impact body image and eating.

However, most of the studies included in **Chapter 3** and the review by Fioravanti et al. (2022) were once-off experimental exposures that explored the immediate impacts of social media. Any effects of the internalisation of ideals may relate to more ongoing social media use, which can only be captured with longitudinal designs. Yet, longitudinal research has found little support for the internalisation of appearance ideals as a mediator between social media use and body image (Jarman, McLean, et al., 2021; Skowronski et al., 2020), and has not found that social media use predicts changes in internalisation of appearance

ideals (Sevic et al., 2020). Another way to gain insight into the role of internalisation of appearance ideals in linking social media use to poorer body image and disordered eating is to consider evidence from intervention studies targeting the internalisation of appearance ideals associated with the use of social media. In two such studies, there were improvements in *either* thin-ideal internalisation (for female participants only) *or* body satisfaction, suggesting that improvements in one may not have been attributable to changes in the other (Bell et al., 2022; Bell et al., 2021).

Considering the results from this thesis and the different research designs discussed here, it seems clear that the tripartite influence model proposed by Thompson et al. (1999) provides a useful foundation for considering how social media can lead to changes in body image and eating. There is ample evidence to suggest that appearance comparison is a key mechanism in this relationship, but the precise role of the internalisation of appearance ideals remains unclear. Further prospective and intervention research that can shed light on the circumstances under which internalisation of appearance ideals is a driving mechanism would inform the refinement of theoretical models from which interventions are developed.

### *Uses and Gratifications Theory*

The results of this thesis provide evidence for the applicability of uses and gratifications theory (Blumler & Katz, 1974; Katz et al., 1973) to understanding the connections between social media use, body image, and disordered eating. Consistent with this theory, prior evidence has highlighted the relationship between appearance-related motivations for using social media and poorer body image (Jarman, Marques, et al., 2021a; Lee et al., 2014; Rodgers et al., 2021). The model tested in **Chapter 5** supports this suggestion and extends these findings to suggest that such motivations are also associated with more disordered eating. Appearance-related motivations for using social media were more strongly related to body image and disordered eating than the frequency of engaging in

specific appearance-related behaviours on social media. This provides preliminary support for the contention that measuring motivations for use may be a more fruitful path to understanding interactions between social media and body image/eating than measures of frequency or quantity of use, which have dominated theoretical models (for discussion of previous models, see **Chapter 2**).

Because so little research has examined the interaction between appearance-motivated social media use and body image and eating, there remain several pertinent questions that the literature and this thesis are unable to answer. One such question pertains to the specific need or needs that are gratified through appearance-related social media use. As a starting point, Blumler and Katz (1974) indicate that we can attempt to work backwards from a gratification to uncover the needs it may fulfil. The five items from the Appearance subscale of the Motivations for Social Media Use Scale (MSMU), which were used in the studies reported in **Chapters 5 and 6**, measure the extent to which respondents use social media: 1) to know if their pictures look attractive; 2) to get their friends' opinions on how they look; 3) to learn how to improve how they look; 4) to compare how they look with how their friends look; and 5) because they can filter the photos they post (Rodgers et al., 2021). These are suggestive of needs relating to obtaining validation or reassurance from others, deriving a sense of self-worth, self-esteem, or identity, gaining information, improving their understanding of their relative social position or how well they meet social norms, or presenting a desired image or view of themselves to others.

Two of the needs that may drive appearance-related social media use that are suggested by the items of the MSMU – information-seeking and self-status-seeking – have been raised in prior research. They were two of the three appearance-related motivations for social media use measured by Lee et al. (2014), who found that using social media for information-seeking about body image was related to poorer body image in both the US and

South Korean samples, social media use for self-status seeking was related to better body image in the South Korean sample, and in neither sample was socialising about body image on social media linked to body image. Information-seeking and self-status-seeking were also described as advantages of posting about or following thin-ideal content on social media by people who reported engaging in these activities (Cavazos-Rehg et al., 2020). This sample reported other advantages that may also reveal underlying user needs, which were getting motivation or encouragement from others, socialising with people they can relate to, having an emotional outlet, and entertainment. Evidently, there are a range of needs potentially addressed through "appearance-motivated social media use", and the use of this umbrella term may belie the different outcomes associated with specific needs that can be met through appearance-related use.

Another salient question about how appearance motivations for social media use are connected to body image and eating that current research and the studies in this thesis do not address concerns the possibility of reverse or bidirectional relationships. That is, the experience of poor body image or disordered eating may motivate people to seek out more appearance-related content on social media to meet needs related to their body image and eating. Moreover, seeking out this content may have ramifications for any pre-existing pathology.

Evidence about the existence of reverse relationships is mixed. As discussed in **Chapter 3**, longitudinal studies typically do not find evidence that body image predicts general social media use (de Vries et al., 2016; Steinsbekk et al., 2021; Tiggemann & Slater, 2016; Vandenbosch & Eggermont, 2016), except one recent study finding that wanting a thinner body predicted quantity of Instagram but not TikTok use five months later (Maes & Vandenbosch, 2022). However, consistent with the transactional model of social media and body image concerns, in which individual vulnerability factors are proposed to precede the

gratifications sought from social media (Perloff, 2014), body image has been found to predict other-oriented social media behaviours of social comparison (Rousseau et al., 2017), adding friends (Tiggemann & Slater, 2016), and monitoring attractive peers (Vandenbosch & Eggermont, 2016) in longitudinal designs. These behaviours could be indicative of pre-existing body image concerns driving appearance-related motivations for use.

Regarding reciprocal relationships, a longitudinal study found evidence of bidirectional relationships between psychological well-being and social media use in an adult sample, such that people experiencing more distress and less life satisfaction may use social media to try to improve their well-being (i.e., to gratify a need), resulting in higher social media use, ultimately leading to poorer well-being (Jarman, McLean, Paxton, et al., 2022). Likewise, a systematic review of the relationship between social media use and depression and anxiety concluded that the relationship was bidirectional, offering that users may seek out online communication to regulate their distress (i.e., to gratify a need), although the content they are exposed to on social media may exacerbate distress (Lopes et al., 2022). So, while the studies in this thesis assume that appearance-related motivations for social media use precede impacts on body image and eating, the directionality of effects between motivations and psychological symptoms may be more complex.

### *Limitations of Current Models*

The social media literature comprises a diverse array of theoretical models that have been offered as potential explanations for how impacts on body image and eating can occur. Most such models have been grounded in sociocultural or objectification theories and have therefore focused on the mechanisms of appearance comparison, internalisation of appearance ideals, and facets of self-objectification (de Valle et al., 2021; Fioravanti et al., 2022; Holland & Tiggemann, 2016; Rodgers & Melioli, 2016; Zhang et al., 2021). In contrast, the systematic review in **Chapter 4** revealed that very little research has

investigated how personality factors may help to explain the relationship between the use of social media and body image or disordered eating. When two such factors (i.e., perfectionism and self-criticism) were included in models tested in **Chapter 5**, results were consistent with either of these mediating the relationship between appearance motivations for social media use and both body image flexibility and disordered eating.

These findings suggest that many of the current models describing how social media can affect body image and eating may be limited by a failure to consider the role of personality. As discussed in **Chapter 2**, evidence suggests that appearance-related images are common and popular on the most-used social media platforms, so appearance-related use is likely to occur at a reasonably high rate. Likewise, a study using ecological momentary assessment, which is designed to minimise recall biases and maximise validity by having participants provide data multiple times a day whilst partaking in their typical activities and settings, indicated that appearance comparisons are a common occurrence for women who use social media (Fardouly et al., 2017). This is supported by qualitative studies in which social media users have reported comparing themselves to others frequently on social media (see **Chapter 5** and Anixiadis et al., 2019; Cavazos-Rehg et al., 2020; Easton et al., 2018; Flannery et al., 2020; Moreton & Greenfield, 2022; Popat & Tarrant, 2022; Rounsefell et al., 2020; Young et al., 2022). Yet, disordered eating and eating disorders do not affect every person who engages with or compares themselves to appearance-related social media content. Further consideration of personality factors offers a logical pathway to improving the understanding of why some people are more vulnerable to the negative effects of appearance-based social media use and subsequent appearance comparisons than others.

**Clinical Implications**

Clinicians working with clients experiencing body image disturbance should consider the possible role of exposure to appearance ideals on social media in the development and

maintenance of their clients' symptoms and whether changes to their social media use could help to decrease these symptoms. Though much of the research has focused on the impacts of viewing various types of appearance-ideal images on females, exposure to fitspiration material emphasising the value of leanness and muscularity may likewise be a salient factor for males (Fioravanti et al., 2022; Lonergan et al., 2021). Psychoeducation can be provided on the harmful impact of exposure to these images and clinicians could explore ways of reducing clients' exposure to them. One way may be to simply reduce their time on social media, with one study finding that a three-day break from social media use produced reductions in adolescent girls' body surveillance and body shame (T. A. Roberts et al., 2022). However, it should be noted that there has been mixed evidence for the effectiveness of brief breaks from social media on other indices of well-being (see, for example: Graham et al., 2021; Lambert et al., 2022; Przybylski et al., 2021).

Moreover, there are potential pitfalls associated with recommending people cease or reduce social media use. Aspects of social media (e.g., reinforcement schedules, availability, strong cue triggers) make it especially difficult for users to self-regulate their use in this way (Reinecke et al., 2022). Furthermore, this perpetuates a reductionist view of social media as having only negative effects. Social media have the potential to positively impact well-being; for example, by facilitating the satisfaction of intrinsic psychological needs about connection and relatedness (Moreton & Greenfield, 2022; Popat & Tarrant, 2022; Reinecke et al., 2022) and by motivating users to engage in healthy self-improvement (see qualitative analyses from **Chapter 5** and Cavazos-Rehg et al., 2020; Easton et al., 2018; Popat & Tarrant, 2022). A single-session intervention of behavioural activation that partially utilised amusing animal videos on social media led to decreased restrictive eating, depressive symptoms, and hopelessness and increased agency in depressed adolescents at three-month follow-up (Schleider et al., 2021). So, limiting or ceasing social media use may not be an effective or

acceptable strategy for every client; instead, strategies that aim to modify ways of using social media or improve resilience to negative impacts may be more appropriate.

The results of the studies in **Chapters 5 and 6** suggest that targeting reductions in self-criticism, and to a lesser extent curating the social media feed to reduce exposure to appearance-ideal content, are potentially viable strategies for clinicians to incorporate into treatment. Findings also indicate that working with clients to change the motivations for their social media use may be another helpful approach. For example, behavioural experiments could be set up to test beliefs about the effects of appearance-related social media use, to determine whether it is meeting the need it purports to fulfil (e.g., clients may seek out images of others on social media to compare their appearance, with the hope of improving their feelings about their appearance, although the research presented in this thesis suggests this strategy will backfire). To maximise the effectiveness of such strategies, it will be important for clinicians to first engage their clients in contemplation and discovery around the gratification they seek from social media when engaging with appearance-related content, to ensure that techniques such as behaviour experiments are targeted towards the specific need they are trying to meet.

Given that body image flexibility may be a mediating factor in the relationship between social media use and eating disorder risk (see **Chapter 5**), aiming to increase this type of flexibility offers yet another potentially viable intervention strategy. This is consistent with recent calls to focus on self-regulation in modulating the impacts of social media on well-being (Reinecke et al., 2022; Zerhouni et al., 2022), since body image flexibility is proposed to facilitate regulation of appearance-related distress (Linardon, Anderson, et al., 2021; Rogers et al., 2018). Several types of psychological intervention have been found to produce improvements in body image flexibility, with larger reductions reported for interventions incorporating third-wave behavioural principles, such as those used in

acceptance and commitment therapy, mindfulness-based cognitive therapy, and compassion-focused therapy (Linardon, Anderson, et al., 2021). Extrapolating from the apparent efficacy of these approaches, strategies designed to reduce experiential avoidance and increase acceptance, mindfulness, and psychological flexibility may also increase body image flexibility. However, this suggestion should be considered in the context of the relatively small number of intervention studies that have examined effects on body image flexibility, which have typically been characterised by small samples and a lack of credible control conditions (Linardon, Anderson, et al., 2021).

Although body-positive content shows promise as a potentially beneficial type of social media content, it may be prudent for clinicians to exercise caution in recommending that clients follow body-positive accounts until the effects of exposure to this content are better understood. Consistent with reservations expressed in online fora about the detrimental impact of trying but failing to generate body-positive feelings (Eating Disorder Solutions, 2022; Pugle, 2022), mixed findings have emerged from the current literature, including evidence that body-positive images may promote self-objectification, potentially by perpetuating a focus on appearance (Cohen et al., 2020; Fioravanti et al., 2022). Another potential side-effect of recommending that clients follow body-positive content is an unintentional increase in exposure to idealised content, whether by encouraging non-users to join social media platforms, where idealised images comprise a significantly higher proportion of all content than body-positive images (Graham et al., 2022), or by increasing clients' interaction with appearance-focused content, which could train their algorithms to present them with more appearance-related content, some of which may be idealised. An additional concern is the extent to which content labelled as body-positive (i.e., hashtagged as such) may instead perpetuate appearance ideals or promote weight loss, restrictive diets, detox teas, and cosmetic surgeries (Jarman, McLean, Griffiths, et al., 2022; Lazuka et al.,

2020). The practice of body neutrality, with a focus on health and functionality (Healthline, 2021), merits investigation as an alternative strategy.

Furthermore, given the results of Category 2 of the meta-analyses in **Chapter 3**, which concerned the impacts of contextual features surrounding appearance-ideal images, clinicians might suggest that clients proactively reduce their exposure to social media accounts that share images of appearance-ideal people accompanied by body-positive messages, since these images are likely to remain at least somewhat damaging to their body image despite the messages. Although one study has found that body esteem was significantly higher in women exposed to fitspiration images with a body-positive caption compared to the same images with a fitspiration or neutral caption (Davies et al., 2020), two others found that attaching body-positive captions to images of attractive celebrities did not ameliorate the detrimental impact to women's body image (Brown & Tiggemann, 2020; Tiggemann et al., 2020a).

## Limitations

### Measures

The studies in this thesis were based solely on self-report measures. This applies to the data included in the meta-analyses and systematic review (**Chapters 3 and 4**, respectively), as well as to the novel quantitative data collected for the mixed methods and pilot studies (**Chapters 5 and 6**, respectively). The use of self-report questionnaires is a common approach in psychological research. It offers several advantages over alternative data collection methods (e.g., direct observation or interviews), such as being able to measure internal phenomena in many people within a short timeframe, using minimal resources, whilst maximising privacy and accessibility (in the case of online delivery). However, self-reporting can introduce biases (e.g., social desirability or sampling biases) and measurement error (e.g., from individual differences in understanding of internal experiences or

comprehension of questionnaire items) into the data and thereby reduce the validity of results. Future research, especially any additional evaluation of the intervention described in **Chapter 6**, may produce more robust estimates of symptomatology by triangulating self-report data with responses to structured clinical interviews (e.g., measuring disordered eating using the Eating Disorder Examination; Fairburn, 2008).

It has been noted that the items in the body image flexibility questionnaire used in **Chapters 5 and 6** (i.e., the Body Image Acceptance and Action Questionnaire; [BIAAQ]; Sandoz et al., 2013) are worded negatively and then reverse-coded, despite ostensibly measuring a positive aspect of body image, such that development of a measure with positively worded items may improve the validity of findings (Linardon, Anderson, et al., 2021). If positive body image and negative body image are indeed separate constructs, as argued by Tylka and Wood-Barcalow (2015), then this reverse-scoring procedure would be inappropriate, and the questionnaire could be considered to measure an aspect of negative body image (i.e., *in*flexibility) rather than positive body image. However, the proposition that positive and negative body image are distinct constructs has been undermined by recent research indicating that body appreciation (a positive body image variable) and body dissatisfaction (a negative body image variable) were located on the same dimension (More et al., 2022). Further research that can clarify the validity of the scoring procedure used for the BIAAQ, possibly by comparing positively and negatively worded versions of the measure, would aid the interpretation of the findings of this thesis and would be a useful addition to the body image flexibility literature more generally, given that this literature has relied heavily on the use of the BIAAQ (Rogers et al., 2018).

The MSMU, which like the BIAAQ was used in the studies reported in **Chapters 5 and 6**, was conceived for use with adolescents and has only been validated in this age group (Rodgers et al., 2021), yet it was applied to young adults in this thesis. The MSMU was

selected due to a lack of other instruments measuring appearance motivations for social media use. It demonstrated good internal consistency and was correlated with other variables as expected in **Chapters 5 and 6**, providing preliminary evidence of convergent validity with young adults. However, the lack of prior, more thorough validation of this measure in this age group means that the validity of the findings of these studies may have been compromised. Similarly, Jarman, McLean, Griffiths, et al. (2022) noted that little is known about the temporal stability of motivations for using social media, limiting confidence in the reliability of our findings. Therefore, the use of the MSMU with age groups other than adolescents (e.g., young adults), and examination of measurement invariance over time should be addressed through psychometric evaluation.

**Sample Characteristics**

Across the studies included in the meta-analyses and systematic review (**Chapters 3 and 4**, respectively), most participants were young (i.e., adolescents or young adults), identified as female and White/Caucasian, and were based in Western countries. Likewise, participation in the mixed methods and pilot studies (**Chapters 5 and 6**, respectively) was limited to university students aged 17 to 25, there was a higher rate of participation by people identifying as female, and it is highly likely that most participants were based in Australia, given that the majority of them were recruited through the psychology research participation system run by Flinders University, which is based in South Australia. The use of highly homogenous samples like those included in this thesis (i.e., primarily young, female, university students, White/Caucasian, and from Western countries) in research on social media is common and has previously been posited as a factor limiting the generalisability of the current literature (Jarman, McLean, Griffiths, et al., 2022; Vandenbosch et al., 2022).

As discussed in **Chapter 1**, eating disorders are more prevalent in females than males, most eating disorders have onset in adolescence and young adulthood, and rates of social

media use are especially high in these age groups. So, it could be argued that the overrepresentation of young females in this literature reflects research efforts being appropriately directed to those at the highest risk. However, other genders and age groups also engage with social media and can present with disordered eating, and their experiences and needs also merit exploration. Investigating connections between social media and males' body image and eating is an area of growing interest (see, for example: Boursier & Gioia, 2022; Flannery et al., 2020; Griffiths, Murray, et al., 2018; Gültzow et al., 2020; Hilkens et al., 2021; Modica, 2020; Piatkowski et al., 2021; Seekis et al., 2021b; Sumter et al., 2022; Tiggemann & Anderberg, 2020; Yee et al., 2020), but there is little research in older age groups (Nelson et al., 2022) and people of diverse genders.

There are also potential limits to generalisability within the target age group of this thesis: young adults. Though it is convenient to access this age group through university-based recruitment methods, there may be systematic differences between young adults who do and do not attend university; for example, in socioeconomic status. Non-students may represent a significant proportion of young adults, with over 50% of those aged 20 to 24 in Australia not enrolled in study in 2021 (Australian Bureau of Statistics, 2022). Any such differences could undermine the applicability of the findings of **Chapters 5 and 6** to young adults outside of the university context.

**COVID-19**

Data collection for the studies described in **Chapters 5 and 6** was conducted after the onset of the COVID-19 pandemic, occurring from April to November 2020 and March to October 2021, respectively. These periods of data collection took place while Australia was under various phases of restrictions with fluctuating intensity, aimed at pursuing a COVID-zero (i.e., elimination) strategy, which was abandoned from the latter stages of 2021 in favour of loosening restrictions as vaccination rates increased (Mao, 2021; McGowan, 2021). Meta-

analyses and systematic reviews indicate that symptoms of body image disturbance and eating pathology increased from pre- to peri-COVID times (Linardon, Messer, et al., 2021; Meier et al., 2022; Schafer et al., 2022; Schneider et al., 2022). Increases in social media use associated with pandemic-related restrictions have also been reported, and it has been suggested that this may be one of the factors driving the observed increases in body image and eating pathology (Cataldo et al., 2022; Gobin et al., 2021; Mannino et al., 2021; Vall-Roqué et al., 2021). It is possible, therefore, that the studies described in **Chapters 5 and 6** incorporated pandemic-related effects on the use of social media, body image, and/or disordered eating and may hence be less applicable to a post-COVID world. As restrictions are increasingly eased (see, for example, in Australia: Jose & Jackson, 2022), it may be useful to conduct replication studies to determine whether results remain consistent.

## Future Research Directions

### Appearance-Ideal Images on Social Media

There is a need for research that can shed light on how social media users typically spend their time on social media platforms to inform further research that can investigate causality. The experimental studies analysed in **Chapter 3** focused on the impact of viewing appearance-ideal images on social media, but it is unclear how much time users spend engaged in that activity compared to the myriad of other activities available on social media platforms. Furthermore, research that can inform understanding of how often such images are of known peers as opposed to strangers or celebrities will help us to determine whether the exposures in the experimental studies that were examined in **Chapter 3** (which involved exposure to images of strangers, often Instagram models, or celebrities) are representative of social media users' typical experiences, particularly given that exposure to content generated by known peers is one of the key features distinguishing social media from traditional media.

It is not presently clear whether the effects of exposure to appearance-ideal images on social media differ as a function of the type of person in the image (i.e., known peer versus stranger or celebrity). Social comparison theory posits that more similar targets are more likely to provoke comparisons than less similar targets, and that where a range of targets of varying similarity to oneself are available, a person will select a more similar target with whom to compare themselves (Festinger, 1954). This may imply that exposure to known peers would be more likely to provoke appearance comparison and hence impact body image than exposure to strangers or celebrities. Outcomes of cross-sectional studies examining comparison to different target groups on social media have tended to suggest that comparison to images of known peers (including close friends and more distant peers) is more harmful than comparison to images of celebrities (Fardouly et al., 2015a; Fardouly & Vartanian, 2015; Ho et al., 2016), though one study found the opposite (Fardouly, Willburger, et al., 2018). An experimental design compared the effects of exposure to images of attractive peers and celebrities on Instagram and found no significant difference in impacts on mood and body dissatisfaction (Brown & Tiggemann, 2016); however, the images in the peer condition were of unknown peers, so this study does not inform understanding of the effects of being exposed to images of known friends or acquaintances who meet appearance ideals. Further research that directly compares the effects of exposure to appearance-ideal images of known peers versus strangers and/or celebrities would aid in determining whether the effects described in **Chapter 3** are likely to be generalisable beyond the images of strangers that were used in the experimental studies included in the meta-analyses.

**Experimental and Longitudinal Research**

It would be helpful for future experimental studies to investigate other popular social media platforms than Facebook and Instagram, which were the foci of most of the experimental designs included in the meta-analyses in **Chapter 3**. Examining the effects of

TikTok is a logical choice for such designs, given its enormous rise in popularity over recent years (Cyca, 2022; Koetsier, 2020). In the only experimental study of TikTok to date, exposure to fitspiration videos on TikTok increased women's appearance comparison and negative mood but did not impact body dissatisfaction, relative to control videos about art (Pryde & Prichard, 2022). In other designs that also used female samples, TikTok use was indirectly associated with more body dissatisfaction via appearance comparison and body surveillance using cross-sectional data (Bissonette Mink & Szymanski, 2022), whilst longitudinally, TikTok use did not predict changes in body image five or ten months later (Maes & Vandenbosch, 2022). Given the amount of concern raised by health experts and TikTok users alike (Cranston, 2022; Dempster, 2020; Dias et al., 2021; Kaufman, 2020; McCormack, 2021), further research on the potential impacts of this platform on body image and eating is warranted.

Additional experimental and longitudinal investigation of the effect of social media use on disordered eating would complement the findings about body image presented in **Chapter 3**. A meta-analysis of cross-sectional evidence found that the use of social networking sites had a small, positive correlation with disordered eating (Zhang et al., 2021). However, there exists almost no experimental and very little longitudinal evidence examining disordered eating outcomes, such that these could not be included in the study in **Chapter 3**. Hence, we have a poor understanding of the directionality of effects and causality. Experimentally, women exposed to their own Facebook feed did not select smaller meal portions compared to women who viewed a news website, whereas exposure to their own Instagram feed resulted in women who idealised thinness and men who reported smaller actual body size consuming fewer potato chips than those who viewed a control account about science and technology (Pink et al., 2022). So, there is preliminary evidence that there can be causal impacts of social media on eating behaviours. Prospectively, social

comparisons on Facebook predicted bulimic symptoms one month later, which was a positive relationship once suppression effects were removed (Puccio, Kalathas, et al., 2016), and maladaptive Facebook use (i.e., use associated with negative social evaluations and comparisons) predicted increases in bulimic symptoms four weeks later (Smith et al., 2013). In contrast, Ferguson et al. (2014) found that the frequency of social media use did not predict eating disorder symptoms six months later. In sum, current evidence suggests that social media use can be linked to eating behaviours, but further research is needed to improve the understanding of causality in this relationship and elucidate the conditions under which effects occur.

There is a range of other potential avenues for experimental and longitudinal exploration that would complement the findings presented in **Chapter 3**. It is currently unclear whether the negative impacts of exposure to appearance-ideal images are additive over multiple exposures and which aspects of body image are more strongly impacted by exposure to appearance-ideal social media images (the latter of which may assist in identifying specific targets for intervention). It would also be instructive to tease out the effects of the duration of each exposure to appearance-ideal images, the level of investment in the images (with mostly correlational evidence suggesting that greater investment in one's own and others' social media images is associated with poorer body image and disordered eating; Butkowski et al., 2019; Cohen et al., 2018; Lonergan et al., 2019, 2020; McLean et al., 2015; Tiggemann et al., 2018), the effects of specific types of social media contextual features (e.g., captions, comments, and like counts), and the circumstances under which these features can be helpful or harmful.

**The Role of Personality**

The systematic review presented in **Chapter 4** found that there has been limited research into the interactive effects of personality in links between social media and eating

disorder risk. Investigating transdiagnostic risk factors for psychopathology offers an avenue to uncovering personality characteristics that can be targeted in interventions with the potential for broad benefits. Transdiagnostic risk factors that have yet to be examined with respect to social media use and eating disorder risk, but may be worth examining in future research, include intolerance of uncertainty (Brown et al., 2017; Clarke & Kiropoulos, 2021; Kesby et al., 2017; McEvoy et al., 2019; Williams & Levinson, 2021) and psychological inflexibility or deficits in set-shifting (Kashdan & Rottenberg, 2010; Keegan et al., 2021; Levin et al., 2014; Wu et al., 2014).

Future longitudinal research, which could provide more convincing evidence of interactive and mediating effects of personality than the cross-sectional research that comprises the bulk of the literature currently available, should carefully consider the time course and manner of proposed effects. For reference, neither of the longitudinal studies (i.e., Puccio, Kalathas, et al., 2016; Smith et al., 2013) included in the review in **Chapter 4** justified the interval of time between assessments. Researchers should think about the timeframe in which effects might be observed, as well as how much exposure to social media is required and what type of social media use is likely to have the effect under investigation. If personality characteristics are conceptualised as a mediating variable that is impacted by social media use, then consideration as to the relative stability of those characteristics should inform the selection of time between measurements. Without proper consideration of timing between measurements, it may remain unclear whether any null findings are evidence of a null effect or instead a reflection of poorly timed follow-up assessments (Timmons & Preacher, 2015). It would also be useful for more experimental research to investigate whether there are interactive effects of baseline personality characteristics to further progress understanding.

**Further Evaluation of the Model Proposed in This Thesis**

Replication studies are required to establish further evidence about the utility of the model proposed in **Chapter 5**, which informed the intervention tested in **Chapter 6**. The inclusion of appearance motivations for social media use, self-criticism, perfectionism, and body image flexibility were novel compared to previous models, so although the results of this thesis supported their inclusion, their roles in particular warrant more attention. Ideally, future research should test the model using a prospective design that can assess the suggested temporal sequence. It would also be useful for further evaluations of the model with adequate power to examine individual difference variables such as gender and age group. If different intervening mechanisms are supported for different groups of people, this would inform the selection of intervention strategies for those groups (i.e., supporting a personalised medicine approach). Further evaluation of the proposed model would address the core element of refinement and testing of program theory from the MRC Framework (Skivington et al., 2021).

Investigation of needs and gratifications in relation to appearance motivations for social media use may represent an especially fertile area for further research. Studies that can assist with identifying the specific needs that users attempt to gratify through appearance-related social media use would have implications for modifications to the model and the intervention from this thesis. These studies would also inform clinical practice, guiding clinicians to work with clients on developing alternative pathways to meeting those needs. As noted above, another pertinent question relates to how sustained motivations for use are across time (Jarman, McLean, Griffiths, et al., 2022). Relatedly, it is not currently known how stable motivations are within individual instances of use – for example, can the content someone is exposed to during social media use alter their motivations for use from that point on? Finally, as noted above, the directionality of effects concerning motivations for using social media and body image/eating is not clear. Longitudinal designs that can elucidate the

temporal sequence and investigate the potential for bidirectional impacts would be useful additions to the nascent literature on appearance motivations for social media use.

Finally, the results of **Chapter 6** suggest pathways for further work on the self-criticism intervention. The qualitative feedback from pilot study participants can inform modifications to the intervention and comparison modules as well as the design of the trial itself (e.g., increasing the amount of time given to participants to complete the intervention), addressing the core element of intervention refinement from the MRC Framework (Skivington et al., 2021). Following this, the intervention can progress to the evaluation phase, using a randomised controlled trial that can assess intervention efficacy in terms of changes in key outcomes. This larger trial would benefit from offering reimbursement to maximise attraction and retainment of participants, based on lower rates of recruitment and higher attrition associated with a lack of reimbursement in the pilot study. Other recommended changes include instituting a longer follow-up period to permit the examination of the longevity of intervention effects, which would enable further comparison with other interventions for social media and body image, and measuring self-compassion and exposure to appearance ideals to determine whether changes to these variables (and those that were posited as mediators in the proposed model: appearance comparison, self-criticism, and body image flexibility) mediate outcomes.

Planning for further evaluation of the intervention through the MRC Framework (Skivington et al., 2021) phases of evaluation and implementation can be informed by the RE-AIM framework (Glasgow et al., 2019; RE-AIM, n.d.). The RE-AIM framework is designed to assist with planning and evaluation of programs with respect to five outcomes: reach, effectiveness, adoption, implementation, and maintenance. Reach of the intervention could be measured through comparison of the obtained sample size against the size of the target population (e.g., using population estimates of rates of disordered eating in young

adults in Australia), and by comparing sociodemographic characteristics of the sample against those of the population group (to address representativeness). If the intervention were later transformed into a dedicated website, estimation of reach could be informed by data pertaining to access to the website (e.g., downloads per month) and embedding brief questionnaires. Effectiveness would be addressed through examination of changes in key outcomes according to questionnaire data, as in the pilot study. Adoption could be assessed through offering access to the intervention to a range of potential stakeholders (e.g., university counselling services) and tracking uptake by providing the stakeholders with unique URLs containing embedded codes that would produce data on access via each URL. Implementation checks for fidelity or adherence may be difficult to administer in the intervention's current self-guided, PDF format. However, if the intervention modules were transformed into a website, users' responses could be collected through the website to enable analysis of how well they correspond to the intended aims of the intervention strategies. The cost of program delivery, which is another implementation consideration, could easily be measured (e.g., by tracking any costs associated with the set-up and maintenance of a dedicated website). Finally, maintenance could be examined by use of follow-up questionnaires and by periodically reviewing use or sharing of the intervention by the external stakeholders, using the unique URL code data described above.

## Conclusions

There has been a great deal of research into the relationship between social media use, body image, and to a lesser extent, disordered eating. This thesis has addressed several gaps in this growing literature. Meta-analyses were conducted, finding that exposure to appearance ideals on social media negatively impacts body image and use of social media predicts deterioration in body image, advancing on previous meta-analyses comprising only cross-sectional associations (Mingoia et al., 2017; Saiphoo & Vahedi, 2019). The literature on the

role of personality in linking social media to body image and eating was systematically reviewed, revealing that our knowledge in this area is very limited. Results of model-testing suggested that either perfectionism or self-criticism may mediate the relationship between appearance-motivated social media use and disordered eating, but that self-criticism might be a more efficient target for intervention. On this basis, an intervention targeting self-criticism was developed and pilot-tested, obtaining promising results in feasibility, acceptability, and efficacy. The findings of this thesis offer a range of pathways for further research, including increasing the scope of evidence about the effects of exposure to appearance ideals on social media, improving understanding of how aspects of personality are implicated in the effects of social media on body image and disordered eating, replication studies on the proposed model linking appearance-motivated social media use to disordered eating, and further refinement and testing of the novel self-criticism intervention.

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* = articles included in the meta-analyses reported in **Chapter 3**

† = articles included in the systematic review reported in **Chapter 4**

# APPENDIX A

Published Study 1

Available at https://doi.org/10.1016/j.bodyim.2021.10.001

Body Image 39 (2021) 276–292

Contents lists available at ScienceDirect

Body Image

Journal homepage: www.journals.elsevier.com/body-image

## Social media, body image, and the question of causation: Meta-analyses of experimental and longitudinal evidence

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ARTICLE INFO

*Article history:*
Received 5 April 2021
Received in revised form 23 September 2021
Accepted 3 October 2021
Available online 22 October 2021

*Keywords:*
Meta-analysis
Social media
Social networking site
Body image
Appearance ideals
Fitspiration

ABSTRACT

This article presents four meta-analyses that can inform causality in the relationship between social media and body image; 24 experimental samples comparing the effect of appearance-ideal social media images to non-appearance-related conditions ($n$ = 3816); 21 experimental samples examining the effect of contextual features (e.g., comments and captions) accompanying appearance-ideal social media images ($n$ = 3482); 14 experimental samples investigating the effect of appearance-ideal images versus other appearance images on social media ($n$ = 2641); and 10 longitudinal samples on social media use and body image ($n$ = 5177). Social media appearance-ideal images had a moderate negative effect on body image (Hedges' $g$ = −0.61, $p$ < .01), were more damaging in higher- than lower-risk contexts (Hedges' $g$ = −0.12, $p$ < .01), and were moderately more impactful than other social media appearance images (Hedges' $g$ = −0.68, $p$ = .05). These effects were smaller but significant with outliers removed. Social media use had a very small, negative correlation with body image longitudinally (Fisher's $Z$ = −0.08, $p$ < .001). No significant moderators emerged. Clinicians should consider approaches to managing social media use, particularly exposure to appearance-ideal imagery, in case conceptualisation and psychoeducation for clients at risk of, or experiencing, body image disturbance.



### 1. Introduction

Just over half of the world's population uses social media, with higher rates of penetration in Australia, Europe, and the Americas (We Are & Hootsuite, 2021a, 2021b). Social media are accessed through mobile devices by about 99% of users; this easy access contributes to the average of two and a half hours spent per day on social media, representing a third of internet users' average time online (We Are & Hootsuite, 2021b). Furthering our understanding of social media's impact on users remains a pertinent area for research; in this article, we focus on the impact on body image.

Despite burgeoning research interest in the effects of social media, little seems to be known about precisely what users do when on social media. There are a variety of activities users can engage in, including viewing images or videos posted by others or uploading their own images or videos, and interacting with content (e.g., "liking" or commenting) or with other users via forum and messaging features. To date, there is no information about how much time users typically spend on each activity, nor on the amount of time spent interacting with particular types of content when engaging in these activities (e.g., viewing appearance-ideal images, viewing images of people the user knows as opposed to strangers or public figures). Each type of social media activity is likely to affect body image differently.

Viewing images of others on social media may be more detrimental to body image than other social media activities, given evidence that exposure to appearance ideals in traditional media images deleteriously impacts body image in males and females (Barlett, Vowels, & Saucier, 2008; Grabe, Ward, & Hyde, 2008). An image-based platform, Instagram, is the fifth most popular social media platform in the world as of January 2021 (We Are & Hootsuite, 2021b). Instagram has higher user engagement for images containing faces, and #Fashion and #Beautiful are two of the most popular hashtags applied to posts on the platform (Aslam, 2021). As noted by Brown and Tiggemann (2020), many of the most popular Instagram accounts belong to celebrities who meet appearance ideals (i.e., youthful, thin, and toned bodies; Statista, 2021a). Models or 'influencers' who forged a career on Instagram are now so prevalent and popular that they are being sought out by modelling

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https://doi.org/10.1016/j.bodyim.2021.10.001
1740-1445/

agencies for their skills in cultivating their own content (Criddle, 2021). Similarly, anecdotal evidence suggests that TikTok, a video sharing platform that has enjoyed an enormous rise in popularity since the advent of the coronavirus pandemic (Koetsier, 2020), also exposes users to appearance-ideal content (Hahn, 2020; Kaufman, 2020). Examination of the top 10 most popular TikTok accounts as of July 2021 reveals that young people meeting appearance ideals dominate (see, for example, Charli d'Amelio [@charlidamelio], Addison Rae [@addisonre], and Bella Poarch [@bellapoarch]; Statista, 2021b).

Evidence from a meta-analysis of 63 samples found that social media use had a small, positive relationship with body image disturbance cross-sectionally (Saiphoo & Vahedi, 2019), with stronger effects for appearance-focussed use than general use. An earlier meta-analysis (Mingoia, Hutchinson, Wilson, & Gleaves, 2017) also found a stronger relationship between thin-ideal internalisation and appearance-related social media use than general social media use. Although these prior meta-analyses provide useful information suggesting a relationship between appearance-based use of social media and body image disturbance, our ability to draw conclusions about causality remains limited because of a reliance on cross-sectional research. We are therefore unable to ascertain whether social media cause a deterioration in body image, whether people with poorer body image are more avid users of social media, or whether the relationship is due to some unknown, third factor. Improving our understanding of this relationship will inform interventions for poor body image. A better understanding of causality can be obtained by examining experimental and longitudinal research.

Because at least some content that users are exposed to on social media may be similar to the appearance-ideal images disseminated through traditional media, theories previously applied to traditional media can inform our understanding of how social media could cause body image disturbance. Viewed through the lens of sociocultural theory (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999), social media are a new avenue through which societal ideals of beauty can be disseminated (Rodgers & Melioli, 2016). When users compare themselves to that ideal and find that they do not meet it, they feel negatively about their body, leading to the development of body image pathology. There is accumulating evidence that users engage in appearance comparisons on social media and that this is associated with poorer body image (see, for example: Chang, Li, Loh, & Chua, 2019; Fardouly & Vartanian, 2015; Fardouly, Willburger, & Vartanian, 2018; Jarman, Marques, McLean, Slater, & Paxton, 2020). Applying self-objectification theory (Fredrickson & Roberts, 1997), social media provide opportunities to sexually objectify bodies, which can cause internalisation of an observer's view of the self. The result is habitual body monitoring in the form of self-consciousness about physical appearance, leading to shame and anxiety. Self-objectification and body surveillance have been associated with Facebook involvement (Manago, Monique Ward, Lemm, Reed, & Seabrook, 2015), Instagram use (Fardouly et al., 2018), appearance conversations on social media (Trekels, Ward, & Eggermont, 2018; Wang, Wang, Yang, Zeng, & Lei, 2020), and posting sexualised photos of oneself to social media (Bell, Cassarly, & Dunbar, 2018; Ruckel & Hill, 2017).

Despite their similarities, the contents of social and traditional media differ in several crucial ways. On social media, users are not just recipients of content but also creators (Holland & Tiggemann, 2016; Perloff, 2014). Users can present an idealised identity on social media (Fox & Vendemia, 2016; Mendelson & Papacharissi, 2010), and content analyses have determined that several social media trends perpetuate appearance ideals. These trends include fitspiration (i.e., promotion of exercise and diet regimes to improve health, appearance, and lifestyle; Boepple, Ata, Rum, & Thompson, 2016; Carrotte, Prichard, & Lim, 2017; Deighton-Smith & Bell, 2018; Simpson & Mazzeo, 2017) and thinspiration (i.e., promotion of thinness and weight loss; Alberga, Withnell, & von Ranson, 2018; Talbot, Gavin, van Steen, & Morey, 2017; Wick & Harriger, 2018). Social media users can curate their online appearance in a way that mimics the curation of traditional media content; editing images before posting them (Chua & Chang, 2016; Fox & Rooney, 2015; Fox & Vendemia, 2016; Lonergan et al., 2019; McLean, Paxton, Wertheim, & Masters, 2015), using filters on photos (Choi & Behm-Morawitz, 2018; Fox & Vendemia, 2016; McLean et al., 2015), and manipulating aspects such as setting, lighting, posing, and angles (Choi & Behm-Morawitz, 2018). Hence, social media enable users to present an idealised version of themselves using similar processes previously applied in traditional media.

The interactive nature of social media content (i.e., the "social" aspect of social media) means that users are not just posting but also receiving this idealised content. Users can then provide feedback on it using likes and comments, which may give signals to other viewers about its social desirability. As noted by Tiggemann, Hayden, Brown, and Veldhuis (2018), the proposition of social comparison theory (Festinger, 1954) that people seek out comparisons with more similar others suggests that comparisons made to peers on social media could be more impactful than those made to models and celebrities in traditional media, and feedback features such as likes may serve to reinforce appearance ideals where they indicate social approval of those ideals. These differences between social and traditional media mean that they may not impact body image equally.

The aim of the current investigation is to conduct a meta-analysis of the experimental and longitudinal research examining the association between social media and body image, to generate causal hypotheses about this relationship that can inform intervention development. Given that the cross-sectional evidence indicates a stronger relationship between body image disturbance and appearance-focussed social media use than general use (Saiphoo & Vahedi, 2019), and because most of the experimental research has focussed on the impact of viewing appearance-ideal images on social media, the analysis of the experimental evidence will be limited to studies investigating this type of social media activity.

A range of comparison conditions have been used in the experimental studies, which can create considerable heterogeneity. To increase homogeneity in our analysis, we conduct four meta-analyses that group together comparisons that address a similar underlying question. Category 1 includes experimental comparisons of the effects of viewing social media appearance-ideal images to non-appearance-related conditions (i.e., neutral images or no stimuli). Category 2 comprises experiments comparing the impact of viewing social media appearance-ideal images with higher-risk contextual features (e.g., comments praising the person's appearance) vs lower-risk contextual features (e.g., disclaimer captions highlighting the unrealistic nature of the images). This allows us to understand key features unique to social media that can potentially be manipulated to moderate the impact of appearance-ideal imagery. Category 3 examines experiments comparing the effects of viewing social media appearance-ideal images to other appearance images, giving insight into whether the type of appearance in a social media image moderates impact on body image.

Compared to the experimental research, the longitudinal research has included a broader range of measures of social media use than just exposure to appearance-ideal images. These longitudinal studies form Category 4. This category is intended to answer the question of whether using social media in a more general way than that investigated in the experimental analyses predicts later body image disturbance. Although such evidence cannot demonstrate causality, it would satisfy two of the three necessary criteria for establishing causation (i.e., association and temporal precedence), and this would provide a clear rationale for further research investigating the mechanisms involved.

## 2. Materials and methods

### 2.1. Search strategy and selection of studies

The review process was conducted according to the PRISMA statement (Moher, Liberati, Tetzlaff, & Altman, 2009). Search terms were produced by the first author with input from a co-author (TW) and after reviewing search terms used in related published reviews. Searches were conducted on the 24th of June 2019, 22nd of January 2020, the 28th of May 2020, and the 12th of February 2021 using the PsycINFO, MEDLINE, and Scopus online databases. The search terms for PsycINFO and MEDLINE were: *(social media or social networking site* or facebook or instagram or snapchat or youtube or pinterest or tumblr or twitter or myspace or flickr or fitsp* or thinsp* or bopo or bodypositiv*) and (eating disorder* or disordered eating or bulimi* or anorexi* or EDNOS or OSFED or orthorexi* or purg* or binge eat* or binge-eat* or eating behavi* or body image or body dysmorph* or body inflexib* or body flexib* or body satisf* or body dissatisf* or body surveillance or body esteem or thin ideal or thin-ideal or body ideal or body shame or body positiv* or body accept* or weight satisf* or body bash* or body size or body neutral* or size accept* or weight bias* or shape concern* or self objectif* or self-objectif* or drive for muscularity or drive for thinness).* These terms were adapted for use in Scopus. Results in PsycINFO were limited to those containing the search terms in the title or abstract, and to quantitative studies in peer-reviewed journals. Scopus results were filtered to those with the source type 'journal'. Moreover, six previous reviews of related literature were scanned to locate additional articles (Fardouly & Vartanian, 2016; Frost & Rickwood, 2017; Holland & Tiggemann, 2016; Lupton, 2017; Mingoia et al., 2017; Rodgers & Melioli, 2016).

Title and abstract screening were conducted by two independent reviewers (MD and MG), with a third reviewer (TW) resolving conflicts. There was 92.5% inter-reviewer agreement at title and abstract screening. Full-text articles were assessed for eligibility by two independent reviewers (MD and MG), who resolved disagreements through discussion (2019 searches) or by referral to the third reviewer (TW; 2020 and 2021 searches). There was 87.4% inter-reviewer agreement at the full-text screening stage. See Fig. 1 for a flow diagram.

### 2.2. Inclusion and exclusion criteria

Inclusion criteria included: (a) experimental or longitudinal peer-reviewed research on original data; (b) inclusion of at least one experimental operationalisation or quantitative measure of social media use and at least one validated outcome measure of body image; (c) presentation of at least one analysis examining the link between the two; and (d) the design fits into one of the meta-analysis categories. To be included in the three meta-analyses of experimental designs, which required that at least one condition was exposed to appearance-ideal images, this included images described as generally meeting ideals (e.g., "attractive" people or people with "ideal" appearances or bodies), or more specific variants comprising images of people meeting thinness ideals (i.e., thinspiration) or fitness ideals (i.e., fitspiration). For Category 1, the comparison condition had to be unrelated to appearance (e.g., exposure to nature, architecture, or travel images, or no exposure). To be included in Category 2, both the experimental and comparison conditions had to be exposed to appearance-ideal images, but features surrounding the images (e.g., accompanying images, captions, comments, slogans, likes, and follows) had to be more likely to increase risk with regard to body image in the experimental condition (e.g., comments praising the person's appearance) and/or less likely to increase risk in the comparison condition (e.g., body-positive captions). For inclusion in Category 3, the comparison condition had to be exposed to appearance images that were less likely to be damaging to body image (e.g., body-positive images, average- or plus-sized people, or unedited images) than those in the appearance-ideal experimental condition.

Exclusion criteria were: (a) published in languages other than English; (b) experimental operationalisations of social media use that did not clearly situate the exposure in a social media context (e.g., where images were taken from social media but presented to participants as standalone images without social media features such as profiles, borders, likes, or comments); and (c) unclear measures of either social media use or body image (i.e., where they were not clearly described or where social media measures were too broad, for example including general app usage). The criteria requiring that images in experimental operationalisations be clearly situated in a social media context was designed to maximise the ecological validity (Barron, Krumrei-Mancuso, & Harriger, 2021; Chansiri, Wongphothiphan, & Shafer, 2020; Cohen, Fardouly, Newton-John, & Slater, 2019; Dignard & Jarry, 2020; Kim, 2020; Tamplin, McLean, & Paxton, 2018) and minimise the heterogeneity of the exposures. It was also informed by experimental evidence comparing the effects of thin-ideal images presented in conventional media and Facebook contexts, in which there was a significantly greater increase in body dissatisfaction in the latter compared to the former group (Cohen's $d$ = 0.35, 95% CIs = 0.06, 0.63; Cohen & Blaszczynski, 2015). This suggests that the social media context itself may be harmful.

For Category 4 (i.e., longitudinal studies), we excluded ecological momentary assessment and experience sampling designs because they differ from the standard prospective designs in that they address whether a specific instance or instances of exposure to social media within a short, prescribed timeframe are associated with immediate change in body image. In comparison, the standard prospective designs that make up most longitudinal research explore the relationship between markers of general social media use (e.g., frequency of access), or trends in use of social media in a specific way (e.g., for monitoring attractive peers) at one point and body image at a later point. Hence, there are crucial differences in specificity of the relationship and the timeframe in which the relationship is examined that make examining them together inappropriate.

### 2.3. Allocation of comparisons to categories for experimental studies

The first author allocated comparisons to categories, and allocations were discussed with a co-author (TW). We refer to the allocation of comparisons to categories rather than articles to categories because some articles examined more than two conditions (e.g., A, B, and C), so that the comparison between one pair of conditions (e.g., A and B) may address a different question, and hence fit within a different category, to the comparison between another pair of conditions (e.g., A and C). Additionally, some articles with more than two conditions allowed for comparisons that addressed the same question, so all comparisons that met inclusion criteria for that category were included (e.g., A vs B and A vs C). Hence, some articles are represented in more than one category, or multiple times within a single category.

Comparisons were included in Category 1 when one group (designated the "experimental group" for this category) was exposed to social media appearance-ideal images (including specific variations on this such as fitspiration and thinspiration), and the other group (designated the "comparison group" for this category) was exposed to either appearance-neutral images (e.g., travel or nature images) or did not undergo any exposure.

Comparisons were included in Category 2 when both groups were exposed to appearance-ideal images but one group (the "experimental group" for this category) was exposed to a version with contextual features that were deemed more likely to deleteriously

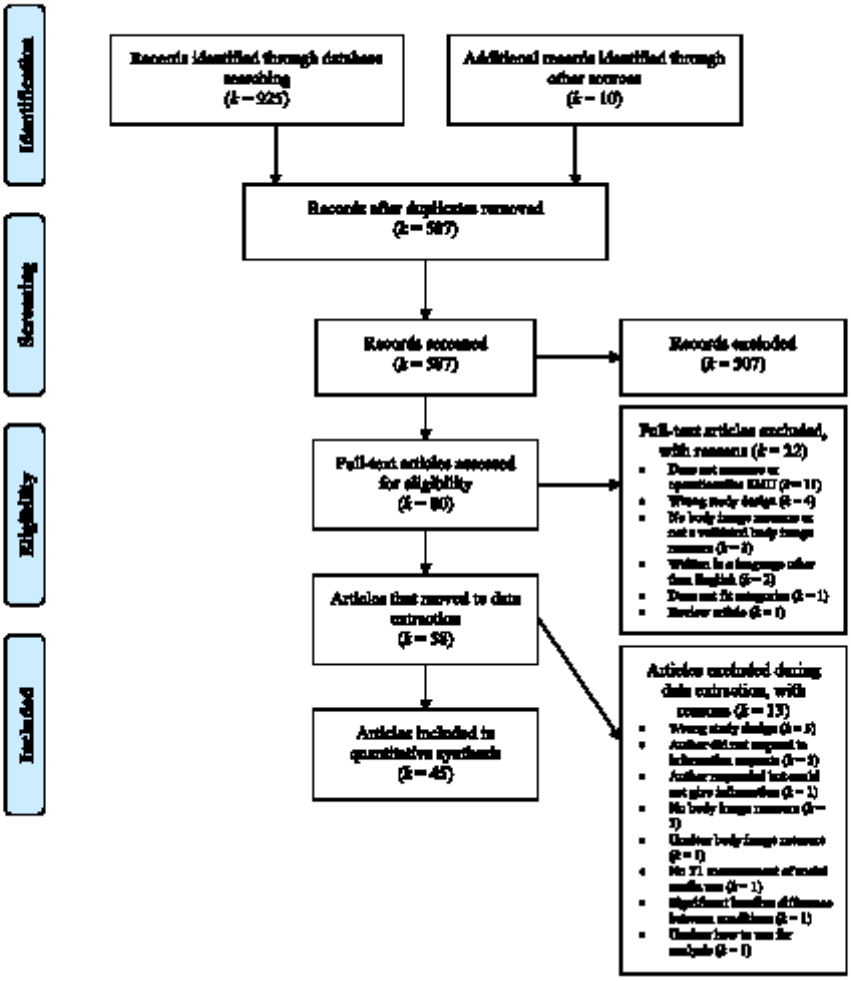


Fig. 1. PRISMA flow diagram. Note. SMU = social media use.

impact body image, whilst the other group (the "comparison group" for this category) viewed a version with contextual features deemed less likely to damage body image. Exposures were deemed more likely to negatively impact body image if they involved a standard appearance-ideal image: 1) without additional, potentially protective contextual features, but the comparison group was exposed to an image that *did* include such potentially protective features; or 2) with additional, potentially damaging contextual features. Similarly, exposures were deemed less likely to negatively impact body image if they: 1) included potentially protective contextual features; 2) involved a standard appearance-ideal image without additional, potentially damaging contextual features, but the experimental group was exposed to an image that *did* include such potentially damaging features.

For Category 2, we considered the following to be potentially protective contextual features: self-compassion quote/travel/non-idealised (i.e., 'reality') images alongside the appearance-ideal image, disclaimer comments or captions (i.e., those highlighting the idealised nature of the images), body-positive comments or captions, empowering slogans, comments rejecting the appearance-ideal, a low number of likes/follows, weight loss discouragement messages, and icons indicating that photo manipulation had taken place. The following were considered potentially damaging contextual features: idealising comments (i.e., those reinforcing the ideals present in the image), fitspiration comments or captions, objectifying slogans, a high number of likes/follows, weight loss encouragement messages, and hashtags indicating that the person in the image did not enhance their appearance.

For Category 3, comparisons had to include one group (the "experimental group" for this analysis) that was exposed to appearance-ideal images, and another group (the "comparison group" for this analysis) that was exposed to appearance-related images that were

less likely to deleteriously impact body image. For this category, the images participants were exposed to that were deemed less likely to damage body image included body-positivity, plus-sized models, untouched selfies, people in a larger body, people not wearing makeup, unedited images, parody versions of idealised images, and people of average size.

### 2.4. Data extraction process

Data were extracted by two reviewers (MD and MG) and effect sizes were placed into tables that were used to populate the meta-analysis data files. For both experimental and longitudinal studies, the tables included mean age of participants, number of participants in the analyses of interest, percentage of female participants, proportion of participants identifying as White or Caucasian, the country in which the research was based, the type of sample, and the measures used in the analysis. The first author also extracted any moderators or mediators that addressed individual difference or vulnerability factors. For the experimental studies, the tables included information about the experimental and comparison conditions in the analysis, Cohen's *d* and Hedges' *g* for the comparison between the conditions, and 95% confidence intervals for Cohen's *d* and Hedges' *g*. For the longitudinal studies, the table included the time between measurement points and Fisher's *Z* with 95% confidence intervals. Because we could not find a common timepoint to examine among the longitudinal studies, we only included the relationship from T1 to T2, and excluded any additional timepoints. Duration between timepoints ranged from four weeks to two years.

Where further information was needed about articles for screening decisions or to calculate effect sizes, the first author requested this information from the corresponding authors of those articles. In total, 37 requests for information were made, 32 of which were responded to and 30 of which resulted in the requested information being obtained.

### 2.5. Risk of bias and quality assessment

Risk of bias and quality assessments were conducted by a research assistant, in consultation with the first author. The Revised Cochrane Risk of Bias Tool for Randomised Trials (RoB 2; Higgins et al., 2011) was used for risk of bias assessment of the experimental studies. This tool is designed to identify features of randomised trials in healthcare that might limit the extent to which causal inferences can be drawn from their findings. Its relevance to research on psychological experiments examining the effects of one-off exposures is somewhat limited because it was designed to assess trials of interventions; however, a more suitable tool could not be located. The RoB 2 evaluates the risk of bias in studies based on the following domains, using 22 questions: the randomisation process, the effect of assignment to interventions, missing outcome data, measurement of the outcome, selection of the reported result, and overall (based on judgements in the previous categories). The domains for effect of assignment to intervention and selection of the reported result (Domains 2 and 5) were not very relevant to the experiments included in this analysis (the former because it focusses on interventions, the latter because pre-specified analysis plans were unlikely to be available – these are more commonly available as part of pre-registration of intervention trials). Hence, these domains were excluded from our assessment. Overall ratings for each domain are derived using algorithms based on responses for each question in that domain. Response options per question are Yes, Probably Yes, No, Probably No, and No Information, and overall domain ratings are Low Risk, Some Concerns, and High Risk.

The IHE Quality Appraisal Checklist for Case Series Studies (Guo, Moga, Harstall, & Schopflocher, 2016) was used for quality assessment of the longitudinal studies. This checklist includes 20 questions about the study objective, study design, study population, intervention and co-intervention, outcome measures, statistical analysis, results and conclusions, and competing interests and sources of support. The checklist includes a recommendation that researchers review the items before beginning the quality assessment to ensure that they are all relevant to the studies of interest, and that reviewers discuss and decide on the important aspects of criteria for certain items. The first author and research assistant decided that 15 of the items were relevant to the longitudinal studies in our review (Items 4, 7, 9, 11, and 18 were deemed irrelevant), and that the important characteristics of the participants to be reported were age (*M* and *SD*), gender (percentage or *n*), and ethnicity (percentage or *n*; for Item 5). Response options for each item include Yes, No, and either Partial or Unclear (depending on the item).

### 2.6. Statistical analyses

#### 2.6.1. Calculation of effect sizes

Between-groups Cohen's *d* and 95% CIs for the experimental studies were calculated using the online Campbell Collaboration tool (https://campbellcollaboration.org/research-resources/effect-size-calculator.html), inputting sample sizes, means or adjusted means, and standard deviations or standard errors (where both were provided, preference was given to adjusted means and standard errors that accounted for baseline levels of outcome measures). The Cohen's *d* values were then transformed to Hedges' *g* values.

For longitudinal studies, an Excel file written by an author (PW) produced the partial correlations between social media use at T1 and body image at T2 (controlling for baseline body image), Fisher's *Z*, standard error for Fisher's *Z*, and 95% CIs for Fisher's *Z*, using the correlations between T1 social media use and T1 body image, T1 social media use and T2 body image, and body image at T1 and T2. Formulae used were obtained from Cohen and Cohen (1983, pp. 88–108) and Pennsylvania State University (2021). Effect sizes were calculated such that a negative sign indicates poorer body image, and a positive sign indicates improved body image.

#### 2.6.2. Meta-analyses

Meta-analyses were conducted in R, a free software environment for statistical analyses (R Core Team, 2021). Multi-level meta-analyses were conducted, to account for non-independence of effect sizes where more than one effect was reported from a single sample (i.e., those with multiple body image outcomes or comparisons of interest), using the approach outlined by Harrer, Cuijpers, Furukawa, and Ebert (2021). The metafor package (Viechtbauer, 2010) was used to run the multi-level models and produce forest plots and funnel plots.

#### 2.6.3. Moderator analyses

We conducted moderator analyses in categories with at least 20 samples, investigating whether age and proportion of self-reported female participants were related to outcomes. Categories 1 and 2 met this threshold. Mean age and percentage of self-reported females in the sample were included as continuous, quantitative predictors. We also examined whether time between measurements (operationalised as months between measurements, also a continuous, quantitative variable) moderated outcomes in the longitudinal studies (i.e., Category 4), to assess whether the variability in the timespans examined posed a methodological concern. We ran the analyses according to the steps outlined by Harrer et al. (2021), which use the metafor package (Viechtbauer, 2010).

#### 2.6.4. Testing heterogeneity

We used the *Q* and $I^2$ statistics to assess heterogeneity, the former obtained through the metafor package (Viechtbauer, 2010) and the latter through the dmetar package (version 0.0.9000; Harrer,

Cuijpers, Furukawa, & Ebert, 2019). The *Q* statistic is a measure of weighted squared deviations around the mean, and a significant result suggests that variability is unlikely to be due to chance (Laird, Tanner-Smith, Russell, Hollon, & Walker, 2017). The $I^2$ statistic is a measure of the proportion of total study variation that is due to heterogeneity. A value of 0 indicates that no variance between study estimates is due to heterogeneity, mild heterogeneity is indicated by values of 30 or less, and notable heterogeneity is suggested by values above 50 (Higgins & Thompson, 2002).

#### 2.6.5. Publication bias

We tested for evidence of publication bias using Egger's regression intercept (Egger, Davey Smith, Schneider, & Minder, 1997), in which the standardised effect sizes are regressed against their precisions and a regression intercept of zero is expected if there is no publication bias, whereas a significant result suggests that publication bias may be present. Because we are not aware of a function in any R package designed to run Egger's test for multilevel meta-analyses, we followed advice from Viechtbauer (2015) to include sample variance as a moderator to extend the test to our models. Evidence of significant moderation would suggest possible publication bias. A similar approach was used by Habeck and Schultz (2015).

## 3. Results

### 3.1. Characteristics of articles

Data were extracted for 53 samples (43 experimental, 10 longitudinal) from 45 articles (36 experimental, 9 longitudinal). Samples were based in 13 countries, with Australia ($k$ = 18, 34.0%) and the USA ($k$ = 15, 28.3%) the most highly represented countries. The average mean (i.e., the mean mean) of participant age was 21.49 years (*SD* = 2.06; range = 15.92–26.79) for experimental studies and 14.83 years (*SD* = 2.29; range = 10.51–18.72) at T1 for longitudinal studies. Females were highly represented, comprising a mean of 82.69% (*SD* = 33.76; range = 0–100) of experimental samples and 54.33% (*SD* = 43.92; range = 0–100) of longitudinal samples. Similarly, where information on this was available, the included studies tended to report that most of their participants were White or Caucasian, comprising a mean of 60.58% (*SD* = 25.79; range = 0 – 100; $k$ = 34) in experimental samples. Statistics on the proportion of White or Caucasian participants were only available in one of the longitudinal studies, but the longitudinal studies were likely to have a high proportion of participants identifying as White or Caucasian, given the countries in which they were based (i.e., Australia, Belgium, Croatia, Germany, Norway, the Netherlands, and the USA). Experimental samples typically comprised college or university students ($k$ = 29, 67.44%) or young adults ($k$ = 12, 27.9%). In the longitudinal designs, high school students ($k$ = 5, 50.0%) were the most common sample type. See Tables A.1 and A.2 for information about included articles on a study-by-study basis.

### 3.2. Risk of bias and quality assessment

#### 3.2.1. Risk of bias assessment of experimental studies

The risk of bias assessment for the experimental studies is summarised in Table A.3 and Fig. 2. No study was assessed as being at 'high risk' of bias due to the randomisation process, but 17 studies (47.2%) were rated as having 'some concerns', most commonly due to there being insufficient information to determine whether the allocation sequence was concealed prior to participants enroling and being assigned to a condition, and to determine whether assignment to conditions was random. For the missing outcome data domain, 22 (61.1%) studies were considered 'low risk', whilst the remaining 14 (38.9%) were rated as 'high risk', most frequently because it was unclear whether all randomised participants were accounted for in the presentation of the results. For the domain related to risk of bias in measurement of the outcome, all studies received a rating of 'low risk'. Regarding the overall ratings, 14 (38.9%) studies were rated 'high risk' because they were rated as such in the domain for risk of bias due to missing outcome data. A further 10 studies (27.8%) were rated as having 'some concerns' because they received this rating for the domain related to risk of bias in the randomisation process but were rated 'low risk' in the other domains. The 12 (33.3%) studies rated 'low risk' overall received this rating in every domain.

#### 3.2.2. Quality assessment of longitudinal studies

The overall quality of the longitudinal studies was fair, with all studies receiving the most positive rating possible on 11 of the 15 items (see Table A.4 and Fig. 3). The key quality issue with the

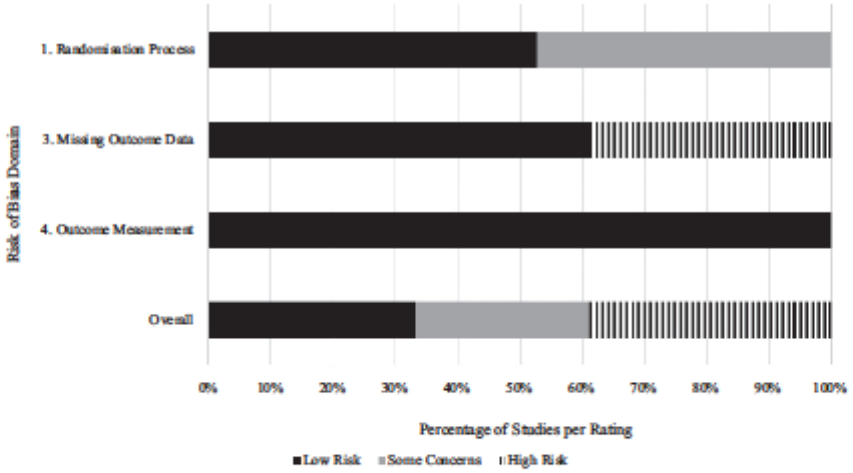


**Fig. 2.** Risk of bias assessment for each domain as a percentage of all experimental studies. Note. Missing domain numbers indicate those domains that were deemed irrelevant to our assessment and therefore not used.


**Fig. 3.** Quality assessment for each item as a percentage of all longitudinal studies. Note. Missing item numbers indicate those items that were deemed irrelevant to our assessment and therefore not used.

included studies was a lack of transparency in the inclusion criteria, with no study rated as having adequately outlined eligibility criteria. Other, less common issues identified included recruitment appearing to be based at only one site, insufficient detail in reporting of participant characteristics, and unclear reporting of competing interests.

### 3.3. Meta-analyses

#### 3.3.1. Category 1: appearance-ideal images vs non-appearance-related

Category 1 included 24 experimental samples, comprising 3816 participants (Table A.5 shows information used in the analysis). The pooled effect size suggested that viewing appearance-ideal images on social media has an immediate, moderate, detrimental effect on body image, compared to non-appearance related conditions (Hedges' $g = -0.61$, 95% CIs = −1.06, −0.15, $p < .01$; see Fig. 4). Heterogeneity was very high ($Q = 477.87$, $p < .001$; $I^2 = 98.63$), which was predominantly due to within-study variance ($I^2 = 88.98$), rather than between-study variance ($I^2 = 9.65$). Percentage of females in the sample and age were not significant moderators (ps = .35 and .60, respectively).

Three outlier effect sizes were identified by viewing the forest plot and scanning the Hedges' $g$ values; their confidence intervals had no overlap with those from the other studies in the analysis. All three outliers were self-objectification effects from the studies by Qi and Cui (2018). Removing these outliers from the analysis resulted in a small, revised pooled effect size of Hedges' $g = -0.28$, 95% CIs = −0.35, −0.20, $p < .001$, and a considerable improvement in heterogeneity, such that it was now mild to moderate ($Q = 81.83$, $p = .02$; $I^2 = 34.79$), with most of this heterogeneity attributed to between-study variance ($I^2 = 33.98$), and very little within-study variance ($I^2 = 0.82$). See Fig. A.1 for a revised forest plot. Again, percentage of females in the sample and age were not significant moderators (ps = .28 and .74, respectively).

#### 3.3.2. Category 2: appearance-ideal images with more vs less risky context

Category 2 included 21 experimental samples, comprising 3482 participants (see Table A.6 for the meta-analysis input). The pooled effect size indicated that contextual features have a very small immediate impact, whereby body image is worse after viewing appearance-ideal social media images in higher-risk than lower-risk contexts (Hedges' $g = -0.12$, 95% CIs = −0.20, −0.04, $p < .01$). An overview of these results is provided in Fig. 5. Heterogeneity was mild but not significant ($Q = 48.54$, $p = .08$; $I^2 = 30.73$). All the observed heterogeneity was attributable to between-study heterogeneity ($I^2 = 30.73$), not within-study heterogeneity ($I^2 = 0.00$). Percentage of females in the sample and age were not significant moderators (ps = .42 and .98, respectively).

#### 3.3.3. Category 3: appearance-ideal images vs other appearance images

Category 3 included 14 experimental samples, comprising 2641 participants (see Table A.7 for input details). Of note, 100% of participants in this analysis were female. The pooled effect size suggested that viewing appearance-ideal social media images has an immediate, moderate, negative effect on body image compared to viewing other appearance images on social media (Hedges' $g = -0.68$, 95% CIs = −1.38, 0.01, $p = .05$; see Fig. 6 for the forest plot). Heterogeneity in this analysis was high ($Q = 254.04$, $p < .001$; $I^2 = 99.15$), and was attributed to within-study variance ($I^2 = 99.15$), not between-study variance ($I^2 = 0.00$).

Two outlier effect sizes were identified when viewing the forest plot and scanning the Hedges' $g$ values. These were the body satisfaction effect from the South Korean sample in Lee, Taniguchi, Modica, and Park (2013) and the self-objectification effect from Study 2 in Qi and Cui (2018). As with the outliers in Category 1, the confidence intervals for these outliers had no overlap with those from the other studies in the analysis. Removing these outliers from the analysis (thereby reducing the number of samples to 13) resulted in a small, revised pooled effect size of Hedges' $g = -0.29$, 95% CIs

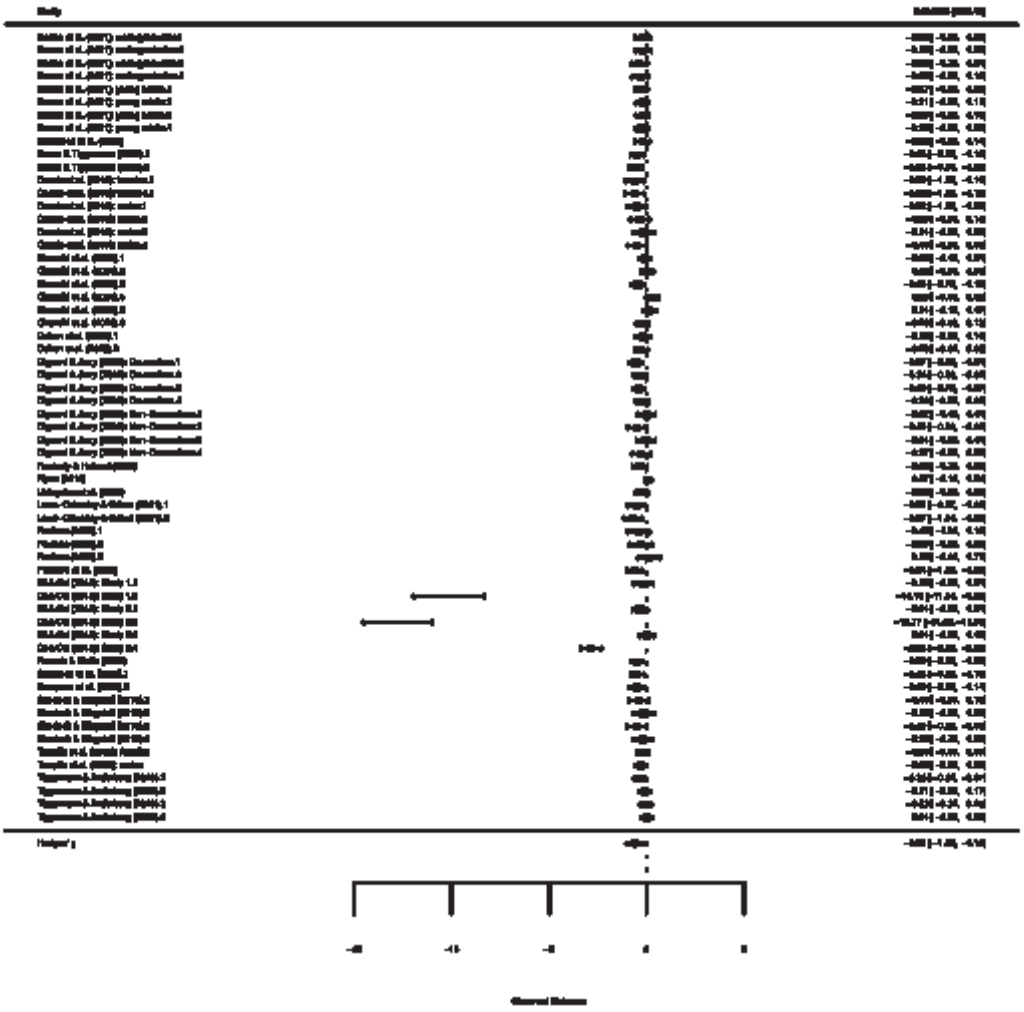

Fig. 4. Category 1 forest plot. Note. Some samples contributed more than one effect size; these are indicated where numbers follow the study name.

= −0.40, −0.18, $p$ < .001 and a reasonable improvement in heterogeneity, although it remained moderately high ($Q$ = 33.24, $p$ = .03; $I^2$ = 48.98). Heterogeneity was due to between-study variance ($I^2$ = 48.98), rather than within-study variance ($I^2$ = 0.00). Fig. A.2 is the revised forest plot.

### 3.3.4. Category 4: longitudinal studies

Category 4 included 10 longitudinal samples, comprising 5177 participants (Table A.8 provides the details used in the analysis). Overall, there was a statistically significant but very small negative partial (controlling for baseline body image) correlation between social media use and body image (Fisher's $Z$ = −0.08, 95% CIs = −0.11, −0.06, $p$ < .001). Fig. 7 is the forest plot for this analysis. There was evidence of moderate heterogeneity ($Q$ = 51.74, $p$ < .01; $I^2$ = 47.40), which was attributed to within-study variance ($I^2$ = 47.40), not between-study variance ($I^2$ = 0.00). No outliers were identified. Time between measurement points was not a significant moderator ($p$ = .62).

## 3.4. Publication bias

The funnel plots for all categories are available in Fig. A.3 through A.6. Egger's regression test was significant for Categories 1 ($Q$ = 278.43, $p$ < .001) and 3 ($Q$ = 166.78, $p$ < .001), but not Categories 2 ($Q$ = 1.15, $p$ = .28) or 4 ($Q$ = 0.60, $p$ = .44). In the models excluding outliers, Egger's regression test was no longer significant for Categories 1 ($Q$ = 3.03, $p$ = .08) or 3 ($Q$ = 0.02, $p$ = .90). Thus, there was no evidence of publication bias amongst the longitudinal studies, but mixed findings amongst the experimental studies, in which outlier

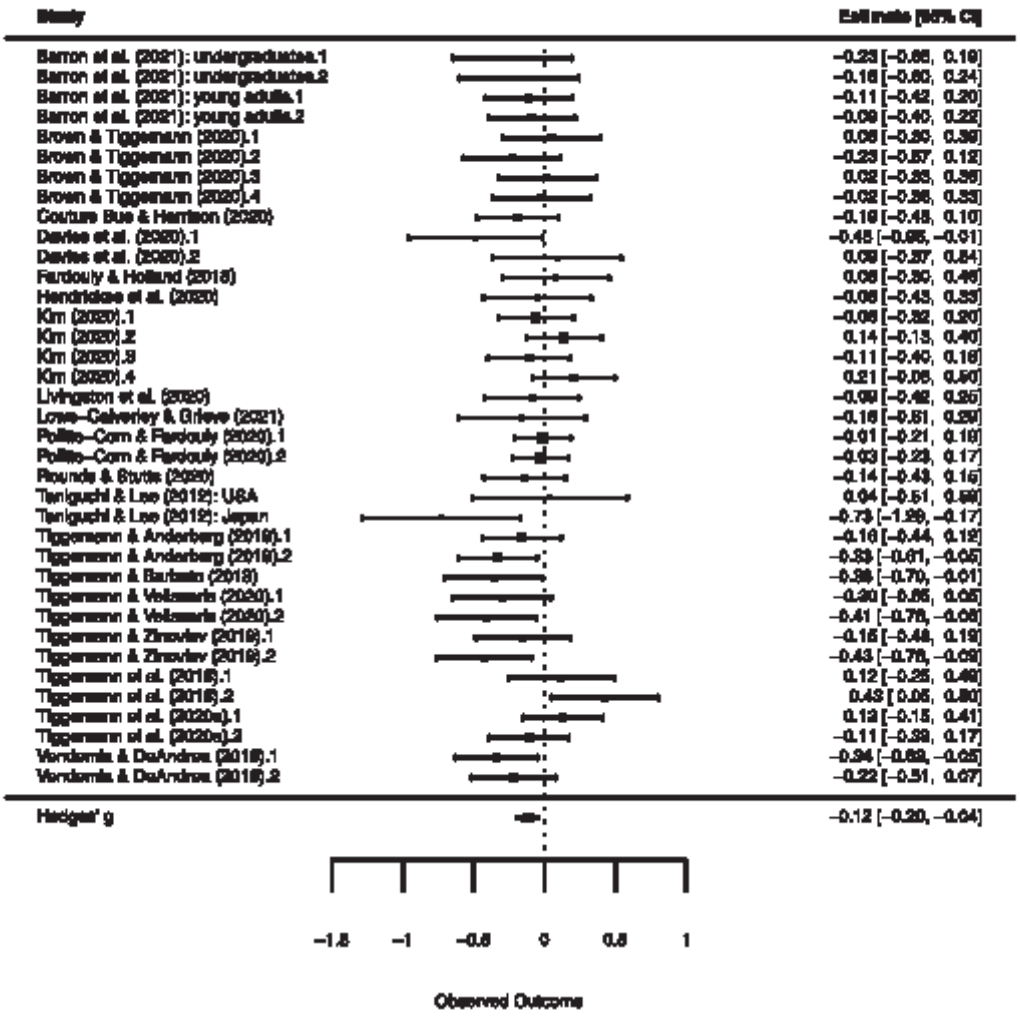


Fig. 5. Category 2 forest plot. Note. Some samples contributed more than one effect size; these are indicated where numbers follow the study name.

effect sizes strongly influenced the test used to assess publication bias.

### 3.5. Moderators and mediators examined in included studies

Tables A.1 and A.2 outline the moderators and mediators examined in studies included in our meta-analyses. Comprehensive qualitative synthesis of these findings is beyond the scope of the current paper, but we provide here a short summary.

Comparison was the most investigated mechanism, being conceptualised alternatively as a moderator and mediator in experimental research. It demonstrated a statistically significant moderating or mediating role approximately half the times it was examined. Similarly, it was examined as a mediator twice in the longitudinal studies, once being found significant and once not. Where significant relationships were found, it was generally the case that engaging in more comparisons conferred greater risk to body image, although in one study, participants with higher trait appearance comparison showed more benefit to body appreciation after exposure to self-compassion quote images than those with low trait appearance comparison (Barron et al., 2021).

Next most frequently examined was appearance-ideal internalisation (encompassing thin, muscular, and general ideals), which was typically conceptualised as a moderator in experimental research, and a mediator in longitudinal research. Despite being a common target for enquiry, appearance-ideal internalisation only showed a significant role once, as a moderator. In this case, women with stronger thin-ideal internalisation reported more body appreciation after viewing images of average-sized women with a body positive caption compared to when there was no caption, but the

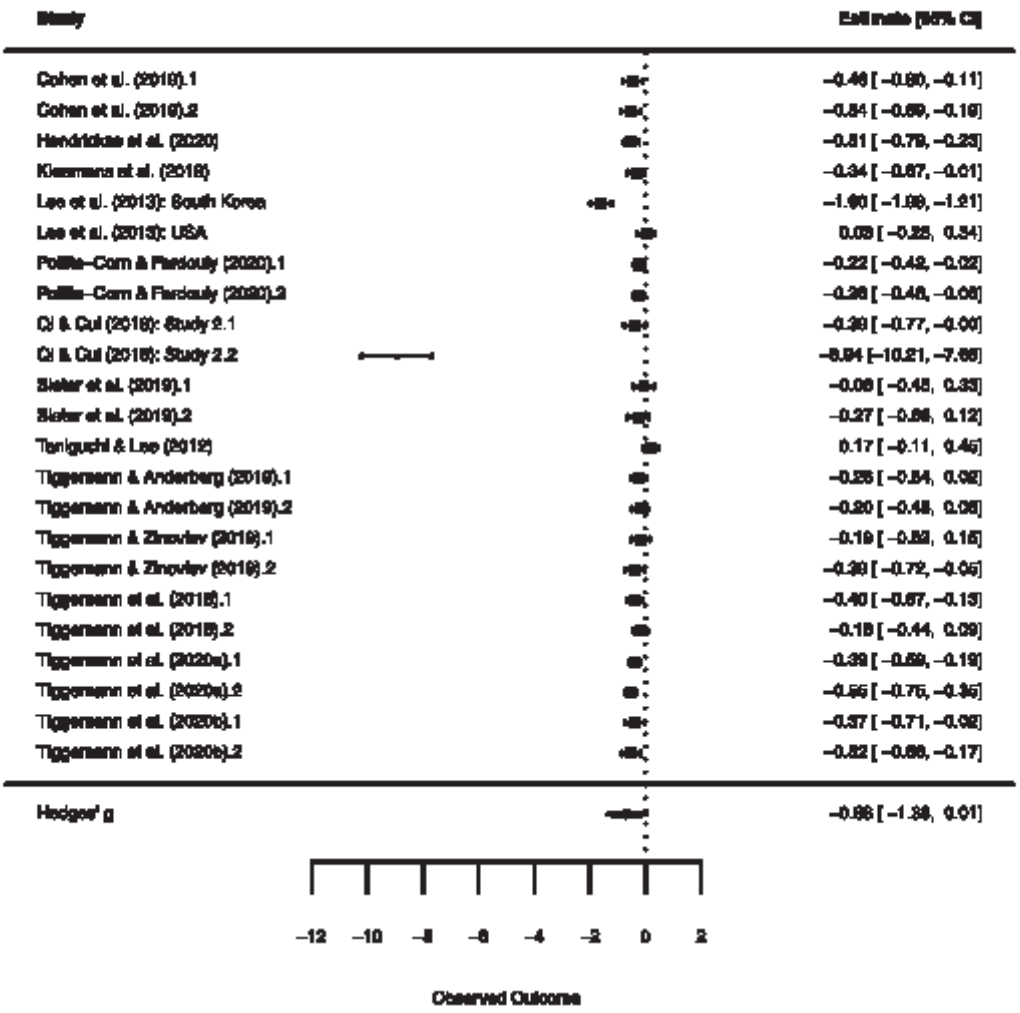


Fig. 6. Category 3 forest plot. Note. Some samples contributed more than one effect size; these are indicated where numbers follow the study name.

reverse was true when they were exposed to thin-ideal images of women (Tiggemann, Anderberg, & Brown, 2020).

Other mechanisms were examined less often. "Gender" was investigated as a moderator in seven samples (two experimental, five longitudinal), though it was described as a binary variable, so we refer to it as sex. Sex was a significant moderator in three longitudinal studies. Briefly, passive Facebook use predicted more appearance comparison in boys but not girls (Rousseau, Eggermont, & Frison, 2017), other-oriented social media use predicted decreases in appearance self-esteem for girls but not boys (Steinsbekk et al., 2021), and social network site use predicted increased self-objectification in girls but not boys (Vandenbosch & Eggermont, 2016). While other moderators or mediators were examined, these did not appear in enough studies to enable conclusions to be drawn about their effects.

## 4. Discussion

The meta-analyses in this article support the suggestion that social media negatively impact body image, particularly when used to view appearance ideals, which shows an immediate, negative effect. Effects were of a similar size to those obtained in meta-analyses of the cross-sectional research, in which appearance-focussed social media use had a stronger relationship with body image disturbance than general social media use (Saiphoo & Vahedi, 2019), and social media use had a small cross-sectional association with thin-ideal internalisation that was stronger when use was appearance-related (Mingoia et al., 2017). The key novel findings from the present meta-analyses are that viewing appearance-ideal social media images has a causal, negative impact on body image, contextual features make a very small difference to this impact,

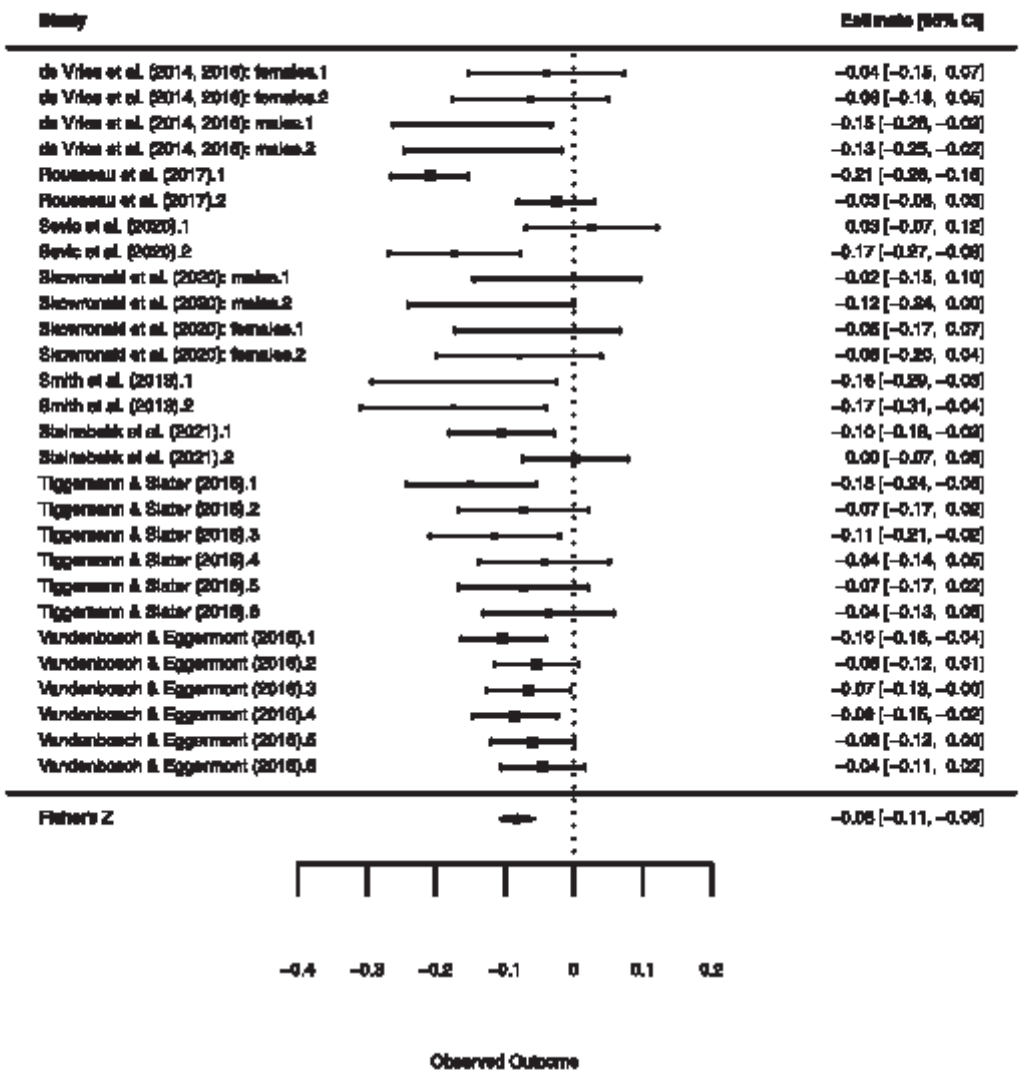


Fig. 7. Category 4 forest plot. Note. Some samples contributed more than one effect size; these are indicated where numbers follow the study name.

appearance-ideal social media images are more detrimental to body image than other types of appearance images on social media, and social media use at a given time is associated with slightly poorer body image later in time.

### 4.1. Category 1: appearance-ideal images vs non-appearance-related

Appearance-ideal social media images had a moderate, immediate detrimental impact on body image compared to appearance-neutral conditions, or a small effect with outliers removed. Effects were of a similar size to that produced by traditional media ($d$ = −0.19 to −0.39; Barlett et al., 2008; Grabe et al., 2008). Although we found a modest impact, this is based on experiments using single, brief exposures, whereas users typically access social media multiple times per day for an average total of almost two and a half hours (We Are & Hootsuite, 2021b; Yellow, 2020). The cumulative effect of these multiple exposures may be cause for concern, although it should be noted that there is no evidence demonstrating that the effects of exposure are additive. It also raises concerns about the potential impact of using image- and video-based social media platforms such as Instagram (which most articles in this category were investigating), Tumblr, and TikTok, where users can access a constant stream of appearance ideal imagery from 'influencers',

models, and celebrities, depending on the accounts they follow and what the platforms' algorithms suggest for them.

The results observed in this category may be explained by sociocultural theory in that these images promote appearance ideals to the viewer, who compares their appearance to those ideals and typically finds that they do not meet them, and hence feels worse about their appearance. It may also be explained by self-objectification theory in that viewing images of others' appearance could provoke a sense of observing others, in particular their bodies, which may then incite self-conscious feelings that others are observing and evaluating one's own body. Indeed, it is possible that both of these theories are applicable (Seekis, Bradley, & Duffy, 2020).

This category included a range of appearance-ideals, including people simply described as meeting ideals, as well as the more specific variations of fitspiration and thinspiration. Given that heterogeneity was only mild (once outliers were removed), we might suggest that each of these image types is similarly impactful, although when more studies are available, moderator analyses may be used to determine whether different appearance-ideal image types have a different impact.

### 4.2. Category 2: appearance-ideal images with more vs less risky context

Contextual features such as comments, captions, and the inclusion of other image types in addition to the appearance-ideal images made a small but significant impact on how strongly appearance-ideal social media images impacted viewers' body image immediately following exposure, with stronger deleterious effects observed when images were presented in higher- than lower-risk contexts. Almost all the samples in this category were female, so it is unclear whether the same effect would be observed in other genders.

Our second category most closely addressed the difference between traditional and social media by examining the effect of contextual features characteristic of social media. Our results suggest that these can be manipulated with a small effect on the impact to body image, indicating that the effects of social media appearance-ideal images on body image may be different to when those same images are presented in traditional media because these cues may moderate the impact. This may be interpreted through the lens of social reinforcement theory, such that when significant figures in socialisation such as family, peers, and the media appear to support or approve of appearance ideals through comments or actions (e.g., "likes"), this establishes expectations about the benefits of meeting these ideals, which can serve to reinforce the notion that those ideals are desirable (Thompson & Stice, 2001). The internalisation of such ideals has a moderate to very large association with body dissatisfaction (Paterna, Alcaraz-Ibanez, Fuller-Tyszkiewicz, & Sicilia, 2021). Hence, some of the "riskier" conditions may have had a stronger impact on body image because they implied social support for appearance ideals.

However, social reinforcement theory would not explain all the effects observed in this category. Comparisons from Barron et al. (2021), Rounds and Stutts (2020), and Tiggemann and Anderberg (2019) saw one group (the "experimental group" for this category) being exposed to appearance-ideal images, whilst the comparison groups were also exposed to these images, but with the additional context of less risky images (i.e., self-compassion quote images, travel images, non-idealised images) accompanying the appearance-ideal images. It has been suggested that the inclusion of the additional images may serve as a buffer, reducing the negative effects of being exposed to appearance ideals (Barron et al., 2021; Slater, Varsani, & Diedrichs, 2017; Tiggemann & Anderberg, 2019). This is likely to depend on the type of additional image presented; images that actively counteract the appearance-ideals (e.g., self-compassion quotes, non-idealised images) may be more protective than neutral images (e.g., travel images; Rounds & Stutts, 2020).

The smaller size of the pooled effect in this category than that observed in Category 1 suggests that contextual features may be processed less deeply than the images they accompany. In support of this, Couture Bue and Harrison (2020) found that although participants exposed to appearance-ideal images with disclaimer comments spent longer viewing the comments than those exposed to comments romanticising the image, post-exposure body anxiety did not differ between conditions. Those in the disclaimer comment condition spent less time viewing the models on average but this difference was not significant. Moreover, one study of disclaimer labels in traditional media found that they did not protect against the detrimental effects of viewing appearance-ideal images and may paradoxically increase some viewers' attention to the images, therefore increasing body dissatisfaction (Tiggemann, Slater, Bury, Hawkins, & Firth, 2013). More research on how contextual features are processed would be helpful in illuminating under what circumstances and how these features impact on the effect of viewing the images with which they are presented.

### 4.3. Category 3: appearance-ideal images vs other appearance images

Appearance-ideal social media images had an immediate, moderate, detrimental impact on body image compared to viewing other appearance images, or a small effect when outliers were removed. The effects observed in this category were very similar to those observed in Category 1. This implies that it is the appearance ideals that are harmful, rather than being exposed to appearance images more generally.

Upwards social comparisons to the appearance ideals, which sociocultural theory proposes as a mechanism of effect, offer a logical explanation for this. From the perspective of self-objectification theory, it has been proposed that exposure specifically to appearance-ideal social media images may provoke women to internalise these as the appearance standards to which they should aspire, affecting their perspective on and monitoring of their own body (Feltman & Szymanski, 2018). Indeed, Feltman and Szymanski (2018) also found that upwards appearance comparisons mediated the relationship between Instagram use and self-objectification, supporting the idea that both sociocultural and self-objectification theories are useful for understanding the relationship between social media and body image.

Two features of this category should be noted. First, all the participants were female, so again we cannot know what the effect would be in other genders. Second, heterogeneity remained moderately high even after removing outliers. This may be related to diversity in the types of comparisons included in this category, which included comparing appearance-ideal images with images of body-positivity, plus-sized models, people in larger bodies, average-sized people, and parody versions of appearance-ideal images. Some comparisons also involved both groups viewing appearance-ideal images but with the comparison group viewing a potentially less impactful version (i.e., unedited, no make-up, more realistic, or lower socio-economic status versions) than the experimental group.

In all, there has been comparatively little focus on appearance images on social media that do not contain appearance ideals. This would be a fruitful avenue for further exploration, given the potential for some of these image types to not only not be harmful, but possibly even protective for body image. Examples of potentially protective variants include body-positive images, images of plus-sized models, parody versions of appearance-ideal images, Instagram vs reality images, and enhancement-free images (Cohen et al., 2019; Hendrickse, Clayton, Ray, Ridgway, & Secharan, 2020; Slater, Cole, & Fardouly, 2019; Tiggemann & Anderberg, 2019; Tiggemann & Zinoviev, 2019). If further research supports these

image types as being protective, clinicians could recommend that clients follow platforms that share them, and they could be included in preventative body image interventions.

### 4.4. Category 4: longitudinal studies

The pooled effect size for the longitudinal studies suggests that social media use has a very small, negative association with body image over time, a smaller effect than those found in the experimental analyses. Time between measurement points varied between studies (from four weeks to two years), but this did not moderate outcomes, and the heterogeneity in outcomes was attributed to within-study rather than between-study variance, suggesting that differences in effects may be related to how social media use was operationalised, which aspect of body image was measured, or a combination of these. At present, there are not enough longitudinal studies available for appropriately powered moderator analyses to investigate these potential explanations statistically.

Examining the longitudinal results presented in Table A.8, it is difficult to observe trends that might suggest specific relationships are operating. Perhaps the only clear trend was that social media use was almost exclusively linked with deterioration in body image, with only one effect size out of 28 suggesting it was related to improvement in body image, and just one other suggesting no relationship at all. Regarding the body image outcome examined, no specific outcome appears to be more strongly related on face value; though, evidence of this may be inhibited by use of a diverse range of outcomes within a relatively small pool of studies. Likewise, we did not see a clear difference in strength of association when comparing measures of quantity of social media use (e.g., frequency of access, time spent, number of friends) and measures addressing exposure to images of others (e.g., comparison on Facebook, exposure to sexualised images, monitoring attractive peers). When more longitudinal research is available, moderator analyses that can illuminate some of the reasons for the heterogeneity we observed would be an important addition to the literature.

Moreover, although the results from this category might hint at a causal link, they cannot demonstrate causation. It is also possible that there is a reciprocal relationship, whereby people who already have, or are predisposed to, poor body image seek out more appearance-related content on social media, and this in turn worsens their body image. In support of this theory, some researchers have already proposed that poor body image might predict increased social media use or engagement with appearance-related social media activities (Caso, Schettino, Fabbricatore, & Conner, 2020; Fox & Rooney, 2015; Veldhuis, Alleva, Bij de Vaate, Keijer, & Konijn, 2020; Wang, 2019). There have been mixed results when longitudinal studies have tested this opposite relationship (i.e., body image predicting later social media use), with some findings supporting this relationship and others not. Overall, the limited information available suggest that body image may not predict general social media use at a later point (de Vries, Peter, de Graaf, & Nikken, 2016; Steinsbekk et al., 2021; Tiggemann & Slater, 2016; Vandenbosch & Eggermont, 2016), but that it may predict specific other-oriented social media behaviours such as social comparison (Rousseau et al., 2017), adding friends (Tiggemann & Slater, 2016), and monitoring attractive peers (Vandenbosch & Eggermont, 2016).

### 4.5. Moderators and mediators

In our meta-analyses, neither percentage of self-reported females in the sample nor age moderated outcomes. The former result accords with the moderator analyses from the meta-analysis of cross-sectional evidence on social media use and body image, however the latter result contradicts their finding that the relationship was weaker as age increased (Saiphoo & Vahedi, 2019). Our analyses included considerably fewer samples than the meta-analysis by Saiphoo and Vahedi (2019), accompanied by a somewhat narrower range of ages (although, even in their analysis, there was a strong representation of children to young adult samples), so it is possible that we were underpowered to detect age-related effects. Alternatively, the moderating effect of age observed in the cross-sectional research may be spurious. Recent evidence suggests that, in most age groups, body satisfaction improves with age (Hockey, Milojev, Sibley, Donovan, & Barlow, 2021), whilst extent of social media use appears to be reasonably similar across teens and young adults (Pew Research Center, 2018, 2021). So, it may not be that there is a weaker association between social media use and body image disturbance as age increases, but that social media use stays fairly constant as teens grow into young adults, whilst there is an unrelated improvement in body image during this period.

Regarding the mechanisms investigated in studies included in our analyses, the evidence most strongly supports comparison as either a moderator or mediator that may increase risk for negative impacts to body image due to social media use. This finding supports the assertion of sociocultural theory that comparison to others can be harmful to body image (Thompson et al., 1999). Yet, the finding that appearance-ideal internalisation was only once supported as a moderator despite being examined reasonably frequently is seemingly at odds with sociocultural theory. A tentative explanation could be that appearance-ideal images are so impactful to body image that the extent to which a person had already internalised the ideals in the image is irrelevant, but further research is needed to explore explanations for these null findings.

### 4.6. Clinical implications

Clinicians working with clients experiencing body image disturbance should consider the possible role of exposure to appearance ideals on social media in the development and maintenance of their clients' symptoms and explore whether changes to their social media use could help to decrease these symptoms. Psychoeducation can be provided on the harmful impact of exposure to these images, and clinicians might discuss ways of reducing clients' exposure to them. One way may be to simply reduce their time on social media. Another may be to make changes to the pages and profiles they follow, as suggested by Cohen, Slater, and Fardouly (2019) and Glover (2019). This may involve unfollowing accounts that often share appearance-ideal images, such as those belonging to celebrities and 'influencers', and instead following accounts related to appearance-neutral hobbies and areas of interest. This latter strategy may serve to increase focus on areas of clients' life contributing to self-worth outside of their weight and shape, so may be especially helpful for clients with eating disorders, given that overemphasis on shape and weight as markers of self-worth is a feature of these disorders (American Psychiatric Association, 2013).

Although body-positive content shows promise as a potentially positive type of social media content, clinicians might like to exercise caution in recommending that clients follow body-positive accounts until there is further research in this area, given some evidence that they may promote self-objectification (Cohen, Newton-John, & Slater, 2020). Moreover, given the results found in Category 2 of our analyses, clinicians might suggest that clients avoid following social media accounts that share images of appearance-ideal people accompanied by body-positive messages, since these images may remain at least somewhat damaging to their body image despite the messages. Although one study has found that body esteem was significantly higher in women exposed to fitspiration images with a body positive caption compared to the same images with a fitspiration or neutral caption (Davies, Turner, & Udell,

2020), two others found that attaching body positive captions to images of attractive celebrities did not ameliorate the detrimental impact to women's body image (Brown & Tiggemann, 2020; Tiggemann et al., 2020).

Another avenue for clinicians to consider is raising clients' social media literacy, with a small but promising body of research suggesting this can ameliorate the negative effects of social media use. A pilot study by McLean, Wertheim, Masters, and Paxton (2017) found that three social media literacy lessons produced small improvements in adolescent girls' body image and disordered eating, relative to girls attending their usual classes. Also, social media literacy has been found to be protective against the deleterious impacts of exposure to appearance-ideal images on social media in women, although not men (Tamplin et al., 2018). Strategies for raising social media literacy include fostering critical thinking about why people post what they do to social media, and awareness of the selectivity and modification associated with posts to social media, which present an idealised version of the poster's life (McLean et al., 2017).

### 4.7. Limitations

Several limitations of this article should be considered. There were indicators of possible bias in the experimental studies, over a third of which were rated as being at high risk of bias. Similarly, there was evidence of possible publication bias in Categories 1 and 3, which may have led to an exaggerated estimation of effect sizes. Because the test for publication bias was not significant in the models excluding outliers, these may provide more accurate estimates of the pooled effect size. There were several outlier effect sizes in the experimental studies, but we cannot be sure why these effects were so different to the others. One characteristic they all shared was that they came from samples in Asia, which could point to a cultural effect, with some evidence suggesting that body dissatisfaction may be even more prevalent in some Asian countries, including China and Japan, than Western ones (Cummins, Simmons, & Zane, 2005). However, given that so few studies have been conducted assessing the impact of social media in Asian samples, we do not yet have enough information to determine whether effects differ by culture. Moreover, the experimental studies in our meta-analyses all involved exposure to appearance-ideal images of strangers or celebrities, so it is unclear whether these findings would generalise to appearance-ideal images of known peers (e.g., friends, acquaintances, and family members).

The diversity of ways in which social media use was operationalised in longitudinal studies meant that we could not obtain more specific estimates of the relationship between, for example, specific activities on social media and later body image. Similarly, because the time points between measurements were of varying lengths, we could not be more precise about the time course of this relationship. Finally, the high representation of young participants, females, and people from Western countries in both the experimental and longitudinal research makes it unclear whether the effects of social media use differ in older samples, people from non-Western countries, males, or people of diverse genders.

### 4.8. Future directions

There is a need for research that can shed light on how social media users typically spend their time on social media platforms to inform further research that can investigate causality. The experimental studies in this paper focussed on the impact of viewing appearance-ideal images on social media, but it is unclear how much time users spend engaged in that activity compared to the myriad other activities available on social media platforms. Furthermore, research that can inform understanding of how often such images are of known peers as opposed to strangers or celebrities will help us to determine whether the exposures in the experimental studies we examined (which involved exposure to images of strangers, often Instagram models, or celebrities) are representative of social media users' typical experiences, particularly given that exposure to content generated by known peers is one of the key features distinguishing social media from traditional media.

Future experimental studies might consider investigating other social media platforms that have not yet been examined, such as TikTok. Other avenues for experimental exploration include teasing out the effects of duration of each exposure to appearance-ideal images, level of investment in the images (with evidence suggesting that greater investment in one's own and others' social media images is associated with poorer body image and disordered eating; Butkowski, Dixon, & Weeks, 2019; Cohen, Newton-John, & Slater, 2018; Lonergan et al., 2019, 2020; McLean et al., 2015; Tiggemann et al., 2018), and the effects of specific types of social media contextual features and the circumstances under which they can be helpful or harmful, whether negative impacts are additive over multiple exposures, and which aspects of body image are more strongly impacted by exposure to appearance-ideal social media images, the latter of which may assist in identifying specific targets for intervention. When more research is available, it will be useful to meta-analyse the impacts of other social media activities than viewing appearance-ideal images; for example, uploading selfies, with experimental evidence thus far suggesting that posting selfies to social media negatively impacts body image (Mills, Musto, Williams, & Tiggemann, 2018; Shome, Vadera, Male, & Kapoor, 2020; Wick & Keel, 2020).

It is recommended that future longitudinal research focusses on transferable activities on social media (e.g., following certain types of accounts, posting certain types of content), as opposed to use of specific platforms, given the speed with which new platforms emerge and the popularity of existing platforms changes. Moreover, more research on samples with diverse ages may help to illuminate whether the relationship differs at various developmental stages. Additions to the emerging body of experience sampling and ecological momentary assessment literature in this area may permit meta-analyses of these designs in future, which can also shed light on potential causality.

## 5. Conclusions

Our results suggest that viewing appearance-ideal images on social media detrimentally impacts body image. Effects were small to moderate, similar to meta-analyses of cross-sectional research in this area (Mingoia et al., 2017; Saiphoo & Vahedi, 2019), and to the effects of traditional media (Barlett et al., 2008; Grabe et al., 2008). The evidence suggests that it is exposure to appearance-ideals specifically, rather than to appearance content generally, that is damaging, and features of the social media context (e.g., likes, comments, hashtags) can make a small difference to the impact of viewing appearance-ideal images. Social media use predicts a very small increase in body image disturbance longitudinally, controlling for baseline body image, but it is not yet clear what kind of use is most strongly related to body image nor the timeframe in which this relationship emerges. Clinicians who treat body image might benefit from considering clients' use of appearance-related social media in case conceptualisation and incorporating changes to social media use in treatment planning.

## Role of funding sources

Funding for this study was provided by Flinders University via a High Impact Incentive. Flinders University had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication. The

first author is supported by an Australian Government Research Training Program Scholarship. The Australian Government had no role in the study design, collection, analysis or interpretation of the data, writing the manuscript, or the decision to submit the paper for publication.

## CRediT authorship contribution statement

**Madelaine K. de Valle**: Conceptualization, Methodology, Investigation, Formal analysis, Data Curation, Writing - Original Draft, Writing - Review & Editing, Visualization, Project administration. **María Gallego-García**: Investigation, Data Curation, Writing - Review & Editing. **Paul Williamson**: Resources, Writing - Review & Editing. **Tracey D. Wade**: Conceptualization, Methodology, Resources, Writing - Review & Editing, Supervision, Funding acquisition.

## Data availability statement

The data from this study are available from the corresponding author upon reasonable request.

## Conflict of interest statement

Nothing declared.

## Acknowledgements

We would like to acknowledge the assistance provided by Nepheli Beos, who undertook risk of bias and quality assessment for the studies included in this article.

## Appendix A. Supporting information

Supplementary tables and figures associated with this article can be found in the online version at doi:10.1016/j.bodyim.2021.10.001.

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# APPENDIX B

Published Study 2



## Abstract

**Objective**: Evaluate the feasibility, acceptability, and preliminary efficacy of a self-criticism intervention addressing the link between appearance-motivated social media use and eating disorder risk. Another condition, designed to help users curate their social media feed to reduce negative impacts on wellbeing, was also trialled as an active and credible comparison. **Method**: University students aged 17-25 (*N* = 170) were screened and randomised (*n* = 130) to the self-criticism intervention, social media curation, or waitlist control group. The intervention comprised self-guided cognitive behaviour therapy delivered in four modules over one week. Primary outcomes were feasibility and acceptability. Secondary outcomes were appearance motivations for social media use, appearance comparison, self-criticism, body image flexibility, and disordered eating (at baseline, one-week post-randomisation, and two-weeks post-randomisation). Trial registration: ACTRN12621000353897. **Results**: Participants completed an average of 82% of the intervention modules and 77% of the homework exercises within the week allocated. The intervention was well-accepted; participants reported a range of positive aspects, alongside suggested modifications to the

intervention and study design to improve acceptability. Group by time interactions suggested groups changed at a different rate on three secondary outcomes; between-groups effect sizes suggested this was due to greater improvements in the self-criticism group than waitlist control. **Discussion**: This was the first study to evaluate an intervention for the link between appearance-related social media use and eating disorder risk for young adults. Positive findings relating to feasibility, acceptability, and preliminary efficacy suggest a larger randomised controlled trial, with modifications to the intervention and study design, is warranted.

**Keywords:** Social Media; Self-Assessment; Self-Compassion; Body Image; Feeding and Eating Disorders; Pilot Projects; Young Adult; Feasibility Studies; Follow-Up Studies

**Public Significance Statement**: Appearance-related social media use has been linked to poorer body image and disordered eating, necessitating treatments that can disrupt this relationship. The self-criticism intervention evaluated in this study shows promise as a strategy to address this need. It is the first intervention focussed on appearance-related social media use to be designed for and tested in young adults, who are at heightened risk of developing an eating disorder.

**Targeting the link between social media and eating disorder risk: A randomised, controlled pilot study**

Meta-analyses and reviews link social media use to poorer body image and disordered eating (de Valle et al., 2021; Frost & Rickwood, 2017; Holland & Tiggemann, 2016; Mingoia et al., 2017; Ryding & Kuss, 2019; Saiphoo & Vahedi, 2019; Zhang et al., 2021). Across these reviews, appearance-related use (i.e., exposure to appearance-ideal images; posting photos of oneself; viewing/liking/commenting on others' photos; and appearance-related social media motivations) has stronger associations with negative outcomes. Appearance comparison appears to be a key mediator/moderator of the relationship between social media use and adverse outcomes for body image and eating (de Valle et al., 2021; Fardouly & Vartanian, 2015; Fardouly, Willburger, et al., 2018; Griffiths et al., 2018; Jarman et al., 2020; Rodgers, Slater, et al., 2020; Seekis et al., 2020).

To date, five interventions have been evaluated that seek to interrupt this relationship between social media, appearance comparison, and body image/disordered eating. Four were classroom interventions targeting adolescents: a single-session intervention challenging social media appearance ideals (Bell et al., 2021); two social media literacy interventions (Gordon et al., 2021; McLean et al., 2017); and a three-workshop intervention comprising one workshop about social media (Svantorp-Tveiten et al., 2021). The only intervention not delivered to adolescents in classrooms was a three-minute self-compassion writing task trialled with adult women prior to exposure to thin-ideal Instagram images (Gobin et al., 2022). These interventions had some favourable results, but effect sizes were generally null to small, with few moderate and none large. There were no improvements on some key variables and in one study, poorer outcomes for the intervention group than the control group on some variables (Gordon et al., 2021).

Interventions are also required for young adults, who make considerable use of social media (Pew Research Center, 2019; Sensis, 2018), and are at heightened risk for eating disorders, particularly binge and purge disorders (Hudson et al., 2007). In common with other young adults, university students face barriers to accessing interventions, including lacking time/awareness of available supports, long waitlists, preferring alternatives to on-campus options (e.g., online self-help), stigma, and preferring to handle the problem alone (Broglia et al., 2021; Dunley & Papadopoulos, 2019; Ebert et al., 2019).

To address some of their barriers, we tested an intervention for social media use and eating disorder risk in young adult university students. We did not modify an intervention developed for adolescents because the relatively small effect sizes obtained with these interventions suggest that exploring different intervention targets is warranted, alternatives to classroom delivery are needed to reach them, and there are developmental differences between these groups. Young adults are less likely than adolescents to have their social media use monitored by their parents, which may make them more vulnerable; more parental control of preadolescents' social media use was linked to improved appearance satisfaction via reduced social media use and an associated reduction in appearance comparisons (Fardouly, Magson, et al., 2018).

Hence, we developed a novel intervention for young adults, designed to reduce self-criticism and increase self-compassion. Self-criticism is positively associated with appearance comparison, unfavourable social comparisons, and disordered eating (Duarte et al., 2016; Gilbert et al., 2006; Gilbert et al., 2010; Sturman & Mongrain, 2005; Zelkowitz & Cole, 2019), and predicts disordered eating behaviours longitudinally (Zelkowitz & Cole, 2020). Self-criticism acts as a mediator, for example in the relationships between overvaluation of shape, weight, and eating and shame in people with eating disorders (Duarte et al., 2016) and body image shame and binge-eating (Duarte et al., 2014). Thematic analysis

of websites about perfectionism, a transdiagnostic risk factor for eating disorders, anxiety, and depression (Egan et al., 2011), identified social media as perpetuating perfectionism (Wade et al., 2021). People with lived experience of anxiety and depression included self-criticism in a model linking perfectionism to their anxiety and depression (Wade et al., 2021). Self-criticism is the aspect of perfectionism that most robustly predicts maladjustment (Dunkley et al., 2006), and may underlie the comorbidity between eating, depressive, and anxiety disorders (Williams & Levinson, 2022). In contrast to self-criticism, self-compassion has negative associations with eating disorder symptoms and body image concerns, and self-compassion interventions for disordered eating and body image have a moderate, positive impact on these domains, though the role of self-compassion (i.e., moderating, mediating, or protective factor) is unclear (Turk & Waller, 2020). The intervention we developed was free, brief, self-guided, and did not require a diagnosed eating disorder, to try to circumvent some of the barriers to treatment access described above.

We also developed modules addressing "curating your social media feed" (i.e., using tools on social media to control the types of content you are exposed to so that it is more conducive to wellbeing). This has been suggested as a helpful approach to managing pressures experienced on social media (Cohen et al., 2019; Glover, 2019). It has the potential to reduce exposure to an environmental factor that may increase eating disorder risk, whilst the self-criticism intervention aims to reduce risk by promoting more adaptive responses following exposure. The social media curation modules were conceptualised as an active and credible comparison condition, rather than a second intervention, due to the lack of research on this strategy compared to the evidence for self-criticism.

This was a pilot study, so the primary outcomes were feasibility and acceptability, to inform a future, larger evaluation (see: Leon et al., 2011). Accordingly, preliminary efficacy was a secondary consideration, which was evaluated with respect to appearance-motivated

social media use, appearance comparison, body image flexibility, and disordered eating. We hypothesised that both active conditions (i.e., self-criticism intervention and social media curation) would be engaging, with high levels of module and homework completion, and that between-group effect sizes comparing the active conditions to waitlist control would indicate that the self-criticism intervention impacts more variables than the social media curation condition, based on evidence supporting the transdiagnostic nature of self-criticism.

## Method

### Ethics and Study Registration

This study was approved by the Flinders University Human Research Ethics Committee (project 2345) and was registered with the Australian New Zealand Clinical Trials Registry (ACTRN12621000353897). Although recorded as retrospectively registered, the information about the trial that was accepted by the registry was submitted prior to enrolment of the first participant, and only one participant had enrolled when registration received approval.

### Participants

Inclusion criteria were: 17 to 25 years old, current university student, English fluency, and using social media for appearance-related reasons. The latter criterion was assessed by asking respondents if they thought one of the primary reasons for their social media use was appearance related. The exclusion criterion was concurrent treatment for self-criticism, body image, or disordered eating.

Participants were recruited by advertisements through Flinders University on the psychology student participant pool (reimbursed with research participation credit), and posters/research webpage (neither attracted reimbursement) between March and October 2021. The total sample size was 170 after removing duplicate responses ($n$ = 32), 140 were

eligible, and 130 were randomised (see Figure 1), with 94.7% of participants recruited through the participant pool.

Randomised participants were aged 17 to 25 years ($M$ = 19.29, $SD$ = 1.88) and mostly Oceanian ($n$ = 69, 53.1%), followed by North-West European ($n$ = 17, 13.1%), Southern or Eastern European ($n$ = 8, 6.2%), Southern and Central Asian ($n$ = 5, 3.8%), South-East Asian ($n$ = 3, 2.3%), North-East Asian ($n$ = 2, 1.5%), and North African or Middle Eastern ($n$ = 2, 1.5%). Another 24 participants (18.5%) did not identify with these groups. Most identified as women ($n$ = 116, 89.2%), the remainder as men ($n$ = 9, 6.9%) and non-binary ($n$ = 5, 3.8%).

## Materials

### *Active Conditions*

The self-criticism intervention and social media curation modules were fillable PDF documents (permitting flexibility in completion location and style using a device or printed copy), each comprising four modules of cognitive behaviour therapy-based content and homework exercises. Table 1 provides an outline of the modules, with PDFs available at https://osf.io/xm95n/ (self-criticism intervention) and https://osf.io/r38ef/ (social media curation). They were designed to be completed over one week as one 15-minute module every one to two days. Modules contained text, graphics, links to videos, interactive activities, and references for further information if interested. The modules were written by the first author with input from the second author, and neither set of modules had been evaluated previously.

### *Demographics*

Participants reported their age, height in centimetres, and weight in kilograms; the latter two to calculate body mass index (BMI), with evidence suggesting this should be controlled for in research about social media and body image (Rodgers, Slater, et al., 2020). Participants identified their gender using the three inclusive response options by Cameron

and Stinson (2019). Ethnicity was collected with 10 options: the nine broad cultural and ethnic groups from the Australian Bureau of Statistics (2019) and one option to self-identify.

### *Outcome Measures*

Feasibility and acceptability were the primary outcomes. Feasibility was assessed with two items: “Can you please enter an estimate of how much (as a percentage) of the intervention modules you completed (i.e., how much you read and how many questions you answered in the PDFs)?” and “Can you please enter an estimate of how much (as a percentage) of the homework tasks you completed?”. Acceptability was evaluated via responses to: “What did you like about the intervention?”, “What did you dislike about the intervention?”, and “Do you have any other feedback for us?”. Table 2 outlines the secondary outcome measures and their internal consistency in this study.

## Procedure

Advertisements linked to the Qualtrics survey platform, which hosted all surveys. After completing baseline measures, and on confirming interest in receiving the intervention, participants were randomised using a Qualtrics feature that randomly embeds data. Participants in the active conditions were emailed the modules, asked to complete them over one week, and a week later were emailed a link to another survey of the primary and secondary outcome measures (the waitlist control group received just the secondary outcome measures). Written responses were collected for the acceptability items. The surveys asked if participants consented to being sent the optional two-weeks post-randomisation (i.e., one-week follow-up) measures; those who consented were emailed a link to a survey containing the secondary outcome measures. Reimbursement for participants from the participant pool was given on completion of the one-week post-randomisation measures. To minimise respondent burden and mitigate the risk of introducing desirability bias to their use of the modules, participants were not asked to return completed modules to the researchers.

## Statistical Analyses

### *Data Preparation and Preliminary Analyses*

The data were prepared and analysed with IBM SPSS Statistics (version 28.0.1.0), using an alpha level of .05, and effect sizes interpreted per guidelines by Cohen (1988). Mean item scale scores for secondary outcomes were calculated, which are more easily interpreted than total scores. There were no outliers or significant departures from normality on secondary outcomes. We used ANOVAs to test for group differences at baseline on the secondary outcomes and BMI, and whether dropout at post-treatment occurred at random.

### *Analysis of Primary and Secondary Outcomes*

Descriptive statistics for feasibility items were calculated. Responses to the acceptability items were examined using content analysis to extract categories, following the steps outlined by Erlingsson and Brysiewicz (2017). The first author reviewed the data, produced the original categories, and completed the first round of coding. Subsequently, a research assistant used the categories generated by the first author to independently code the data. The first author calculated percentage of inter-coder agreement and Cohen's kappa (Cohen, 1960) as measures of inter-coder reliability. Cohen's kappa is a measure of inter-coder agreement that accounts for chance agreement between coders. Guidelines for its interpretation are: 0 - .20 no agreement; .21 - .39 minimal agreement; .40 - .59 weak agreement; .60 - .79 moderate agreement; .80 - .90 strong agreement; and above .90 almost perfect agreement (McHugh, 2012). After the first round of coding, five of 23 categories had inadequate inter-coder reliability, with 80% inter-coder agreement and Cohen's kappa of .60 as the minimum threshold for adequacy. The coders discussed these categories, resulting in revisions to some categories and replacement of others, then independently recoded the data for those categories, obtaining adequate inter-coder reliability for all categories. The coders resolved the remaining differences for the final codes. Responses varied in length and detail,

such that more than one category could be identified within them. A handful of responses were not coded to any category because they were unique compared to other responses. The final item requesting additional comments was not a specific question, so content analysis was not undertaken; instead, any novel insights were noted.

We analysed preliminary efficacy with respect to secondary outcomes for all randomised participants (i.e., including dropouts) with linear mixed models, which use maximum likelihood estimation, whereby available data are used to produce estimates of the parameters that were most likely to have occurred, enabling estimation of significance when data are missing. Group, time, a two-way interaction between group and time, and BMI were included as fixed effects. Preliminary efficacy was assessed by examining group by time interactions, between-groups effects sizes at one- and two-weeks post-randomisation (if randomisation successfully creates equivalent groups at baseline, significant between-groups effects at later points suggest outcomes differed due to group allocation), and line graphs depicting change over time within groups. Between-groups Cohen's *d*s were calculated with the Campbell Collaboration tool (https://campbellcollaboration.org/research-resources/effect-size-calculator.html), inputting sample sizes, means, and standard deviations for completer statistics, and sample sizes, means, and standard errors for intention to treat statistics.

## Results

### Participant Flow

Figure 1 describes participant flow. Attrition was 23.1% at one-week post-randomisation and 59.2% at two-weeks post-randomisation. Non-reimbursed participants had slightly lower attrition (16.7% and 50.0% at one- and two-weeks post-randomisation, respectively) than reimbursed participants (23.4% and 59.7% at one- and two-weeks post-randomisation, respectively).

### Descriptive Statistics and Correlations

Table 3 contains baseline descriptive statistics for all randomised participants. Using a total score of ≥15 (i.e., mean item score of ≥1.25) on the short version of the Eating Disorder Examination Questionnaire as the threshold (Prnjak et al., 2020), 64 participants (49.2%) reported clinically significant disordered eating at baseline. Mean BMI in the average range (i.e., 18.5-25) was reported by 62.9% of participants, with 5.7% below and 31.4% above this range. Variables had significant, weak to strong correlations in the expected directions.

## Baseline Analyses

Participants were divided into four groups: waitlist control, self-criticism intervention, social media curation, and those who declined randomisation. Group descriptive statistics are in Table A.1 and the results of the ANOVAs assessing for baseline differences in groups appear in Table A.2. Groups did not differ on outcome measures or BMI at baseline.

To examine whether dropout occurred at random, randomised participants were divided into dropouts ($n$ = 30, 23%) and one-week post-randomisation completers ($n$ = 100, 77%). Dropout was not significantly related to baseline measures (see Table A.2), nor was it predicted by group, $F(2, 127) = 0.10$, $p = .91$, suggesting data are missing at random.

## Feasibility and Acceptability

### *Feasibility*

Self-reported module completion was high and comparable in both active conditions. Participants reported completing an average of 82.0% ($SD$ = 19.4) of the self-criticism intervention modules, and 84.0% ($SD$ = 21.9) of the social media curation modules. Thirteen participants in the self-criticism intervention condition (39.4%) and 16 participants in the social media curation condition (48.5%) reported fully completing the modules. Average module completion was 88.0% for the non-reimbursed participants ($n$ = 2) and 82.86% for the reimbursed participants ($n$ = 64).

Participants' self-reported homework completion was high and similar across active conditions. They reported completing 77.2% (*SD* = 24.6) of the self-criticism intervention homework, and 78.2% (*SD* = 23.7) of the social media curation homework. Eleven participants in the self-criticism intervention condition (33.3%) and 13 participants in the social media curation condition (39.4%) reported completing 100% of the homework exercises. Average homework completion was 84.5% for the non-reimbursed participants and 77.5% for the reimbursed participants.

***Acceptability***

**Self-Criticism Intervention.** Feedback suggested that participants had favourable opinions of the intervention (see Table A.3). Six specific aspects that participants liked emerged: 1) it prompted self-reflection; 2) the structure and format; 3) the content; 4) that it was easy to understand and complete; 5) it helped them practice new tools and strategies; and 6) its tone. Cohen's kappa values suggested moderate to strong inter-coder agreement for these categories. Another six categories emerged regarding what they disliked: 1) it was time-consuming; 2) parts of the information were overwhelming or hard to understand; 3) they did not dislike anything; 4) they experienced challenges with it being self-directed; 5) completing the intervention over several days; and 6) finding it repetitive. Cohen's kappa values indicated moderate to almost perfect inter-coder agreement on these categories. When requesting any additional feedback, amendments to the intervention were proposed: giving more time to complete it, implementing email reminders, and including a daily questionnaire or journal entry.

**Social Media Curation Condition.** Results are based on 32 available responses (see Table A.4 for details). Participants demonstrated positive views of the social media curation modules. The six categories observed in their reports as to what they liked were: 1) they promoted insight around social media and its effects; 2) they were informative; 3) they were

easy to understand and complete; 4) their structure and format; 5) they helped them make positive changes to their social media use; and 6) they produced additional benefits to them beyond social media. Cohen's kappa values suggested moderate to almost perfect inter-coder agreement on these categories. When asked what they disliked, respondents commonly denied disliking anything. The four other categories were that: they disliked recording their social media use; it was confronting to see their extent of social media use and how it affects them; it was time-consuming; and it was self-directed. Cohen's kappa values suggested moderate to almost perfect inter-coder agreement on these categories. Suggestions were made for improvements: including an outline of the modules with a timeline and replacing some text with alternative media.

**Preliminary Efficacy**

Estimated group changes across measurement points for all randomised participants are provided in Table 4. There were significant group by time interactions for appearance motivations for social media use, self-criticism, and disordered eating, and significant main effects of time and BMI for all five outcomes.

***One-Week Post-Randomisation***

The between-groups effect sizes and 95% confidence intervals (both completer and intention to treat; see Table 5) indicate that at one-week post-randomisation, the self-criticism intervention group had significantly lower appearance motivations for social media use, appearance comparison, and disordered eating, and significantly higher body image flexibility than the waitlist control group, each with a moderate effect. The social media curation group demonstrated significantly lower appearance comparison than the waitlist control group, with a moderate effect. There were no significant differences between the self-criticism intervention group and the social media curation group, although effect sizes above .20 on several outcomes could translate into significant differences favouring the self-

criticism intervention in a trial with more power. Figure 2 illustrates changes in each group over measurement points.

### *Two-Weeks Post-Randomisation*

Table 6 provides between-groups effect sizes at two-weeks post-randomisation. Generally, improvements noted in the self-criticism intervention group were still evident, suggesting treatment gains were maintained, excepting disordered eating, which was no longer significantly different to waitlist control. There were fewer significant effects in the completer sample, although the size of effects was similar, with power reduced due to attrition at follow-up. The improvement in appearance comparison in the social media curation group compared to the waitlist control group was retained. As seen in Figure 2, the self-criticism intervention group had the strongest trajectory of positive change on all five outcomes.

### *Moderator Analysis*

Post-hoc analyses examined whether outcomes varied by baseline disordered eating. Clinically significant baseline disordered eating (present/absent, using threshold described above) and all two-way and three-way interaction between group, time, and baseline disordered eating, were added as fixed effects in four linear mixed models with appearance motivations for social media use, appearance comparison, self-criticism, and body image flexibility as the outcomes, respectively. There were no significant three-way interactions, suggesting baseline disordered eating did not moderate outcomes.

## Discussion

This study represents the first evaluation of an intervention designed for young adults that aims to reduce self-criticism to reduce the detrimental impact of social media on body image and eating. It is only the second intervention targeting effects of social media to be delivered outside of classrooms. Findings provided preliminary support for the feasibility and

acceptability of the intervention. Rates of recruitment of non-reimbursed participants and considerable attrition at two weeks post-randomisation (for which no reimbursement was offered) suggest that reimbursement will be important for attracting and retaining participants in future designs but may not affect engagement with the intervention. Approximately half of the participants demonstrated clinically significant disordered eating at baseline, indicating that this intervention can attract people at elevated risk. Preliminary examination of effects on outcomes of interest suggests that the self-criticism intervention shows promise as a potentially effective tool for reducing harmful consequences associated with social media. Further evaluation of the intervention in a larger randomised, controlled trial is warranted.

Participants liked the breakdown of the intervention into modules, variety of exercises, interactive elements, and encouragement to come to one's own conclusions. They also suggested modifications: providing longer estimated times and including an outline of the modules and homework exercises at the beginning. Challenges associated with the self-guided approach may be addressed by encouraging participants to institute phone or computer reminders. Information processing may be facilitated by increasing use of mediums other than text (e.g., images and video links). If further research in a larger trial supports the efficacy of the intervention, conversion to an online platform could address the latter two modifications (e.g., via automated reminders, embedding videos, and increasing interactive elements). Unsurprisingly, there was overlap between what participants liked and disliked about the interventions. For example, in the social media curation condition, some participants said it was confronting to face their social media use; however, the majority highlighted improving insight into their social media use as a positive. Moreover, confronting social media use is not necessarily associated with negative impacts – this awareness-raising may be the first step to making adaptive changes (see, for example: Prochaska et al., 1992).

The self-criticism intervention showed promise for improving body image and reducing disordered eating. Compared to previous interventions primarily developed for adolescents (Bell et al., 2021; Gobin et al., 2022; Gordon et al., 2021; McLean et al., 2017; Svantorp-Tveiten et al., 2021), where effects were typically null to small, effects were moderate in this study. This requires further examination in an adequately powered trial but suggests that the self-criticism intervention may be at least as effective as previous interventions. Evaluations of some of these interventions included a follow-up period examining a longer timespan than the present study (8 weeks to 12 months; Bell et al., 2021; Gordon et al., 2021; Svantorp-Tveiten et al., 2021). The use of a brief follow-up period and low power at follow-up limited the present study, preventing conclusions about maintenance of effects or comparison with previous interventions. Yet, it was encouraging to see that improvements observed in the self-criticism intervention group were largely maintained one week after intervention completion. Future trials should adopt a longer follow-up period and maximise power by including follow-up as a main component of the study instead of an optional extra.

Whilst the self-criticism intervention was the primary focus, the social media curation condition was also novel. It yielded similar improvements to the self-criticism intervention on appearance comparison at one- and two-weeks post-randomisation. This condition included a module to increase social media literacy, an approach that has shown some success in previous interventions (Gordon et al., 2021; McLean et al., 2017). The tripartite influence model (Thompson et al., 1999) would suggest that reducing exposure to appearance ideals on social media leads to reduced pressure to meet those ideals and fewer appearance comparisons, and curating the social media feed may have achieved this. However, further research is required to explore whether actual change in exposure to appearance ideals follows completion of the modules. Feedback also suggested the social media curation

modules were potentially more acceptable than the self-criticism intervention, with more participants reporting there was nothing they disliked and fewer finding it time-consuming or that self-direction was a barrier in the former than the latter group. Hence, intervention length and challenges associated with the self-directed approach may be two primary areas to address in improving acceptability of the self-criticism intervention.

Limitations of this study should be considered. We had a majority female sample, in common with other university samples (see, for example: Grieve et al., 2021; Johnson et al., 2019; Wade et al., 2019), limiting generalisability to other young adults. The underrepresentation of genders other than female also precludes assessment of gender differences in outcomes, which have been observed in previous interventions (Bell et al., 2021; Gordon et al., 2021; Svantorp-Tveiten et al., 2021). This is an important avenue for investigation in subsequent evaluations of this intervention.

Whilst attrition at one-week post-randomisation (when data on the primary outcomes of feasibility and acceptability were collected) was at a typical level for self-guided mental health interventions (see: Karyotaki et al., 2018; Karyotaki et al., 2017; Linardon & Fuller-Tyszkiewicz, 2020)), the design of future trials examining efficacy should be amended to maximise retention and address the more significant attrition at follow-up; for example, offering monetary incentives for completing assessments (Brueton et al., 2014). Participant feedback from this study discussed above also suggests avenues for maximising retention in future trials of this and other online interventions. Attracting a larger sample will also enable further examination of moderation by baseline psychopathology. Although baseline disordered eating did not moderate outcomes, suggesting that people with clinically elevated symptoms did not respond differently to other participants based on group allocation, it would be prudent to reanalyse this with more power, since any significant findings would inform selection of intervention strategies.

There were potential measurement issues. Between-groups effect sizes suggested the self-criticism intervention produced modest reductions in self-criticism that were not significantly different to control, despite this being the intervention's focus. There was a significant group by time interaction for this outcome; examination of the line graphs suggests this was associated with the self-criticism group having slightly higher self-criticism at baseline than the other groups, but lower self-criticism at subsequent measurements. Hence, the lack of significant between-groups differences at those later measurement points may simply reflect the higher starting point of the self-criticism group and the low power to detect smaller effects. Adjusting for baseline observations and adding alternative measures of self-criticism may aid interpretation in future studies that have adequate power to test for mediation in other outcomes by change in self-criticism. Also, while the self-criticism intervention was intended to also increase self-compassion, we did not measure self-compassion, so cannot ascertain whether this aim was achieved. High attrition is common in online interventions (Eysenbach, 2005), and we selected self-criticism as the main variable for this pilot study to reduce respondent burden. However, future evaluations should measure self-compassion to determine whether improvements in outcomes are related to increases in self-compassion. Moreover, measuring treatment and homework completion via self-report, though not uncommon (see, for example: Cooper et al., 2017; Watts et al., 2013) may have introduced demand characteristics.

A final consideration relates to the comparison of reimbursed and non-reimbursed participants. We reported rates of recruitment, attrition, and homework and module completion for these groups. However, because so few participants were recruited via non-reimbursed pathways, we were underpowered to statistically analyse for group differences; this should be addressed in future, adequately powered trials.

## Conclusion

The self-criticism intervention evaluated in this study, which is unique with respect to focus, target age group, and delivery format, showed promise as a tool for intervening in the relationship between appearance-motivated social media use and eating disorder risk. It demonstrated reasonable feasibility and acceptability and trends suggest it produced improvements in outcomes of interest. Future research can expand on the promising findings of this pilot study by conducting a full-scale randomised controlled trial, using feedback from this study to inform modifications, to enable more definitive conclusions about efficacy.

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**Table 1**

*Outline of Modules*

| Module | Content Summary |
|---|---|
| | Self-Criticism |
| 1 | Psychoeducation about self-criticism and self-compassion<br>*Homework*: recording instances of self-criticism and self-compassion |
| 2 | Learning more about self-compassion, identifying barriers to self-compassion<br>*Homework*: rating productivity in several areas of life, living one day as usual and the next day actively using self-compassion |
| 3 | Generating personally relevant self-compassion statements, imagery rescripting on a recent memory involving self-criticism about appearance<br>*Homework*: revisiting the rescripted memory |
| 4 | Problem-solving social media use to reduce its potential to impact body image<br>*Homework*: implementing the solution generated through problem-solving |
| | Social Media Curation |
| 1 | Psychoeducation about social media and its relationship to mental health<br>*Homework*: recording time and reason for social media use and feelings after |
| 2 | Discussion of how and why social media content may be idealised/inauthentic, questions to consider about social media content to improve social media literacy<br>*Homework*: recording when and how you noticed inauthenticity on social media |
| 3 | Identifying what you like/dislike about social media, thinking about how to maximise exposure to the former and limit exposure to the latter<br>*Homework*: recording the types of content you see on social media and whether this impacts your wellbeing positively or negatively |
| 4 | Using reflections from the previous exercises and tools available on social media to produce a plan to curate your feed to improve your wellbeing<br>*Homework*: implementing this plan and recording its effects |

**Table 2**

*Secondary Outcomes Measures and Their Internal Consistency at Each Measurement Point*

| Outcome | Measure | Cronbach's α at baseline, one-, and two-weeks post-randomisation |
|---|---|---|
| Appearance motivations for social media use | 5-item Appearance subscale of the Motivations for Social Media Use Scale (Rodgers, McLean, et al., 2020) | 82, .80, .89 |
| Appearance comparison | 11-item Physical Appearance Comparison Scale-Revised (Schaefer & Thompson, 2014) | .95, .96, .96 |
| Self-criticism | 9-item Self-Criticism subscale of the Reconstructed Depressive Experiences Questionnaire (Bagby et al., 1994) | .85, .88, .85 |
| Body image flexibility | 12-item Body Image Acceptance and Action Questionnaire (Sandoz et al., 2013) | .93, .95, .96 |
| Disordered eating | 12-item, short version of the Eating Disorder Examination Questionnaire (Gideon et al., 2016)[a] | .89, .91, .92 |

[a] Unlike the full-length Eating Disorder Examination Questionnaire, which measures symptoms over the past 28 days, the short version used in this study examines only the past seven days.

**Table 3**

*Correlation Matrix and Descriptive Statistics at Baseline (n = 130)*

| Variable | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| 1. Appearance motivations | - | | | | | |
| 2. Appearance comparison | .52*** | - | | | | |
| 3. Self-criticism | .48*** | .50*** | - | | | |
| 4. Body image flexibility | -.44*** | -.69*** | -.70*** | - | | |
| 5. Disordered eating | .38*** | .61*** | .60*** | -.77*** | - | |
| 6. BMI | .20* | .27** | .36*** | -.42*** | .38*** | - |
| *M* | 3.17 | 2.63 | 4.29 | 3.74 | 1.21 | 23.85 |
| *SD* | 0.89 | 0.97 | 1.12 | 1.34 | 0.61 | 5.17 |
| Min | 1.00 | 0.27 | 1.00 | 1.33 | 0.17 | 15.16 |
| Max | 5.00 | 4.00 | 6.11 | 6.83 | 2.75 | 48.33 |

*Note*. Appearance motivations = appearance motivations for social media use. Correlations are two-tailed.

*$p < .05$. **$p < .01$. ***$p < .001$

**Table 4**

*Estimated Group Scores on Outcome Measures at Baseline, Post-Treatment, and One-Week Follow-Up for Randomised Participants (n = 130)*

| Outcome (range) | Group | $M_B$ | $SE_B$ | $M_{PT}$ | $SE_{PT}$ | $M_{FU}$ | $SE_{FU}$ |
|---|---|---|---|---|---|---|---|
| Appearance motivations (1-5) | Control | 3.15 | 0.14 | 3.12 | 0.14 | 3.11 | 0.19 |
| | S-C intervention | 3.18 | 0.13 | 2.59 | 0.14 | 2.44 | 0.21 |
| | SM condition | 3.15 | 0.14 | 2.76 | 0.14 | 2.65 | 0.20 |
| Appearance comparison (0-4) | Control | 2.82 | 0.14 | 2.56 | 0.16 | 2.65 | 0.17 |
| | S-C intervention | 2.63 | 0.14 | 2.02 | 0.16 | 1.86 | 0.18 |
| | SM condition | 2.40 | 0.14 | 1.89 | 0.16 | 2.06 | 0.17 |
| Self-criticism (1-7) | Control | 4.27 | 0.16 | 3.99 | 0.19 | 4.23 | 0.20 |
| | S-C intervention | 4.42 | 0.16 | 3.66 | 0.19 | 3.70 | 0.21 |
| | SM condition | 4.11 | 0.16 | 3.95 | 0.19 | 3.82 | 0.21 |
| Body image flexibility (1-7) | Control | 3.61 | 0.19 | 3.85 | 0.21 | 3.79 | 0.25 |
| | S-C intervention | 3.79 | 0.19 | 4.54 | 0.21 | 4.55 | 0.26 |
| | SM condition | 3.93 | 0.19 | 4.20 | 0.21 | 3.94 | 0.26 |
| Disordered eating (0-3) | Control | 1.21 | 0.09 | 1.13 | 0.10 | 1.08 | 0.11 |
| | S-C intervention | 1.20 | 0.09 | 0.81 | 0.10 | 0.85 | 0.12 |
| | SM condition | 1.20 | 0.09 | 0.94 | 0.10 | 0.92 | 0.12 |

*Note*. B = baseline, PT = post-treatment, FU = follow-up. Appearance motivations = appearance motivations for social media use. S-C intervention = self-criticism intervention. SM condition = social media curation condition.

**Table 5**

*Between-Groups Cohen's (95% Confidence Intervals) at Post-Treatment for Completers (n = 100; Upper Diagonals) and the Intention to Treat Sample (n = 130; Lower Diagonals)*

| | S-C Intervention | SM Condition | Control |
|---|---|---|---|
| *Appearance Motivations for Social Media Use* | | | |
| S-C intervention | – | -0.16 (-0.64, 0.32) | **-0.49 (-0.98, -0.01)** |
| SM condition | -0.18 (-0.60, 0.24) | – | -0.40 (-0.88, 0.09) |
| Control | **-0.57 (-1.00, -0.14)** | -0.39 (-0.82, 0.03) | – |
| *Appearance Comparison* | | | |
| S-C intervention | – | 0.14 (-0.35, 0.62) | **-0.53 (-1.02, -0.05)** |
| SM condition | 0.12 (-0.30, 0.54) | – | **-0.65 (-1.15, -0.16)** |
| Control | **-0.51 (-0.94, -0.08)** | **-0.63 (-1.07, -0.20)** | – |
| *Self-Criticism* | | | |
| S-C intervention | – | -0.40 (-0.89, 0.09) | -0.29 (-0.78, 0.19) |
| SM condition | -0.24 (-0.66, 0.18) | – | 0.06 (-0.42, 0.54) |
| Control | -0.27 (-0.69, 0.15) | -0.03 (-0.45, 0.39) | – |
| *Body Image Flexibility* | | | |
| S-C intervention | – | 0.34 (-0.15, 0.83) | **0.51 (0.02, 0.99)** |
| SM condition | 0.25 (-0.17, 0.67) | – | 0.16 (-0.32, 0.64) |
| Control | **0.51 (0.08, 0.93)** | 0.26 (-0.17, 0.68) | – |
| *Disordered Eating* | | | |
| S-C intervention | – | -0.32 (-0.81, 0.16) | **-0.51 (-1.00, -0.02)** |
| SM condition | -0.21 (-0.63, 0.21) | – | -0.20 (-0.68, 0.28) |
| Control | **-0.51 (-0.94, -0.08)** | -0.30 (-0.73, 0.12) | – |

*Note*. S-C intervention = self-criticism intervention. SM condition = social media curation condition. Bolded results indicate significant effect sizes, evidenced by confidence intervals that do not cross zero.

**Table 6**

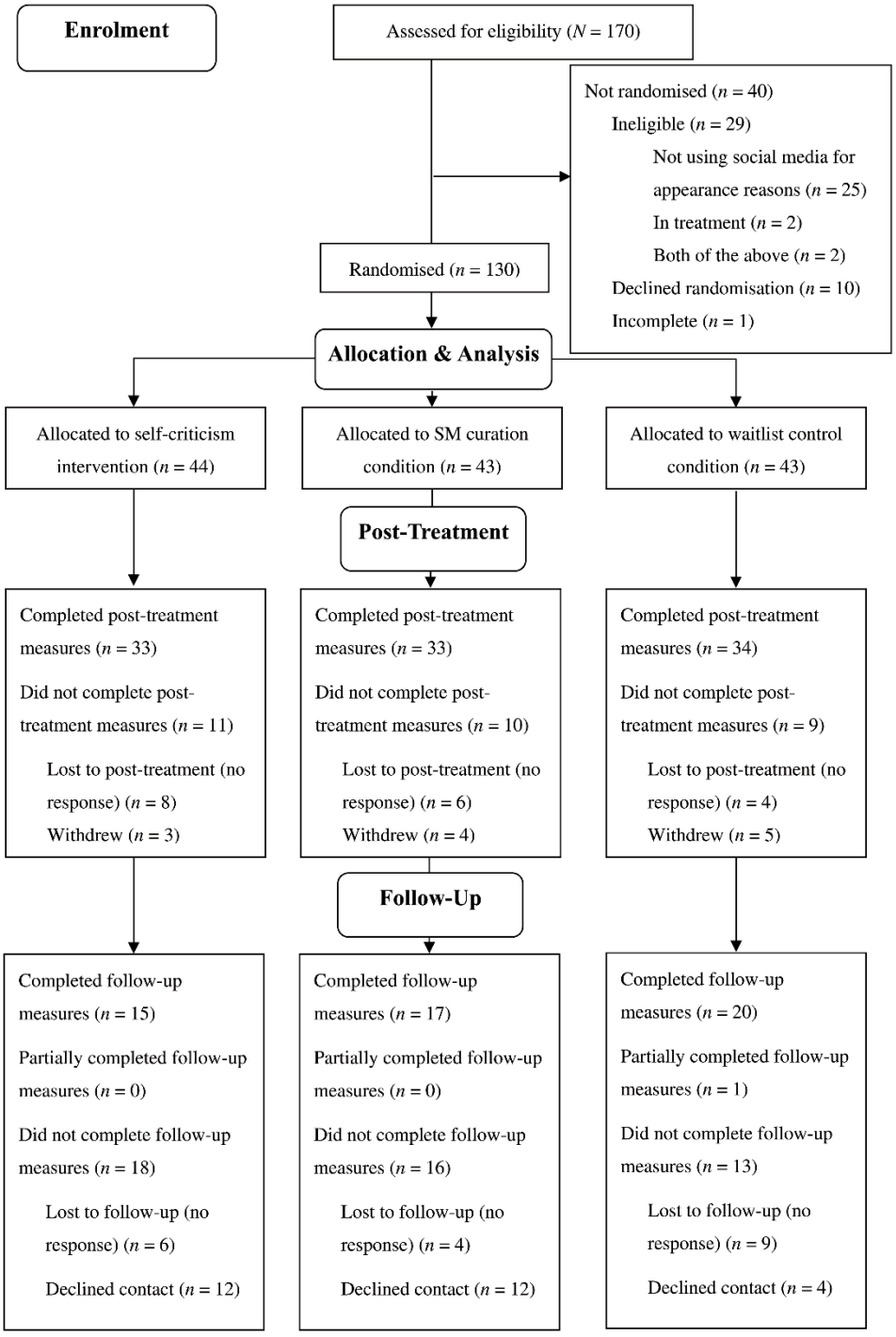
*Between-Groups Cohen's (95% Confidence Intervals) at One-Week Follow-Up for Completers (n = 52; Upper Diagonals) and the Intention to Treat Sample (n = 130; Lower Diagonals)*

| | S-C Intervention | SM Condition | Control |
|---|---|---|---|
| *Appearance Motivations for Social Media Use* | | | |
| S-C intervention | – | -0.01 (-0.71, 0.68) | -0.40 (-1.08, 0.27) |
| SM condition | -0.16 (-0.58, 0.26) | – | -0.43 (-1.09, 0.22) |
| Control | **-0.51 (-0.94, -0.09)** | -0.36 (-0.78, 0.07) | – |
| *Appearance Comparison* | | | |
| S-C intervention | – | -0.39 (-1.09, 0.31) | **-0.82 (-1.52, -0.12)** |
| SM condition | -0.17 (-0.59, 0.25) | – | -0.60 (-1.26, 0.06) |
| Control | **-0.70 (-1.13, -0.26)** | **-0.53 (-0.96, -0.10)** | – |
| *Self-Criticism* | | | |
| S-C intervention | – | -0.39 (-1.09, 0.31) | -0.53 (-1.22, 0.15) |
| SM condition | -0.09 (-0.51, 0.33) | – | -0.27 (-0.92, 0.38) |
| Control | -0.40 (-0.82, 0.03) | -0.32 (-0.74, 0.11) | – |
| *Body Image Flexibility* | | | |
| S-C intervention | – | 0.65 (-0.06, 1.37) | 0.53 (-0.15, 1.20) |
| SM condition | 0.36 (-0.06, 0.78) | – | 0.02 (-0.62, 0.66) |
| Control | **0.46 (0.03, 0.89)** | 0.09 (-0.33, 0.52) | – |
| *Disordered Eating* | | | |
| S-C intervention | – | -0.27 (-0.96, 0.43) | -0.45 (-1.13, 0.23) |
| SM condition | -0.09 (-0.51, 0.33) | – | -0.24 (-0.89, 0.41) |
| Control | -0.30 (-0.72, 0.12) | -0.21 (-0.64, 0.21) | – |

*Note*. S-C intervention = self-criticism intervention. SM condition = social media curation condition. Bolded results indicate significant effect sizes, according to confidence intervals that do not cross zero.

**Figure 1**

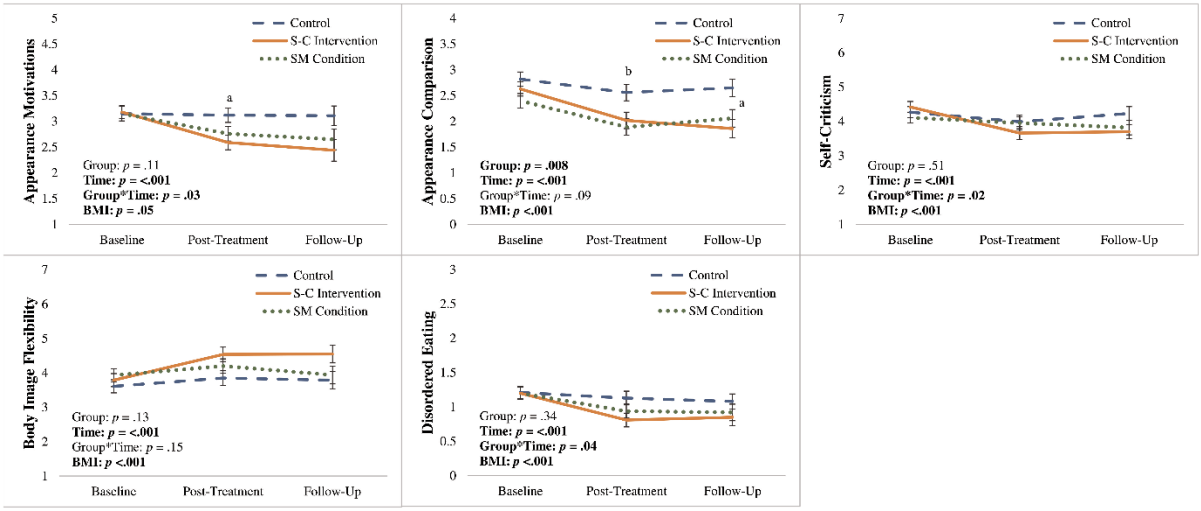
*Flow Diagram*




*Note*. SM curation condition = social media curation condition.

**Figure 2**

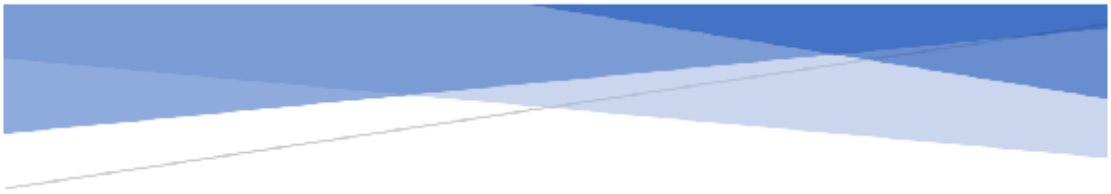
*Line Graphs of Outcomes Across Measurement Points, Controlling for BMI*




*Note*. S-C Intervention = self-criticism intervention. SM Condition = social media curation condition. Appearance motivations = appearance motivations for social media use. Y axes cover possible score ranges for each outcome. Bolded results indicate significant effects from the linear mixed models. Error bars represent standard errors.

**APPENDIX C**

Self-Criticism Modules



# CRITICISM AND COMPASSION

4 brief modules that aim to help you adjust the balance of self-criticism and self-compassion in your life to improve your psychological wellbeing.

## Module 1: The Tripod for Balance in Life

Over these four modules, we'll introduce you to some concepts about balance in life: pursuing important goals whilst also practising self-care. Throughout the modules, we'll keep the information as simple and uncluttered as possible but provide references at the end, so you can look up the evidence for yourself.

**Psychologists believe that to achieve optimal balance and achievement in life, we need three things.[1]**


We view this as tripod. If one of the legs is missing or faulty, the whole thing falls over.

Think about Laura, who has a dream to become a journalist and is currently doing a journalism degree. The workload is more difficult than she expected.

- If Laura lacked **drive** what might happen?

Laura finds that her part-time job means she does not have enough time to do as well in her coursework as she needs to get her the interstate job she wants.

- If Laura lacked a sense of **threat**, what might happen?

Laura gets one assignment back where she did worse than she expected, as she had misunderstood the question.

- If Laura lacked **self-compassion**, what might happen?

In each case, the overall outcome is the same. Laura will not achieve her highly valued goal, whether it be because she gives up in the face of difficulty, does not give up her part-time job, or beats herself up and procrastinates on the next assignment because she thinks she is not up to it, rather than seeking support to ensure she does not make the same mistake next time.

**While most people can appreciate the value of drive and anxiety, many fewer are convinced about the value of self-compassion. These modules help you to examine the place of self-compassion in your life and whether you need to reduce your self-criticism.**

Researchers have found that **self-compassion** is associated with[2]:

- Being more productive, in terms of:
  - Reaching goals
  - Resilience when a goal is not achieved, with a quicker recovery time
  - Less procrastination
  - Less worry and fear of failure about study
  - Conscientiousness
- Feeling better emotionally, in terms of:
  - Happiness
  - Optimism
  - Agreeableness

In contrast, **self-criticism** is associated with:

- Depression, anxiety, and disordered eating
- Less involvement in social activities and less intimate connections
- Rumination
- Loss of self-esteem
- Less progress toward valued goals and greater levels of procrastination and avoidance

Self-criticism can be triggered by many things and might depend on the things about you that most concern you. Here are some examples of things that can trigger self-criticism:

- Making a spelling mistake on an assignment
- Having an unkind thought about someone
- Noticing a pimple on your face
- Not playing as well in a sporting match as usual
- Telling a joke that no one laughs at
- Having an argument with someone
- Burning the food that you were cooking for dinner
- Seeing a photo of someone on social media who you think looks better than you

| Examples of the self-critical voice | Examples of the self-compassionate voice |
|---|---|
| *"You are a loser"* | *"You can do it"* |
| *"If you don't win, you are a failure"* | *"It's okay, you tried your best, there's always next time"* |
| *"You should just give up now"* | *"Just keep trying, you will get there"* |
| *"If you don't do well, no one will like you"* | *"I am good at lots of other things, people will still like me if I'm not great at this one thing"* |
| *"If you make a mistake, everyone will think you are stupid"* | *"I don't have to get absolutely everything right, everyone makes mistakes"* |

## Module 1 Homework

This homework exercise is designed to help you learn about the balance between self-compassion and self-criticism in your life.

For the next few days, keep a note of any situations when things don't go according to plan or don't go well. Write down what the situation was (for example, tripping over in front of someone), and note if your immediate thought was self-compassionate (e.g., "everybody does that from time to time") or self-critical (e.g., "I'm so stupid, I can't believe I did that"). Look at how you felt at the time.

Keep notes on the record below or keep a note of it on your phone if that is easier for you. Try to write down at least 5 examples, so you can see if you tend to use self-compassion or self-criticism.

| Situation | Self-Critical Thought(s) | Self-Compassionate Thought(s) | Feelings |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

**References to look up if you want more information:**

1: Gilbert P. (2014). The origins and nature of compassion focused therapy. *The British Journal of Clinical Psychology*, *53*(1), 6–41. https://doi.org/10.1111/bjc.12043

2: Warren, R., Smeets, E., & Neff, K. (2016). Self-criticism and self-compassion: Risk and resilience. *Current Psychiatry*, *15*(12), 18-33. https://self-compassion.org/wp-content/uploads/2016/12/Self-Criticism.pdf

## Module 2: Self-Criticism and Self-Compassion

### Homework Review

**Read through the diary you have been keeping and answer the following questions.**

**Did you notice if you used self-criticism more than self-compassion? Did you notice any patterns in the types of situations that make you self-criticise? For example, do you often self-criticise when using social media? Or during social outings? If you do not notice any patterns in your self-criticism, you might like to do the diary again for a couple more days and then come back to this question. Write down 1 or 2 things that most commonly cause you to self-criticise based on your diary:**

**What do you notice about the thoughts and feelings you have when you self-criticise? Do you think they are helpful or unhelpful for you? Are there any feelings that come up more often than others? Write a quick reflection on what you learned about your self-critical thoughts and how they make you feel.**

### The Problems with Self-Criticism

**As we discussed in the last module, self-criticism is linked to poorer wellbeing. One way that researchers think we can protect ourselves against the unwanted effects of self-criticism is to develop more self-compassion.**

**Self-compassion involves showing yourself kindness and care when you experience setbacks, make mistakes, or notice things about yourself that you don't like. It looks at the whole picture, rather than just the bits that show you in the worst light. Watch the YouTube clip below to see what happens when you practise "selective attention" (i.e., when you don't look at the whole picture).**

https://www.youtube.com/watch?v=pTv4yD6BK1A

**Important information is missed when people focus on selective aspects rather than the whole picture, and this will bias the decisions and choices you make in a way that wouldn't happen if you were looking at all of the evidence available (rather than just some bits). Self-compassion can help you broaden your attention, so that you don't miss parts of the story, and therefore develop more informed thoughts and decisions. If you're interested, there are some great resources on self-compassion from Dr Kristen Neff, who has spent her career researching it[1].**

## Why Do People Find Self-Compassion So Hard to Practise?

**Note:** The questionnaire that was included at this point of the module is not the intellectual property of the authors of these modules and has therefore been redacted. The questionnaire that was originally included is the measure of fear of compassion for self that is available from: https://depts.washington.edu/uwcssc/sites/default/files//hw00/d40/uwcssc/sites/default/files/Fear%20of%20Compassion%20Scale.pdf.

The reference for the publication that details the development of the questionnaire is: Gilbert, P., McEwan, K., Matos, M., & Rivis, A. (2011). Fears of compassion: Development of three self-report measures. *Psychology and Psychotherapy, 84*(3), 239–255. https://doi.org/10.1348/147608310X526511

## What is Self-Compassion?

Self-compassion involves three parts, which all work together:

1. Treating yourself kindly (as opposed to harshly)
2. Realising that you are a person, and all people make mistakes (as opposed to feeling like your mistakes set you apart from other people)
3. Being more mindful during negative experiences (i.e., acknowledging bad or painful aspects of the experience without exaggerating them or ignoring the neutral or positive aspects)

The easiest way to generate self-compassionate statements is to think of the things you would say to a friend: someone you care about and someone you want to see do well.

## Module 2 Homework

Over the next 2 days, we would like you to first try using your normal patterns (including self-criticism), and then self-compassion, to see what impact these approaches have on you.

On the first day, live like you normally do, without making any effort to change anything about your habits. Keep a record of how many times you self-criticise that day and rate your productivity in several areas using the record on the next page. Also, make a note of how you felt that day.

On the second day, choose a self-compassionate message or messages (e.g., "Everyone makes mistakes, but I'm doing my best"). Keep reminding yourself of that message(s); you might like to write it on the back of your hand or set up a reminder of the message on your phone to pop up several times that day. If you feel the urge to self-criticise, think about your self-compassionate message instead. Again, rate your productivity for that day and how you felt using the record below.

**DAY ONE – NORMAL**

| | |
|---|---|
| How many times did you self-criticise today? | |
| On a scale of 1-10, where 1 means not productive at all and 10 means the most productive you could possibly be, rate how productive you felt in the following areas of your life today: | |
| Study | |
| Work (if you have a job) | |
| Hobbies | |
| Social life | |
| On a scale of 1-10, where 1 means not feeling good at all and 10 means feeling the best you could possibly feel, how did you feel today? | |

**DAY TWO – SELF-COMPASSION**

Write the self-compassionate message(s) you chose in this box:

| |
|---|
| |

| | |
|---|---|
| How many times did you use self-compassion today? | |
| On a scale of 1-10, where 1 means not productive at all and 10 means the most productive you could possibly be, rate how productive you felt in the following areas of your life today: | |
| Study | |
| Work (if you have a job) | |
| Hobbies | |
| Social life | |
| On a scale of 1-10, where 1 means not feeling good at all and 10 means feeling the best you could possibly feel, how did you feel today? | |

**References to look up if you want more information:**

1: Neff, K. (2020). *Self-compassion.* https://self-compassion.org/

## Module 3: Trying Something New

### Homework Review

Now that you have recorded your productivity and feelings on a normal day and a self-compassionate day, does either approach seem to be a better fit for you?

Of course, you only compared these approaches for two days, so it is possible that other things might have impacted on you. But, based on these two days, what were your impressions on how each of these approaches affected your productivity and wellbeing? Write a quick reflection below.

### Practising Self-Compassion in the Face of Adversity

We are now going to pull together the best self-compassionate statements for you to keep close and practise. There are a variety of approaches to doing this; here are some ideas:

- Look at your responses to the questionnaire you completed in Module 2. Pick three items that you gave higher scores for and write a response or retort to that item in the form of a belief that highlights the benefits of self-compassion.
    - For example, in response to the item "I feel that I don't deserve to be kind and forgiving to myself", you might write a response like: "Being kind and forgiving to myself will help me to be more resilient in tough moments".
- Reflect on the self-compassionate messages you used or thought of using in the Module 2 homework – which was/were your favourite(s)?
- Think about a recent time you spoke with a friend who was going through a challenging time and the compassionate things you said to them.
- Think about a recent time a friend spoke to you when you were going through a challenging time, what compassionate things did they say to you?
- Think about a past experience where you encountered adversity and then think about a compassionate person (you don't need to know this person, it can someone you imagine to be compassionate, like the Dalai Lama) – what would they have said to you in that situation?
- Look up famous quotes on failure and making mistakes on a web search engine – are there quotes there that reflect self-compassion that you would like to use?

| Self-Compassionate Statements |
| --- |
| *e.g., Treating yourself with compassion helps you to succeed in life because it makes you more resilient to setbacks* |
| |
| |
| |
| |
| |

## Trying Something New with Something Old[1]

You have spent a few days now thinking about self-criticism and self-compassion, and it is likely that you have begun taking more notice of your self-criticism. We would like you to pick one instance from the last few days in which you engaged in self-criticism about your appearance for this next exercise. If you have not done this recently, then you can write about a time you did this that was longer ago.

Bring to mind all the details you can remember from that instance of appearance-related self-criticism and write about what happened in the box below. As much as possible, imagine yourself back in that situation as if it were happening now. Aim to include enough information to answer the following questions: Where were you? Who were you with? What time of day was it? What were you doing (i.e., how did it start)? What did you think and feel during and after that situation?

Next, think back to that same situation, but this time imagine what it would look like if the current version of yourself, who is a little older, a little wiser, and a little more self-compassionate, were watching the situation unfold from a third-person perspective. What do you think about the situation now, as an observer? How does the original version of yourself look to the more compassionate you? What do you think would help the original version of yourself in that moment? It doesn't matter if it's not realistic – if you think it would be helpful for the current version of yourself to come in and shrink a person who said something nasty with magic powers, then you can write that down!

Lastly, imagine yourself in that situation again, as the original version of yourself, but this time the more self-compassionate version of yourself appears when you start to self-criticise. Write about what happens in the box below, including what the more self-compassionate version of yourself says or does in response to your self-criticism and what the original version of yourself would be likely to think and feel afterwards. This exercise sounds a little strange but have some fun with it!

## Module 3 Homework

Tomorrow, instead of doing another module, re-read the version of the situation you just wrote where the self-compassionate version of yourself enters and stands up for you (i.e., the last version). Really try to imagine yourself back in that situation and picture what it would look and feel like if the self-compassionate version of yourself were there to counter your self-critical thoughts. After doing this homework exercise tomorrow, please complete the fourth and final module the day after tomorrow.

**References to look up if you want more information:**

1: Arntz, A. (2012). Imagery rescripting as a therapeutic technique: Review of clinical trials, basic studies, and research agenda. *Journal of Experimental Psychopathology*, 3(2), 189–208. https://doi.org/10.5127/jep.024211

## Module 4: Tying it All Together

### Homework Review

In the last module, we asked you to re-read your recount of a situation in which you self-criticised, imagining how it would look and feel different if a more self-compassionate version of yourself were there to intervene. How did you feel after doing this? Did you learn anything from this experience? Write a quick reflection on it in the box below.

### Problem-Solving Your Social Media Use

We would like to invite you to apply what you have learned in these modules to a specific activity and area of your wellbeing where we know self-criticism can be damaging: using social media, and how this impacts on your body image. Research suggests that using social media can lead to you comparing yourself to other people, particularly comparing your appearance to the appearance of the people you see on social media, and that this can make you feel negatively about how you look[1,2,3].

This activity asks you to use problem-solving techniques to help you come up with things you can do that might help reduce the potentially harmful impacts of your social media use on your body image. When completing the steps in this activity, it might be helpful to keep in mind some of the possible reasons for using social media that we asked you about in a questionnaire before you started these modules:

- To know if your pictures look attractive
- To get your friends' opinion on how you look
- To learn how you can improve how you look
- To compare how you look with how your friends look
- Because you can filter the photos you post

**Step One: Identify and Define the Problem**

State this as clearly as possible, be objective and specific (e.g., who does what, how many times, with what, and where?).

**Step Two: Come Up with Possible Solutions**

Start by making a list of all possible solutions, without worrying too much about how good they are, how much you like them, or how easy they are to apply.

Once you have listed all possible solutions, cross out (or delete if doing this on a computer) the ones that are not very good or which are not possible to use. Then, write your three preferred solutions in the box below.

**Step Three: Consider Your Options**

Write down the pros (i.e., advantages) and cons (i.e., disadvantages) of the three preferred solutions you chose in Step Two in the table below.

| | Advantages | Disadvantages |
|---|---|---|
| **Potential Solution 1** | | |
| **Potential Solution 2** | | |
| **Potential Solution 3** | | |

**Step Four: Choose a Solution**

Pick one solution you wrote about in the last step that you think is most likely to succeed, based on its pros and cons. In the table below, make a list of the specific steps you will need to take to make this solution work and when you will take these steps. Being specific about this will make it easier for you to use this solution.

| Action Step | When To Do It |
|---|---|
| | |
| | |
| | |
| | |
| | |

## Module 4 Homework

**Step Five: Implement the Solution(s)**

Try implementing the solution(s) you picked, using the action steps you outlined above. You might like to wait a couple of days before completing the next, final step in the process.

**Step Six: Evaluate the Outcome**

Think about the changes you made over the past couple of days and write a reflection below. In this reflection, write about whether the solution(s) seemed effective and whether there are any changes to be made to the solution to make it work better for you.

**References to look up if you want more information:**

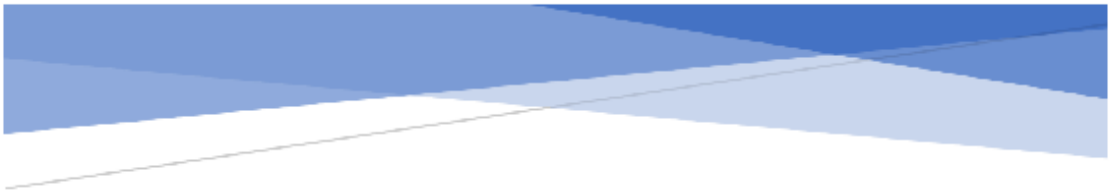
1: Fardouly, J., & Vartanian, L. R. (2015). Negative comparisons about one's appearance mediate the relationship between Facebook usage and body image concerns. *Body Image, 12*, 82–88. https://doi.org/10.1016/j.bodyim.2014.10.004

2: Hanna, E., Ward, L., Seabrook, R., Jerald, M., Reed, L., Giaccardi, S., & Lippman, J. (2017). Contributions of social comparison and self-objectification in mediating associations between Facebook use and emergent adults' psychological well-being. *Cyberpsychology, Behavior, and Social Networking, 20*(3), 172-179. https://doi.org/10.1089/cyber.2016.0247

3: Seekis, V., Bradley, G. L., & Duffy, A. L. (2020). Appearance-related social networking sites and body image in young women: Testing an objectification-social comparison model. *Psychology of Women Quarterly, 44*(3), 377–392. https://doi.org/10.1177/0361684320920826

**APPENDIX D**

Social Media Curation Modules



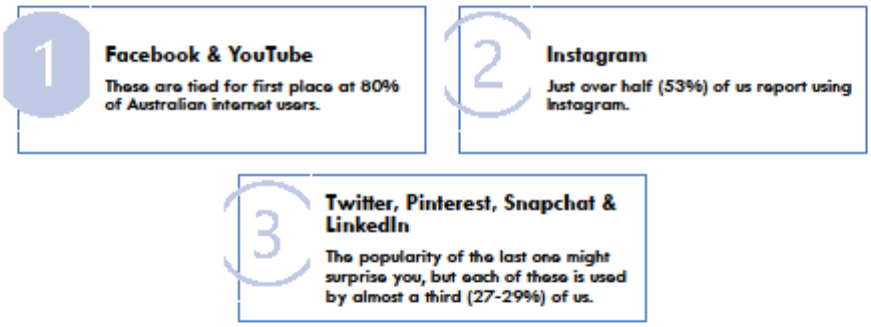
# CURATING YOUR FEED

4 brief modules that aim to help you change the way you use social media to improve your psychological wellbeing.

## Module 1: Learning About Social Media

In Australia, there are 18 million active social media users – that's 71% of our population![1] Australians spend an average of almost 2 hours per day on social media, which is likely to be even higher in younger age groups.

Social media can go wherever we go, thanks to smart devices. So, we can use our favourite social media sites anytime, anywhere. But what are Australia's favourite social media sites? Let's look at the social media platforms most commonly used by Australian internet users aged 16-24 in 2020.[1]




A smaller number of people reported using other platforms, like Reddit, Tumblr, and TikTok.

### Social Media and Mental Health

You might have heard that some people are worried about how using social media might impact on people's mental health. For example, Facebook use is linked to poorer mental health in the areas of[2]:

- Anxiety
- Depression
- Body image and disordered eating

Meta-analyses have been conducted to learn more about the relationship between social media use and body image and disordered eating. A meta-analysis is when researchers collect data published by other researchers on the same topic and put it all in a single, bigger analysis. This makes it possible to draw stronger conclusions.

One meta-analysis found that social media use is associated with a small increase in body image disturbance (i.e., it's linked to feeling worse about your body).[3] The relationship was stronger for appearance-focussed use (e.g., comparing your appearance to others'), compared to general use.

Another meta-analysis found that:

- Social media causes a small to moderate immediate increase in eating disorder risk
- Instagram, but not Facebook, appears to increase eating disorder risk
- Seeing people who meet appearance ideals is an especially harmful part of social media use

### Why Does Social Media Affect Body Image and Disordered Eating?

Here's a quick overview of the two theories that researchers most often use to try to understand why social media increases risk factors for eating disorders.

**Sociocultural Theory** suggests that there is a "sociocultural ideal" that defines what body type is seen as beautiful (and what is not). This changes over time and culture, but currently in Australia, the ideal body type for females is thin and toned, and for males is muscular. In both cases, the ideal body type is so extreme as to be out of reach for most people.

The ideal body type is spread and supported by mass media, including magazines, TV, movies, and, nowadays, social media. When people see this ideal body, they tend to compare their own body to it. Typically, they find that their own body does not meet that ideal. As a result, they feel unhappy about their own body and may be motivated to take actions to change their body shape so that it becomes closer to the ideal.

**Objectification Theory** proposes that our culture "sexually objectifies" people's bodies. That is, it reduces people to their appearance and treats them like "objects" for sexual attraction. This highlights an observer's perspective on people's bodies (not a broader perspective that includes both physically observable aspects of a person and more complex, internal aspects, like personality). Seeing pictures or videos others post of themselves on social media may also highlight an observer perspective.

It is thought that being repeatedly exposed to this objectifying perspective leads people to take on an observer's perspective of their own body (i.e., they "self-objectify"). They then become self-conscious and habitually monitor the way they look, which can lead to feelings of shame and anxiety.

## Key Points

**Social media may be bad for your mental health**

- It's linked to greater anxiety, depression, negative body image, and disordered eating

**Social media might increase risk for eating disorders**

- Research suggests that it causes a small to moderate immediate increase in eating disorder risk factors, including body image and disordered eating symptoms

**Social comparison and self-objectification could be key**

- Comparing ourselves to others or feeling "observed" on social media may help to explain why using social media is linked to risk factors for eating disorders

## Module 1 Homework

We've talked a bit about what research tells us generally about people's social media use, but not about what social media use looks like for you. It's useful to learn more about what your social media use looks like, so that you know what information is most relevant to you. Using social media is often a mindless activity, so you might be surprised by what you notice when you really pay attention to it.

For the next 2 days, fill out the record on the next page, noting what time you use social media, which platform(s) you use, why you decided to use it then (e.g., "bored", "to message a friend", "to post a selfie"), and how you feel after using it (e.g., "excited for the weekend", "sad", or "worried").

| Time (Day One) | Social Media Used | Reason for Using | Feelings Afterwards |
|---|---|---|---|
| | | | |
| **Time (Day Two)** | **Social Media Used** | **Reason for Using** | **Feelings Afterwards** |
| | | | |

**References to look up if you want more information:**

1: We Are Social, & Hootsuite. (2020). *Digital 2020 Australia: All the data, trends, and insights you need to help you understand how people use the internet, mobile, social media, and ecommerce.* https://wearesocial.com/au/digital-2020-australia

2: Frost, R. L, & Rickwood, D. J. (2017). A systematic review of the mental health outcomes associated with Facebook use. *Computers in Human Behavior, 76,* 576-600. https://doi.org/10.1016/j.chb.2017.08.001

3: Saiphoo, A. N., & Vahedi, Z. (2019). A meta-analytic review of the relationship between social media use and body image disturbance. *Computers in Human Behavior, 101,* 259-275. https://doi.org/10.1016/j.chb.2019.07.028

## Module 2: Authenticity on Social Media

### Homework Review

Reflect on your social media use for the past two days. Based on the following questions, write a quick summary in the box below.

- Did you use social media about as often as you expected, or more/less often than that?
- Do you notice any patterns in the times of the day when you used social media?
- Which platform(s) did you use the most?
- What were your most common reasons for using social media?
- Do you notice any patterns in how you felt after using social media? Did you have certain feelings more often at a particular time of day, or from a certain platform, or after using it for a particular reason?

### Authenticity on Social Media

In this module, we want to talk a little about the idea of "authenticity" on social media – that is, realism or truthfulness on social media. You might already be familiar with this concept from the "Instagram versus reality" trend and movement. Watch the YouTube video linked below for a brief view of what it looks like when there is a lack of authenticity online.

https://www.youtube.com/watch?v=0EFHbruKEmw

Don't feel bad if you saw things happening in that video that are similar to things you might have done before. The whole reason people have started talking about this is that *lots* of people present a version of themselves or their lives on social media that doesn't quite match the real thing!

Did you notice anything about the kinds of things people were posting about in the video? It seems like the people in this video felt pressured to present an idealised view of aspects of their life that are important to them, or that they think might be important for what other people think of them, like their:

- Appearance
- Health (regarding their exercise and eating)
- Work
- Relationships (friends and romantic partners)
- Social life

That makes a lot of sense. We want to feel like we're achieving well in areas of our lives that matter to us, and we want to feel like others see us in a positive light in those important areas too.

Social media gives us an opportunity to present whatever version of ourselves we want. You can take 100 photos of yourself and choose whichever one you look best in to post. You might edit that photo, applying filters or airbrushing away imperfections. We can't curate ourselves in everyday life like this – if you do something embarrassing in front of others in person, you can't delete that and redo things! So, it's easy to see how people end up presenting themselves on social media in a way that is unreal or inauthentic.

However, we know that this lack of authenticity is also something that bothers people about social media. When we asked people what they think could change about social media to make it so that it wouldn't affect how they feel about the way they look so much, the most common type of response was that people wanted everyone to present themselves in a way that is more real, genuine, or authentic on social media.

In one study[1], researchers compared how women felt after seeing a normal, idealised photo of another woman on Instagram, and how they felt seeing an "Instagram versus reality" version of that photo (the idealised version on one side, and a more natural version on the other side). They found that women felt less bad about their bodies when they saw the "Instagram versus reality" image than when they saw the idealised image alone. So, it seems like our survey respondents were onto something!

## Social Media Literacy

One thing that might help you to get better at picking up on inauthenticity online is to improve your social media literacy. Social media literacy is your ability to think critically about the things that you see on social media, including aspects such as accuracy, believability, and potential bias.

A pilot study found that giving adolescent girls three social media literacy lessons helped improve their symptoms of poor body image and disordered eating[2]. In another study, social media literacy helped to reduce the negative impacts of seeing idealised social media images on body satisfaction in women (but not men)[3].

Here are some questions you can ask yourself about the things you see on social media:

**Accuracy**

- Is that what the person looks like in real life (if it's someone you have met in person)?
  - *It's possible for a person to edit a photo of themselves such that it no longer really represents what they look like. Or, they might have taken the photo from a carefully selected but abnormal angle or with special lighting that changes their appearance (e.g. makes their eyes look bigger or skin look clearer).*
- Does what you know about this person make you think that what they're posting is truthful?
  - *Consider the video above, when the girl posted a photo of her and her partner looking happy, although they had just argued. Sometimes, you might know that someone is having hardships in an area of their life, but what they post online doesn't reflect that.*

**Believability**

- Are there any aspects of the image that don't look natural?
  - *Filters and problems with an image that result from poor editing, such as warping of parts of an image near where someone has made parts of their body look bigger or smaller, are often obvious. Sometimes, the signs are more subtle, such as something seen in a reflection but not in the rest of the image, blurry areas around the outlines of things in the image (suggesting things have been edited in), or abnormally white teeth.*
- Is there something about what they're posting that just doesn't seem right?
  - *Consider whether something is likely to be factual. For example, anyone can find an image of a beach online and post it, saying that they're enjoying some summer sun. But what if you happen to know that it's currently winter where that image was taken?*

**Potential bias**

- Does this person have a stake in putting forward a particular image or viewpoint?
  - *If you view content from social media influencers, looking as attractive as possible is important for their career! They may have taken many photos to achieve the right posing and lighting, edited the image, and may have other people involved, like makeup artists.*
  - *Consider context in someone's life. For example, you can probably guess why someone is posting photos of themselves looking very attractive after going through a break-up.*
  - *Posts could be related to a person's job or something they have a financial interest in.*
- Is it possible that this person isn't well informed on this topic?
  - *Sometimes people post strong opinions on things and claim to have read all the relevant evidence to come to that point. You might know something about them that suggests that this may not be true, for example if their political beliefs support the view they're posting.*

Remember that people may not be deliberately trying to deceive others through their posts or may not even see what they're posting as inauthentic! Increasing your social media literacy isn't about assigning blame to others, it's about processing the things you see online more consciously and carefully.

## Module 2 Homework

Start looking out for examples of inauthenticity on social media – you might be surprised by how often you notice it when you start looking. Record any examples you find of inauthenticity on social media in this table, and what evidence you noticed that helped you to see that it wasn't necessarily realistic.

| Example of Inauthenticity | Evidence |
|---|---|
| | |

**References to look up if you want more information:**

1: Tiggemann, M., & Anderberg, I. (2019). Social media is not real: The effect of 'Instagram vs reality' images on women's social comparison and body image. *New Media & Society*. https://doi.org/10.1177/1461444819888720

2: McLean, S. A., Wertheim, E. H., Masters, J., & Paxton, S. J. (2017). A pilot evaluation of a social media literacy intervention to reduce risk factors for eating disorders. *International Journal of Eating Disorders, 50*(7), 847-851. https://doi.org/10.1002/eat.22708

3: Tamplin, N. C., McLean, S. A., & Paxton, S. J. (2018). Social media literacy protects against the negative impact of exposure to appearance ideal social media images in young adult women but not men. *Body Image, 26*, 29-37. https://doi.org/10.1016/j.bodyim.2018.05.003

## Module 3: Taking the Good, Leaving the Bad

### Homework Review

What evidence did you find when you looked out for inauthenticity on social media? Was it easy for you to spot? Did you have any thoughts on why people post things that aren't totally real or truthful? Write a quick reflection in the box below about what you learned from this exercise.

### The Bright Side

People wouldn't use social media if there was nothing positive about it.

In fact, some research has suggested that social media can be good for wellbeing. One review noted that there were 15 studies suggesting that using social media was associated with poorer psychological outcomes, but 9 studies that found that it was linked to improved wellbeing in terms of mood, life satisfaction, and loneliness, because it helped people to get support and positive feedback[1].

In other research, teenagers reported several positives from using social media[2], like:

- Being able to connect with people
- Easier access to news and information
- Meeting other people with shared interests
- Opportunities for entertainment, self-expression, and learning

What do you like about using social media? Put another way, what do you get out of using social media? Have a think about the positives of your social media use and write them in the box below.

## Planning for Change

Now that you know what you like about social media, can you think of any changes you could make to the way that you use social media at the moment to have these benefits more often? Try to think of at least 3 changes you could make to your social media use to get more positives out of it:

| | |
|---|---|
| **Change 1** | |
| **Change 2** | |
| **Change 3** | |

Okay, so now you know how to increase the positives. The next thing to think about is how to decrease some of the negative effects of using social media. To help you get started, try to come up with some of the things you don't like about using social media, or its impact on you. Write them in the box below.

Now, based on that list, what 3 changes do you think you could make to the way you use social media to experience the negative impacts less often?

| | |
|---|---|
| **Change 1** | |
| **Change 2** | |
| **Change 3** | |

The ideas for change that you came up with now will form part of the plan that you put together in the next module to curate your social media use. So, you don't have to start implementing those changes now, but you can if you want to.

## Module 3 Homework

To help you get ready to make the plan for curating your social media use in the next module, we invite you to record in the table below the types of content that you see on social media over the next 2 days, and whether you think each of these has a positive impact on your psychological wellbeing, or a negative impact. Aim to get examples of content with both positive and negative impacts, rather than only finding examples that positively impact you, or examples that negatively impact you.

To get you started, we've filled out the first row based on what research says about one type of content[3]. Other examples of social media content include news stories, pictures of pets, or recipes.

| Type of Content | Impact on Wellbeing |
|---|---|
| *Photos of people I think look better than me* | *Negative* |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

**References to look up if you want more information:**

1: Webster, D., Dunne, L., & Hunter, R. (2020). Association between social networks and subjective well-being in adolescents: A systematic review. *Youth & Society*. https://doi.org/10.1177/0044118x20919589

2: Pew Research Center. (2018). *Teens, social media & technology 2018*. https://www.pewresearch.org/internet/2018/05/31/teens-social-media-technology-2018/

3: Saiphoo, A. N., & Vahedi, Z. (2019). A meta-analytic review of the relationship between social media use and body image disturbance. *Computers in Human Behavior, 101*, 259-275. https://doi.org/10.1016/j.chb.2019.07.028

## Module 4: Curating Your Feed

### Homework Review

What did you learn from the homework exercise? Were you able to find examples of social media content that has a positive impact on your wellbeing, as well as examples of content that has a negative impact? If not, maybe try recording for one more day.

If you struggled to find examples of content that positively impacts you, you could also write down examples of things that you didn't see on social media, but which would have a positive impact if you did see them on there. This approach won't be so helpful if you struggled to find examples of things that impacted you negatively, because this would suggest that you've already done a good job of curating your feed – which is what we want to work with you to do in this last module!

Write down any extra ideas or thoughts in the bow below.

### What Does "Curating Your Feed" Mean?

Before we get started on curating your feed, it's important that you know what we mean when we use that phrase. Basically, curating your feed means taking advantage of the options you have on social media sites to control the sorts of content that appears in your feed. For our purposes, it involves:

- "Following" or "friending" accounts, or joining online communities, that share content that promotes positive psychological wellbeing for you
- "Unfollowing" or "unfriending" accounts, or leaving online communities, that share content that has a negative impact on your psychological wellbeing
    - Sometimes, there are factors that make it difficult to unfriend someone that shares this type of content. For example, if your cousin posts pictures of themselves that make you feel bad about your body, it might cause problems in your relationship if you delete them from social media. Many social media platforms have other options so you can stay friends with that person but make it so that their posts don't come up in your feed or only come up rarely. Using these options is another way to curate your feed.

It's sort of like using digital tools to tidy up your online spaces. For that reason, some people have used the phrase "KonMari your timeline"[1], based on the popular book and Netflix series by Marie Kondo about organising your physical space.

This idea of tidying up your social media world may be a useful metaphor for you to keep in mind when you put together your plan to curate your feed. If you found that you still have a jumper that's old and worn out, or that has a strange smell that gives you a headache, or is so tight that it makes your stomach hurt when you wear it, you probably wouldn't keep it. Instead, you might throw it away to make more space for clothes that fit you nicely and don't make you unwell. Let's take a similar approach to the things you see on social media that make you feel bad.

## My Plan to Curate My Feed

We'd like to bring together all the things you've done in these modules so far and use them to make a plan for how to curate your social media feed, and your social media experience more generally. We strongly recommend reading the excellent guide available at the following link before you continue, to give you some additional ideas to consider when creating your plan:
https://freedfromed.co.uk/img/guides/Social_Media_And_Apps-FREED.pdf

First, it's time to make some decisions about the types of content you don't want to keep seeing, and the types of content that you want to keep seeing or see more of. From the Module 3 homework exercise, you should already have some ideas for this, but if needed you can consider these questions:

- What social media content makes me feel good?
- What social media content is useful and interesting to me?
- What social media content is in line with my values?
- What social media content feels most authentic/real to me?
- Does some social media content make me feel better at first, but worse over time?

Fill out the table below with the social media content that you're going to keep or add in, and the content you're going to remove. In case you're struggling, here are some ideas (but of course, it depends on what is relevant to you and your interests):

- Content to keep/add in:
  - Photos of cats, dogs, kittens, and puppies
  - People who share craft tutorials
  - Supporter pages for sports teams I follow
- Content to remove:
  - Model/influencer accounts
  - Ex-partners' social media profiles
  - Weight loss pages

This plan is likely to be most effective if you are as clear as possible about the content you're referring to. So, as much as possible, write the names of specific accounts or communities you're referring to. If, for example, you wanted to increase the number of accounts relating to knitting that appear in your feed, then you might write down the names of multiple accounts that share this type of content in the "content to keep/add in" column. You can do the same thing for the "content to remove" platform.

| Content to Keep/Add In | Content to Remove |
|---|---|
| | |
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| | |
| | |
| | |
| | |
| | |
| | |
| | |

In Module 3, you came up with some changes to your social media use that might help you increase its positive aspects and decrease its negative aspects. Let's expand on that a little here (and add in new

ideas if your original ideas were already about curating your feed). We can use what we learned from the other modules to do this.

The homework in Module 1 was to keep a record of your social media use. We used it to learn about the times of day when you use social media, what platforms you use, why you use it, and how you feel after. If you re-read your reflection on that exercise, does it suggest any other changes you might like to make to your social media use? Module 2 was about authenticity on social media and social media literacy. Did learning about these things give you other ideas for some other changes to make to your social media use?

Now, write a new list of changes to make to your social media use. It can include both changes to increase positive impacts and changes to decrease negative impacts. Try to come up with at least 3.

| | |
|---|---|
| **Change 1** | |
| **Change 2** | |
| **Change 3** | |

## Module 4 Homework

For homework, put your plan to curate your social media feed into action, using the steps you outlined in this module. For the next 1-2 days, keep a record of your social media use while putting your new plan into action. Record what time you use social media, what type of content you viewed on there, your reason for using it, and how you felt after using it.

| Time (Day One) | Content Viewed | Reason for Using | Feelings Afterwards |
|---|---|---|---|
| | | | |

| Time (Day Two) | Content Viewed | Reason for Using | Feelings Afterwards |
|---|---|---|---|
| | | | |

After you've done this for 1-2 days, write a reflection on what you've learned in the box below. Do you feel differently after using social media with your curated feed, compared to how you felt after using social media before? Refer back to your record from the Module 1 homework to compare. Are there any changes that you need to make to your current plan to make it work better for you?

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This is a plan that you can develop over time and update based on new information and experiences. So, you can keep coming back to this plan from time to time and updating it to make it a better fit.

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**References to look up if you want more information:**

1: Glover, C. (2019). *The secret to actually enjoying social media? KonMari your timeline.* https://thriveglobal.com/stories/secret-to-actually-enjoying-social-media-konmari-timeline-wellness-joy-mental-health/