



**Università  
degli Studi  
di Palermo**

AREA QUALITÀ, PROGRAMMAZIONE E SUPPORTO STRATEGICO  
SETTORE STRATEGIA PER LA RICERCA  
U. O. DOTTORATI

HEALTH PROMOTION AND COGNITIVE SCIENCES (INTERNAZIONALE)  
Dipartimento di Scienze Psicologiche, Pedagogiche, dell'Esercizio Fisico e della Formazione

**ONLINE SOCIAL COMPARISON:  
ITS ROLE IN PREDICTING INDIVIDUALS'  
WELL-BEING**

IL DOTTORE

**RUBINIA CELESTE BONFANTI**

IL COORDINATORE

**MASSIMILIANO OLIVERI**

IL TUTOR

**GIANLUCA LO COCO**

CO TUTOR

**STEFANO RUGGIERI**

CICLO XXXV

ANNO CONSEGUIMENTO TITOLO 2022/2023



**Università  
degli Studi  
di Palermo**

AREA QUALITÀ, PROGRAMMAZIONE E SUPPORTO STRATEGICO  
SETTORE STRATEGIA PER LA RICERCA  
U. O. DOTTORATI

Thesis Title

ONLINE SOCIAL COMPARISON:  
ITS ROLE IN PREDICTING INDIVIDUALS' WELL-BEING

Rubinia Celeste Bonfanti

Doctor Europeus

Health Promotion and Cognitive Science

Department of Psychology, Educational Science and Human Movement

University of Palermo

and

Hôpital Lapeyronie, Department of Psychiatric Emergency & Acute Care

University of Montpellier 3, Montpellier



## **Abstract**

Social comparison is the practice through which people compare their own opinions, abilities, behaviours, and emotions with those of others as an external guide and a source for self-evaluation. Social comparison has been put forward as a core feature of interpersonal relationships both in the offline context and in virtual interactions through social media. A growing number of studies has highlighted that online social comparison through social media can influence individuals' everyday life. In this thesis, I will examine the role of online social comparison in influencing individuals' well-being in three research designs with different outcomes. In the first empirical study, a cross-lagged panel model was used to examine the predictive role of online social comparison to ameliorate individual distress during the first wave of the COVID-19 pandemic. Findings of the first study showed that online social comparison predicted an increase in individuals' levels of anxiety, stress, loneliness and life satisfaction over time. In the second study, Latent Class Analysis was adopted to classify participants into three groups with different levels of problematic Facebook use. Findings from this study showed that online social comparison was linked to passive use of social media and the fear of missing out. Moreover, longitudinal analyses showed that problematic Facebook users reported greater levels of psychological distress and lower levels of well-being at each time point. Finally, in the third study, a systematic review and meta-analysis was conducted to examine the association between online social comparison and body image outcomes. Results from 57 cross-sectional studies showed that online social comparison was linked to body image concerns, eating disorder behaviours and positive body image, demonstrating the importance of the physical appearance comparison in the online contexts. Overall, these results highlight the multifaceted nature of the social comparison construct, which can play a different role in predicting psychological well-being in specific contexts.

**Keywords:** Online Social Comparison; Social Media; Well-Being; Body Image; Psychological Distress.



## **Acknowledgments**

*Vorrei ringraziare mia Madre, perché senza di Lei non esisteremmo entrambe e il mondo sarebbe sicuramente un posto peggiore!*



### Common abbreviations used

|                 |   |
|-----------------|---|
| <b>APUF</b>     | <b>Active And Passive Facebook Use Scale</b>          |
| <b>BIC</b>      | Bayesian Information Criterion                        |
| <b>BMI</b>      | Body Mass Index                                       |
| <b>BLRT</b>     | Bootstrap Likelihood Ratio Test                       |
| <b>CFI</b>      | Comparative Fit Index                                 |
| <b>CI</b>       | Confidence Interval                                   |
| <b>COVID-19</b> | Coronavirus Infectious Disease 2019                   |
| <b>DASS-21</b>  | Depression, Anxiety And Stress Scale                  |
| <b>ED</b>       | Eating Disorder                                       |
| <b>EDE-Q</b>    | Eating Disorder Examination Questionnaire             |
| <b>FoMO</b>     | Fear Of Missing Out                                   |
| <b>HLMs</b>     | Hierarchical Linear Models                            |
| <b>INCOM</b>    | Iowa-Netherlands Comparison Orientation Measure       |
| <b>LCA</b>      | Latent Class Analysis                                 |
| <b>LMR LRT</b>  | Lo-Mendell Rubin Likelihood Ratio Test                |
| <b>MLR</b>      | Maximum Likelihood Estimation                         |
| <b>MAC-RF</b>   | Multidimensional Assessment Of COVID-19-Related Fears |
| <b>NOS</b>      | Newcastle-Ottawa Scale                                |
| <b>OBCS</b>     | Objectified Body Consciousness Scale                  |
| <b>PFU</b>      | Problematic Facebook Use                              |
| <b>RMSEA</b>    | Root Mean Square Error Of Approximation               |
| <b>SWLS</b>     | Satisfaction With Life Scale                          |
| <b>SCO</b>      | Social Comparison Orientation                         |
| <b>SNS</b>      | Social Network Sites                                  |
| <b>SEM</b>      | Structural Equation Modelling                         |
| <b>WHO</b>      | World Health Organization                             |



## **List of contents**

|   |               |
|---|---------------|
| Abstract  | pag.2         |
| Acknowledgements  | pag.3         |
| Common Abbreviation Used  | pag.4         |
| List Of Tables  | pag.7         |
| List Of Figures   | pag.9         |
| <br>  |               |
| <b><i>CHAPTER 1. Introduction</i></b>   | <b>pag.10</b> |
| 1.1 The evolution of Social Comparison Theory   | pag.10        |
| 1.2 Social comparison on Social Network Sites   | pag.12        |
| 1.3 The effects of online social comparison on well-being   | pag.15        |
| <br>  |               |
| <b><i>CHAPTER 2. THE ROLE OF ONLINE SOCIAL COMPARISON AS A PROTECTIVE FACTOR FOR PSYCHOLOGICAL WELLBEING: A LONGITUDINAL STUDY DURING THE COVID-19 QUARANTINE</i></b>   | <b>pag.20</b> |
| <br>  |               |
| <b><i>CHAPTER 3. A LONGITUDINAL INVESTIGATION ON PROBLEMATIC FACEBOOK USE, PSYCHOLOGICAL DISTRESS AND WELL-BEING DURING THE SECOND WAVE OF COVID-19 PANDEMIC</i></b>    | <b>pag.39</b> |
| <br>  |               |
| <b><i>CHAPTER 4. EFFECTS OF SOCIAL COMPARISON ON SOCIAL MEDIA ON BODY IMAGE CONCERNS AND EATING DISORDERS SYMPTOMATOLOGY: A SYSTEMATIC REVIEW AND META-ANALYSIS</i></b> | <b>pag.66</b> |



|   |                |
|---|----------------|
| <b>CHAPTER 5. DISCUSSION</b>                        | <b>pag.109</b> |
| 5.1 Overview of research aims and findings          | pag.109        |
| 5.2 Study strengths and weaknesses                  | pag.111        |
| 5.3 Declaration of candidate's role                 | pag.112        |
| 5.4 List of publications not associated with thesis | pag.113        |
| 5.5 List of Presentations during PhD                | pag.115        |
| 5.6 Conclusion                                      | pag.116        |
| <b>REFERENCES</b>                                   | <b>pag.117</b> |



## List of tables

### CHAPTER II

|  |        |
|--|--------|
| <b>Table 1.</b> Means, standard deviations, skewness, kurtosis and scores range of study variables | pag.29 |
| <b>Table S1.</b> Pearson correlation coefficients between study variables                          | pag.31 |
| <b>Table 2.</b> Results of repeated measures ANOVAs  | pag.33 |
| <b>Table S2.</b> Goodness of fit indices for ARCL models   | pag.34 |

### CHAPTER III

|   |        |
|---|--------|
| <b>Table 1.</b> Participants' demographic information and health-related data   | pag.45 |
| <b>Table 2.</b> LCA model fit indices   | pag.50 |
| <b>Table 3.</b> Means, Standard Deviations and total N for all variables, across all time points, for the entire sample and separately for each class   | pag.51 |
| <b>Table S1.</b> Correlations among the study variables at T0, for the whole group and separately for the three classes   | pag.55 |
| <b>Table 4.</b> Fixed effects for the longitudinal changes in psychological distress (i.e. depressive symptoms and fear of COVID-19 pandemic) and well-being from baseline to 4 months later in the full sample of participants (n = 493) | pag.57 |
| <b>Table S2.</b> B, standard errors, degrees of freedom, t- and p-values for the between-group comparisons at T0 on all dependent variables (Depressive Symptoms, Well-being, Fear of COVID-19 pandemic)                                  | pag.59 |
| <b>Table S3.</b> B, standard errors, degrees of freedom, t- and p-values for the between-group comparisons at T1 on all dependent variables (Depressive Symptoms, Well-being, Fear of COVID-19 pandemic)                                  | pag.60 |





**Table S4.** B, standard errors, degrees of freedom, t- and p-values for the between-group comparisons at T2 on all dependent variables (Depressive Symptoms, Well-being, Fear of COVID-19 pandemic)

pag.61

#### **CHAPTER IV**

Table 1. Search strategy for each database

pag.85

Table 2. Quality assessment of included studies

pag.87

Table 3. Summary of characteristics of included studies

pag.90

Table 4. Association between online social comparison and body image concerns, eating disorder behaviours and positive body image

pag.101

Table 5. Meta-regression of the factors affecting the association between online social comparison on body image concerns

pag.101

Table 6. Meta-regression of the factors affecting the association between online social comparison on eating disorder behaviours

pag.102

Table 7. Meta-regression of the factors affecting the association between online social comparison on positive body image characteristics

pag.102



## List of figures

### CHAPTER II

**Figure 1.** Hypothetical Autoregressive Cross-Lagged model pag.26

**Figure 2.** Statistical models of the relations between SCO and loneliness (a), depression (b), anxiety (c), stress (d), and life satisfaction (e). Standardized solution pag.35

### CHAPTER IV

Figure 1. Flowchart of study selection pag.86

Figures 2-3. Forrest and Funnel Plot of the association between social comparison processes and body image concerns pag.104

Figures 4-5. Forrest and Funnel Plot of the association between social comparison processes and ED behaviours pag.106

Figures 6-7. Forrest and Funnel Plot of the association between social comparison processes and positive body image characteristics pag.107



## **CHAPTER I**

### **INTRODUCTION**

#### **1.1 The evolution of Social Comparison Theory**

In this thesis, online social comparison is examined from both a social psychology and health psychology perspective, examining its role through three research studies. The present studies aimed to explore the role of social comparison on online contexts and to investigate its influence on individuals' well-being.

The construct of social comparison was developed by Festinger in 1954. The author defined it as the process of evaluating information about one or more persons in relation to the self. This definition also implies that people are usually looking for similarities or differences to base the comparison on a specific human characteristic or dimension (Festinger, 1954).

According to Festinger's original theory, individuals are motivated by a desire for self-assessment, a motivation that drives them to establish if their opinions are correct and to know exactly what they are capable of doing in life. The author explains that individuals generally prefer objective information to assess their position on a specific attribute, but when this information is not available, they turn to others to obtain it. The theory suggests that people compare themselves to others with respect to two constructs: abilities and opinions. Abilities are related to the comparison of performances, and opinions are related to the comparison of thoughts and emotions. It states also that people learn about themselves through comparison with other people (Festinger, 1954).

These comparison process allow individuals to smoothly navigate the social world, providing information about other people's abilities, social standing, and performances. Additionally, knowing information about other people and groups has the function of satisfying basic human needs, such as the needs for affiliation and self-esteem.

Over the years, several theories have attempted to explain this phenomenon by exploring the influence of situational aspects, the frequency, individual characteristics and principles of social



comparison processes (Blau, 1964; Merton, 1968; Pettigrew, 1967; Kruglanski & Mayseles, 1990; Suls, 1991; Suls & Wheeler, 2000; Tennen et al., 2000).

In the first decade, research focused on the comparison of abilities. With respect to this aspect of social comparison theory, Wheeler (1966) developed the “rank order paradigm”, in which he explains that individuals generally prefer to compare themselves with others whom they think are slightly better, by connecting to the notion of the “upward drive” or “upward comparison.” Subsequently, Wills developed a theory of “downward comparison” (Wills, 1981). The author suggested that comparisons are generally upward but in cases where the individual's self-esteem is threatened; in this cases, individuals prefer to compare themselves with someone who is in a worse condition (downward comparison) with the aim of restoring individual's self-esteem. Wills also suggested that people with a low self-esteem would be particularly inclined to a downward comparison in cases where their self-esteem is threatened (Wills, 1981).

Since early theorizing in the 1950s, psychologists have expanded upon the social comparison theory by exploring motivations for social comparison. In fact, the researchers have identified several motivations for social comparison, including self-enhancement and maintenance of a positive self-evaluation (Eyal & Te'eni-Harari, 2013; Tiggemann, Polivy, & Hargreaves, 2009).

With respect to the consequences of social comparison in individuals' lives, there are different ways in which social comparison can be implemented depending on the conditions in which the subjects find themselves.

In the context of chronic health conditions, different studies have shown that patients actively seek information from other patients, carrying out a downward comparison against those who are worse off, which impacts how they feel about and evaluate their personal situation, namely in terms of severity, prognosis or coping ability (Darley, 1966; Schachter, 1959; Wills, 1981).

Actually, social comparison is a ubiquitous social phenomenon. Everyone does it because it can fulfil fundamental functions, such as providing useful information, feeling better about oneself, and adapting to challenging situations (Buunk & Gibbons, 2007). For the above reasons, it is possible to postulate that social comparison depends on the context in which it is carried out and the motivations that drive individuals to engage in it (Fardouly et al., 2015).



## **1.2 Social comparison on Social Network Sites**

Social comparison is omnipresent in every culture (Baldwin & Mussweiler, 2018), is practiced from childhood (Steinbeis & Singer, 2013), and is a core feature of human social evolution (Gilbert, Price & Allan, 1995). As mentioned above, important for social comparison processes is the selection of the target (lateral, upward or downward), the consequence of the comparison, and particularly the context in which the social comparison takes place.

In an offline context, targets for social comparison are limited to a few known people due to time and space constraints. With the opportunities that Social Media, and particularly Social Network Sites (SNS) such as Facebook or Instagram, provide to create a large network of social connections that can be easily accessed at any time, social comparison becomes one of the habitual behaviours of users. Indeed, any SNS update from any virtual friend reveals the details of others' lives and provides a fertile ground for online social comparisons (Verduyn, Ybarra, Resibois, Jonides & Kross, 2017).

Users spend a large part of the day on social networks, with recent statistics revealing that people worldwide spend on average more than 2 hours and 27 minutes per day in 2022 (Statista, 2022a). Thus, SNS have radically changed the modalities and strategies through which people interact.

SNS are technological platforms based on the Web 2.0 principles, in which users have an active role and can share user-generated content (Chung, Andreev, Benyoucef, Duane, & O'Reilly, 2017). There are different types of SNS and these technological tools are characterised by involving social communication and building reputation (Zhang, Trusov, Stephen, & Jamal, 2017). They allow users to create a personal profile, have a list of online connections, and view a stream of information updated at all times with posts from their own online connections (e.g. Facebook or Instagram News Feed, through which people are exposed to content posted by members of their SNS). They also continually give users the opportunity for social comparisons (Verduyn et al., 2017), as information about similar or different comparison targets is available very clearly and quickly.

Furthermore, on SNS it is easy for an upward comparison to occur, as SNS make it easy for users to portray a perfect picture of their own life, and users are often driven to compare



themselves with the successes rather than the failures of their online connections (Kross et al., 2013). What motivates the occurrence of this process is that many SNS allow for asynchronous communication, providing ample time for intelligent comments or filtered pictures to further enhance one's physical appearance of already carefully selected images.

Furthermore, users of these virtual platforms have numerous techniques to maximise positive self-presentation, such as by posting pictures of themselves with a perfect body or face, or having fun with friends in popular or attractive places. These techniques allow people to present an idealised image of themselves to create the best possible impression on others (Dorethy, Fiebert, & Warren, 2014; Ellison, Heino, & Gibbs, 2006; Manago, Graham, Greenfield, & Salimkhan, 2008; Nadkarni & Hofmann, 2012; Zhao, Grasmuck, & Martin, 2008).

Obviously, individuals were trying to impress others before the emergence of SNS, but these technological platforms have greatly simplified this process, as a result of which people are now more often exposed to idealised images of others as well as sharing self-enhancing information more often.

Facebook is the biggest social network worldwide, with over 2.96 billion monthly active users in the third quarter of 2022 (Statista, 2022b). It is a platform that fosters a massive social comparison process (Ozimek, Baer, & Förster, 2017). The members of this social network spend most of their time checking their online connections' recent posts (e.g., status updates, photos, and activities) by browsing the News Feed (Pempek, Yermolayeva, & Calvert, 2009). The social comparison that occurs on this virtual platform almost exclusively involves an upward comparison (Lee, 2014; Vogel, Rose, Okdie, Eckles, & Franz, 2015) since, as anticipated above, on Facebook people tend to present an idealised image of themselves and to share only the positive aspects of their lives (Ruggieri et al., 2021; Vogel, Rose, Roberts, & Eckles, 2014). Usually, Facebook posts are associated with impression management (Jang, Park, & Song, 2016) and the tendency to present an idealised self-image, the platform is useful for showing happy and joyous events and to represent positive rather than negative situations and emotions (Denti et al., 2012; Gonzales & Hancock, 2011).



Chou and Edge (2012) found that an intensive use of Facebook was linked to the belief that others live better lives, and that one's own life is unfair. Similarly, Appel, Crusius, and Gerlach (2015) found that people evaluate those with an attractive Facebook profile as better than themselves, and viewing an attractive person on this virtual platform stimulates envy, especially among individuals with high levels of depression. Also, De Vries and Kühne (2015) found that those who use Facebook in an intensive way report negative consequences of social comparisons. Specifically, they found that negative consequences of social comparison predicted lower levels of self-perceived social competence and lower levels of self-perceived physical attractiveness. Other studies (Ruggieri et al., 2021) have shown that social comparison on Facebook can be a protective factor in a period of particular conditions, such as during the Covid-19 restrictions. Overall, the results on the use of Facebook and the social comparison process are mixed, as they emphasize both positive and negative consequences of social comparisons on the social media.

Instagram has also become one of the most used SNSs in recent years, with over 2 billion active users worldwide in the third quarter of 2021 (Statista, 2022c). It is an image-oriented social media platform, and it is well-known that pictures may influence impressions more strongly than words (Heide, D'Angelo & Schumaker, 2012). This virtual platform is based on photos sharing. Photos are used as an influential communication and identity-construction tool (Eftekhar et al., 2014), and can provide great potential for creating idealised self-presentational posts (Lup, Trub, & Rosenthal, 2015)

Regarding the importance of images in individuals' lives, a study conducted by the Royal Society for Public Health (2017) has illustrated that image-oriented social media such as Instagram and Snapchat were the worst for young people's wellbeing. Due to the way these platforms enable individuals to share a desirable lifestyle through positive self-representational posted images, social comparison processes can be triggered and result in negative consequences in the lives of individuals.

Lup and colleagues (2015) conducted a study on the influence of Instagram use on psychological wellbeing of its users, and they found a relationship between negative online social comparison



(upward) and depressive feelings caused by following strangers' profiles. Another study on Instagram social comparison (Yang, 2016) explored how its activities can be linked to social comparison and loneliness. The study found that social comparison orientation in the relationship between Instagram use and loneliness played a moderating role, specifically Instagram use increase loneliness only for those high in social comparison.

In conclusion, it has been seen in all SNS (whether they are based on the exchange of content or on the publication of images) that social comparison can frequently occur and it may be associated with negative consequences on people's lives, especially those with a high orientation towards social comparison. In the following paragraphs we will try to understand what consequences might occur in individuals' lives.

### **1.3 The effects of online social comparison on well-being**

Both cross-sectional (Sherlock & Wagstaff, 2018), longitudinal (Verduyn et al., 2015) and experimental (Tiggemann, Hayden, Brown & Veldhuis, 2018) studies on online social comparison show that comparing one self on SNS generates a decrease in individual subjective well-being. Specifically, two recent meta-analyses (Yang, Wei & Tang, 2019; Yoon, Kleinman, Mertz & Brannick, 2019) showed that lateral social comparison on SNS causes a decrease in subjective well-being with a small to medium-sized effect, whereas online upward social comparisons predict a decrease in subjective well-being with a medium-sized effect. These results show that an online upward comparison is more problematic than an online non-directional comparison.

Experimental studies have shown that passive exposure to information from other people's lives can affect self-assessments. Specifically, in a real-life experimental study in which subjects were subliminally presented with pictures of a very famous sports person, participants were much more likely to rate themselves as less athletic after seeing those pictures (Mussweiler et al., 2004). A number of studies have been interested in the link between that passive consumption of positive information on SNSs and social comparisons (Ferrara & Yang, 2015; Lin & Utz, 2015).





A study found a positive correlation between the frequency of social comparisons after passive Facebook exposure and the frequency of negative feelings arising from the comparison (Lee, 2014). Kramer and colleagues (Kramer, Guillory & Hancock, 2014), after studying this relationship, predominantly showed that the relationship resulted in damaging subjective well-being. Specifically, users who were passively exposed online to negative words posted by their Facebook connections subsequently posted negative words themselves. The authors interpreted these results with reference to emotional contagion, in which the type of emotions experienced by one person influence online contacts (Sun, Schwartz, Son, Kern & Vazire, 2020).

It should be noted that numerous studies showed that online passive consumption of information may push towards upward comparison and it has been linked to feelings of envy (Krasnova, Wenninger, Widjaja & Buxmann, 2013; Verduyn et al., 2015). Meta-analytic evidence reveals that higher SNS passive use was associated with lower well-being; while higher SNS active use was associated with higher subjective well-being (Liu, Baumeister, Yang & Hu, 2019). Fardouly and colleagues (2015) showed that browsing on Facebook causes an increase in negative mood, and a decrease in affective well-being at the end of the day (Verduyn et al., 2015). Moreover, high levels of social comparisons were associated with lower levels of self-perception and self-esteem, and high levels of negative affect (Vogel, Rose, Okdie, Eckles, & Franz, 2015).

SNSs browsing and social comparison can influence different areas of self-perception in different ways. Spending time on SNSs and engaging in social comparison can be relevant to social acceptance and self-perception of the physical aspect. Social acceptance can be questioned, as users may upload content depicting social events on SNSs (Underwood & Ehrenreich, 2017), including events that may exclude others (Lenhart, 2015), potentially damaging the perceived social self-acceptance of users who have been excluded from these events.

Physical appearance is also relevant with respect to the ways of using SNSs. Studies have shown links between SNSs use and body image concerns as a result of passive exposure to attractive images that others post online (Fardouly & Vartanian, 2016). Studies on this last topic have



focused on people reporting eating disorders, as people with these symptoms are more likely to engage in online social comparison based on images and body comparison (Walker et al., 2015). Furthermore, both self-perceived social acceptance and physical appearance can be influenced by SNS usage. For example, a post featuring a good-looking person or a positive social event that receives many likes and comments may trigger online social comparison, which in turn may impact on self-perceived social acceptance and/or physical appearance of users (Nesi, Choukas-Bradley, & Prinstein, 2018). One study examined the links between self-perception and online social comparisons, and showed that upward Facebook social comparisons is associated with lower self-perception of physical appearance and social acceptance (de Vries & Kühne, 2015). However, some studies have shown that online social comparison does not always generate a decrease in subjective well-being. First, the type of comparison is important as research has shown that social comparison on SNS is not associated with negative emotional consequences when the comparison is focused on opinions rather than abilities (Yang, Holden & Carter, 2018). Second, the response to the target is also important, with research showing that enacting assimilation behaviour (rather than contrast) to an upward comparison target generates feelings of inspiration that cause positive consequences for subjective well-being (Park & Baek, 2018). Moreover, a recent longitudinal study has shown that in situations of heightened stress, online social comparison mitigates the evolution of certain clinical outcomes. Specifically, Ruggieri and colleagues (2021) emphasised the positive effects of online social comparison on the reduction of psychological distress during the COVID-19 quarantine. Their results showed that online social comparison predicted the individual's increase in levels of anxiety, stress, loneliness and life satisfaction over time in a period of particular emergency.

Contemporaneously, research on types of envy (Meier & Schaefer, 2018; Lim & Yang, 2019) has shown that benign envy (linked to feelings of inspiration and a tendency to improve oneself) is linked to the increase of subjective well-being, whereas malicious envy (linked to feelings of inferiority and a tendency to harm the comparison target), is linked to a decrease of subjective well-being.



These positive consequences may be the exception rather than the rule, in the sense that exposure to others' success on SNSs is more likely to cause negative than positive emotional feedback. This is consistent with the meta-analysis on SNSs social comparison showing that comparisons generally have a negative impact on subjective well-being (Yoon, Kleinman, Mertz & Brannick, 2019) and with a meta-analysis on offline social comparison showing that people tend to engage in upwardly contrasting social comparisons (Gerber, Wheeler & Suls, 2018).

As already noted, psychologists have identified several motivations for social comparison, including self-enhancement, which can cause upward comparison, and maintenance of positive self-evaluation, which can cause downward comparison. While self-enhancement may produce positive outcomes, studies have shown that it may contribute to negative effects over time (Tiggemann, Polivy & Hargreaves, 2009). Researchers have also suggested that competition is often a motivation for social comparison (Garcia, Tor & Gonzalez, 2006) and there is an abundance of literature on the relationship between this construct and body image (Gaspar et al., 2011; Carlson Jones, 2004).

Both qualitative and quantitative studies have begun to explore the relationship between social comparison and body image in SNSs contexts (Fardouly, Diedrichs, Vartanian, & Halliwell, 2015; Tiggemann & Slater, 2013). A study found that both physical fitness and appearance contexts were sources of upward social comparison and feelings of envy for college-aged students. For women in particular, appearance contexts were more salient (Pila, Stamiris, Castonguay, & Sabiston, 2014). They also found that body-related envy caused by social comparison was positively related to identified regulation, which was in turn associated with exercise behaviour. Also, Tiggemann and Slater (2013) found that high-school girls who had a Facebook profile scored higher on social comparison and all measured body image concerns than non-Facebook users did. Furthermore, women high in appearance comparison tendency reported more appearance discrepancies after Facebook exposure than exposure to a control website (Fardouly et al., 2015).

Regarding Facebook, De Vries and Kühne (2015) showed that people who use Facebook intensively are more likely to engage in upward social comparisons. That is, the perception that



others are more successful and have a better life than them generates negative feelings. Furthermore, they found that upward social comparison on Facebook also predicted the development of a belief to be lower in social competence and physical attractiveness.

In qualitative research, Fox and Moreland (2015) investigated the experience of social comparison on Facebook. In their interviews, Facebook users reported that they often compare their lives with those of their online connections and that such comparisons lead to negative sensations.

Overall, the findings of previous studies are mixed, emphasizing both positive and negative consequences of online social comparisons on individual's well-being. For these reasons, the aim of this thesis is to shed some further light on the role of online social comparison in different contexts and with respect to different psychological variables linked to individuals' well-being.



## CHAPTER II

### STUDY 1: THE ROLE OF ONLINE SOCIAL COMPARISON AS A PROTECTIVE FACTOR FOR PSYCHOLOGICAL WELLBEING: A LONGITUDINAL STUDY DURING THE COVID-19 QUARANTINE

**Publication:** Ruggieri, S., Ingoglia, S., Bonfanti, R., & Lo Coco, G. (2021). The role of Online Social Comparison as a protective factor for psychological wellbeing: A longitudinal study during the COVID-19 quarantine. *Personality and Individual Differences*, 110486. <https://doi.org/10.1016/j.paid.2020.110486>



## **1.1 Abstract**

During the COVID-19 pandemic crisis, the experience of quarantine has been an undesirable condition for people and it can have a negative impact on mental health and psychological wellbeing. Social isolation has led to an increase in time spent on social network sites, with people interacting more frequently with each other, and comparing online the way in which they are experiencing the same state of home confinement. Our study aimed to investigate the role of online social comparison on individuals' psychological distress and life satisfaction during the COVID-19-related quarantine. Specifically, a cross-lagged panel study at three-waves was conducted in Italy in order to examine the change in psychosocial distress levels (e.g. depression, anxiety, stress, loneliness, low life-satisfaction) from before the quarantine for a period of one month, as well as the predictive role of online social comparison to ameliorate individual distress. An online survey was distributed through a social media platform three times after the initial lockdown and at the epidemic's peak two and five weeks later. A total of 113 participants participated in an online survey between the 7th of March and 14th of April 2020. The results showed an increase in the levels of loneliness, depression, stress, anxiety and a decrease in the level of life satisfaction in the pre/post quarantine comparison. Our cross-lagged results also showed that online social comparison at T1 and T2 predicted the individual's improvement in levels of anxiety, stress, loneliness and life satisfaction over time. Overall, the results of the current study underline the positive effects of online social comparison on the reduction of psychological distress during the COVID-19 quarantine.

## **1.2 Introduction**

The COroNaVIrus Infectious Disease 2019 (COVID-19) was first detected in November 2019 when the first case emerged in China. Since then there has been a progressive spread of the virus throughout the world, infecting millions of people and causing hundreds of thousands of deaths. On March 11th, 2020, the World Health Organization (WHO) declared a state of pandemic. Quarantine and isolation were considered the most helpful measures in containing the infection (WHO, 2020). However, the experience of quarantine is an undesirable condition and can have



a negative impact on an individual's mental health and psychological wellbeing (Brooks et al., 2020). After the COVID-19 outbreak, some preliminary surveys from China showed a deterioration in psychological conditions (Cao et al., 2020; Duan & Zhu, 2020), even though research has still been lacking regarding the mental health consequences of COVID-19 over several months. Moreover, further research is needed to examine what personality characteristics can help people to cope with their distress during the pandemic (Rettie & Daniels, 2020). The current study aims to fill this gap in the literature regarding the influence of social comparison orientation (SCO) on mental health consequences caused by the COVID-19 outbreak.

As COVID-19 continues to spread, so does the research on the increasing use of social network sites (SNS) during the pandemic. This is not surprising because so many people are struggling with social isolation measures, and digital social platforms have been the only opportunity to communicate with others. Given the individual's marked involvement with SNS during quarantine, people tend to interact with each other more frequently, comparing with others the same state of social isolation they are experiencing. Consequently, online SCO has become one of the key elements of these social interactions (Robinson et al., 2019).

Prior research has demonstrated that self-evaluations relative to others have important implications for well-being (Buunk & Gibbons, 2007). Social comparison theory was introduced in the 1950s (Festinger, 1954), and became a central concept in social psychological research (Buunk & Gibbons, 2007). SCO refers to the tendency to compare one's opinions and abilities with those of others for self-evaluation (Festinger, 1954). Prior research showed that the level of comparison changes from person to person and SCO represents the individual tendency to engage in social comparisons (Gibbons & Buunk, 1999). Seminal research on SCO has shown how people prefer to affiliate with others when experiencing stressful conditions (Buunk & Gibbons, 1997). According to Wills (1981), people who are undergoing a stressful experience may be more likely to compare themselves with others who are worse-off than they are, than those who are in a better state, through downward comparison (Buunk & Gibbons, 1997). SNS provide settings for people to engage in online social comparison, given that it commonly takes place when an individual believes others to be sharing similar opinions, beliefs and abilities to



one's own (Gibbons & Buunk, 1999). Features such as Facebook's newsfeed or Instagram's daily stories provide a stream of information about friends' lives, achievements, abilities, emotions and personalities, creating a perfect breeding ground for social comparison to take place (Gerson, Plagnol, & Corr, 2016; Ruggieri, Bonfanti, Passanisi, Pace & Schimmenti, 2021). Therefore, researchers started examining how SCO operates in SNS, given that social media allow users to constantly monitor what friends are doing and talking about, and how others are responding (Haferkamp & Kramer, 2011). Some prior studies reported that Facebook-based negative SCO can have negative effects on an individual's self-perception and distress-level (Appel, Gerlach, & Crusius, 2016; Liu et al., 2017; Robinson et al., 2019). For example, it was suggested that people frequently engaging in social comparison on Facebook felt they were less socially connected to others (Lee, 2014), and were more likely to believe that others had better lives than themselves (Chou & Edge, 2012). It is also worth noting that people experiencing a fear of isolation are more likely to engage in social comparison on Facebook by monitoring their friends' activities for self-evaluation, and tend to self-present a favorable self-image (Lee & Cho, 2018). However, SCO is not in itself problematic and it can have several positive effects (e.g., self-improvement and self-enhancement) (Wood, 1989). Thus, it could be expected that people facing social isolation due to quarantine would be more likely to engage in social comparison on social media, with some positive consequences for an individual's self-evaluation and well-being. Although previous research suggested a negative relation between SCO and psychological wellbeing, this causal relationship is far from clear, given the cross-sectional level of evidence. Moreover, no previous longitudinal panel studies examined the predictive role of online SCO on individual distress during the COVID-19 pandemic crisis. It is possible that social comparison in social media during the pandemic might foster greater life-satisfaction and lower distress-levels, because users who all share the same condition will be more likely to compare themselves in a positive light. For example, Johnson and Knobloch-Westerwick (2014) found that when people experience a negative mood, they are motivated to repair their affective state through selective exposure to social comparisons, in order to restore their positive mood. Furthermore, people facing social restrictions can adopt social comparison





in social media as a strategy to build and maintain relationships, thus reinforcing their own self-worth (Vogel, Rose, Roberts, & Eckles, 2014).

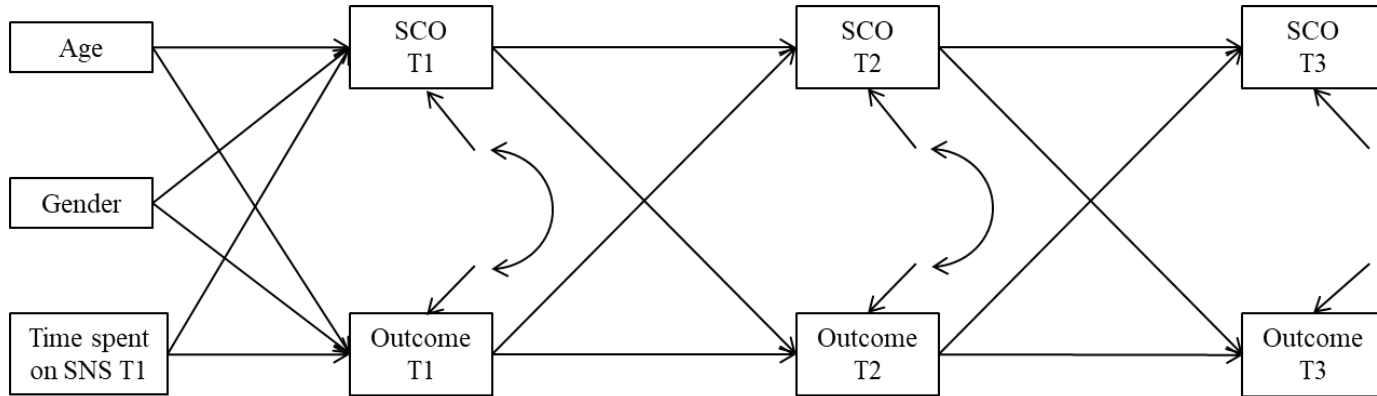
The present study aims to examine the longitudinal trend of psychosocial distress levels before and after quarantine, by a three-wave panel study. Moreover, we aim to explore the role of online SCO as a key variable in alleviating the negative effects of isolation due to the COVID-19 pandemic. Based on the evidence regarding the negative psychosocial consequences of quarantine, along with prior research on the effects of SNS social comparisons to well-being, the following hypotheses and research questions will be subject to empirical examination:

H1. Given that we measured individual distress at a baseline assessment before the lockdown, we expect an increase in levels of psychosocial distress levels (i.e., depression, anxiety, stress, loneliness, life satisfaction) during quarantine. Although the short and long-term effects of quarantine on psychological outcomes have been widely investigated (Brooks et al., 2020), to date, less is known about the abrupt change in individuals' psychological conditions due to the transition to quarantine.

RQ1: How would online SCO relate to psychosocial outcome variables over time? Specifically, we will explore whether a higher tendency towards social comparison on social media can prospectively predict a decrease in psychosocial distress during quarantine, by examining directionality of effects (see Figure 1). At the same time, we will also explore, conversely, whether psychological distress might predict any changes in SCO over time. We included gender, age and time spent on SNS as covariate in the statistical model.

**Figure 1.**

Hypothetical Autoregressive Cross-Lagged model.



*Note.* SCO social comparison orientation.

### 1.3 Method

#### 1.3.1. Participants and procedure

In this longitudinal study, a convenience sample of 200 Italian Facebook users were invited to participate in an online survey about the psychological consequences of the COVID-19 outbreak. Our snowball sampling strategy focused on recruiting the general public living in Italy during the pandemic. Respondents were recruited through online advertisements using e-mail lists and social media platforms groups (Facebook and WhatsApp). All postings included the hyperlink to the electronic survey. 113 subjects agreed to participate and took the survey (45 men and 68 women; mean age = 32.05 ; SD = 8.01), ranged between 17 and 59 years, at the first measurement (T1); 24 men and 51 women (mean age = 32.13; SD = 7.65), ranged between 23 and 59 years, at the second measurement (T2); 27 men and 53 women (mean age = 32.35; SD = 7.87), ranged between 26 and 59 years, at the third measurement (T3).

This study was conducted from 7th March to 14th April, eighteen days apart. On the 11th of March the Italian Government advised the public to adopt social distancing and obliged all



inhabitants to quarantine themselves. The lockdown was protracted until the 4th of May, 2020. The T1 took place on 7th-9th March. The T2 took place on 25th-27th March. The T3 took place on 12th-14th April. Participation in the study was voluntary and the participants could quit the survey at any point.

Participants were informed that the study was anonymous except for a nickname, chosen by the participant, to be used in the subsequent research phases. No information that might compromise the anonymity of anyone was requested throughout the research. Ethics approval for the project was obtained from the coordinating site. All participants signed statements of informed consent to participate in this study.

### ***1.3.2. Measures***

The study collected the following socio-demographic information: Age, gender, educational level and average daily time spent on SNS.

Depression, anxiety and stress were assessed using the Italian adaptation of the Depression, Anxiety and Stress Scale (DASS-21; Henry & Crawford, 2005). The participants were assessed by asking them to respond on a 4-point scale. The DASS-21 showed good psychometric properties (Bottesi et al., 2015) and in the current study the Cronbach's alphas were  $\alpha_{T1}=.88$ ;  $\alpha_{T2}=.85$ ;  $\alpha_{T3}=.87$  for depression (e.g., "I was unable to become enthusiastic about anything"),  $\alpha_{T1}=.78$ ;  $\alpha_{T2}=.69$ ;  $\alpha_{T3}=.78$  for anxiety (e.g., "I felt scared without any good reason"), and  $\alpha_{T1}=.85$ ;  $\alpha_{T2}=.86$ ;  $\alpha_{T3}=.87$  for stress (e.g., "I found it difficult to relax"), respectively.

Life satisfaction was measured using the Italian version of the Satisfaction with Life Scale (SWLS; Diener, Emmons, Larsen, & Griffin, 1985). Respondents were asked how much they agree or disagree with each of the 5 items using a 7-point scale (e.g., "If I could live my life over, I would change almost nothing"). Internal consistency was  $\alpha_{T1}=.92$ ;  $\alpha_{T2}=.91$ ;  $\alpha_{T3}=.91$ , respectively.

Loneliness was measured using The Three-Item Loneliness Scale (Hughes, Waite, Hawkey, & Cacioppo, 2004). This shortened 3-item loneliness scale measured the sense of loneliness and the response categories were coded from 1 to 3 (e.g., "How often do you feel that you lack companionship?"). Internal consistency was  $\alpha_{T1}=.71$ ;  $\alpha_{T2}=.67$ ;  $\alpha_{T3}=.60$ , respectively.



Online SCO was assessed using an adapted version of the Iowa-Netherlands Comparison Orientation Measure (INCOM, Gibbons & Buunk, 1999), an 11-item self-report measure which assesses differences in social comparison orientation. Responses range from (1) strongly disagree to (5) strongly agree for each item (i.e., “I often compare myself with others with respect to what I have accomplished in life”). A high score indicates that individuals are prone to collecting information about others, and/or regularly comparing that information to their own circumstances. For the purposes of the current study, the scale was adapted by asking participants to think about the social interactions and behavior that are established on Social Networks. As a single scale, the INCOM had good internal reliability ( $\alpha_{T1}=.86$ ;  $\alpha_{T2}=.86$ ;  $\alpha_{T3}=.86$ ).

### ***1.3.3. Attrition Analyses***

Of the 113 participants who provided data at T1, data were obtained for 75 at T2 and for 80 at T3; moreover, data were obtained for 15 (13%) participants at T1 and T3 alone. Cases with complete data on all time points totalled 65 (57%). Attrition analyses between participants in the study at T1, who participated versus not participated in the study at T2 and T3, revealed no significant differences on demographic or primary outcome measures, Little’s (1988) MCAR test was not significant,  $\chi^2(33) = 31.78$ ,  $p = .53$ , indicating that drop-out likely occurred at random. Hence, the missing data were dealt with through the expectation maximization algorithm for analyses with manifest variables and through full-information maximum likelihood (Enders & Bandalos, 2001) for analyses with latent variables.

## **1.4 Results**

### ***1.4.1. Preliminary Analyses***

Means, standard deviations, skewness, kurtosis, and range of study variable scores are presented in Table 1. A series of univariate ANOVAs was performed in order to detect gender differences in study variables. Results revealed no significant effects of gender. Pearson correlation coefficients among study variables are reported in Table S1. There were strong recurring correlations between the same variables, suggesting a good level of reporting consistency. At



T1, online SCO was positively associated with loneliness, depression, anxiety and stress, and negatively associated with life satisfaction; at T2, online SCO was positively associated only with depression; at T3, online SCO was positively related with depression and life satisfaction.

**Table 1**

*Means, standard deviations, skewness, kurtosis and scores range of study variables.*

|               | <i>M</i> | <i>SD</i> | <i>Skweness</i> | <i>Kurtosis</i> | <i>Observed range</i> | <i>Range</i> |
|---------------|----------|-----------|-----------------|-----------------|-----------------------|--------------|
| T1 Online SCO | 24.43    | 8.30      | 0.39            | -0.30           | 11-49                 | 11-55        |
| T2 Online SCO | 25.49    | 7.83      | 0.56            | 0.14            | 11-51                 | 11-55        |
| T3 Online SCO | 25.77    | 7.60      | 0.36            | 0.02            | 11-51                 | 11-55        |
| T1 Loneliness | 4.80     | 1.47      | 0.89            | 0.39            | 3-9                   | 3-9          |
| T2 Loneliness | 5.40     | 1.36      | 0.55            | 0.11            | 3-9                   | 3-9          |
| T3 Loneliness | 6.10     | 1.37      | 0.14            | -0.12           | 3-9                   | 3-9          |
| T1 Depression | 5.21     | 3.85      | 1.27            | 2.58            | 0-21                  | 0-21         |
| T2 Depression | 6.67     | 4.02      | 0.45            | -0.31           | 0-17                  | 0-21         |
| T3 Depression | 7.03     | 3.84      | 0.24            | -0.38           | 0-17                  | 0-21         |
| T1 Anxiety    | 3.33     | 2.93      | 0.87            | 0.22            | 0-13                  | 0-21         |
| T2 Anxiety    | 5.53     | 2.93      | 0.30            | -0.01           | 0-13                  | 0-21         |
| T3 Anxiety    | 6.30     | 3.43      | 0.37            | -0.16           | 0-15                  | 0-21         |
| T1 Stress     | 7.20     | 3.66      | 0.76            | 0.64            | 0-20                  | 0-21         |
| T2 Stress     | 8.98     | 3.59      | 0.16            | -0.69           | 2-17                  | 0-21         |
| T3 Stress     | 10.20    | 3.94      | 0.00            | -0.93           | 2-18                  | 0-21         |



|                      |       |      |       |       |      |      |
|----------------------|-------|------|-------|-------|------|------|
| T1 Life satisfaction | 20.61 | 6.96 | -0.04 | -0.77 | 5-35 | 5-35 |
| T2 Life satisfaction | 19.20 | 6.45 | 0.19  | -0.13 | 1-35 | 5-35 |
| T3 Life satisfaction | 17.75 | 5.89 | 0.39  | -0.21 | 7-34 | 5-35 |

---

*Note.* SCO social comparison orientation



**Table S1**

*Pearson correlation coefficients of study variables.*

|               | T1    | T1    | T1    | T1    |       | T1    | T2   | T2 | T2 | T2 |       | T2  | T3 | T3 | T3 | T3 |       | T3  |  |
|---------------|-------|-------|-------|-------|-------|-------|------|----|----|----|-------|-----|----|----|----|----|-------|-----|--|
|               | L     | D     | A     | S     | T1 LS | SCO   | L    | D  | A  | S  | T2 LS | SCO | L  | D  | A  | S  | T3 LS | SCO |  |
| T1 Loneliness | 1     |       |       |       |       |       |      |    |    |    |       |     |    |    |    |    |       |     |  |
| T1 Depression | .268  | 1     |       |       |       |       |      |    |    |    |       |     |    |    |    |    |       |     |  |
| T1 Anxiety    | .177  | .571  | 1     |       |       |       |      |    |    |    |       |     |    |    |    |    |       |     |  |
| T1 Stress     | .238  | .704  | .619  | 1     |       |       |      |    |    |    |       |     |    |    |    |    |       |     |  |
| T1 Life sat.  | -.272 | -.592 | -.261 | -.423 | 1     |       |      |    |    |    |       |     |    |    |    |    |       |     |  |
| T1 Online SCO | .361  | .344  | .471  | .307  | -.239 | 1     |      |    |    |    |       |     |    |    |    |    |       |     |  |
| T2 Loneliness | .536  | .155  | .046  | .066  | -.155 | -.064 | 1    |    |    |    |       |     |    |    |    |    |       |     |  |
| T2 Depression | .359  | .793  | .511  | .539  | -.527 | .421  | .258 | 1  |    |    |       |     |    |    |    |    |       |     |  |



|               |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |       |      |   |
|---------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|---|
| T2 Anxiety    | .014  | .557  | .591  | .532  | -.162 | -.065 | .166  | .425  | 1     |       |       |       |       |       |       |       |      |   |
| T2 Stress     | .147  | .555  | .414  | .763  | -.316 | .015  | .215  | .469  | .552  | 1     |       |       |       |       |       |       |      |   |
| T2 Life sat.  | -.165 | -.481 | -.233 | -.388 | .839  | -.102 | -.184 | -.464 | -.184 | -.379 | 1     |       |       |       |       |       |      |   |
| T2 Online SCO | .389  | .393  | .412  | .334  | -.253 | .844  | .049  | .513  | .008  | .137  | -.087 | 1     |       |       |       |       |      |   |
| T3 Loneliness | .503  | .171  | .087  | .041  | -.136 | -.233 | .761  | .218  | .268  | .209  | -.159 | -.085 | 1     |       |       |       |      |   |
| T3 Depression | .284  | .676  | .522  | .465  | -.418 | .380  | .187  | .909  | .473  | .391  | -.320 | .436  | .152  | 1     |       |       |      |   |
| T3 Anxiety    | -.019 | .458  | .420  | .426  | -.164 | -.228 | .209  | .350  | .785  | .465  | -.233 | -.146 | .316  | .401  | 1     |       |      |   |
| T3 Stress     | .110  | .459  | .341  | .537  | -.280 | -.201 | .229  | .373  | .497  | .843  | -.408 | -.101 | .303  | .324  | .591  | 1     |      |   |
| T3 Life sat.  | -.032 | -.309 | .006  | -.202 | .641  | .300  | -.167 | -.266 | -.185 | -.301 | .839  | .270  | -.221 | -.152 | -.314 | -.439 | 1    |   |
| T3 Online SCO | .435  | .350  | .385  | .316  | -.259 | .776  | .093  | .473  | -.016 | .157  | -.123 | .922  | -.076 | .384  | -.156 | -.071 | .202 | 1 |

*Note.* L Loneliness, D Depression, A Anxiety, S Stress, LS Life satisfaction, SCO social comparison orientation.

Values  $\geq .20$  are significant at  $p < .05$ .





### 1.4.2. Test of hypotheses

Regarding the first aim of the study, we tested the differences in mean scores across the three time points in study variables via a series of repeated measures ANOVAs (Table 2). Significant differences from T1 to T2 were found for all variables: participants reported higher levels of loneliness, depression, anxiety and stress, and lower levels of life satisfaction at T2; significant differences were also found for online SCO, but with a small effect size. Finally, significant differences from T2 to T3 were found for loneliness, anxiety, stress and life satisfaction: participants reported increased levels of loneliness, anxiety, stress and decreased levels of life satisfaction at T3.

**Table 2**

*Results of repeated measures ANOVAs*

|                   | $F(2, 224)$ | $p$    | $\eta^2$ |
|-------------------|-------------|--------|----------|
| Online SCO        | 5.78        | .008   | .05      |
| Loneliness        | 60.28       | < .001 | .35      |
| Depression        | 33.33       | < .001 | .23      |
| Anxiety           | 68.51       | < .001 | .38      |
| Stress            | 63.71       | < .001 | .36      |
| Life satisfaction | 23.85       | < .001 | .18      |

*Note.* SCO social comparison orientation

To examine the longitudinal associations between online SCO and psychosocial distress indicators, we used autoregressive cross-lagged modeling through structural equation modelling (SEM), with Mplus software (Version 7; Muthén & Muthén, 2012). All variables included in the model were specified as observed variables. In order to take into account the potential effect of gender, age and the time spent on SNS at T1, we specified them as covariates for variables at T1. We corrected for the non-normality observed in depression at



T1 through robust maximum likelihood estimation (MLR). Evaluation of model fit was based on the chi-square index and the cut-off of .06 for the Root Mean Square Error of Approximation (RMSEA). Moreover, a Comparative Fit Index (CFI) of .95 or higher also indicates a good fit (Marsh, Hau, & Wen, 2004). We tested the model, which included (a) stability coefficients for all constructs (i.e., autoregressive paths), (b) within-time correlations between the variables, and (c) cross-lagged paths between each of the constructs. Goodness of fit indexes are reported in Table S2, the standardized solution of parameter estimates for the tested models is reported in Figure 2.

**Table S2**

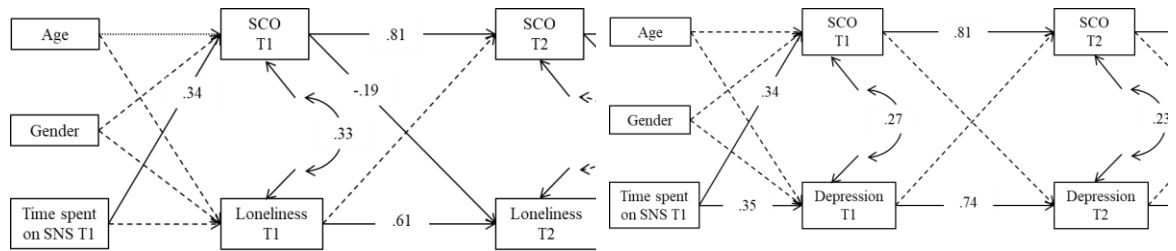
*Goodness of fit indices for ARCL models*

|                                      | SB $\chi^2$ | df | p   | CFI  | RMSEA | RMSEA 95% C.I. |
|--------------------------------------|-------------|----|-----|------|-------|----------------|
| Model 1 Online SCO – Loneliness      | 37.07       | 20 | .01 | .944 | .087  | .041 - .130    |
| Model 2 Online SCO – Depression      | 28.08       | 20 | .11 | .979 | .060  | .000 - .108    |
| Model 3 Online SCO – Anxiety         | 29.42       | 20 | .08 | .968 | .065  | .000 - .111    |
| Model 4 Online SCO – Stress          | 27.11       | 20 | .13 | .981 | .056  | .000 - .105    |
| Model 5 Online SCO – Life satisfact. | 33.78       | 20 | .03 | .964 | .078  | .026 - .122    |

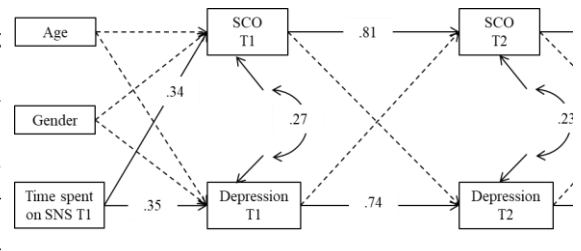
*Note.* SCO social comparison orientation.

**Figure 2**

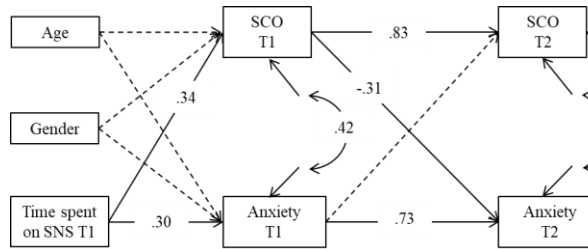
Statistical models of the relations between SCO and loneliness (a), depression (b), anxiety (c), stress (d), and life satisfaction (e). Standardized solution.



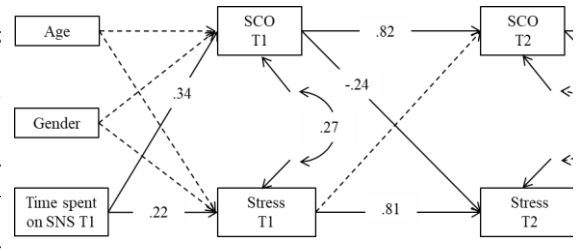
(a) Model 1



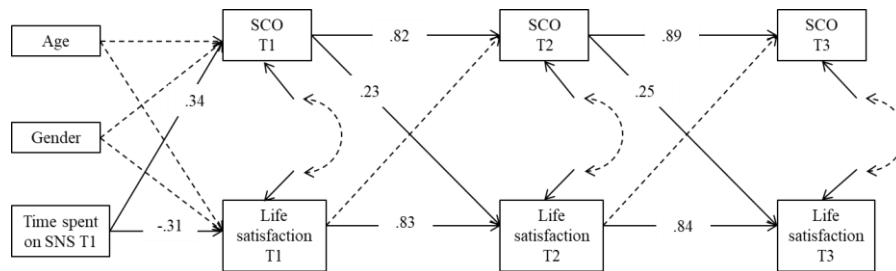
(b) Model 2



(c) Model 3



(d) Model 4



(e) Model 5

*Note.* SCO social comparison orientation. All parameters are significant with  $p < .05$ , except those represented by dashed lines.

With regard to loneliness, the structural model fit the data well, even though RMSEA was higher than the cut-off value; the model is presented in Figure 2a. As for the within-time correlations, online SCO at T1 was associated with more loneliness at T1. More importantly, in terms of cross-lagged associations, online SCO at previous time predicted relative



decreases in loneliness. Finally, the time spent on SNS at T1 was positively and significantly related with online SCO.

With regard to depression, the structural model fit the data well and is presented in Figure 2b. As for the within-time correlations, both at T1 and T2, online SCO was associated with more depression. No significant cross-lagged path was found. Finally, the time spent on SNS at T1 was positively and significantly related with online SCO and depression.

With regard to anxiety, the structural model fit the data well and is presented in Figure 2c. As for the within-time correlations, online SCO at T1 was associated with more anxiety at T1. In terms of cross-lagged associations, online SCO at previous time predicted relative decreases in anxiety. Finally, the time spent on SNS at T1 was positively and significantly related with online SCO and anxiety.

With regard to stress, the structural model fit the data well and is presented in Figure 2d. As for the within-time correlations, online SCO at T1 was associated with more stress at T1. In terms of cross-lagged associations, online SCO at previous time predicted relative decreases in stress. Finally, the time spent on SNS at T1 was positively and significantly related with online SCO and stress.

With regard to life satisfaction, the structural model fit the data well, even though RMSEA was higher than the cut-off value; the model is presented in Figure 2e. As for the within-time correlations, online SCO at T1 was associated with lower life-satisfaction at T1. In terms of cross-lagged associations, online SCO at previous time predicted relative increases in life satisfaction. Finally, the time spent on SNS at T1 was positively related with online SCO, and negatively with life satisfaction.

## **1.5 Discussion**

The current study examined whether SCO in social media is prospectively related to an individual's distress as experienced during the COVID-19 quarantine, taking into account the bottom-line of distress prior to the COVID-19 outbreak with a three-wave panel study. Our primary findings revealed that participants reported increasing levels of loneliness, depression, anxiety, stress and lower life-satisfaction at T2 from the baseline assessment. These findings suggest that quarantine due to the COVID-19 can have negatively influenced



several aspects of individual psychological wellbeing, consistently with prior research (Duan & Zhu, 2020). Our results also showed a worsening of loneliness, anxiety, stress, and life satisfaction increased from T2 to T3 during quarantine, whereas the depression levels did not change in this time lag. These findings seem to be in line with those of other COVID-19 community estimates, which evidenced varying levels of anxiety and depression in China (Elhai et al., 2020; Wang et al., 2020), but further research is necessary to examine the spread of psychological distress among populations from different cultural contexts. Taken together, these preliminary findings might support the view that COVID-19 quarantine can have had lasting effects on psychological well-being, with an abrupt shift from a baseline (i.e. the first week of March 2020) to the subsequent quarantine period (i.e. after one month) in which social isolation and home confinement had become part of everyday life. Our findings also add to the previous literature on the negative consequences of COVID-19 by showing an increasing trend in feelings of loneliness and a decreasing trend in levels of life satisfaction. These results are only partially consistent with those reported in some recent studies from China and USA (Luchetti et al., 2020; Wang et al., 2020) which monitored the trend of distress or loneliness during the COVID-19 quarantine condition, and did not detect any substantial change in these variables during the quarantine.

In the current study, we also examined the role of online SCO in predicting the effects of isolation due to the COVID-19 pandemic. Consistently with our expectations, the SCO level did not change over time, in accordance with some scholars who suggested that the tendency to make social comparisons may represent a personality characteristic (Hemphill & Lehman, 1991). Individuals spending more time on SNS were more likely to report higher SCO levels at T1. Most importantly, the results of the cross-lagged panel analyses showed somewhat mixed patterns: a) Before the beginning of lockdown, a higher tendency to online SCO was cross-sectionally associated with greater psychosocial distress, loneliness and lower life satisfaction. However, this link between SCO and psychological outcomes was no longer significant at T2 and T3, during the COVID-19 quarantine, with the exception of the association between SCO and depression at T2; b) However, we found significant longitudinal cross-lagged effects, with SCO at both T1 and T2 assessments predicting lower levels of loneliness, anxiety, stress and higher life satisfaction. Taken together, these findings suggest that SCO and time spent on SNS played a different role in predicting psychological



variables before and after the lockdown. Although our results at T1 are in line with previous research, which suggested that social comparison in SNS can have negative effects on an individual's self-evaluation and distress (Lee, 2014; Liu et al., 2017; Robinson et al., 2019), it seems that during the COVID-19-related quarantine, online SCO may have fostered lower distress as well as greater life satisfaction and social connectedness, given that people felt that they were sharing the same difficult time, thus lessening the negative impact of social comparisons (Chou & Edge, 2012). This finding seems in line with those showing that individuals who are under threatening conditions of health tend to spontaneously compare themselves with disadvantaged friends in an effort to bolster self-esteem (Buunk & Gibbons, 2007). We could also speculate that during the COVID-19 pandemic, online social comparison may lead the person to elevate his/her own wellbeing in order to be in the same category as other friends and peers, consistent with the assimilation effect (Collins, 2000). The current study is the first to longitudinally examine both autoregressive and cross-lagged paths between online SCO and psychological distress during the COVID-19 quarantine, and results seem to suggest that people facing a difficult time due to the COVID-19-induced home-confinement were more likely to engage in online social comparison as a positive resource for improving social connections and sharing their feelings of fear and uncertainty. Interestingly, our results regarding the association between online SCO and depression at T1 and T2 seem to suggest that people with feelings of poor self-worth and a negative mood are more likely to engage in online SCO as a means of managing negative effects. There is research evidence regarding the interplay between social comparison in SNS and depression, even though the specific processes at work have not yet been disentangled (Appel et al., 2016).

The study has certain limitations. Firstly, this study relied on the participants' self-reports on their psychosocial distress, and might well be susceptible to response tendencies such as social desirability. Secondly, our study used a convenience sample with a small number of participants and only Facebook users, and the non-random sampling procedure limits the generalizability of our findings. Finally, in the current study we did not differentiate the role of social comparison between various SNS, and further research is needed to examine whether specific patterns of use of SNS such as Facebook, Instagram, Pinterest, can predict psychological outcomes, given their distinctive content and design properties.



## **1.6 Conclusions**

The current longitudinal cross-lagged study examined two important aspects of life during the COVID-19-related quarantine: the increase in psychological distress and the beneficial role that online social comparison can play in mitigating this psychological state. Overall, our results suggest that online SCO can play an important role as a protective factor with respect to the problems encountered during the COVID-19 quarantine. Moreover, our findings suggest that online social comparison can play an important role as a protective factor with respect to the problems encountered during the COVID-19 quarantine. With home confinement and social distancing becoming more dramatic, research into cyberpsychology is exploring the need to understand how the processes involved in online social interactions can help people to stay in contact. The analysis of online social comparison can be worthwhile during the COVID-19 pandemic crisis, and it does not seem to be a coincidence that this practice is widely studied in online support groups (Haberstroh & Moyer, 2012; Rains & Tsetsi, 2016). These groups, especially in difficult conditions, can satisfy the individual's needs for affiliation, information acquisition, emotional support, and also of social comparison, in order to positively compare their own living conditions with the living conditions of others (Suls & Wheeler, 2012). The findings of the present research might help to prioritize those individuals who need more psychosocial help; psychologists and mental health professionals might provide services to at least start addressing the mental health issues, also during the lockdown. Consistently with the saying misery loves company, observing that others are in the same uncomfortable situation in as oneself, mitigates the effects of the shared discomfort. Future research will benefit from examining the positive side of online SCO during the COVID-19 crisis.



### CHAPTER III

#### **Study 2: A LONGITUDINAL INVESTIGATION ON PROBLEMATIC FACEBOOK USE, PSYCHOLOGICAL DISTRESS AND WELL-BEING DURING THE SECOND WAVE OF COVID-19 PANDEMIC**

**Publication:** Bonfanti, R. C., Brugnera, A., Salerno, L., & Lo Coco, G., (2022). A longitudinal investigation on problematic Facebook use, psychological distress and well-being during the second wave of COVID-19 pandemic. *Scientific Reports*, *12*, 21828. <https://doi.org/10.1038/s41598-022-26281-0>





## **2.1 Abstract**

The social isolation and the subsequent, increased use of Social Networking Sites (SNSs) due to the COVID-19 pandemic have had an impact on subjective well-being around the world. The present longitudinal study examined whether changes in psychological distress and well-being during the Italian second wave of the pandemic differ among people with different levels of Problematic Facebook Use (PFU). A total of 493 adult participants (Mage = 24.55±7.25; 80.3% females) completed measures of passive use of Facebook, social comparison orientation on Facebook, fear of missing out, psychological distress (depressive symptoms and fear of COVID-19 pandemic) and well-being across three waves. Latent class analysis (LCA) was used to categorize participants into three groups with different PFU levels: Healthy users (low level), Moderate PFU users (moderate level), and High PFU users (high level). Results from HLM showed that the between-person level (class membership) accounted for most of the variability in psychological distress and well-being. No significant changes were found in psychological distress and well-being over time, but the High PFU users showed greater levels of psychological distress and lower levels of well-being at each time point. Thus the High PFU users showed higher levels of psychological distress and lower well-being, which remain stable over time. The findings of this study suggest that the relationship between PFU, psychological distress and well-being may reflect trait-like time-invariant differences between individuals rather than state-like changes.

## **2.2 Introduction**

The COVID-19 pandemic enhanced the individual's use of social media and increased the risk of acquiring addictive tendencies (Zhao & Zhou, 2021). In the last few years, the restrictions aimed at lessening the spread of the virus have resulted in social distancing, curfews, and shelter-in-place orders across the globe, all of which has led to limited interpersonal and close relationships. During this difficult time, people were overwhelmed by the continual desire to stay connected with others and improve interpersonal communication, and this need was easily satisfied by using social media, such as Facebook (Gioia et al., 2021; Wiederhold, 2020). However, there is a debate on the consequences of heavy Facebook use for an individual's well-being (Liu et al., 2019; Verduyn et al., 2017), and whether problematic Facebook use (PFU), defined as a lack of self-regulation in one's



own use of Facebook, leading to problems in the user's life (Marino et al., 2018a; Primi et al., 2021), can be conceptualized as dysfunctional behavior. Although Facebook might prove valuable in enhancing social contact, receiving positive feedback (there is no dislike button on this platform) and by enhancing social capital (Appel et al., 2020; Liu & Baumeister, 2016), PFU is considered as a dysfunctional use of Facebook; it has been related to clinical impairments in various areas of one's life, such as increased psychological distress and sense of loneliness, decreased self-esteem and life satisfaction (Chou & Edge, 2012; Sherlock & Wagstaff, 2019; Kuss & Griffiths, 2011; Shensa et al., 2017). Although PFU is associated with time spent online (Hormes et al., 2014), frequency of Facebook use does not seem to capture the core issues related to PFU (Marino et al., 2018b). Meta-analytic evidence showed that PFU is associated with excessive or problematic Internet use (Marino et al., 2018b), but probably boasting distinctive features. For example, the hypothesis for passive social media use (e.g., scrolling through news feeds or looking at other users' profiles, without engaging in direct social interactions) posits that passive Facebook use can lead to a decline in well-being (Fioravanti & Casale, 2020; Verduyn et al., 2015). Recent reviews and meta-analytic evidence, from both cross-sectional and longitudinal studies, supported a negative association between passive social media use (i.e., content consumption, browsing with low social connection) and well-being outcomes (Liu et al., 2019; Verduyn et al., 2017; Valkenburg et al., 2021).

Passive Facebook use might bring about negative feelings or distress because it may induce upward social comparison regarding dimensions that are important to one's self-worth and social connectivity (Verduyn et al., 2020; Yue et al., 2022). Contents posted by others are usually positively skewed, and social comparison can make readers feel negative about their own lives (Vogel et al., 2015; Yang, 2016). The meta-analysis by Yoon and colleagues (2019) showed that social comparisons on Facebook were more strongly related to depression than was the time actually spent, suggesting that an extensive use of SNSs might lead individuals to compare themselves with other users in a negative way, thus resulting in lower subjective well-being.

Prior research suggested that Fear of Missing Out (FoMO; i.e. "a pervasive apprehension that others might be having rewarding experiences from which one is absent", Przybylski et al., 2013, p. 1841) may also represent a reinforcement mechanism of PFU (Wegmann &



Brand, 2019). Problematic Facebook users experiencing unwanted feelings or a sense of loneliness when they use Facebook might report increased levels of FoMO (Blachnio & Przepiórka, 2018; Gioia et al., 2021; Dempsey et al., 2019). Specifically, individuals who are afraid of being excluded from the world of Facebook and who are in situations of physical isolation might increase widespread use or PFU (Schimmenti, Billieux & Starcevic, 2020).

To sum up, previous research suggested that the mental health consequences of SNSs such as Facebook may critically depend on the way they are used (Appel et al., 2020; Verduyn et al., 2021). PFU encompasses different domains (e.g., passive use, social comparison, FoMO) which are related to the individual's need for relatedness, which may lead to lower well-being or distress. However, early research into PFU-well-being effects relied primarily on cross-sectional data (Marino et al., 2018a) and did not take into account how these effects varied in magnitude between individuals (Di Blasi et al., 2022; Perry et al., 2022). Thus, examining how PFU characteristics co-occur may provide a valuable research option. Prior research has utilized clustering techniques to identify distinct groups and patterns of problematic social media use (Dantlgraber et al., 2016; Lee et al., 2018; Lo Coco et al., 2018; Shensa et al., 2018). In the current study we examine different patterns of PFU by Latent Class analysis (LCA) and whether these empirically-derived subgroups differ on both well-being and psychological distress over time. LCA derives a set of latent variables from a series of observed variables and allocates them to a latent class. Thus, this method can be useful in exploring the multifaceted nature of PFU and revealing its maladaptive patterns.

In the present investigation we focus on the link between patterns of PFU and well-being during the COVID-19 outbreak, which has thus far not received extensive research attention. Although people have been using Facebook heavily for sharing COVID-19 information (Malik et al., 2021), prior studies showed an association between problematic social media or passive use, online social comparison, FoMO with different facets of an individual's distress during the first wave of the pandemic (Di Blasi et al., 2022; Dong et al., 2020; Gioia et al., 2021; Ruggieri et al., 2021; Zhao & Zhou, 2021; Yue et al., 2022). However, no prior longitudinal studies examined the relationship between patterns of PFU, well-being and distress during the second wave of the COVID-19 pandemic.

The present longitudinal study examined (i) whether distinct patterns of PFU could be identified through LCA on the basis of the following indicators: Facebook passive use, social



comparison on Facebook, FoMO, and numbers of Facebook friends; and (ii) whether both moment-related evaluations, as well as changes in both psychological distress (i.e. depressive symptoms and Fear of COVID-19 pandemic) and well-being, differ among people with different patterns of PFU. According to prior evidence regarding positive associations between PFU and psychological distress (Dempsey et al., 2019; De Vries & Kühne, 2015; Gioia et al., 2021; Liu et al., 2019; Schimmenti, Starcevic et al., 2020; Verduyn et al., 2015), it was hypothesized that the class with a higher dysfunctional pattern of PFU would have greater psychological distress and lower well-being across different stages of the second wave of pandemic.

## **2.3 Method**

### ***2.3.1. Participants and Procedure***

Participants comprised college students at two large Universities in southern Italy. Four hundred and ninety-four participants consented to participate and completed an online survey at T0 (October 2020, a pandemic time in which new restrictions were implemented because of the spread of the second wave of COVID-19). Of these, two hundred and twenty-four participants (response rate 45.3%) completed the survey at T1 (December 2020, a period characterized by tightened containment measures and “red zones” for the Christmas holidays) and one hundred and ninety-one participants (response rate 38.7%) completed the survey at T2 (February 2021; a period characterized by the easing of restrictions). One participant was identified as a univariate outlier and was subsequently excluded from the analyses (see the Results section), thus 493 (80.3% females; Mage = 24.55  $\pm$  7.25; age range = 18-63), 224 (78.1% females; Mage = 24.49  $\pm$  6.61; age range = 18-57) and 190 (82.1% females; Mage = 25.00  $\pm$  6.97; age range = 18-57) participants were considered for the three waves, respectively. Since we kept missing data points when matching the data for the three waves, the analytical sample included 493 participants. They were recruited through an announcement in the University and via on-line advertisements. Participation was voluntary and participants received no compensation. Information about the objectives of the study was given to the participants, and a prior statement of informed consent to participate was obtained from each participant. The online questionnaire took approximately 15-20 minutes to be completed. The research was conducted in accordance with the ethical standards of the



Italian Psychological Association (AIP), as well as the Declaration of Helsinki. Participants' demographic information and health-related data, as reported in Table 1.

**Table 1**

*Participants' demographic information and health-related data.*

| Variable   | Participants<br>( <i>N</i> = 493) |
|--|-----------------------------------|
| Age, <i>M</i> (SD)                                       | 24.55 (7.25)                      |
| Gender, <i>n</i> (%)                                     |                                   |
| <i>females</i>   | 396 (80.3)                        |
| <i>males</i>   | 97 (19.7)                         |
| Educational Level, <i>n</i> (%)                          |                                   |
| <i>8 years of education</i>                              | 12 (2.4)                          |
| <i>13 years of education</i>                             | 265 (53.8)                        |
| <i>degree/post-degree</i>                                | 216 (43.8)                        |
| Marital status, <i>n</i> (%)                             |                                   |
| <i>In a relationship/married</i>                         | 267 (54.2)                        |
| <i>Single/divorced/widowed</i>                           | 226 (45.8)                        |
| Personal COVID-19 infection, <i>n</i> (%)                | 18 (3.7)                          |
| COVID-19 infection among relatives/friends, <i>n</i> (%) | 154 (31.2)                        |

### **2.3.2. Measures**

At each wave, the first part of the questionnaire was used to collect information about participants' demographic characteristics, including age, gender, educational level and marital status. In the next part, some questions about personal and relatives experiences of COVID-19 infection were inserted. Finally, data about PFU (i.e. number of Facebook friends, social comparison orientation on Facebook, passive use of Facebook and FoMO),



psychological distress (i.e. depressive symptoms and fear of COVID-19 pandemic) and well-being were collected.

**Social Comparison Orientation on Facebook.** The Iowa-Netherlands Comparison Orientation Measure (INCOM; Gibbons & Buunk, 1999) is an 11-item self-report measure of social comparison orientation (e.g. “I often compare myself with respect to what I have accomplished in life”). For the purposes of the current study, the scale was adapted by asking participants to think about the social interactions and behavior that are established on Facebook (e.g. “When I use Facebook, I often compare myself with respect to what I have accomplished in life”). Items were rated on a 5-point Likert scale, from 1 (Strongly Disagree) to 5 (Strongly Agree) with higher overall scores indicating a greater Facebook Social comparison orientation (Ruggieri et al., 2021). The scale demonstrated good internal consistency in the present study at each time-point (Cronbach’s  $\alpha = .84, .87$  and  $.85$  for T0, T1 and T2, respectively).

**Passive use of Facebook.** The Active and Passive Facebook Use Scale (APUF; Fioravanti & Casale 2020) is a 7-item self-report measure of passive use of Facebook. Participants were asked to rate the frequency of use for some Facebook activities (e.g. “Reading posts”) on a 7-point Likert scale, from 1 (Never to) to 7 (More than once a day) with higher overall scores indicating a greater passive use of Facebook. The scale demonstrated acceptable-to-good internal reliability in the present study at each time-point (Cronbach’s  $\alpha = .81, .81$  and  $.79$  at T0, T1 and T2, respectively).

**Fear of Missing Out.** The Fear of Missing Out scale (FoMOs; Casale & Fioravanti, 2020; Przybylski et al., 2013) is a 10-item self-report measure of fear of missing out (e.g. “I get anxious when I don’t know what my friends are up to”). Items were rated on a 5-point Likert scale, from 1 (Not at all true of me) to 5 (Extremely true of me) with higher overall scores indicating more severe fear of missing out. The scale demonstrated good internal consistency in the present study at each time-point (Cronbach’s  $\alpha = .82, .84$  and  $.84$  at T0, T1 and T2, respectively).

**Depressive symptoms.** The 7-item Depression subscale (DASS-D) of the Italian adaptation of Depression, Anxiety and Stress Scale (DASS-21; Bottesi et al., 2015; Henry & Crawford, 2005) was used to measure depressive symptoms (e.g. “I felt down hearted and blue”). Items were rated on a 4-point Likert scale, from 0 (It’s never happened to me) to 3 (It’s happened





to me most of the time) with higher overall scores indicating more severe depression. The scale demonstrated excellent internal consistency in the present study at each time-point (Cronbach's  $\alpha = .91, .91$  and  $.93$  for T0, T1 and T2, respectively).

**Fear of COVID-19 pandemic.** The Multidimensional Assessment of COVID-19-Related Fears (MAC-RF; Schimmenti et al., 2020) is an 8-item self-report measure of fear of COVID-19 pandemic (e.g. "During the coronavirus pandemic I constantly feel that I have to do something"). Items were rated on a 5-point Likert scale, from 0 (Strongly Disagree) to 4 (Strongly Agree) with higher overall scores indicating more severe fear of the COVID-19 pandemic. In the present study, the scale demonstrated acceptable-to-good internal consistency in the present study at each timepoint (Cronbach's  $\alpha = .75, .80$  and  $.77$  at T0, T1 and T2, respectively).

**Well-being.** The Satisfaction with Life Scale (SWLS; Di Fabio & Palazzeschi, 2012; Diener et al., 1985) is a 5-item self-report measure of well-being (e.g. "If I could live my life over, I would change almost nothing"). Items were rated on a 5-point Likert scale, from 1 (Strongly Disagree) to 7 (Strongly Agree) with higher overall scores indicating a greater well-being. The scale demonstrated good-to-excellent internal reliability in the present study at each timepoint (Cronbach's  $\alpha = .88, .87$  and  $.90$  at T0, T1 and T2, respectively).

### ***2.3.3. Statistical analysis***

Data analyses were conducted using IBM SPSS (v. 22), Mplus (v. 7.0) and HLM software (v. 8.2). As a preliminary step in the data analysis, attrition analysis was conducted in order to compare participants with complete data with those with missing data at T1 and/or T2. Cronbach's alphas were computed for all scales in order to assess their internal consistency. The normality of continuous variables was checked examining their skewness and kurtosis values. Descriptive statistics (means and standard deviations for continuous variables and frequencies and percentages for categorical variables) were computed for demographics and variables of interest.

As a first step in the data analysis, Latent Class Analysis (LCA) was conducted in order to classify the participants into different groups according to their PFU (i.e. number of Facebook friends, Passive use of Facebook, Social Comparison Orientation on Facebook



and FoMO) at T0. We ranked models containing the one to four latent class to find a more meaningful and parsimonious model. The following fit indicators were examined to determine how many groups should be classified: Bayesian information criterion (BIC), sample size adjusted BIC (aBIC), entropy, Lo-Mendell Rubin likelihood ratio test (LMR LRT), and bootstrap likelihood ratio test (BLRT). The most suitable model had the following fit indices: BIC and aBIC should be lower; entropy should be larger and LMR and BLRT should be significant (Tein et al., 2013). Moreover, the clinical meaning of the latent classes was also considered when selecting the model.

As a second step in the data analysis, we tested for the presence of significant linear changes in psychological distress (i.e. depressive symptoms and fear of COVID-19 pandemic) and well-being, from baseline to 4-months later, using 2-level Hierarchical Linear Models (HLMs). HLMs are considered one of the best statistical techniques for examining longitudinal changes in nested data (Singer & Willett, 2003). Then, we entered the classes of participants -obtained through LCAs- as predictors of the longitudinal changes in psychological distress and well-being. This allowed us to test whether participants in specific classes experienced different time slopes compared to those from other classes. In addition, we compared the levels of each dependent variable at T1 and T2 across the classes through HLMs, changing how time was coded in our models (i.e. for comparisons at T1, time was coded as “-1”, “0” and “1” for the three time points, respectively; for comparisons at T2, it was coded as “-2”, “-1” and “0”) and testing for significant group differences at the Intercept. Effect sizes indicating the proportion of within-person variance were accounted for by adding the linear parameter and were assessed and reported using pseudo-R<sup>2</sup> (Raudenbush & Bryk, 2002). Their magnitude was interpreted according to guidelines (.01 = small, .06 = medium, >.14 = large; Cohen, 1988).

## **2.4 Results**

### **2.4.1. Preliminary Analyses**

At the baseline, no significant differences on demographics (i.e. age, gender and marital status), health-related data (i.e. personal and relatives COVID-19 infection), PFU characteristics (i.e. social comparison on Facebook, Facebook passive use and FoMO),





psychological distress (i.e. depressive symptoms and fear of COVID-19 pandemic) or well-being at T0 were found between participants with complete data on all waves and those with missing data at T1 and/or T2. Significant differences were found only for educational level and number of Facebook friends. The normality of continuous variables was checked, and a positive skewed distribution was found for the number of Facebook friends. One univariate outlier was removed, and square root transformation was conducted to improve the normality of this variable. All other variables revealed no substantial violation of normality regarding data distribution at each time point ( $|Sk| < 1$ ; Ku range: -1.273 - 1.393).

#### ***2.4.2. Latent Class Analysis of Facebook users***

LCA identified three classes of participants. Evaluating one to four class models, the three-class model revealed the best solution (Table 2). Class 3 ( $n = 143$ ; 29%) had the highest scores on all PFU indicators; therefore, it was defined as the “High PFU users”. Class 2 ( $n = 28$ ; 6%) had the lowest scores on all indicators; therefore, it was defined as the “Healthy users”. Finally, Class 1 ( $n = 322$ ; 65%) had indicators’ scores between Class 3 and Class 2; therefore, it was defined as the “Moderate PFU users”. Descriptives across all time points are reported in Table 3 for the whole group and for the three classes, separately. Correlations among the study variables at T0 are reported in Table S1.



**Table 2**

*LCA model fit indices*

| Model | BIC       | aBIC      | Entropy | LMR LRT      | BLRT         |
|-------|-----------|-----------|---------|--------------|--------------|
| #1    | 13379.771 | 13354.379 | -       | -            | -            |
| #2    | 13210.069 | 13168.807 | .722    | -6665.084*** | -6665.084*** |
| #3    | 13179.563 | 13122.431 | .760    | -6564.731*** | -6564.731*** |
| #4    | 13182.823 | 13109.821 | .790    | -6533.977    | -6533.977*** |

*Note: LCA = Latent Class Analysis; BIC = Bayesian information criterion; aBIC = sample size adjusted BIC; LMR LRT = Lo-Mendell Rubin likelihood ratio test; BLRT = bootstrap likelihood ratio test; # = number of classes; \*\*\*  $p < .001$ .*



**Table 3**

*Means, Standard Deviations and total N for all variables, across all time points, for the entire sample and separately for each class.*

| Variable                         | Group              | T0  |              | T1  |              | T2  |              |
|----------------------------------|--------------------|-----|--------------|-----|--------------|-----|--------------|
|                                  |                    | N   | Mean (SD)    | N   | Mean (SD)    | N   | Mean (SD)    |
| <b>Depressive symptoms</b>       | Total              | 490 | 9.13 (5.89)  | 224 | 8.53 (5.86)  | 189 | 9.42 (6.52)  |
|                                  | Healthy Users      | 28  | 5.46 (5.02)  | 12  | 4.25 (4.99)  | 9   | 6.33 (6.69)  |
|                                  | Moderate PFU Users | 321 | 8.16 (5.55)  | 151 | 7.40 (5.46)  | 132 | 8.33 (5.99)  |
|                                  | High PFU Users     | 141 | 12.09 (5.67) | 61  | 12.18 (5.31) | 48  | 12.98 (6.67) |
| <b>Fear of COVID-19 pandemic</b> | Total              | 493 | 15 (5.82)    | 223 | 14.77 (5.91) | 190 | 13.86 (5.77) |
|                                  | Healthy Users      | 28  | 12.04 (6.48) | 12  | 11.58 (6.46) | 9   | 9.44 (6.41)  |



|                                       |                       |  |     |                 |  |     |              |  |     |                 |
|---------------------------------------|-----------------------|--|-----|-----------------|--|-----|--------------|--|-----|-----------------|
|                                       | Moderate PFU<br>Users |  | 322 | 14.24 (5.39)    |  | 151 | 13.97 (5.54) |  | 133 | 13.31<br>(5.42) |
|                                       | High PFU Users        |  | 143 | 17.29 (5.94)    |  | 60  | 17.42 (5.90) |  | 48  | 16.23<br>(5.83) |
| <b>Well-being</b>                     | Total                 |  | 491 | 21.37 (6.51)    |  | 224 | 21.28 (6.22) |  | 189 | 22.01<br>(6.61) |
|                                       | Healthy Users         |  | 28  | 24.50 (5.72)    |  | 12  | 24.25 (5.24) |  | 9   | 24.33<br>(5.79) |
|                                       | Moderate PFU<br>Users |  | 322 | 22.00 (6.49)    |  | 151 | 21.75 (6.31) |  | 132 | 22.36<br>(6.54) |
|                                       | High PFU Users        |  | 141 | 19.3 (6.18)     |  | 61  | 19.54 (5.83) |  | 48  | 20.63<br>(6.82) |
| <b>Number of Facebook<br/>Friends</b> | Total                 |  | 415 | 719.82 (622.67) |  | -   | -            |  | -   | -               |



|  |                       |            |                     |            |                     |            |                         |
|--|-----------------------|------------|---------------------|------------|---------------------|------------|-------------------------|
|  | Healthy Users         | 17         | 231.24 (215.38)     | -          | -                   | -          | -                       |
|  | Moderate PFU<br>Users | 278        | 690.94 (581.23)     | -          | -                   | -          | -                       |
|  | High PFU Users        | 120        | 855.94 (708.19)     | -          | -                   | -          | -                       |
| <b>Passive Use of Facebook</b>           | <b>Total</b>          | <b>487</b> | <b>32.69 (8.16)</b> | <b>223</b> | <b>31.80 (8.01)</b> | <b>188</b> | <b>31.80<br/>(7.49)</b> |
|  | Healthy Users         | 28         | 14.71 (5.89)        | 12         | 18.50 (6.19)        | 9          | 14.89<br>(6.51)         |
|  | Moderate PFU<br>Users | 320        | 32.85 (6.52)        | 150        | 31.87 (6.43)        | 132        | 31.57<br>(5.96)         |
|  | High PFU Users        | 139        | 35.92 (7.32)        | 61         | 34.26 (9.28)        | 47         | 35.68<br>(6.93)         |
| <b>Social Comparison on<br/>Facebook</b> | <b>Total</b>          | <b>483</b> | <b>23.82 (7.93)</b> | <b>221</b> | <b>23.40 (8.42)</b> | <b>189</b> | <b>22.92<br/>(7.82)</b> |



|                            |                       |            |                     |            |                     |            |                         |
|----------------------------|-----------------------|------------|---------------------|------------|---------------------|------------|-------------------------|
|                            | Healthy Users         | 25         | 15.12 (4.41)        | 12         | 13.83 (3.13)        | 9          | 14.11<br>(3.22)         |
|                            | Moderate PFU<br>Users | 319        | 20.63 (5.28)        | 150        | 21.29 (6.96)        | 133        | 20.87<br>(6.24)         |
|                            | High PFU Users        | 139        | 32.71 (5.94)        | 59         | 30.71 (7.60)        | 47         | 30.43<br>(7.18)         |
| <b>Fear of Missing Out</b> | <b>Total</b>          | <b>493</b> | <b>23.88 (7.40)</b> | <b>223</b> | <b>23.54 (7.51)</b> | <b>190</b> | <b>23.70<br/>(7.32)</b> |
|                            | Healthy Users         | 28         | 14.82 (3.63)        | 12         | 16.00 (3.10)        | 9          | 15.67<br>(3.46)         |
|                            | Moderate PFU<br>Users | 322        | 21.08 (5.25)        | 151        | 21.34 (6.29)        | 133        | 21.71<br>(6.09)         |
|                            | High PFU Users        | 143        | 31.95 (5.03)        | 60         | 30.60 (5.91)        | 48         | 30.71<br>(5.96)         |

*Note.* PFU = Problematic Facebook Use; T0 = October, 2020; T1 = December, 2020; T2 = February, 2021.



**Table S1**

*Correlations among the study variables at T0, for the whole group and separately for the three classes*

| Group         |  | 1.     | 2.      | 3.      | 4.      | 5.      | 6.     |
|---------------|--|--------|---------|---------|---------|---------|--------|
| Total         | 1. Number of Facebook Friends                | -      |         |         |         |         |        |
|               | 2. Passive Use of Facebook                   | .308** | -       |         |         |         |        |
|               | 3. Social Comparison Orientation on Facebook | .094   | .290**  | -       |         |         |        |
|               | 4. Fear of Missing Out                       | .096   | .285**  | .503**  | -       |         |        |
|               | 5. Depressive symptoms                       | -.081  | .090*   | .257**  | .438**  | -       |        |
|               | 6. Well-being                                | .059   | -.121** | -.162** | -.295** | -.538** | -      |
|               | 7. Fear of COVID-19 pandemic                 | .039   | .138**  | .242**  | .341**  | .374**  | -.115* |
| Healthy Users | 1. Number of Facebook Friends                | -      |         |         |         |         |        |
|               | 2. Passive Use of Facebook                   | -.192  | -       |         |         |         |        |
|               | 3. Social Comparison Orientation on Facebook | -.144  | -.187   | -       |         |         |        |
|               | 4. Fear of Missing Out                       | .421   | -.245   | .181    | -       |         |        |
|               | 5. Depressive symptoms                       | -.149  | -.084   | -.028   | .508**  | -       |        |
|               | 6. Well-being                                | .034   | .136    | -.167   | -.363   | -.510** | -      |
|               | 7. Fear of COVID-19 pandemic                 | -.064  | .097    | -.061   | .207    | .291    | -.020  |



|                    |  |         |       |       |         |         |        |  |
|--------------------|--|---------|-------|-------|---------|---------|--------|--|
| Moderate PFU Users | 1. Number of Facebook Friends                | --      |       |       |         |         |        |  |
|                    | 2. Passive Use of Facebook                   | .181**  | -     |       |         |         |        |  |
|                    | 3. Social Comparison Orientation on Facebook | -.014   | .116* | -     |         |         |        |  |
|                    | 4. Fear of Missing Out                       | -.097   | .017  | -.056 | -       |         |        |  |
|                    | 5. Depressive symptoms                       | -.156** | -.002 | .039  | .276**  | -       |        |  |
|                    | 6. Well-being                                | .143*   | -.072 | -.031 | -.212** | -.523** | -      |  |
|                    | 7. Fear of COVID-19 pandemic                 | -.058   | .086  | .046  | .234**  | .269**  | -.116* |  |
| High PFU Users     | 1. Number of Facebook Friends                | -       |       |       |         |         |        |  |
|                    | 2. Passive Use of Facebook                   | .352**  | -     |       |         |         |        |  |
|                    | 3. Social Comparison Orientation on Facebook | -.053   | .015  | -     |         |         |        |  |
|                    | 4. Fear of Missing Out                       | .054    | .052  | -.042 | -       |         |        |  |
|                    | 5. Depressive symptoms                       | -.173   | -.165 | -.023 | .333**  | -       |        |  |
|                    | 6. Well-being                                | .059    | .035  | .096  | -.162   | -.465** | -      |  |
|                    | 7. Fear of COVID-19 pandemic                 | .078    | -.070 | .129  | .208*   | .408**  | .057   |  |

Note. PFU = Problematic Facebook Use; \*  $p < .05$ ; \*\*  $p < .01$





**Università  
degli Studi  
di Palermo**

AREA QUALITÀ, PROGRAMMAZIONE E SUPPORTO STRATEGICO  
SETTORE STRATEGIA PER LA RICERCA  
U. O. DOTTORATI



**Table 4**

*Fixed effects for the longitudinal changes in psychological distress (i.e. depressive symptoms and fear of COVID-19 pandemic) and well-being from baseline to 4 months later in the full sample of participants (n = 493).*

| Variable                  | $\beta_{10}$ | SE   | t-value | df  | p-value | R <sup>2</sup> | Within-person<br>variance | Between-person<br>variance |
|---------------------------|--------------|------|---------|-----|---------|----------------|---------------------------|----------------------------|
| Depressive symptoms       | 0.20         | 0.17 | 1.167   | 489 | .25     | .33            | .29                       | .71                        |
| Fear of COVID-19 pandemic | -0.21        | 0.15 | -1.394  | 492 | .19     | .17            | .27                       | .73                        |
| Well-being                | 0.29         | 0.16 | 1.858   | 490 | .064    | .19            | .22                       | .78                        |

*Note.* R<sup>2</sup> refers to pseudo-R<sup>2</sup> indicating the proportion of within-person variance accounted for by adding the “Time” parameters to the model; SE = standard error of the regression coefficient; df = degrees of freedom.



### Longitudinal Changes in Psychological Distress and Well-being Across the Three Classes

The 2-level HLMs models evidenced non-significant longitudinal changes in measures of psychological distress and well-being, from baseline to 4-months later. That is to say, participants from the entire sample did not experience significant changes in psychological distress nor in well-being over time. The addition of the predictor "Time" at level-1 of all models accounted for 17% to 33% of the within-patient variance in the dependent variables, with large effects (see Table 4). Moreover, the between-person level accounted for most of the variability in all the dependent variables (range: .71 - .78).

We then added the dummy-coded grouping variables as second-level predictors in our models: at baseline (T0), participants from the three groups reported significantly different levels (all  $ps < .05$ ) in psychological distress (High PFU users > Moderate PFU users > Healthy users) and life satisfaction (High PFU users < Moderate PFU users < Healthy users; see Table 3 for descriptives and Table S2 for t- and p-values). The only non-significant comparison was that between "Healthy users" and "Moderate PFU users" for fear of COVID-19. Interestingly, the grouping variable did not predict the longitudinal changes over time in psychological distress and well-being. That is to say, individuals clustered on the basis of their PFU pattern reported significantly different levels of psychological distress and well-being at baseline, which remained consistent over time (i.e., did not change). We further compared the levels of each dependent variable at T1 and T2 across the three classes; at two months follow-up, High PFU users reported greater levels of psychological distress and lower levels of well-being than the other two classes. Similarly, Moderate PFU users reported greater distress than Healthy users, but differences on well-being were not significant. At four months follow-up, High PFU users reported greater levels of psychological distress and lower levels of well-being than individuals belonging to the other two classes. Furthermore, Moderate PFU users reported greater fear of the COVID-19 pandemic than Healthy users, but all other comparisons were non-significant (see Table 3 for descriptives and Table S3-4 for t- and p-values).



**Table S2**

*B, standard errors, degrees of freedom, t- and p-values for the between-group comparisons at T0 on all dependent variables (Depressive Symptoms, Well-being, Fear of COVID-19 pandemic)*

| T0 – Depressive Symptoms             | $\beta_{10}$ | <i>SE</i> | <i>t</i> -value | <i>df</i> | <i>p</i> -value |
|--------------------------------------|--------------|-----------|-----------------|-----------|-----------------|
| Healthy Users vs High PFU Users      | -6.692       | 1.033     | -6.478          | 487       | < .001          |
| Moderate PFU Users vs High PFU Users | -3.895       | 0.559     | -6.966          | 487       | < .001          |
| Healthy Users vs Moderate PFU Users  | 2.797        | 0.972     | -2.877          | 487       | .004            |
| T0 – Fear of COVID-19 pandemic       |              |           |                 |           |                 |
| Healthy Users vs High PFU Users      | -5.233       | 1.281     | -4.085          | 490       | < .001          |
| Moderate PFU Users vs High PFU Users | -3.081       | 0.582     | -5.291          | 490       | < .001          |
| Healthy Users vs Moderate PFU Users  | -2.152       | 1.217     | -1.767          | 490       | .078            |
| T0 – Well-Being                      |              |           |                 |           |                 |
| Healthy Users vs High PFU Users      | 5.158        | 1.171     | 4.405           | 488       | < .001          |



|                                      |       |       |       |     |        |
|--------------------------------------|-------|-------|-------|-----|--------|
| Moderate PFU Users vs High PFU Users | 2.633 | 0.624 | 4.221 | 488 | < .001 |
| Healthy Users vs Moderate PFU Users  | 2.526 | 1.113 | 2.270 | 488 | .024   |

**Table S3**

*B, standard errors, degrees of freedom, t- and p-values for the between-group comparisons at T1 on all dependent variables (Depressive Symptoms, Well-being, Fear of COVID-19 pandemic)*

| T1 – Depressive Symptoms              | $\beta_{10}$ | SE    | t-value | df  | p-value |
|---------------------------------------|--------------|-------|---------|-----|---------|
| Healthy Users vs High PFU Users       | -6.840       | 1.182 | -5.787  | 487 | < .001  |
| Moderate PFU Users vs High PFU Users  | -4.226       | 0.582 | -7.258  | 487 | < .001  |
| Healthy Users vs Moderate PFU Users   | -2.614       | 1.121 | -2.333  | 487 | .020    |
| <b>T1 – Fear of COVID-19 pandemic</b> |              |       |         |     |         |
| Healthy Users vs High PFU Users       | -5.780       | 1.269 | -4.554  | 490 | < .001  |
| Moderate PFU Users vs High PFU Users  | -2.845       | 0.565 | -5.031  | 490 | < .001  |



|                                     |        |       |        |     |      |
|-------------------------------------|--------|-------|--------|-----|------|
| Healthy Users vs Moderate PFU Users | -2.936 | 1.213 | -2.421 | 490 | .016 |
|-------------------------------------|--------|-------|--------|-----|------|

T1 – Well-Being

|                                      |       |       |       |     |        |
|--------------------------------------|-------|-------|-------|-----|--------|
| Healthy Users vs High PFU Users      | 4.364 | 1.146 | 3.808 | 488 | < .001 |
| Moderate PFU Users vs High PFU Users | 2.586 | 0.654 | 3.956 | 488 | < .001 |
| Healthy Users vs Moderate PFU Users  | 1.778 | 1.069 | 1.663 | 488 | .097   |

**Table S4**

*B, standard errors, degrees of freedom, t- and p-values for the between-group comparisons at T2 on all dependent variables (Depressive Symptoms, Well-being, Fear of COVID-19 pandemic)*

| T2 – Depressive Symptoms             | $\beta_{10}$ | SE    | t-value | df  | p-value |
|--------------------------------------|--------------|-------|---------|-----|---------|
| Healthy Users vs High PFU Users      | -6.988       | 1.660 | -4.210  | 487 | < .001  |
| Moderate PFU Users vs High PFU Users | -4.557       | 0.813 | -5.601  | 487 | < .001  |
| Healthy Users vs Moderate PFU Users  | -2.432       | 1.575 | -1.543  | 487 | .123    |



---

T2 – Fear of COVID-19 pandemic

---

|                                      |        |       |        |     |        |
|--------------------------------------|--------|-------|--------|-----|--------|
| Healthy Users vs High PFU Users      | -6.328 | 1.779 | -3.557 | 490 | < .001 |
| Moderate PFU Users vs High PFU Users | -2.608 | 0.723 | -3.607 | 490 | < .001 |
| Healthy Users vs Moderate PFU Users  | -3.720 | 1.718 | -2.165 | 490 | .031   |

---

T2 – Well-Being

---

|                                      |       |       |       |     |      |
|--------------------------------------|-------|-------|-------|-----|------|
| Healthy Users vs High PFU Users      | 3.571 | 1.592 | 2.243 | 488 | .025 |
| Moderate PFU Users vs High PFU Users | 2.539 | 0.844 | 3.008 | 488 | .003 |
| Healthy Users vs Moderate PFU Users  | 1.031 | 1.493 | 0.691 | 488 | .490 |

---



## **2.5 Discussion**

The current study showed that a three-class model categorized effectively adults presenting different degrees of problematic Facebook use. The “High PFU users” reported greater passive use of Facebook, higher tendency toward online social comparison on Facebook, a greater number of online friends, and higher levels of FoMO. Healthy users showed the lowest scores on all characteristics of PFU, whereas participants in the “Moderate PFU users” reported mild scores on PFU variables ranging between the High PFU and Healthy users.

Consistently with our hypothesis (i.e. the class with higher level of PFU would have significantly greater psychological distress and lower well-being across the three waves), the findings of the study showed that participants with higher PFU also showed higher levels of psychological distress (i.e. depressive symptoms and fear of COVID-19) as well as lower well-being at each time point. These findings support previous evidence regarding the association between PFU and psychological distress and the negative link between life satisfaction and PFU (Marino et al., 2018a). Moreover, the current study adds preliminary evidence that passive Facebook use, online social comparison and FoMO may represent core characteristics of PFU. Prior studies suggested that passive social media use was associated with social comparison, which in turn predicted levels of stress during the pandemic (Yue et al., 2022). It was suggested that passive social media use can negatively affect well-being due to social comparison with those better off than oneself as well as feelings of envy (Verduyn et al., 2020). Conversely, individuals who report less problematic use of social media (with lower levels of passive use and lower online social comparison) may be less exposed to others' online content (Verduyn et al., 2021). This may partially account for the higher scores for subjective well-being of users in the Healthy and Moderate PFU classes. The current findings further support the role of FoMO as an important facet of the individual's impaired control with social media and as a correlate of psychological distress (Fioravanti et al., 2021; Blackwell et al., 2017; Przybylski et al., 2013).

During the second wave of the COVID-19 pandemic, it is also likely that the ongoing social restrictions may have increased PFU (e.g., through increased passive exposure) and worsened subjective well-being (Fang et al., 2022), which exacerbated the use of SNSs for those who had already been problematic users before the pandemic. These findings may also





explain the results regarding significantly lower levels of distress among both the Moderate PFU users and Healthy users during the second wave of the pandemic.

Generally, social media-related activities may have been a major channel in the search for COVID-19-related information during the second wave of the pandemic (Statista, 2022d). Therefore, a vicious cycle may have been generated and subsequently a positive relationship with the PFU (Sun et al., 2020). This leads to the speculation that people with more severe PFU may be more exposed to COVID-19 relevant information, and it may then result in exaggerated psychological distress (Ahmad & Murad, 2020).

The findings of the present study further indicated that the trajectory of psychological distress (i.e. depressive symptoms and fear of COVID-19) and well-being across three stages of the second wave of pandemic remained stable for all the three classes. Thus, participants clustered as “High PFU users” reported significantly higher levels of depressive symptoms and fear of COVID-19 as well as lower levels of well-being, which remained consistent over time. Our results may suggest that the association between the severity of PFU, psychological distress and well-being may be related to stable trait-like and time-invariant differences between individuals (between-person variance) rather than state-like changes (within-person variance) which commonly refers to those that occur from one assessment point to the next one (Di Blasi et al., 2022).

The current study extends our understanding of how PFU is associated with psychological distress and well-being by using a longitudinal design. Proposed implications are especially valuable when the relationship between COVID-19 pandemic, Facebook use, psychological distress and well-being is addressed. In addition, the results of the present study also included a period characterized by the easing of restrictions, which emphasized the importance of the potential need to maintain good mental health, even after the pandemic is over. However, some limitations should be considered when interpreting results. Firstly, the results may not be generalized to other countries due to discrepancies in the stage of COVID-19 infection and different governments’ policies aimed at limiting the spread of the virus. Secondly, the assessment of a non-stratified population with different recruitment procedures does not make these data generalizable. Thirdly, the self-report assessment may also limit conclusions from these results because the accuracy of the participants’ answers might have been



affected. Future research needs to use a stratified sample whilst adding objective assessments of PFU.

### **Conclusion**

These results underlined the link between problematic Facebook use during the COVID-19 pandemic, psychological distress and well-being. It should be emphasized that increased time spent on social media was unavoidable during the pandemic when many activities were suspended. Therefore, in interpreting these results, one must be aware that, regardless of people's usual online habits, the utilization of social media and information acquired through online activities may have triggered the onset of PFU, on top of general, increased internet use during the pandemic.



## **CHAPTER IV**

**Study 3: EFFECTS OF SOCIAL COMPARISON ON SOCIAL MEDIA ON BODY IMAGE CONCERNS AND EATING DISORDERS SYMPTOMATOLOGY: A SYSTEMATIC REVIEW AND META-ANALYSIS**



### **3.1 Abstract**

Background: Over the past decade research has reported that intensive social media use is associated with a tendency to compare oneself with others, which in turn may trigger body image concerns and/or dysfunctional eating behaviours. The aim of this systematic review and meta-analysis was to examine the average impact of online social comparison on body image concerns, eating disorder behaviours and positive body image in the general population. Method: We searched eligible articles published between 2008 and 2022 in Medline, Embase, PsycInfo, Scopus, and Web of Science. We conducted a random-effects meta-analysis of eligible studies reporting the association between social comparison and body image and/or eating disorder outcomes. Heterogeneity was tested using I-squared (I<sup>2</sup>) statistics. Results: Results from 57 cross-sectional studies with 44,116 participants (mean age 22.01 years; mean BMI 22.98; 88.28% female) indicated that the weighted average correlation between higher social comparison and greater body image concerns was significant ( $r = .44$ ; 95% CI: .39 – .48), as were the correlations between higher social comparison and lower positive body image ( $r = -.30$  95% CI: -.44 – -.17) and between higher social comparison and greater eating behaviour symptoms ( $r = .35$ ; 95% CI: .23 – .48). The heterogeneity of effect sizes was high and meta-regression analyses showed that quality of studies, country, type of social comparison, % female participants, age and BMI moderated the relationship between online social comparison and body image outcomes. Conclusion: This meta-analysis evidenced a moderate association between social comparison processes and body image outcomes in the context of social media use.

**Keywords:** Social comparison; Social media; Body image; Eating behaviors; Positive body image.



### **3.2 Introduction**

The construct of social comparison was developed by Festinger in 1954. Festinger (1954) defined it as the process of evaluating information on one or more people in relation to oneself. According to Festinger's theory, people compare themselves to others in terms of abilities and opinions. Abilities are related to the comparison of performances, and opinions are related to the comparison of thoughts and emotions. Festinger's theory also states that people learn about themselves through comparison with others (Festinger, 1954). These comparison processes allow individuals to smoothly navigate the social world by providing information about others' abilities, social statuses, and performances. In addition, knowing information about other people and groups may have the function of satisfying basic human needs, such as the need for affiliation and self-esteem. Central to the construct of social comparison is the selection of a comparison target. The social comparison can be directed at someone similar to oneself, leading to "lateral comparison," someone better, leading to "upward comparison," or someone worse, leading to "downward comparison." (Buunk & Gibbons, 2007). Meta-analytic evidence reported that the majority of individuals tend to compare themselves to someone who outperforms them, generating lower self-esteem, envy and a worsening of mood (Gerber, Wheeler & Suls, 2018).

Over the years, several social psychological theories have attempted to explain this phenomenon by exploring the influence of the situational aspects, individual characteristics such as personality traits, and antecedents of social comparison processes (Blau, 1964; Merton, 1968; Pettigrew, 1967; Kruglanski & Mayseles, 1990; Suls, 1991; Suls & Wheeler, 2000; Tennen et al., 2000).

Recent research has extensively supported that social comparison is a pervasive behaviour, particularly among adults, that occurs both in real life and on Social Networks Sites (SNS). SNS continually provide users with opportunities for comparisons (Verduyn et al., 2017), given that information about similar or different comparison targets is available clearly and quickly. With the opportunities that SNS (e.g., Facebook or Instagram) provide to create a large network of social connections that can be easily accessed at any time, social media platforms provide fertile ground for online social comparisons (Verduyn et al., 2017).

A growing amount of research has underlined that online social comparison through SNS (mostly Facebook) may influence everyday life in terms of self-esteem, depression, and poor



well-being (Yoon et al., 2019; Yang et al., 2019). Regarding body image outcomes, early studies suggested that media-related factors such as exposure and internalization of idealized images may contribute to body dissatisfaction and eating-related pathology (Stice et al., 1994) and highlighted the effects of appearance-related social comparison on body image (Thompson et al., 1999). More recent reviews (Choukas Bradley et al., 2022; de Valle et al., 2021) found that the features of SNS (e.g., idealized images of others, a strong emphasis on physical appearance, or the importance of feedback) create the perfect conditions for exacerbating body image concerns. In this regard, a number of studies have revealed relationship between SNS use and body image concerns as a result of passive exposure of attractive images that others post online (Fardouly & Vartanian, 2016). Social media based on the exchange of content and/or on the publication of images (i.e., Instagram) can especially trigger social comparison, which can result in greater body dissatisfaction (Tiggemann et al., 2018). Indeed, the pervasiveness of idealized images of bodies on SNS creates ample opportunity for people to engage in appearance social comparison with average other people, celebrities, and models (Verduyn, Gugushvili, Massar, Taht, & Kross, 2020), which results in comparing one's body with someone more beautiful, charming or superior in some manner (Morrison, Kalin, & Morrison, 2004).

During the last decade, both qualitative and quantitative studies have explored the relationship between social comparison and body image concerns in SNS contexts (Fardouly, Diedrichs, Vartanian, & Halliwell, 2015; Tiggemann & Slater, 2013). For example, Tiggemann and Slater (2013) found that people who scored higher on online social comparison had more body image concerns. Furthermore, individuals with high online appearance comparison tendencies reported greater appearance discrepancies and a lower sense of physical attractiveness (De Vries and Kühne, 2015; Fardouly et al., 2015). Most of these previous studies emphasized that after making an online appearance-focused comparison, people seemed to experience increased levels of body dissatisfaction, weight and shape preoccupation, appearance ideal internalisation, and decreased levels of physical attractiveness, body-esteem and positive body image perceptions (Brown & Tiggemann, 2016; Feingold & Mazzella, 1998; Leahey & Crowther, 2008; Meier & Gray, 2014).

The relationship between social comparison and eating disorder symptoms received a growing research attention in the last decades.



It is well-known that body image concerns are a major risk factor for the development and exacerbation of eating disorder (ED) behaviours (Corning, Krumm, & Smitham, 2006; Saunders & Eaton, 2018; Stice & Whitenton, 2002), given that they encompass dysfunctional concerns, negative beliefs and feelings about one's weight and shape (Garner, 2002). It was suggested that the manipulated online self-presentation on SNS may expose users to unrealistic beauty ideals shared by others (Fardouly et al. 2015), and this comparison to seemingly perfect or having more attractive bodies may lead to desires for a different and thinner body, by emphasizing weight loss behaviours and the tendency to limit food intake (Fardouly et al. 2017). Moreover, it was shown that endorsement of an ideal female body type can be positively related to both social comparison and intentions to engage in extreme weight-loss behaviours (Lewallen & Behm-Morawitz, 2016). Previous literature also supported that individuals may go online to compare their own eating habits with the "successful" eating habits of celebrities, models, and #fitspiration profiles (Raggatt et al., 2018). When people are induced to compare themselves to these online models, with respect to both body and food intake, they tend to feel worse about themselves and their own appearance, so their eating habits are affected (Joshi et al., 2004; Mills et al., 2002).

Although prior studies have shown a relationship between online social comparison processes and body image concerns and/or ED behaviours, no previous research has summarized the average association between these variables by using meta-analysis. The aim of the present systematic review and meta-analysis is to assess the average association between online social comparison and body image concerns, ED behaviours and positive body image. It will also provide an estimate of the strength of the relationship between online social comparison and body image concerns and/or ED behaviours, and help to identify potential moderators of this relationship.

It was hypothesized that (a) higher levels of online social comparison would be associated with both body image concerns and ED behaviours, and (b) higher online social comparison would be negatively associated with positive body image (i.e. body esteem, body appreciation, attractiveness). This hypothesis was based on prior literature supporting the link between social media use and body image outcomes (Fioravanti et al., 2022; Holland & Tiggemann, 2016; Choukas-Bradley et al., 2022; de Valle et al., 2021).



Regarding moderator variables, specific hypotheses derived from previous scientific literature were stated for study robustness, type of social media use, direction of comparison, and percentage of female participants in each sample. Specifically, we predicted that studies with lower risk of bias would decrease the effect sizes on our three proposed associations, because risk of bias usually differentiates effect estimates, with more conservative estimates for studies at low risk (Hartling et al., 2009). In addition, we predicted that studies investigating the relationship on Instagram would have larger effect sizes than those investigating the relationship on other SNS, because Instagram is an image-oriented social media platform (Eftekhar et al., 2014), and it is well known that pictures may have a stronger influence on impressions of the body than words (Heide, D'Angelo & Schumaker, 2012). Furthermore, based on previous literature (de Vries & Kühne, 2015) we predicted that studies which measured upward social comparison would have larger effect sizes on body image concerns and ED behaviours than those measuring downward or lateral comparison; at the same time, we predicted that studies with downward comparison would have larger effect sizes on positive body image than those with upward or lateral comparison. Lastly, given previous evidence showing that women are more exposed to an image-based ideal of beauty (Grabe & Ward, 2008; McComb & Mills, 2021; Perloff, 2014), we predicted that the relationship between online social comparison and both body image and EDs outcomes will be greater in studies with higher percentage of female participants. Finally, the following additional moderator variables were explored in the meta-regression analysis (i.e., without a clear relationship pattern or direction of influence): country, BMI, year of publication and type of sample (above/under 18 years).

## **Methods**

The review and meta-analysis were conducted according to the preferred reporting items for systematic reviews and meta-analyses (PRISMA) statement (Moher et al., 2015). The protocol was registered in PROSPERO.

### ***Search strategy***





A systematic and comprehensive search was performed using the following databases: PubMed/Medline, ISI Web of Science, PsychInfo, EMBASE, and SCOPUS. Searches were limited to studies published between 1 January 2008 and 30 September 2022. The year 2008 was chosen as the starting year of the search because it is the year in which Social Media began to spread on a global scale (Ortiz-Ospina, 2019). Search terms employed are described in the Table 1.

### ***Study selection***

All empirical correlational studies that investigated the relationship between social comparison processes (general social orientation and physical appearance comparison, upward and downward) in the social media context and: a) eating disorders symptomatology (e.g., eating disorders, anorexia, bulimia, binge, orthorexia, vigorexia, bigorexia); b) body image concerns (e.g., body image, body image dissatisfaction, appearance evaluation, appearance orientation, overweight preoccupation, muscle ideal, thin ideal, internalization, internalize, sociocultural attitudes, media pressure, family pressure, peer pressure, stereotyped beauty ideals, internalization of thinness, internalization of low body fat, internalization of the muscular body, internalization of the athletic body, drive for muscularity, drive for leanness, body dissatisfaction, appearance concerns, appearance preoccupation, shape concerns, weight concern, eating concerns, eating preoccupation, dietary habits, excessive physical activity, excessive exercise, compulsive exercise, exercise addiction); and c) positive body image characteristics (body image satisfaction, body satisfaction, physical attractiveness, body esteem) were considered eligible if they were: (1) original research articles, (2) written in English, (3) reporting correlation between online social comparison and body image outcomes.

Exclusion criteria were: (1) not being original articles (e.g., conference paper, proceeding, review, opinion paper, dissertation, case series or case report), and (2) not assessing the relationship between social comparison processes and target outcomes in the social media context (e.g., studies that have been conducted in real life and do not examine the effect on social media), (3) papers related to eating disorders symptomatology and/or body image concerns in social media context unrelated to social comparison processes, and (4)



randomized controlled trials, cohort studies, and case-control studies not reporting correlations among the study variables.

### ***Data extraction and analyses***

Search results from each database were initially exported to EndNote, provided by Clarivate Analytics, and duplicates were identified and rejected. Thereafter, records were manually screened for titles and abstracts, and noncompliant titles were excluded. Finally, full-text articles were checked for eligibility criteria, and references of included studies were manually screened to obtain eventual additional articles. The following information from studies was extracted: authors, year of publication, country, research design, sample characteristics (country of the study, sample size, type of sample, mean age, percentage of female subjects, BMI), type of Social Media used, type of social comparison, data collection method, type of outcome measure, follow-up period, and study findings. In cases of missing data, authors of the included studies were contacted for additional information. In this phase, quality checks of data were conducted and, attentive cross-checking of the extracted data, and unanimity decisions about methodology.

A meta-analysis was conducted to assess the association between social comparison processes and positive body image characteristics, body image concerns and ED behaviours evaluated in the social media context. Pearson correlation coefficients ( $r$ ) between social comparison processes and positive body image, body image concerns and EDs behaviours were extracted to estimate pooled correlation with 95% confidence interval (CI). Bivariate correlations were preferred to partial correlations. The  $R^2$  and  $\beta$  coefficients were converted to  $r$  (Peterson & Brown, 2005) when zero-order correlations were not available in the paper or upon request to authors. Meta-regression analyses were performed to assess the influence of the following moderators: robustness of the studies (low, medium and high), regional areas (quali nello specifico?), type of sample (adolescents and young adults) and type of Social Media (all, Instagram, Facebook or others), comparison direction (no direction, upward, downward, upward and downward) as factor variables (categorical/ordinal); percentage of female participants in each sample, sample mean age, BMI and year of publication as continuous variables were evaluated as candidate moderators.



Meta-regression analysis overcomes the disadvantages of the traditional approach, which only allows us to investigate moderators singularly using dichotomized subgroups (Combs et al., 2019; Gonzalez-Mulé & Aguinis, 2018). These moderator variables that are merged with the meta-analytical data can be categorical variables (also defined as factors) as described in a previous paragraph, ordinal qualitative variables such as risk of bias score (low, medium, high), or continuous (also addressed as covariates). This procedure allows for a more fine-grained analysis of research questions that are related to moderating effects. However, especially with multiple covariates, Schmidt (2017) critically notes that it is not a recommended option when the number of studies is small (less than a ratio of 5 for each independent variable), as is the case shown in the following analysis regarding EDs. Only outcomes with data available from at least  $k = 3$  studies or samples were included for meta-analysis.

Between-study heterogeneity was tested with the  $\chi^2$ -test (Cochrane's Q) and quantified using I-squared (I<sup>2</sup>) statistics, assuming 0%–25%, 25%–50%, and 50%–75% I<sup>2</sup> values corresponding to low, moderate, and high heterogeneity, respectively (Higgins, Thompson, Deeks, & Altman, 2003). Publication bias was assessed via visual examination of the funnel plot, looking for asymmetry that might suggest specific omission of non-significant results. Moreover, Egger's regression intercept (Egger et al., 1997) was used to assess publication bias. No extreme outliers were identified and therefore no outcomes were excluded in this analysis.

All analyses were performed using Jamovi software 2.3.21 and JASP (Version 0.16.4.0; 2022).

### ***Quality assessment***

The methodological quality of the included papers was assessed with a modified version of the Newcastle-Ottawa Scale (Wells et al., online) for observational studies (see Table 2). The modified version of the NOS checklist assesses the methodological quality of papers with eight items. A maximum of nine points were attributed. Studies were evaluated to be at high risk of bias if scored equal or lower than four, at moderate risk of bias if scored five or six, and at low risk of bias if scored seven to nine. Quality assessment was conducted by



RBC, AT and GA. Any divergence between reviewers was discussed until an agreement was reached, if needed the senior authors were consulted (FM, GLC, and RR). No studies in the present review were excluded on the basis of poor methodological quality.

## Results

A total of 944 records were identified through databases, pre-print servers, and manual search (see the flow diagram in **Figure 1**). After removing 218 duplicates, 726 remaining titles and abstracts were screened, and 186 full-text articles were assessed for eligibility. 57 articles met the inclusion criteria and were included in quantitative analyses.

### *Quality appraisal*

**Table 2** presents the quality ratings of included studies. All the studies were cross-sectional descriptive studies. Eleven percent were evaluated at low risk of bias, 61% at medium risk of bias, and a further 28% at high risk of bias. Most studies revealed a high selection bias, with 66.6% of the studies presenting inadequate recruitment strategies (e.g., convenience sample), and 82% reporting unsatisfactory participation rate of the sample. All the studies used validated tools to assess the outcome (such as the *Body Shape Questionnaire-14* - Dowson & Henderson, 2001, the *Objectified Body Consciousness Scale* - OBCS; McKinley & Hyde, 1996, the *Eating Disorder Examination Questionnaire* - EDE-Q; Fairburn & Beglin, 1994). All the studies provided appropriate and complete statistical tests (i.e., includes both the statistics and p value/ 95% CI). 43% controlled the analysis for basic socio-demographic variables and another 42% for additional potential confounders (e.g., Body Mass Index).

### *Characteristics of the studies*

The characteristics of included articles are reported in **Table 3**. Results are divided into three sections, according to type of outcome (i.e., (a) studies examining the association between social comparison and body image concerns; (b) studies examining the association between



social comparison processes and ED behaviours; (c) studies examining the association between social comparison processes and positive body image).

The total sample included 44,116 participants, (F%=88.3%; mean age = 22.01, range 13.4–35.8), and mean BMI =22.98 (range 19.1–27.8). All the studies involved adult participants belonging to the general population. Of these, 46 studies (80.7%) included young adults (Arroyo & Brunner, 2016; Burke & Rains, 2018; Choukas-Bradley et al., 2020; Cohen et al., 2017; de Vries & Kühne, 2015; Di Gesto et al., 2022; Eckler et al., 2017; Fardouly & Vartanian, 2015; Fardouly et al., 2015; Fardouly et al., 2018; Fatt et al., 2019; Feltman & Szymanski, 2018; Foster et al., 2022; Fox et al., 2016; Griffiths et al., 2018; Hai & Yang, 2022; Hanna et al., 2017; Harriger & Pfund, 2022; Hendrickse et al., 2017; Jung et al., 2022; Kim & Chock, 2015; Kim, 2018; Lee & Lee, 2021; Lee, 2022; Mackson et al., 2019; Modica, 2019; Modica, 2020; Nagl et al., 2021; Pan et al., 2022; Pedalino & Camerini, 2022; Pfund et al., 2020; Powell et al., 2018; Prichard et al., 2021; Rafati et al., 2021; Saunders et al., 2018; Schettino et al., 2022; Seekis & Barker, 2022; Seekis et al., 2020; Sherlock & Wagstaff, 2019; Strubel et al., 2016; Teo et al., 2019; Walker et al., 2015; Wang et al., 2022; Yang et al., 2020; Yao et al., 2020; Zimmer-Gembeck et al., 2021), eleven studies (19.3%) included adolescents (Acar et al., 2020; Chang et al., 2019; Hawes et al., 2020; Jarman et al., 2021; Prieler et al., 2021; Roberts et al., 2022; Rousseau et al., 2017; Scully et al., 2020; Skowronski et al., 2021; Thorisdottir et al., 2019; Yang et al., 2020).

### *Association between social comparison and body image concerns*

Forty-four studies examined the relationship between social comparison processes and body image concerns (e.g., body image, body image dissatisfaction, appearance evaluation, appearance orientation, overweight preoccupation, muscle ideal, thin ideal, internalization, sociocultural attitudes, media pressure, family pressure, peers pressure, stereotyped beauty ideals, internalization of thinness, internalization of low body fat, internalization of the muscular body, internalization of the athletic body, drive for muscularity, drive for leanness, body dissatisfaction, appearance concerns, appearance preoccupation, shape concerns, weight concern, eating concerns, eating preoccupation, dietary habits, excessive physical activity, excessive exercise, compulsive exercise, exercise addiction) (**Figure 2**). A total of K=118 correlations were included in the analysis. Evidence of a positive correlation with



body image concerns was found ( $r = 0.44$ , 95% CI = 0.39–0.49) (**Table 4**). No evidence of publication bias was found (Egger's test  $z = -1.79$ ,  $p = .073$ ).

The analyses suggested that many of the effect sizes were heterogeneous ( $Q (117) = 2909.1871$ ,  $p < 0.0001$ ,  $\tau^2 = 0.06$ ,  $I^2 = 97.0712\%$ ) (**Table 4; Figure 3**), suggesting that moderating factors may account for systematic between-study differences in effect sizes. An examination of the studentized residuals revealed that none of the studies had a value larger than  $\pm 3.5248$  and hence there was no indication of outliers in the context of this model. According to the Cook's distances, none of the studies could be considered to be overly influential. The rank correlation test indicated funnel plot asymmetry ( $p = 0.0001$ ) but not the regression test ( $p = 0.0728$ ).

In the moderator analyses we focused on continuous variables (percentage of female participants, age and BMI), and categorical variables (robustness of the studies, country, type of sample, type of Social Media, and comparison direction). **Table 5** shows the results of the meta-regression analyses. The results indicated that only risk of bias was a significant moderator. Specifically, only studies with high robustness ( $k = 14$ ,  $r = -0.42$ ) obtained a negative association between social comparison processes and body image concerns. Thus, the findings suggest that the relationship between social comparison processes and body image concerns holds across samples varying with regard to age, BMI, country, type of SNSs used, percentage of female participants and comparison direction, which strengthens the generalizability of the findings.

### *Association between social comparison and ED behaviours*

Eleven studies examined the relationship between social comparison processes and ED behaviours (e.g., eating disorders symptomatology identified by a validated tool such as the *Eating Disorder Examination Questionnaire* - EDE-Q; Fairburn & Beglin, 1994) (**Figure 4**). A total of  $K=19$  correlations were included in the analysis. Evidence of positive correlation with ED behaviours was found ( $r = 0.35$ , 95% CI = 0.23– 0.48) (**Table 4**). As suggested by funnel plots (**Figure 5**) and Egger's test there is evidence for publication bias (Egger's test  $z = 2.97$ ,  $p = .003$ ).



The analyses suggested that many of the effect sizes were heterogeneous ( $Q(18) = 553.4916$ ,  $p < 0.0001$ ,  $\tau^2 = 0.08$ ,  $I^2 = 97.2555\%$ ) (**Table 4; Figure 5**), suggesting that moderating factors may account for systematic between-study differences in effect sizes. An examination of the studentized residuals revealed that none of the studies had a value larger than  $\pm 3.0078$  and hence there was no indication of outliers in the context of this model. According to the Cook's distances, none of the studies could be considered to be overly influential. The regression test indicated funnel plot asymmetry ( $p = 0.0029$ ) but the rank correlation test did not ( $p = 0.2057$ ). In the moderator analyses we focused on the same continuous and categorical variables mentioned above. **Table 6** shows the results of the meta-regression analyses. These results indicated that subgroup analyses revealed that none of the moderators showed a significant effect.

#### *Association between social comparison and positive body image characteristics*

Twenty-nine studies examined the association between social comparison processes and positive body image (e.g., body image satisfaction, body satisfaction, physical attractiveness, body esteem) (**Figure 6**). A total of  $K=29$  correlations were included in the analysis. Evidence of negative correlation with positive body image was found ( $r = -0.30$ , 95% CI =  $-0.44; -0.17$ ) (**Table 4**), and no evidence of publication bias was found (Egger's test  $z = -0.01$ ,  $p = .990$ ).

The analyses suggested that many of the effect sizes were heterogeneous ( $Q(28) = 1960.1730$ ,  $p < 0.0001$ ,  $\tau^2 = 0.13$ ,  $I^2 = 98.6947\%$ ) (**Table 4; Figure 7**), suggesting that moderating factors may account for systematic between-study differences in effect sizes. An examination of the studentized residuals revealed that none of the studies had a value larger than  $\pm 3.1340$  and hence there was no indication of outliers in the context of this model. According to the Cook's distances, one study (Pfund et al., 2020) could be considered to be overly influential. Neither the rank correlation nor the regression test indicated any funnel plot asymmetry ( $p = 0.0982$  and  $p = 0.9901$ , respectively).

In the moderator analyses we focused on the same continuous and categorical moderation variables mentioned above. **Table 7** shows the results of the meta-regression analyses. The results of the meta-regression analysis showed that the following moderators had a





significant influence on the association between social comparison processes and positive body image (see **Table 7**): mean age, percentage of female participants, BMI, risk of bias, country, and comparison direction. Specifically, studies with moderate risk of bias ( $k = 22$ ,  $r = -1.020$ ) obtained a negative effect on the association between social comparison processes and positive body image characteristics. The analysis also revealed that regional areas were significant moderators in the relationship between social comparison processes and positive body image. Studies conducted in North America ( $k = 14$ ,  $r = 0.963$ ) and Asia ( $k = 7$ ,  $r = 1.393$ ) showed a stronger effect than studies conducted in Europe. Studies characterized of downward comparison ( $k = 1$ ,  $r = 0.630$ ) obtained a positive effect on the relationship between social comparison processes and positive body image. Also gender distribution of the sample ( $r = -0.021$ ), mean age ( $r = 0.095$ ), and BMI ( $r = -0.263$ ) moderated this association.

## **Discussion**

SNS are used by many people all around the world (Statista, 2022), and their usage has become an important aspect of social behaviour, providing fertile ground for online social comparisons (Verduyn et al., 2017). The current meta-analysis is the first systematic attempt to estimate the correlation between online social comparison and body image outcomes. The results showed small to moderate positive associations between the online social comparison processes, body image concerns and ED behaviours, as well as a negative relationship between the online social comparison processes and positive body image. These findings are consistent with prior evidence that social media use can encourage unfavorable social comparison, which may in turn lead to negative outcomes (Appel et al., 2016; de Vries et al., 2018; Feinstein et al., 2013).

We found a moderate and positive effect size for the relationship between online social comparison processes and body image concerns. More recent literature suggests that Social Media use determines more frequent and more harmful social comparison processes than traditional media exposure which impact body image (Choukas-Bradley et al., 2022; de Valle et al., 2021). This may be because online users may interpret online content as idealized, and more relevant to the own social comparisons (Choukas-Bradley et al., 2022). Similarly, earlier cross-sectional, longitudinal and experimental studies had already





demonstrated that overall SNS use was related to increased levels of body image concerns, such as body dissatisfaction, overweight preoccupation, appearance concerns, and disordered eating (De Vries et al., 2016; Meier & Gray, 2014; Fardouly & Vartanian, 2014; Mabe et al., 2014; Tiggemann & Slater, 2013, 2014), and our meta-analysis adds that online social comparison may play a role in heightening body image concerns. Although previous evidence suggested that social comparison in social media is related to psychological distress (Verduyn et al., 2020), the negative effect of online social comparison on body image received less research attention. A recent meta-analysis on the association between social media use and body image showed that online comparison, as either a moderator or mediator in experimental research, may increase the risk for negative impacts on body image (de Valle et al., 2021). Our findings seem to further support the hypothesis of a negative consequences of social media use.

We also found a small and positive effect size in the relationship between online social comparison and ED behaviors. This result is in line with other previous meta-analyses that found a positive association between traditional media exposure and both eating behaviors and body image concerns in women (Grabe et al., 2008) and men (Barlett et al., 2008). Traditional media is the precursor to Social Media and the literature has suggested that Social Media has become even more influential in people's lives than traditional media (Al-Quran, 2022), probably further emphasizing sociocultural appearance standards and risk factors for eating disorders, causing subsequent behavioral outcomes (e.g., bulimia, steroid usage, and dieting to increase muscularity) (Cafri et al., 2005; Smolak et al., 2005). Prior research using ecological momentary assessment suggested that social comparisons can be associated with later disordered eating thoughts and behaviors in the natural environment, and that body comparisons may predict certain disordered eating thoughts (i.e., thoughts about restriction and exercise) (Fitzsimmons-Craft et al., 2015). Our findings add to this literature by highlighting the potential negative role of social comparison in the context of social media use. However, the evidence of a publication bias limits the possibility of the generalization of conclusions. Given the small number of studies and their limited methodological quality, more research is needed to examine the effect of social comparisons on eating disorder symptoms. Preliminary research also suggested that people compare what others are eating to what they themselves eat, and can draw conclusions from these comparisons about how



much they should eat (Polivy, 2017). However, the negative impact of online social comparison on specific eating behaviors or symptoms seems preliminary, and further research efforts are strongly needed to address this topic more consistently.

Finally, we found that online social comparison is negatively associated with positive body image. Regarding this result, previous literature found that viewing online images that emphasize the thin and perfect ideal led to higher body and facial dissatisfaction (De Vries et al., 2016; Tiggemann et al. 2018). More people are invested in online behaviors (posting, browsing, likes and comments) and more compare themselves to others, and this comparison decreases positive perceptions of one's own body (Tiggemann et al., 2018). This lower body satisfaction could be linked to a negative self-schema, which is a belief about oneself that works as a lens for information related to the self. By looking at body image as connected to self-schema, past research found that using SNS may lead to form a self-schema of dissatisfaction about one's body image (Ahadzadeh et al., 2016; Mulgrew et al., 2014). This self-schema is caused by sociocultural attitudes towards appearance that repeatedly support the perfect ideal (Hargreaves & Tiggemann, 2002; Markus, 1977). Thus, it is possible that after seeing online idealized images it is common for people to internalize such standards and experience fewer positive feelings about one's body.

Our meta-regression results suggested that the relationship between online social comparison processes, body image concerns, ED behavior and positive body image is dependent on study-level variables and sample-level variables. Firstly, as predicted by one of our hypotheses and as supported by the meta-regression analyses, two of our proposed associations depended on the study quality. Thus, the relationship between online social comparison processes and body image concerns, as well as the relationship between online social comparison processes and positive body image, was stronger in studies evaluated with a low and medium risk of bias respectively, which could be justified by the fact that studies with better quality detect more accurately the statistical significance in the relationship of variables (Hartling et al., 2009). In addition, as predicted by our hypotheses and as indicated by meta-regression analyses, our proposed associations were dependent on the comparison directions, but only for the association between online social comparison processes and positive body image, in which the downward comparison increases the effect of the



relationship as we expected based on the literature on the topic (Fox & Vendemia, 2016; van den Berg & Thompson, 2007).

Contrary to our hypothesis, studies with a higher percentage of female participants did not report a greater relationship between the online social comparison processes and body image concerns, as well as between the online social comparison processes and ED behaviours, suggesting that these associations seem not different for males and females. This result is in line with the findings of a recent meta-analysis on the relationship between social media use and body image concerns (Saiphoo & Vahedi, 2019). A possible explanation of this result is that body image concerns have increased in men, especially because appearance comparison through social media has emerged as a critical variable caused by the desire of a muscular body among males (Griffiths et al., 2018). The hypothesis was confirmed in the case of the relationship between the online social comparison processes and positive body image, suggesting that studies with higher proportions of women negatively impact the relationship. These results are in line with Mahon and Hevey (2021) who have found that boys use many different online behavioural strategies for avoiding negative content and selecting positive content, exhibiting greater positive agency over their bodies and SNS use than girls who may be more prone to a negative evaluation of their bodies.

We found that studies conducted in different regional areas did not show a different relationship between online social comparison processes and body image concerns, as well as between the online social comparison processes and ED behaviors. We could speculate that SNSs allow diverse comparison targets for people, and it is likely that users from all cultures and countries could be exposed to targets relevant to them and their body image. However, regarding the relationship between the online social comparison processes and positive body image, we found that the regional area moderated this relationship, with studies conducted in North America and Asia showing a stronger association between social comparison and positive body image outcomes.

For mean age of the sample, the only obtained moderator effect was on the relationship between online social comparison processes and positive body image. Probably because the effect of the self-schema is stronger for adult people, influencing their perception of body and damaging beliefs regarding the positive aspects of their own body. In addition, including BMI resulted in a moderator effect on the relationship between online social comparison



processes and positive body image, negatively impacting the association between the two variables. Finally, type of sample (above/under 18 years), type of social media use and year of publication were not found to be significant moderators of our three proposed associations.

### ***Limitations and future directions***

Though our systematic review and meta-analysis fills a gap in the online social comparison literature, it is also characterized by certain limitations. Firstly, the analysis only included cross-sectional and correlational studies, thus limiting the ability to make causal declaration. Consequently, based on this analysis it is not possible to affirm whether increased use of online social comparison processes results in higher body image concerns, ED behaviours and lower positive body image, or if preexisting aspects linked to body image concerns and ED behaviors may trigger heightened tendencies to online social comparison. Secondly, we ran meta-regression analyses for some few moderating variables and we cannot exclude that other variables may influence the relationship between social comparison and body image outcomes. Thus, it is possible that these estimations could be increased or decreased due to other variables that can explain our three predicted associations. Future studies should also include experimental and longitudinal studies in the analysis, for monitoring variables that may influence the relationship to be investigated. Thirdly, we didn't consider the ways in which social media use was operationalized in the moderation analysis, but this variable could obtain more specific estimates of the relationship between our three predicted associations, for example, some activities on social media have a greater impact on the relationship between online social comparison and body image than others. Categories of the type of SNS use among the moderating variables should be included in future studies. Finally, the high representation of young adult participants and females in the majority of studies makes unclear whether the effects of online social comparison processes differ in older samples, males, or people of diverse genders.

Despite these limitations, this systematic review and meta-analysis has several strengths. To the authors' knowledge, this is the first comprehensive, quantitative review focused only on a specific aspect of SNS usage, online social comparison, contrary to previous reviews that were only focused on Social Media use (Choukas-Bradley et al., 2022; de Valle et al., 2021),



or only addressed a single component of body image (Saiphoo & Vahedi, 2019). Our results suggest to conduct new research in this field. First, further research should investigate causality by using prospective or experimental research designs to address the question of causation between online social comparison and body image outcomes. Secondly, future research should explore the amount of time spent and the way of using social media (e.g., active or passive use) as a moderator variable in the relationship between online social comparison and body image aspects. Finally, future studies might consider investigating these relationships both in traditional and in online contexts.

## **Conclusion**

To sum up, the results of this meta-analysis indicate that online social comparison is associated with body image concerns, ED behaviors and positive body image. This study provides an estimate of the strength of the relationship between online social comparison and body image concerns and ED behaviors that is more nuanced and comprehensive than those previously given. The effect was not large as might have been predicted, which suggests that the associations may not be as harmful as predicted for users in general. However, it may be particularly harmful for certain users (e.g., adult users) who are engaging in certain behaviours (i.e., downward comparison), female, American and Asian users.



**Table 1**

*Search strategy for each database*

| Database              | Search strategy   |
|-----------------------|---|
| <i>PubMed</i>         | ((Digital social network) OR (Digital social network) OR (Social Network Site*) OR (SNS*) OR (Virtual platform*) OR (Instagram) OR (Facebook) OR (Twitter) OR (Snapchat) OR (TikTok) OR (Smartphone) OR (App) OR (Application)) AND ((Social Comparison*) OR (Social Comparison Orientation) OR (Online Social Comparison*) OR (Online Social Comparison Orientation) OR (Upward Comparison*) OR (Downward Comparison*) OR (Online Upward Comparison) OR (Online Downward Comparison) OR (Appearance Comparison*) OR (Physical Appearance Comparison) OR (Online Appearance Comparison) OR (Online Physical Appearance Comparison) OR (Facial comparison) OR (Body comparison)) AND ((Eating Disorder*) OR (Anorexia) OR (Anorexi*) OR (Anorexia Nervosa) OR (Bulimia) OR (Bulimi*) OR (Bulimia Nervosa) OR (Binge) OR (Binge eating) OR (Binging) OR (Bingeing) OR (Orthorexia) OR (Vigorexia) OR (Bigorexia) OR (Body Image) OR (Body image dissatisfaction) OR (Appearance Evaluation) OR (Physical Attractiveness) OR (Appearance Orientation) OR (Overweight Preoccupation) OR (Muscle Ideal) OR (Thin Ideal OR Internalization) OR (Internalize) OR (Sociocultural Attitude*) OR (Media pressure) OR (Family pressure) OR (Peer* pressure) OR (Stereotyped beauty ideal*) OR (Internalization of thin) OR (Internalization of low body fat) OR (Internalization of the muscular body) OR (Internalization of the athletic body) OR (Drive For Muscularity) OR (Drive For Leanness) OR (Body Dissatisfaction) OR (Body Satisfaction) OR (Eating concerns) OR (Eating preoccupation) OR (Appearance concerns) OR (Appearance preoccupation) OR (Dietary Habit*) OR (Excessive physical activity) OR (Excessive exercise) OR (Compulsive exercise) OR (Exercise Addiction) OR (Shape Concern*) OR (Weight Concern*)) |
| <i>Embase</i>         | (Digital social network OR Digital social network OR Social Network Site* OR SNS* OR Virtual platform* OR Instagram OR Facebook OR Twitter OR Snapchat OR TikTok OR Smartphone OR App OR Application) AND (Social Comparison* OR Social Comparison Orientation OR Online Social Comparison* OR Online Social Comparison Orientation OR Upward Comparison* OR Downward Comparison* OR Online Upward Comparison OR Online Downward Comparison OR Appearance Comparison* OR Physical Appearance Comparison OR Online Appearance Comparison OR Online Physical Appearance Comparison OR Facial comparison OR Body comparison) AND (Eating Disorder* OR Anorexia OR Anorexi* OR Anorexia Nervosa OR Bulimia OR Bulimi* OR Bulimia Nervosa OR Binge OR Binge eating OR Binging OR Bingeing OR Orthorexia OR Vigorexia OR Bigorexia OR Body Image OR Body image dissatisfaction OR Appearance Evaluation OR Physical Attractiveness OR Appearance Orientation OR Overweight Preoccupation OR Muscle Ideal OR Thin Ideal OR Internalization OR Internalize OR Sociocultural Attitude* OR Media pressure OR Family pressure OR Peer* pressure OR Stereotyped beauty ideal* OR Internalization of thin OR Internalization of low body fat OR Internalization of the muscular body OR Internalization of the athletic body OR Drive For Muscularity OR Drive For Leanness OR Body Dissatisfaction OR Body Satisfaction OR Eating concerns OR Eating preoccupation OR Appearance concerns OR Appearance preoccupation OR Dietary Habit* OR Excessive physical activity OR Excessive exercise OR Compulsive exercise OR Exercise Addiction OR Shape Concern* OR Weight Concern*)   |
| <i>Web of Science</i> | (Digital social network OR Social Media OR Social Network Site* OR SNS* OR Virtual platform* OR Instagram OR Facebook OR Twitter OR Snapchat OR TikTok OR Smartphone OR App OR Application) AND (Social Comparison* OR Social Comparison Orientation OR Online Social Comparison* OR Online Social Comparison Orientation OR Upward Comparison* OR Downward Comparison* OR Online Upward Comparison OR Online Downward Comparison OR Appearance Comparison* OR Physical Appearance Comparison OR Online Appearance Comparison OR Online Physical Appearance Comparison  |



|                      |  |
|----------------------|--|
|                      | <p>OR Facial comparison OR Body comparison) AND (Eating Disorder* OR Anorexia OR Anorexi* OR Anorexia Nervosa OR Bulimia OR Bulimi* OR Bulimia Nervosa OR Binge OR Binge eating OR Binging OR Bingeing OR Orthorexia OR Vigorexia OR Bigorexia OR Body Image OR Body image dissatisfaction OR Appearance Evaluation OR Physical Attractiveness OR Appearance Orientation OR Overweight Preoccupation OR Muscle Ideal OR Thin Ideal OR Internalization OR Internalize OR Sociocultural Attitude* OR Media pressure OR Family pressure OR Peer* pressure OR Stereotyped beauty ideal* OR Internalization of thin OR Internalization of low body fat OR Internalization of the muscular body OR Internalization of the athletic body OR Drive For Muscularity OR Drive For Leanness OR Body Dissatisfaction OR Body Satisfaction OR Eating concerns OR Eating preoccupation OR Appearance concerns OR Appearance preoccupation OR Dietary Habit* OR Excessive physical activity OR Excessive exercise OR Compulsive exercise OR Exercise Addiction OR Shape Concern* OR Weight Concern*)</p>  |
| <p><i>Scopus</i></p> | <p>“Digital social network” OR “Social Media” OR “Social Network Site*” OR “SNS*” OR “Virtual platform*” OR “Instagram” OR “Facebook” OR “Twitter” OR “Snapchat” OR “TikTok” OR “Smartphone” OR “App” OR “Application” AND “Social Comparison*” OR “Upward Comparison*” OR “Downward Comparison*” OR “Appearance Comparison*” OR “Facial comparison” OR “Body comparison” AND “Eating Disorder*” OR “Anorexia” OR “Anorexi*” OR “Bulimia” OR “Bulimi*” OR “Binge” OR “Binging” OR “Bingeing” OR “Orthorexia” OR “Vigorexia” OR “Bigorexia” OR “Body Image” OR “Appearance Evaluation” OR “Physical Attractiveness” OR “Appearance Orientation” OR “Overweight Preoccupation” OR “Muscle Ideal” OR “Thin Ideal” OR “Internalization” OR “Internalize” OR “Sociocultural Attitude*” OR “Media pressure” OR “Family pressure” OR “Peer* pressure” OR “Stereotyped beauty ideal*” OR “Drive For Muscularity” OR “Drive For Leanness” OR “Body Dissatisfaction” OR “Body Satisfaction” OR “Eating concerns” OR “Eating preoccupation” OR “Appearance concerns” OR “Appearance preoccupation” OR “Dietary Habit*” OR “Excessive physical activity” OR “Excessive exercise” OR “Compulsive exercise” OR “Exercise Addiction” OR “Shape Concern*” OR “Weight Concern*”</p> |

**FIGURE 1**

**Flowchart of study selection (PRISMA)**

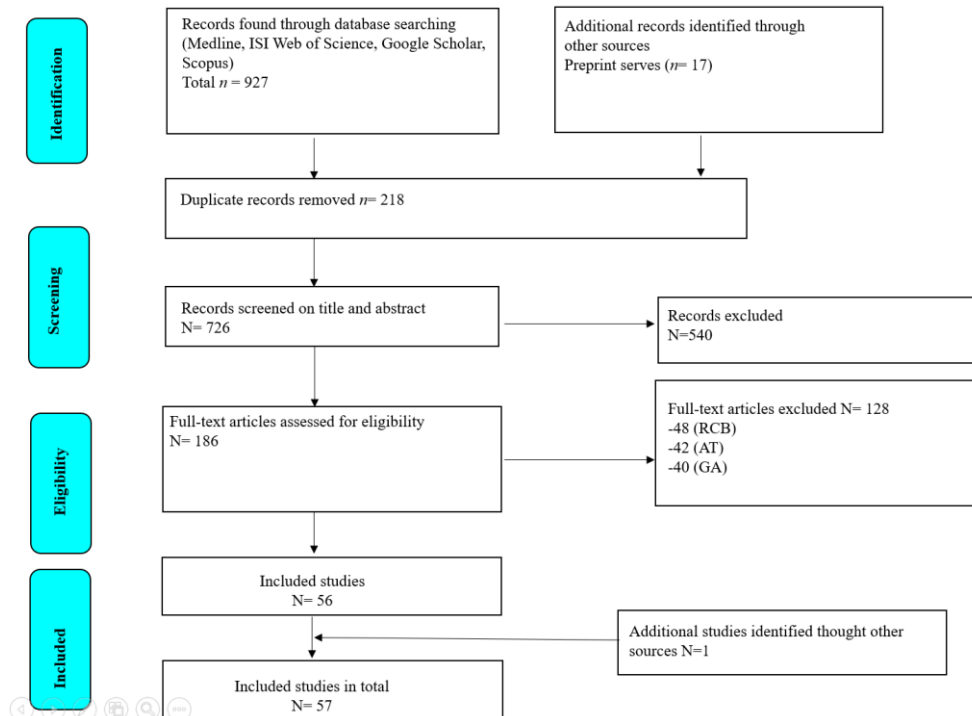


Fig. 1 PRISMA flowchart of study selection





**TABLE 2**

*Quality assessment of included studies*

| Author, date                 | 1. Representativeness of the sample | 2. Sample size | 3. Non-respondents/ Loss to follow up | 4. Assessment of the exposure | 5. Comparability/ adjustment for conf | 6. Assessment of the outcome | 7. Statistical analyses | 8. Follow up | Total score |
|------------------------------|-------------------------------------|----------------|---------------------------------------|-------------------------------|---------------------------------------|------------------------------|-------------------------|--------------|-------------|
| Acar et al., 2020            | 0                                   | 1              | 0                                     | 1                             | 0                                     | 1                            | 1                       | 0            | 4           |
| Arroyo & Brunner, 2016       | 0                                   | 0              | 0                                     | 1                             | 1                                     | 1                            | 1                       | 0            | 4           |
| Burke & Rains, 2018          | 0                                   | 1              | 1                                     | 1                             | 1                                     | 1                            | 1                       | 0            | 6           |
| Chang et al., 2019           | 1                                   | 0              | 1                                     | 1                             | 1                                     | 1                            | 1                       | 0            | 6           |
| Choukas-Bradley et al., 2019 | 0                                   | 0              | 0                                     | 1                             | 0                                     | 1                            | 1                       | 0            | 3           |
| Cohen et al., 2017           | 0                                   | 0              | 0                                     | 1                             | 1                                     | 1                            | 1                       | 0            | 4           |
| de Vries & Kühne, 2015       | 0                                   | 0              | 1                                     | 1                             | 2                                     | 1                            | 1                       | 0            | 6           |
| Di Gesto et al., 2022        | 0                                   | 0              | 0                                     | 1                             | 2                                     | 1                            | 1                       | 0            | 5           |
| Eckler et al., 2017          | 0                                   | 0              | 1                                     | 1                             | 2                                     | 1                            | 1                       | 0            | 6           |
| Fardouly & Vartanian, 2015   | 0                                   | 1              | 0                                     | 1                             | 0                                     | 1                            | 1                       | 0            | 4           |
| Fardouly et al., 2015        | 0                                   | 0              | 0                                     | 1                             | 2                                     | 1                            | 1                       | 0            | 5           |
| Fardouly et al., 2018        | 0                                   | 0              | 0                                     | 1                             | 1                                     | 1                            | 1                       | 0            | 4           |
| Fatt et al., 2019            | 0                                   | 0              | 1                                     | 1                             | 2                                     | 1                            | 1                       | 0            | 6           |
| Feltman & Szymanski, 2018    | 0                                   | 0              | 1                                     | 1                             | 2                                     | 1                            | 1                       | 0            | 6           |
| Foster et al., 2022          | 0                                   | 1              | 0                                     | 1                             | 2                                     | 1                            | 1                       | 0            | 6           |
| Fox et al., 2016             | 1                                   | 0              | 1                                     | 1                             | 1                                     | 1                            | 1                       | 0            | 6           |
| Griffiths et al., 2018       | 1                                   | 0              | 1                                     | 1                             | 2                                     | 1                            | 1                       | 0            | 7           |
| Hai & Yang, 2022             | 0                                   | 0              | 1                                     | 1                             | 0                                     | 1                            | 1                       | 0            | 4           |
| Hanna et al., 2017           | 0                                   | 0              | 1                                     | 1                             | 1                                     | 1                            | 1                       | 0            | 5           |



|                           |   |   |   |   |   |   |   |   |   |
|---------------------------|---|---|---|---|---|---|---|---|---|
| Harriger & Pfund, 2022    | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 4 |
| Hawes et al., 2020        | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 5 |
| Hendrickse et al., 2017   | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 6 |
| Jarman et al., 2021       | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 6 |
| Jung et al., 2022         | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 5 |
| Kim & Chock, 2015         | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 6 |
| Kim, 2018                 | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 6 |
| Lee & Lee, 2021           | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 5 |
| Lee, 2022                 | 0 | 1 | 0 | 1 | 1 | 1 | 1 | 0 | 5 |
| Mackson et al., 2019      | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 5 |
| Modica, 2019              | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 4 |
| Modica, 2020              | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 4 |
| Nagl et al., 2021         | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 4 |
| Pan et al., 2022          | 1 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 6 |
| Pedalino & Camerini, 2022 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 4 |
| Pfund et al., 2020        | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 5 |
| Powell et al., 2018       | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 4 |
| Prichard et al., 2021     | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 7 |
| Prieler et al., 2021      | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 4 |
| Rafati et al., 2021       | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 5 |
| Roberts et al., 2022      | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 4 |
| Rousseau et al., 2017     | 1 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 8 |
| Saunders et al., 2018     | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 3 |
| Schettino et al., 2022    | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 6 |
| Scully et al., 2020       | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 6 |
| Seekis & Barker, 2022     | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 0 | 8 |



|                             |   |   |   |   |   |   |   |   |   |
|-----------------------------|---|---|---|---|---|---|---|---|---|
| Seekis et al., 2020         | 1 | 1 | 0 | 1 | 0 | 1 | 1 | 0 | 5 |
| Sherlock & Wagstaff, 2019   | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 5 |
| Skowronski et al., 2021     | 1 | 0 | 1 | 1 | 2 | 1 | 1 | 1 | 8 |
| Strubel et al., 2016        | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 5 |
| Teo et al., 2019            | 1 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 5 |
| Thorisdottir et al., 2019   | 1 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 7 |
| Walker et al., 2015         | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 6 |
| Wang et al., 2022           | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 5 |
| Yang et al., 2020           | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 5 |
| Yang et al., 2020           | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 0 | 5 |
| Yao et al., 2020            | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 6 |
| Zimmer-Gembeck et al., 2021 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 0 | 6 |



**TABLE 3**

*Summary of characteristics of included studies*

| Author, date                        | Country   | N    | Female (%) | Age (M) | Type of sample   | BMI (M) | Type of Social Media | Comparison direction | Data collection of social comparison   | Body image concerns and ED behaviour studied  | Assessment of body image concerns and ED behaviour  |
|-------------------------------------|-----------|------|------------|---------|------------------|---------|----------------------|----------------------|--|---|---|
| <b>Acar et al., 2020</b>            | Turkey    | 1384 | 698 (50.4) | 14.31   | Adolescents      | 9999    | All                  | No direction         | (1) Turkish version of Physical Appearance Comparison Scale (PACS);<br>(2) Social Media Physical Appearance Comparison Scale (SM-PACS)                         | Eating attitudes  | Eating Attitudes Test (EAT-26)  |
| <b>Arroyo &amp; Brunner, 2016</b>   | England   | 488  | 323 (66.1) | 20.51   | Young adults     | 9999    | All                  | No Direction         | Physical Appearance Comparison Scale (Thompson, Heinberg, & Tantleff, 1991)  | (1) Body surveillance;<br>(2) Body satisfaction;<br>(3) Exercise and healthy eating;<br>(4) Negative body talk. | (1) Body Surveillance subscale from McKinley and Hyde's (1996) Objectified Body Consciousness Scale;<br>(2) Mendelson, and White's (2001) Body Satisfaction Scale for Adolescents and Adults;<br>(3) adapted scale from Jackson (2006);<br>(4) Maddox et al.'s (2012) Negative Body Talk Scale. |
| <b>Burke &amp; Rains, 2018</b>      | USA       | 232  | 131 (56)   | 31.33   | Adults           | 25.40   | All                  | Upward and Downward  | The Upward Physical appearances comparisons scale (UPACS); The downward physical appearances comparisons scale (DACS) (O'Brien et al, 2009).                   | (1) Weight concern; (2) Exercise attitudes  | (1) Killen et al.'s (1994) 5-item weight concern scale; (3) Courneya and Bobick's (2000) 8-item exercise attitudes measure.   |
| <b>Chang et al., 2019</b>           | Singapore | 303  | 303 (100)  | 14.25   | Adolescent girls | 20.05   | Instagram            | Upward and downward  | State Appearance Comparison Scale (Tiggemann & McGill, 2004); (2) Two items adapted from Fardouly and Vartanian (2015) for Direction of appearance comparisons | Body esteem.  | Mendelson, White, and Mendelson's Body Esteem Scale (Mendelson, White, & Mendelson, 1996)   |
| <b>Choukas-Bradley et al., 2019</b> | USA       | 339  | 339 (100)  | 18.35   | College women    | 9999    | All                  | No Direction         | A 6 item Body Comparison Orientation scale of the Body, Eating, and Exercise Comparison Orientation Measure  | (1) Body surveillance; (2) Body esteem  | (1) Body Surveillance subscale of the Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996); (2) A subset of 14 items from the Body Esteem Scale for   |



|                                       |             |     |           |       |                                |       |                        |              |  |  |  |
|---------------------------------------|-------------|-----|-----------|-------|--------------------------------|-------|------------------------|--------------|--|--|--|
|                                       |             |     |           |       |                                |       |                        |              | (BEECOM; Fitzsimmons-Craft et al., 2012)   |  | Adolescents and Adults (BESAA; Mendelson, Mendelson, & White, 2001);   |
| <b>Cohen et al., 2017</b>             | Australia   | 259 | 259 (100) | 22.9  | Young women                    | 22.45 | Facebook and Instagram | No Direction | The five-item Physical Appearance Comparison Scale (PACS; Thompson, Heinberg, & Tantleff-Dunn, 1991)               | (1) Thin-ideal internalization;(2) Appearance evaluation;(3) Body surveillance;(4)Drive for thinness;  | (1)The Internalisation-General subscale of the Sociocultural Attitudes Towards Appearance Questionnaire–Version 3 (SATAQ-3); (2)The Appearance Evaluation (AE) subscale of the Multidimensional Body-Self Relations Questionnaire-Appearance Scales (MBSRQ; Cash, 2000); (3)The Body Surveillance Subscale of the Objectified Body Consciousness Scale (OBCS; McKinley & Hyde, 1996) Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004);(4)The Drive for Thinness Subscale of the Eating Disorder Inventory-3 (EDI-3; Garner, 2004). |
| <b>de Vries &amp; Kühne, 2015</b>     | Netherlands | 231 | 159 (69)  | 22.3  | Young adults                   | 9999  | Facebook               | No Direction | Items ad hoc   | (1) Self-perception  | (1) Harter's Self-Perception Profile for Adolescents (Harter, 1988)  |
| <b>Di Gesto et al., 2022</b>          | Italy       | 305 | 305 (100) | 23    | Italian university women       | 21.78 | Instagram              | No Direction | Instagram Appearance Comparison Scale;   | (1) Body dissatisfaction;(2)stagram Image Activity   | (1) Italian version of the Body Shape Questionnaire-14;  |
| <b>Eckler et al., 2017</b>            | USA         | 881 | 881 (100) | 23.83 | U.S. college women             | 9999  | Facebook               | No Direction | Item ad hoc  | (1) Body image cognitive aspect;(2) Body image behavioural aspect;(3) Attention to physical appearance,Comparing to others,Discussing weight/body image/diet,Weight and eating disorders | (1) Body Shape Questionnaire (BSQ); (2) Eating Attitudes Test (EAT-26). (3) Item ad hoc.   |
| <b>Fardouly &amp; Vartanian, 2015</b> | Australia   | 227 | 227 (100) | 19.13 | First-year psychology students | 21.41 | Facebook               | No Direction | Three statements taken from the Physical Appearance Comparison Scale (PACS; Thompson, Heinberg, & Tantleff, 1991); | Body image concerns;   | Two subscales of the Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983)   |
| <b>Fardouly et al., 2015</b>          | UK          | 150 | 150 (100) | 20,52 | Young women                    | 23.30 | All                    | Upward and   | The Upward and Downward Appearance Comparison Scale  | Self-Objectification.  | The Self-Objectification Questionnaire (SOQ; Noll & Fredrickson, 1998).  |



|                                      |           |       |           |       |                             |       |           |                     |  |  |  |
|--------------------------------------|-----------|-------|-----------|-------|-----------------------------|-------|-----------|---------------------|--|--|--|
| <b>Fardouly et al., 2018</b>         | Australia | 276   | 276 (100) | 22.83 | Undergraduate women         | 24.37 | Instagram | Upward and Downward | (UPACS/DACS; O'Brien et al., 2009)<br>The Upward and Downward Appearance Comparison Scale (UPACS/DACS; O'Brien et al., 2009) | (1) Internalization of the beauty ideal;(2) Body image concerns;(3) Self-Objectification.          | (1) The Internalization-General subscale of the Sociocultural Attitudes Towards Appearance Questionnaire-3 (SATAQ-3); (2) Two subscales of the Eating Disorder Inventory (EDI; Garner et al., 1983): the Body Dissatisfaction subscale, the Drive for Thinness subscale; (3) The Self-Objectification Questionnaire (SOQ; Noll and Fredrickson, 1998). |
| <b>Fatt et al., 2019</b>             | Australia | 154   | 0 (0)     | 19.43 | Male undergraduate students | 24.04 | Instagram | No direction        | Physical Appearance Comparison Scale-Revised (PACS-R; Schaefer and Thompson, 2014).  | (1) Internalisation of the muscular-ideal;(2) Exercise motivation;(3)Body satisfaction             | (1) The male version of the Sociocultural Attitudes Towards Appearance Questionnaire-4; (2) The health and appearance subscales of the Exercise Motivation Inventory-2 (EMI-2; Markland and Ingledew, 1997)Revised;(3)The Appearance subscale of the Body Esteem Scale for Adolescents and Adults (BESAA; Mendelson et al., 2001).                     |
| <b>Feltman &amp; Szymanski, 2018</b> | USA       | 492   | 492 (100) | 26.5  | Undergraduate women         | 23.41 | Instagram | No direction        | The Upward and Downward Appearance Comparison Scale (O'Brien et al. 2009)  | (1) Self-Objectification; (2)Body Surveillance; (3)Internalization of Cultural Standards of Beauty | (1)The Self-Objectification Questionnaire (SOQ; Noll andFredrickson 1998); (2) Body Surveillance subscale of the Objectified Body Consciousness Scale (OBCS; McKinley and Hyde 1996); (3)the Internalization subscale of the Sociocultural Attitudes Toward Appearance Questionnaire (Heinberg et al. 1995)  |
| <b>Foster et al., 2022</b>           | USA       | 636   | 636 (100) | 19    | college women               | 23.97 | Snapchat  | No direction        | Physical appearance comparison Scale-Revised (PACS-R; study 1 a ¼ .98)   | (1) Compensatory eating and drinking behaviour frequency (CEBF); (2) Eating disorder.              | (1) Item ad hoc; (2) Eating disorder Inventory- Drive for thinness subscale (EDI-DT; study 1 a ¼ .83).   |
| <b>Fox et al., 2016</b>              | USA       | 1.686 | 908 (54)  | 29.31 | Adults                      | 27.77 | All       | No direction        | Item ad hoc  | Body image   | Item ad hoc  |



|                                   |  |       |           |       |   |      |           |              |   |  |   |
|-----------------------------------|--|-------|-----------|-------|---|------|-----------|--------------|---|--|---|
| <b>Griffiths et al., 2018</b>     | Australia, the United States, and the United Kingdom | 228   | 212 (93)  | 25.98 | Individuals with self-reported eating disorders | 9999 | All       | No direction | The 11-item Physical Appearance Comparisons Scale – Revised (PACS-R; Schaefer & Thompson, 2014) | (1) Eating disorder symptoms;  | (1) Four subscales from the 22-item EDE-Q.  |
| <b>Hai &amp; Yang, 2022</b>       | China  | 320   | 320 (100) | 21.6  | Female college students or graduates            | 9999 | All       | No direction | Social Network Site Appearance Comparison Scale SNSACS (Fardouly et al.)                        | (1) Body image and body satisfaction; (2) Overweight preoccupation   | (1) Multidimensional Body–Self Relations Questionnaire - MBSRQ (Cash); (2) Multidimensional Body–Self Relations Questionnaire   |
| <b>Hanna et al., 2017</b>         | USA  | 1.104 | 690 (62)  | 20.5  | Undergraduates women and men                    | 9999 | Facebook  | No direction | A scale adapted from the Iowa Netherlands Comparison Orientation Measure                        | (1) Self-objectification; (2) Body shame   | (1) the Surveillance subscale of the Objectified Body Consciousness Scales–Youth (OBC-Y) (2) the Enjoyment of Sexualization Scale   |
| <b>Harriger &amp; Pfund, 2022</b> | USA  | 618   | 334 (54)  | 33.32 | Adults  | 9999 | Zoom      | No direction | The Physical Appearance Comparison Scale (Thompson et al., 1991, 1999)                          | (1) Self-objectification; (2) Appearance satisfaction  | (1) The 8-item body surveillance subscale from the Objectified Body Consciousness Scale (McKinley & Hyde, 1996); (2) the 14-item Body Parts Satisfaction Scale – Revised (Petrie et al., 2002)  |
| <b>Hawes et al., 2020</b>         | Australia  | 763   | 452 (59)  | 17.7  | Adolescents and young adults                    | 9999 | All       | No direction | Item ad hoc   | (1) Appearance Anxiety; (2) Appearance rejection sensitivity.  | (1) The Appearance Anxiety Inventory (AAI; Veale et al., 2014); (4) Appearance-RS scale modified for use with children and adolescents (Webb & Zimmer-Gembeck, 2015; Webb et al., 2017).  |
| <b>Hendric kse et al., 2017</b>   | USA  | 185   | 185 (100) | 21.04 | Female university students                      | 9999 | Instagram | No direction | Physical Appearance Comparison Scale (PACS; Thompson, Heinberg, & Tanleff-Dunn, 1991)           | (1) Drive for thinness; (2) body dissatisfaction.  | (1) Subscale of the Eating Disorder Inventory (EDI; Garner et al., 1983); (2) Subscale of the Eating Disorder Inventory (EDI; Garner et al., 1983)  |
| <b>Jarman et al., 2021</b>        | Australia  | 1.579 | 652 (41)  | 13.45 | Australian adolescents                          | 9999 | All       | Upward       | the Upward Physical Appearance Comparison Scale (O'Brien et al., 2009)                          | (1) Body satisfaction; (2) Body Esteem; (3) Overvaluation of weight and shape; (4) Internalization of the thin-ideal | (1) A modified version of the Body Shape Satisfaction Scale (Pingitore, Spring, & Garfield, 1997); (2) The Appearance Esteem subscale of the Body Esteem Scale (Mendelson, Mendelson, & White, 2001); (3) The Weight and Shape subscales of the Eating Disorder Examination Questionnaire (EDE-Q; Fairburn & Beglin, 1994); (4) The Thin/Low Body Fat subscale of the Sociocultural Attitudes Towards |



|                              |             |     |           |       |                                  |       |           |              |   |  |  |
|------------------------------|-------------|-----|-----------|-------|----------------------------------|-------|-----------|--------------|---|--|--|
| <b>Jung et al., 2022</b>     | USA         | 579 | 579 (100) | 20.21 | Young adult women                | 9999  | All       | No direction | The Physical Appearance Comparison Scale-Revised (PACS-R; Schaefer & Thompson, 2014)  | (1) Internalization of appearance ideals; (2) Body esteem (appearance and weight).               | Appearance Questionnaire-4 ((SATAQ-4; Schaefer et al., 2015)<br>(1) Thin/Low Body Fat subscale of the Sociocultural Attitudes Toward Appearance Questionnaire-4-Revised (SATAQ-4R; Schaefer et al., 2017); (2)The Body-Esteem Scale for Adolescents and Adults (BESAA; Mendelson et al., 2001)   |
| <b>Kim &amp; Chock, 2015</b> | USA         | 186 | 119 (64)  | 19.75 | Northeastern University Students | 9999  | Facebook  | No direction | The Physical Appearance Comparison Scale (PACS) of Thompson, Heinberg, and Tantleff (1991)  | (1) Drive for thinness; (2) Drive for Muscularity  | (1)The Drive for Thinness 7-item subscale of the Eating Disorder Inventory (EDI; Garner et al., 1983); (2)Drive for Muscularity scale (McCreary & Sasse, 2000)   |
| <b>Kim, 2018</b>             | Korea       | 305 | 305 (100) | 23.44 | Young Korean women               | 9999  | Facebook  | No direction | The Physical Appearance Comparison Scale (PACS) (Thompson, Heinberg, & Tantleff, 1991), revised to specify the Facebook context.  | (1) Weight satisfaction (2) Drive for thinness   | (1)The 8-item Weight Satisfaction subscale of the Body-Esteem Scale for Adolescents and Adults (BESAA) ;(2) The 7-item Drive for Thinness subscale of the Eating Disorder Inventory (EDI; Garner, Olmstead, & Polivy, 1983)  |
| <b>Lee &amp; Lee, 2021</b>   | South Korea | 385 | 385 (100) | 29.83 | Young female social media users  | 21.22 | All       | No direction | Three items of appearance-related comparisons on Instagram (Hendrickse et al., 2017) adapted from the Physical Appearance Comparison Scale (PACS; Thompson et al., 1991). | (1) Body satisfaction; (2) Internalization (3)Appearance-related photo activity on social media. | (1)The Multidimensional Body-Self Relations Questionnaire-Appearance Evaluation scale (MBSRQ-AE; Cash, 2000); (2)The Internalization-General Attractiveness subscale from the Sociocultural Attitudes Towards Appearance Questionnaire-4-revised (SATAQ-4R; Schaefer et al., 2017); 3) The six-item SNS (social networking service) Appearance-Related Photo Activity scale (Lee & Lee, 2017); (4) The Multidimensional Body-Self Relations Questionnaire-Appearance Evaluation scale (MBSRQ-AE; Cash, 2000) |
| <b>Lee, 2022</b>             | Korea       | 321 | 321 (100) | 25.29 | Young Korean women               | 21.0  | Instagram | No direction | Three items of appearance-related comparisons on Instagram (Hendrickse et al., 2017)adapted from the Physical Appearance  | (1) Objectification; (2) Body satisfaction; (3)Drive for thinness                                | (1) The eight-item body surveillance subscale from the Objectified Body Consciousness Scales (OBCS; McKinley & Hyde, 1996); (2) The seven-item Appearance Evaluation subscale of   |





|                             |                                     |       |             |       |                           |       |                                      |              |  |   |  |
|-----------------------------|-------------------------------------|-------|-------------|-------|---------------------------|-------|--------------------------------------|--------------|--|---|--|
|                             |                                     |       |             |       |                           |       |                                      |              | Comparison Scale (PACS; Thompson et al., 1991).  |   | the Multidimensional Body-Self Relations Questionnaire (MBSRQ-AE; Cash, 2000); (3) Eating Disorder Inventory (EDI; Garner et al., 1983)  |
| <b>Mackson et al., 2019</b> | USA                                 | 196   | 152 (77)    | 25.16 | Young adults              | 9999  | Facebook, Reddit, Instagram, Twitter | No direction | The Iowa–Netherlands Comparison Orientation Scale (INCOM; Gibbons and Buunk, 1999)   | (1) Body Image  | (1) The Body Image States Scale (BISS; Cash et al., 2002)  |
| <b>Modica, 2019</b>         | Caucasian, African, American, Asian | 232   | 232 (100)   | 35.79 | Adult women               | 25.52 | Facebook                             | No direction | Three modified items from the 5-item Physical Appearance Comparison Scale (PACS; Thompson, Heinberg, & Tantleff, 1991); (2) The 26-item Self-Compassion Scale (SCS; Neff, 2003a) | (1) Facebook appearance-exposure; (2) Body Surveillance; (3) Body esteem; (4) Appearance-contingent self-worth. | (1) The Facebook Questionnaire (FBQ) created by Meier and Gray (2014); (2) The 8-item Body Surveillance subscale of the Objectified Body Consciousness Scale (OBCS) (McKinley & Hyde, 1996); (3) The 23-item Body Esteem Scale for Adolescents and Adults (BESAA; Mendelson, Mendelson, & White, 2001); (4) The 5-item Appearance subscale of the Contingencies of Self-Worth Scale (CSWS; Crocker, Luhtanen, Cooper, & Bouvette, 2003). |
| <b>Modica, 2020</b>         | Caucasian, African, American, Asian | 348   | 0 (0)       | 31.04 | Young-adult men           | 25.93 | Instagram                            | No direction | Three modified items from the Physical Appearance Comparison Scale (PACS).   | (1) Body dissatisfaction  | (1) The 24-item Male Body Attitudes Scale (MBAS).  |
| <b>Nagl et al., 2021</b>    | Germany                             | 252   | 252 (100)   | 30.65 | Women                     | 27.07 | All                                  | No direction | Three items from the Physical Appearance Comparison Scale (PACS)   | (1) Thin-ideal internalization; (2) Body image dissatisfaction; (3) Eating disorder psychopathology             | (1) The internalization subscale of the German Version of the Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ-G, Knäuss et al., 2009); (2) German version of the Body Shape Questionnaire (BSQ) (Pook et al., 2002); (3) The German version of the Eating Disorder Examination Questionnaire (EDE-Q, Hilbert and Tuschen-Caffier, 2006)  |
| <b>Pan et al., 2022</b>     | China                               | 7.015 | 7.015 (100) | 30.42 | Adult female TikTok users | 21.23 | Tik Tok                              | No direction | Items adapted from the Physical Appearance   | (1) Self-Objectification; (2) Intentions to Change Appearance   | (1) Selfobjectification Beliefs and Behaviours Scale (SOBBS); (2)  |



|                                      |  |     |           |       |   |       |                        |              | Comparison Scale-Revised (PACS-R)  |   | Acceptance of Cosmetic Surgery Scale (ACSS)   |
|--------------------------------------|--|-----|-----------|-------|---|-------|------------------------|--------------|--|---|---|
| <b>Pedalino &amp; Camerini, 2022</b> | Italy                                    | 354 | 354 (100) | 19.08 | Adolescents and young adults                    | 9999  | Instagram and Facebook | Upward       | Item ad hoc  | (1) Body Dissatisfaction; (2) Body Appreciation;  | (1) The Body Dissatisfaction Scale (Mutale et al.); (2) The Body Appreciation Scale   |
| <b>Pfund et al., 2020</b>            | USA                                      | 438 | 438 (100) | 31.04 | Adults  | 9999  | Zoom                   | No direction | Three statements from the Physical Appearance Comparison Scale (Thompson, Heinberg, Altabe, & Tantleff-Dunn, 1999) | (1) Appearance satisfactio; (2) Self-objectification;   | (1) The 14-item Body Parts Satisfaction Scale—Revised (Petrie, Tripp, & Harvey, 2002); (2) The 8-item Body Surveillance subscale from the Objectified Body Consciousness Scale (McKinley & Hyde, 1996)  |
| <b>Powell et al., 2018</b>           | USA                                      | 250 | 250 (100) | 22.27 | Female undergraduate students at the University | 24.18 | Pinterest              | No direction | Iowa-Netherlands Comparison Orientation Scale (INCOM; Gibbons & Buunk, 1999)                                       | (1) Internalization ion of various societal appearance ideals; (2) Physical body and appearance satisfaction. | (1) Sociocultural Attitudes Towards Appearance Questionnaire (SATAQ; Thompson, van den Berg, Roehrig, Guarda, & Heinberg, 2004; Thompson et al., 2000); (2) The Appearance Evaluation (AE) subscale and the Body Area Satisfaction Scale (BASS) from the Multidimensional Body-Self Relations Questionnaire (MBSRQ; Cash, 1990) |
| <b>Prichard et al., 2021</b>         | Australia                                | 291 | 291 (100) | 21.68 | Australian women                                | 24.59 | Instagram              | No direction | Item ad hoc  | (1) Body dissatisfaction; (2)Thin ideal internalization.  | (1) The body dissatisfaction subscale from the Eating Disorder Inventory (Garner, Olmstead, & Polivy, 1983); (2) Thin/Low Body Fat Subscale of the Sociocultural Attitudes Towards Appearance Questionnaire-4 (SATAQ-4)(Schaefer et al., 2015)  |
| <b>Prieler et al., 2021</b>          | Austria, Belgium, Spain, and South Korea | 981 | 981 (100) | 14.11 | Adolescent Students                             | 9999  | Facebook               | No direction | The Physical Appearance Comparison Scale by Thompson, Heinberg, and Tantleff                                       | (1) Body Esteem   | (1) Seven appearance dimension items of the body esteem scale for adolescents and adults (BESAA).   |
| <b>Rafati et al., 2021</b>           | Iran                                     | 241 | 241 (100) | 22.06 | Iranian women                                   | 9999  | Instagram              | No direction | Item ad hoc  | (1) Internalization of beauty ideals; (2) Body image concerns, Body Dissatisfaction and Drive for Thinness.   | (1) The Internalization-General subscale of the Sociocultural Attitude Toward Appearance Questionnaire (SATAQ-3) (Thompson, et al. 2004); (2) The   |



|                                  |                    |       |             |       |  |      |                                  |                     |  |  |  |
|----------------------------------|--------------------|-------|-------------|-------|--|------|----------------------------------|---------------------|--|--|--|
|                                  |                    |       |             |       |  |      |                                  |                     |  |  | BD and DT subscales of the Eating Disorder Inventory (EDI)   |
| <b>Roberts et al., 2022</b>      | USA                | 543   | 543 (100)   | 15.58 | Adolescent girls   | 9999 | All                              | No direction        | Body, Eating, and Exercise Comparison Orientation Measure (BEECOM; Fitzsimmons-Craft et al., 2012) | (1) Appearance Pressure: Family, Peers, and Traditional Media; (2) Internalization of Appearance Ideals; (3) Appearance Esteem | (1) The Sociocultural Attitudes Towards Appearance Questionnaire – 4 (SATAQ-4; Schaefer et al., 2015); (2) two SATAQ-4 subscales; (3) Appearance subscale of the Body Esteem Scale for Adolescents and Adults (BESAA; Mendelson et al., 2001);   |
| <b>Rousseau et al., 2017</b>     | Belgium            | 1.840 | 9999 (9999) | 9999  | Adolescents  | 9999 | Facebook                         | No direction        | Item ad hoc  | (1) Body dissatisfaction.  | (1) The Body Dissatisfaction Subscale of the Body Attitude Test (Probst, Vandereycken, Van Coppenolle, & Vanderlinden, 1995)   |
| <b>Saunders et al., 2018</b>     | USA                | 637   | 637 (100)   | 21.3  | Young women  | 9999 | Facebook, instagram and snapchat | Upward and downward | Upward and downward appearance comparison scale (UPACS and DACS)                                   | (1) Body surveillance; (2) body dissatisfaction; (3) eating pathology  | (1) Body surveillance subscale of the objectified body consciousness scale (OBCS); (2-3) Body dissatisfaction, cognitive restraint, binge eating, purging, and excessive exercise subscales of the eating pathology symptoms inventory (EPSI)  |
| <b>Schettino et al., 2022</b>    | Italy and Portugal | 350   | 252 (74)    | 23.08 | Participant by Italian and Portuguese social networks groups | 9999 | Instagram                        | No direction        | the Instagram Appearance Comparison Scale (Di Gesto et al., 2020)                                  | (1) Internalization of beauty ideals; (2) Body shame   | (2) the Internalization-General Attractiveness subscale from the Sociocultural Attitudes Toward Appearance Questionnaire-3 (Italian validation by Stefanile et al., 2011; Thompson et al., 2004); (2) eight-item Body Shame subscale of the Objectified Body Consciousness Scale (Italian validation by Dakanalis et al., 2017; McKinley & Hyde, 1996) |
| <b>Scully et al., 2020</b>       | Ireland            | 210   | 210 (100)   | 15.16 | female students  | 9999 | All                              | No direction        | Item ad hoc  | (1) Appearance exposure; (2) Internalization of the thin ideal; (3) Body dissatisfaction                                       | (1)The eight-item Photo Subscale devised by Meier and Gray (2014); (2)The Thin-Ideal Internalization Scale;(3)the nine-item Body Dissatisfaction Subscale of the Eating Disorder Inventory (Garner et al. 1983)  |
| <b>Seekis &amp; Barker, 2022</b> | Australia          | 399   | 399 (100)   | 19.36 | Undergraduate women  | 9999 | All                              | Upward              | The 10-item Upward Physical Appearance Comparison scale (UPAC: O'Brien et al., 2009)               | (1) General attractiveness internalization; (2) Body Image Concern   | (1) Appearance-Related Social Networking scale (Seekis et al., 2020); (2)The Sociocultural Attitudes Towards Appearance  |



|                                      |           |     |           |       |                                   |       |           |              |  |  |   |
|--------------------------------------|-----------|-----|-----------|-------|-----------------------------------|-------|-----------|--------------|--|--|---|
|                                      |           |     |           |       |                                   |       |           |              |  |  | Questionnaire4R-female (SATAQ-4R; Schaefer et al., 2017) ;(3)The 19-item Body Image Concern Inventory (BICI; Littleton et al., 2005) ;  |
| <b>Seekis et al., 2020</b>           | Australia | 338 | 338 (100) | 19.12 | Female undergraduates             | 22.55 |           | Upward       | Upward Physical Appearance Comparison Scale (O'Brien et al., 2009)               | (1) Body Surveillance; (2) Social Appearance Anxiety; (3) Drive for Thinness; (4) Body Dissatisfaction                           | (1) The 8-item Body Surveillance subscale from the Objectified Body Consciousness Scale (McKinley & Hyde, 1996); (2) The 16-item Social Appearance Anxiety Scale (Hart et al., 2008); (3) The 7-item Drive for Thinness subscale from the Eating Disorders Inventory-3 (Garner, 2004); (4) The 10-item Body Dissatisfaction subscale from the Eating Disorders Inventory-3 (Garner, 2004) |
| <b>Sherlock &amp; Wagstaff, 2019</b> | Australia | 129 | 129 (100) | 24.60 | Undergraduate Psychology students | 9999  | Instagram | No direction | the Iowa Netherlands Comparison Orientation Scale (INCOM; Gibbons & Buunk, 1999) | (1) Body image anxiety; (2) Self-rated physical attractiveness; (3) Body Image Disturbance                                       | (1) The physical appearance state and trait anxiety scale (PASTAS; Reed, Thompson, Brannick, & Sacco, 1991); (2) The Body Image Disturbance Questionnaire (BIDQ; Cash, Phillips, Santos, & Hrabosky, 2004); (3) The Body Image Disturbance Questionnaire (BIDQ; Cash, Phillips, Santos, & Hrabosky, 2004)   |
| <b>Skowronski et al., 2021</b>       | Germany   | 660 | 327 (49)  | 15.09 | German adolescents                | 9999  | Instagram | No direction | The Physical Appearance Comparison Scale (Thompson et al. 1991)                  | (1) Thin-Ideal Internalization; (2)Muscular-Ideal Internalization; (3)Self-Objectification; (4)Body Surveillance.                | (1) Thin/Low Body Fat subscale of the Sociocultural Attitudes towards Appearance Questionnaire-4R (SATAQ-4R; Schaefer et al. 2017); (2) The Muscular/Athletic subscale of the SATAQ-4R; (3) Self-Objectification Questionnaire (Noll and Fredrickson 1998); (4)Surveillance subscale of the Objectified Body Consciousness Scale (Knauss et al. 2008; McKinley and Hyde 1996).            |
| <b>Strubel et al., 2016</b>          | USA       | 796 | 796 (100) | 20.71 | Female college students           | 9999  | Facebook  | No direction | (PACS—Physical Appearance Comparison Scale                                       | (1) Sociocultural internalization (2)Sociocultural information about fashion and appearance; (3)Body satisfaction and body shame | (1) The internalization factor from the Sociocultural Attitudes Toward Appearance Scale (SATAQ-3; Thompson, Van den Berg, Roehrig, Guarda, & Heinberg, 2004); (2) The   |



|                                  |           |        |           |       |                          |       |  |              |  |  |   |
|----------------------------------|-----------|--------|-----------|-------|--------------------------|-------|--|--------------|--|--|---|
|                                  |           |        |           |       |                          |       |  |              |  |  | Information subscale from the Sociocultural Attitudes Toward Appearance Scale (SATAQ-3; Thompson et al., 2004); (3) The 7-item body factor from the Body Parts Satisfaction Scale for Females (BPSS-F; Petrie, Tripp, & Harvey, 2002)   |
| <b>Teo et al., 2019</b>          | Singapore | 358    | 248 (69)  | 22.69 | Adult                    | 9999  | Instagram                              | No direction | The Physical Appearance Comparison Scales (Thompson, Heinberg, & Tantleff, 1991); (2) The Social Comparison Rating Scale | (1) Eating attitude  | (1) The Eating Attitudes Test (EAT 26)  |
| <b>Thorisdottir et al., 2019</b> | Iceland   | 10.563 | 5313 (50) | 15    | Iceland students         | 9999  | Facebook                               | No direction | The 11-item Iowa–Netherlands Comparison Orientation Measure  | (1) Body image   | (1) body image subscale of the Offer Self-Image Questionnaire (Offer & Howard, 1972)  |
| <b>Walker et al., 2015</b>       | USA       | 128    | 128 (100) | 23.5  | College women            | 9999  | Facebook                               | No direction | Online Physical Appearance Comparison Scale (Online PACS)  | (1) Disordered eating  | (1) Eating Disorder Examination Questionnaire (EDE-Q4)  |
| <b>Wang et al., 2022</b>         | China     | 476    | 280 (59)  | 19.65 | Chinese college students | 20.77 | facebook                               | No direction | The scale developed by Fardouly and Vartanian (2015)   | (1) Appearance ideals internalization (Thin/Low Body Fat (IT), Muscular (IM), and General Attractiveness (IG)); (2) Body dissatisfaction | (1) The subscales of (SATAQ-4R; Schaefer et al., 2017); (2)Body Areas Satisfaction Scale (BASS), a subscale of Multidimensional Body-Self Relations Questionnaire (MBSRQ; Cash, 2000).  |
| <b>Yang et al., 2020</b>         | USA       | 100    | 100 (100) | 15.07 | Female adolescents       | 19.05 | Facebook, Instagram, Snapchat, Twitter | No direction | A 10-item adapted version of the Physical Appearance Comparison Scale–Revised  | (1) Cognitive Internalization; (2) Social Appearance Anxiety; (3)Body Esteem; (4)Weight Locus of Control                                 | (1) A nine-item general internalization subscale from the Sociocultural Attitudes Towards Appearance Scale–3; (2)The 16-item Social Appearance Anxiety Scale; (3)The 21-item Body Esteem Scale for Adolescents and Adults; (4)The 16-item Dieting Beliefs Scale (Stotland & Zuroff, 1990) |
| <b>Yang et al., 2020</b>         | China     | 481    | 281 (58)  | 19.44 | College students         | 20.68 | Social Media                           | No direction | The Physical Appearance Comparisons Scale (PACS, Fardouly and Vartanian);  | (1) Self-Objectification; (2)Facial Dissatisfaction  | (1)A Self-Objectification Questionnaire (SOQ); (2)The Facial Appearance Concern (FAC) subscale of the Negative Physical Self Scale (NPSS)   |
| <b>Yao et al., 2020</b>          | China     | 567    | 567 (100) | 19.98 | College women            | 19.84 | Social Media                           | No direction | Item ad hoc  | (1) Body Shame;(2)Body Appreciation;(3)Restrained Eating   | (1)The body shame subscale of the Chinese version (Chen 2014) of the Objectified Body Consciousness Scale (OBCS; Mckinley and Hyde 1996); (2)The Body Appreciation  |



|                                   |           |     |          |       |  |      |          |              |             |  |   |
|-----------------------------------|-----------|-----|----------|-------|--|------|----------|--------------|-------------|--|---|
|                                   |           |     |          |       |  |      |          |              |             |  | Scale-2 (Tylka and Wood-Barcalow 2015a); (3)The Restrained Eating subscale of the Chinese version (Kong 2012)   |
| <b>Zimmer-Gembec et al., 2021</b> | Australia | 281 | 148 (53) | 16.62 | High school students;<br>University students | 9999 | Facebook | No direction | Item ad hoc | (1) Appearance anxiety symptom; (2) Disordered eating and related behaviours | (1) The Appearance Anxiety Inventory (Roberts et al., 2018; Veale et al., 2014); (2) Six items from the Eating Attitudes Test-26 (Garner, Olmsted, Bohr, & Garfinkel, 1982) |

**TABLE 4**

*Association between online social comparison and body image concerns, eating disorder behaviours and positive body image*

| Domain   | K   | ES (95% CI)             | Outcome |                   |                |
|--|-----|-------------------------|---------|-------------------|----------------|
|  |     |                         | p       | Q (p)             | I <sup>2</sup> |
| <i>Online social comparison and Body image concerns</i>        | 118 | 0.440 (0.393; 0.487)    | < .001  | 2909.187 (< .001) | 97.07%         |
| <i>Online social comparison and Eating disorder behaviours</i> | 19  | 0.353 (0.226; 0.480)    | < .001  | 553.492 (< .001)  | 97.26%         |
| <i>Online social comparison and Positive body image</i>        | 29  | -0.304 (-0.439; -0.169) | < .001  | 1960.173 (< .001) | 98.69%         |

**TABLE 5**

*Meta-regression of the factors affecting the association between online social comparison on body image concerns*

| <i>Online social comparison and Body image concerns</i> | EST.   | S.E.  | P value      |
|---|--------|-------|--------------|
| <b>Risk of bias</b>                                     |        |       |              |
| High risk (ref)   |        |       |              |
| Medium risk   | 0.029  | 0.283 | 0.917        |
| Low risk  | -0.419 | 0.208 | <b>0.044</b> |
| <b>Type of sample</b>                                   |        |       |              |
| Adolescents (ref)                                       |        |       |              |
| Young Adult   | -0.124 | 0.369 | 0.738        |
| <b>Country</b>  |        |       |              |
| Europa (ref)  |        |       |              |
| America   | 0.001  | 0.295 | 0.996        |
| Asia  | -0.083 | 0.191 | 0.664        |
| Australia   | -0.013 | 0.202 | 0.950        |
| Mixed   | 0.260  | 0.220 | 0.237        |
| <b>Type of Social Media</b>                             |        |       |              |
| All (ref)   |        |       |              |
| Instagram   | 0.095  | 0.084 | 0.259        |



|                           |        |       |       |
|---------------------------|--------|-------|-------|
| Facebook                  | 0.012  | 0.240 | 0.959 |
| Instagram and Facebook    | -0.113 | 0.168 | 0.500 |
| <b>Type of comparison</b> |        |       |       |
| No direction (ref)        |        |       |       |
| Upward                    | 0.008  | 0.179 | 0.966 |
| Downward                  | -0.262 | 0.193 | 0.175 |
| <b>Year</b>               |        |       |       |
|                           | 0.066  | 0.068 | 0.331 |
| <b>% Female</b>           |        |       |       |
|                           | 0.004  | 0.002 | 0.083 |
| <b>Mean Age</b>           |        |       |       |
|                           | -0.004 | 0.014 | 0.761 |
| <b>BMI</b>                |        |       |       |
|                           | 0.012  | 0.072 | 0.862 |

**TABLE 6**

*Meta-regression of the factors affecting the association between online social comparison on eating disorder behaviours*

| <i>Online social comparison<br/>and Eating disorder<br/>behaviours</i> | <b>EST.</b> | <b>S.E.</b> | <b>P value</b> |
|--|-------------|-------------|----------------|
| <b>Year</b>  | -0.066      | 0.049       | 0.182          |
| <b>Mean Age</b>  | 0.012       | 0.007       | 0.101          |

**TABLE 7**

*Meta-regression of the factors affecting the association between online social comparison on positive body image characteristics*

| <i>Online social comparison and<br/>Positive body image</i> | <b>EST.</b> | <b>S.E.</b> | <b>P value</b> |
|---|-------------|-------------|----------------|
| <b>Risk of bias</b>   |             |             |                |
| Medium risk   | -1.020      | 0.276       | < .001         |
| <b>Type of sample</b>                                       |             |             |                |
| Young Adult   | -0.101      | 0.177       | 0.569          |
| <b>Country</b>  |             |             |                |
| America   | 0.963       | 0.217       | < .001         |
| Asia  | 1.393       | 0.285       | < .001         |



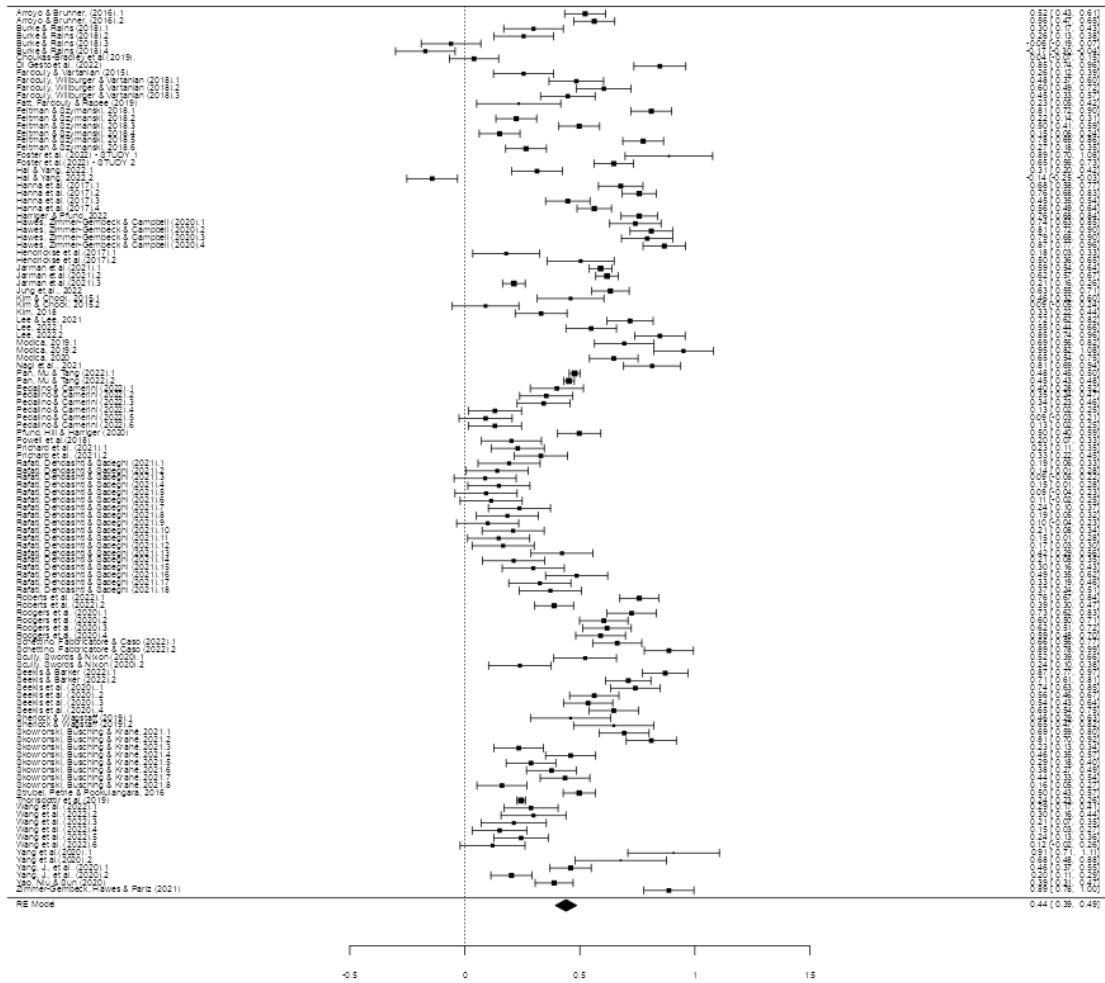


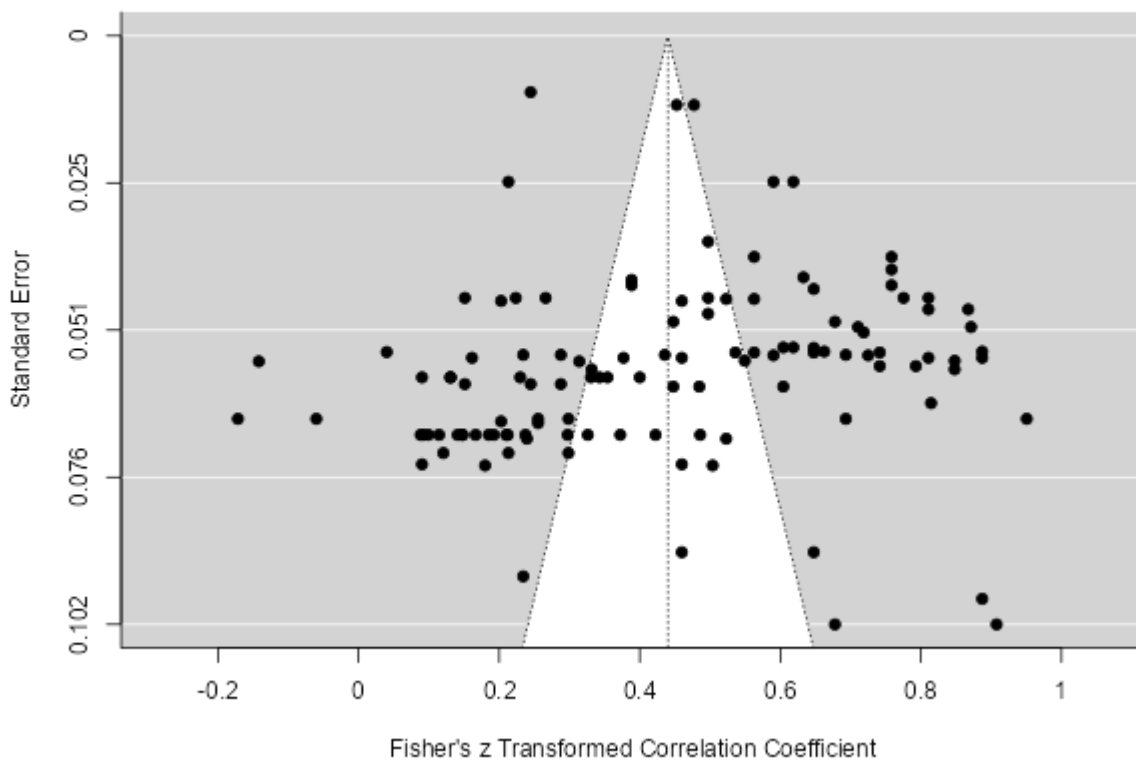
|                           |        |       |        |
|---------------------------|--------|-------|--------|
| <b>Type of comparison</b> |        |       |        |
| Downward                  | 0.630  | 0.103 | < .001 |
| <b>Year</b>               | -0.081 | 0.056 | 0.147  |
| <b>% Female</b>           | -0.021 | 0.005 | < .001 |
| <b>Mean Age</b>           | 0.095  | 0.021 | < .001 |
| <b>BMI</b>                | -0.263 | 0.069 | < .001 |



Figures 2-3

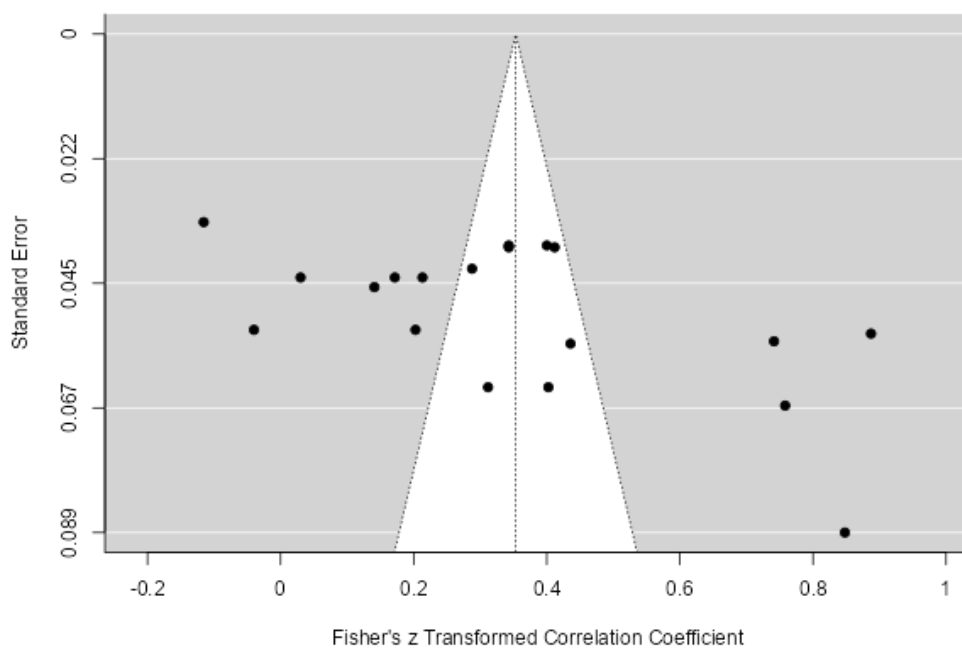
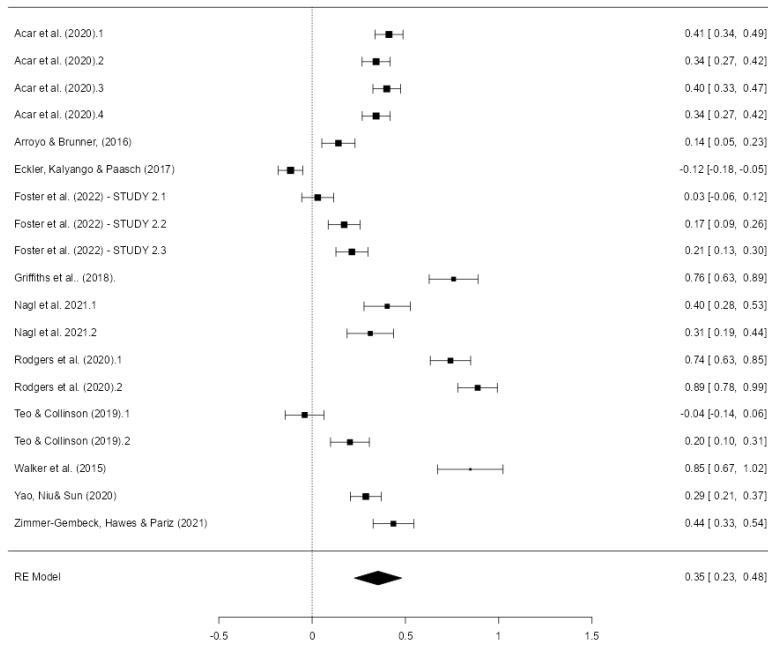
*Forrest and Funnel Plot of the association between social comparison processes and body image concerns*





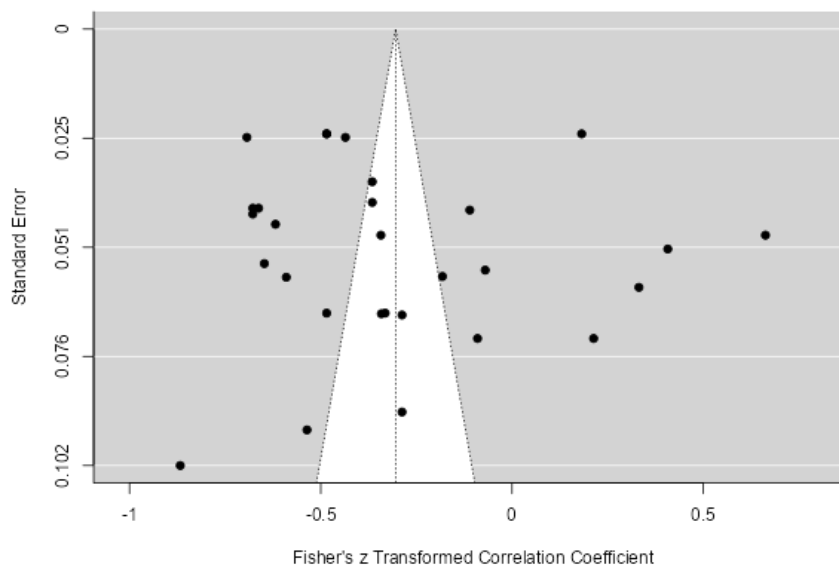
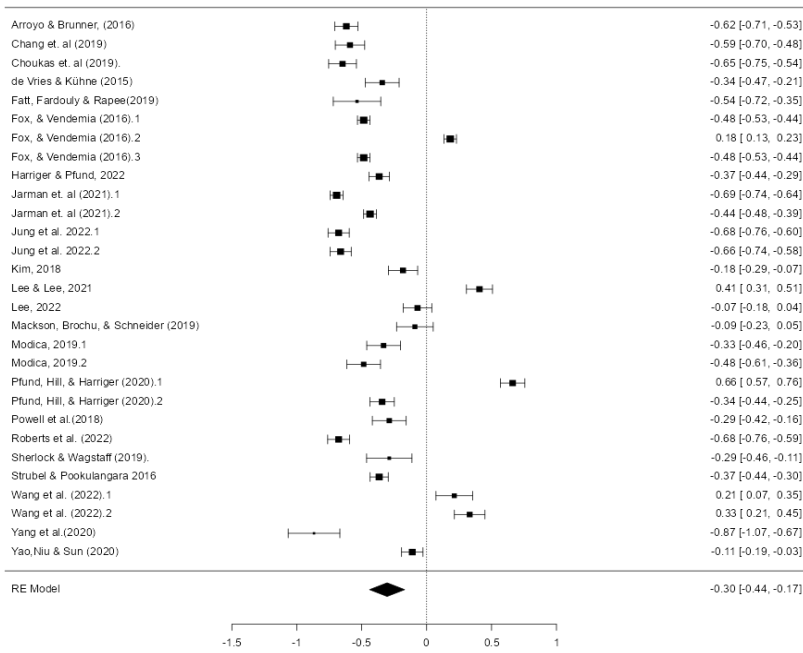
**Figures 4-5**

*Forrest and Funnel Plot of the association between social comparison processes and ED behaviours*



**Figures 6-7**

*Forrest and Funnel Plot of the association between social comparison processes and positive body image characteristics*





## **CHAPTER V**

### **DISCUSSION**

#### **5.1 Overview of research aims and findings**

In this thesis we have shown that social comparison is a process that occurs when individuals browse on SNSs and it could be linked to individuals' well-being. Online social comparison is influenced by user's personal characteristics and the way in which these virtual platforms are used.

Specifically, the occurrence of social comparison depends mainly on on the users' way of using SNS. Previous research highlighted two main types of SNS use, labelled as active and passive use (Burke, Marlow & Lento, 2010; Verduyn et al., 2017). Active usage refers to activities that implement direct exchanges with online connections (Fioravanti & Casale, 2020). It includes targeted one-on-one exchanges (e.g., sending a private message or a comment) or broadcasting (e.g. posting a status update, video or photos). Passive usage refers to passive content consumption on SNSs (Fioravanti & Casale, 2020), such as monitoring the online life of online connections without engaging in direct exchanges with them (e.g., scrolling through news feeds or looking at other users' profiles). While in active usage the information is mainly produced, during passive usage information is only consumed. In the introduction and in the three studies included in this thesis, we reviewed how online social comparison, both active and passive, could generate consequences in individuals' well-being. Findings showed that it may occasionally result in an increase of subjective well-being, by representing a protective factor in times of particular stress, and by stimulating feelings of inspiration or motivation to self-improve.

In conclusion, research emphasizes that the process of social comparison on SNS could be linked to subjective well-being. As online social comparison is widespread among a large number of people in contemporary society, it is important to understand the potential benefits and drawbacks of this psychological mechanism. Future research may develop interventions to protect individuals from the harmful consequences of social comparisons on SNS.

Throughout this thesis, much evidence has been provided on the role of online social comparison processes in predicting individual well-being.



After the first introductory chapter on the theory of social comparison, the second chapter aimed to evaluate the role of online social comparison on individuals' psychological distress and life satisfaction during the COVID-19-related quarantine. The results showed that online social comparison is linked to higher individuals' levels of anxiety, stress, loneliness and life satisfaction over time. Overall, the study emphasized the positive effects of online social comparison on the reduction of psychological distress during a period of particular stress and emergency.

The third chapter, aimed to examine whether changes in psychological distress and well-being during the second wave of the pandemic in Italy differed among people with different levels of Problematic Facebook Use (PFU), characterized by an online social comparison trait. Latent class analysis was used to categorize participants into three groups with different PFU levels: Healthy users (low level), Moderate PFU users (moderate level), and High PFU users (high level). Results showed that no significant changes were found in psychological distress and well-being over time, but the High PFU users showed greater levels of psychological distress and lower levels of well-being at each time point. Thus, the High PFU users showed higher levels of psychological distress and lower well-being, which remained stable over time. Overall, the study suggested that the relationship between PFU, psychological distress and well-being may reflect trait-like time-invariant differences between individuals rather than state-like changes.

The fourth chapter of this thesis examined the association between online social comparison and positive body image, body image concerns and eating disorders behaviours, through a systematic review and meta-analysis that used data from 57 cross-sectional studies. Results indicated that the weighted average correlation between social comparison and body image concerns was significant, as were the correlations between social comparison and positive body image and between social comparison and eating behaviour symptoms. The heterogeneity of effect sizes was high and meta-regression analyses were conducted to explain this. Some variables were found to moderate these associations between social comparison and body image: robustness of studies, country, type of comparison, percentage of female participants, mean age of sample and body mass index. Overall, this meta-analysis evidenced a relationship between online social comparison processes and positive body image, body image concerns and eating disorder behaviours.



## **5.2 Study strengths and weaknesses**

In the following section, strengths and weaknesses for each of the studies conducted will be described according to the chapters' order used above.

### **Study 1.**

This study was the first to longitudinally examine both autoregressive and cross-lagged paths between online social comparison and psychological distress during the COVID-19 quarantine, and results suggested that people facing a difficult time due to the COVID-19-induced home-confinement were more likely to engage in online social comparison as a positive resource for improving social connections and sharing their feelings of fear and uncertainty. Despite the original results of this study, it has certain limitations. Firstly, this study relied on participants' self-report of their psychosocial distress, and might well be susceptible to response biases such as social desirability. Secondly, the study used a convenience sample with a small number of participants and only Facebook users, and the non-random sampling procedure limits the generalizability of our findings. Finally, in the study there is no difference in the role of social comparison between various SNS, and further research is needed to examine whether specific patterns of use of SNS such as Facebook, Instagram, Pinterest, can predict psychological outcomes, given their distinctive content and design properties.

### **Study 2.**

This study extends our understanding of how Problematic Facebook Use is associated with psychological distress and well-being by using a longitudinal design. The results of the study included a period characterized by the easing of restrictions, which emphasized the importance of the potential need to maintain good mental health, even after the pandemic is over. However, some limitations should be considered when interpreting results. Firstly, the results can only refer to Italy and they may not be generalized to other countries due to discrepancies in the stage of COVID-19 infection and different governments' policies aimed at limiting the spread of the virus. Secondly, the assessment of a non-stratified population with different recruitment procedures means the data is not generalizable. Thirdly, the self-report assessment may also limit conclusions from these results because the accuracy of the





participants' answers might have been affected. Future research needs to use a stratified sample while adding objective assessments of Problematic Facebook Use.

### Study 3.

This systematic review and meta-analysis filled a gap in the literature focused on online social comparison and body image. Despite the comprehensive results of this meta-analysis, the study has certain limitations. Firstly, the analysis only included correlational studies, limiting the ability to make causal declaration. Secondly, the estimation of a relationship taken from correlational studies cannot consider potential other variables into account. Thirdly, the study does not consider the ways in which social media use was operationalised in the moderation analysis, but social media use could obtain more specific estimates of the relationship between our three predicted associations, for example, specific activities on social media have a greater impact on the relationship between online social comparison and body image than others. Notwithstanding the limitations discussed above, this systematic review and meta-analysis has several strengths. To the authors' knowledge, this is the first comprehensive, quantitative review focused only on a specific aspect of SNS usage, the online social comparison, in contrast to previous reviews that were focused on generic usage of social media, or were only focused on a single component of body image.

## **5.3 Declaration of candidate's role**

### Chapter 1: Introduction

All work is the candidate's own. The candidate independently conducted a literature search for relevant theoretical ideas and previous empirical findings. The candidate wrote the introduction and subsequently receiving comments and recommendations for improvement from Professor Gianluca Lo Coco and Professor Stefano Ruggieri.

### Chapter 2:

The candidate independently proposed the research question examined in the literature background. The candidate subsequently recruited all participants and conducted all data collection for the study. Abstract and full-text screening was subsequently repeated by the candidate and she also attended the consultation sessions with Professor Sonia Ingoglia for



statistical advice. The candidate wrote the paper along with Professors Gianluca Lo Coco and Stefano Ruggieri.

#### Chapter 3:

The candidate recruited all participants and conducted all data collection for the study. The author refined the study's hypotheses, and contributed to the methods section. For the analyses contained within the paper Dr. Laura Salerno and Dr. Agostino Brugnera provided statistical advice and consultation. The candidate subsequently received comments and recommendations from Professor Gianluca Lo Coco for improvement from the paper's co-authors.

#### Chapter 4:

The candidate independently proposed the research question examined in the systematic review and meta-analysis. The candidate subsequently developed the systematic search strategy with Professors Rachel Rodgers and Gianluca Lo Coco, and conducted the systematic search. Abstract and full-text screening was subsequently repeated by the candidate and the other authors. She also attended the consultation sessions with Professor Francesco Maria Melchiori for statistical advice. The candidate subsequently conducted the meta-analyses and conducted a qualitative synthesis of the results independently. The candidate wrote most of the paper and holds first authorship.

#### Chapter 5: Discussion

All work is candidate's own.

#### **5.4 List of publications not associated with thesis**

Bonfanti, R. C., Lo Coco, G., & Salerno, L. (2023). Interplay between fear of missing out and loneliness: a three-wave panel study during the COVID-19 pandemic. *Cyberpsychology, Behavior, and Social Networking* (*accepted for publication*)

Ruggieri, S., Gagliano, M., Bonfanti, R. C., Cucinella, N., & Ingoglia, S. (2023). Interaction through social media: Development and validation of a social network site self-efficacy scale (SNS-SES). *Acta Psychologica*, 235, 103889. <https://doi.org/10.1016/j.actpsy.2023.103889>



- Bonfanti, R. C., Garro, M., Lavanco, G., & Ruggieri, S. (2023). The role of sexting in couple well-being for Italian women during the second wave of the Covid-19 pandemic. *Frontiers Psychology, 14*, 1105556. <https://doi.org/10.3389/fpsyg.2023.1105556>
- Bonfanti, R. C., Lo Coco, G., Salerno, L., & Di Blasi, M. (2022). The Thin Ideal and Attitudes towards Appearance as Correlates of Exercise Addiction among Sporty People during the COVID-19 Pandemic. *Behavioral Sciences, 12*(6), 187. <https://doi.org/10.3390/bs12060187>
- Franchina, V., Bonfanti, R. C., Lo Coco, G., & Salerno, L. (2022). COVID-19 Vaccine Hesitancy: the role of existential concerns in the individual's decisions regarding vaccine uptake. *Vaccines, 10*(7), 1079. <https://doi.org/10.3390/vaccines10071079>
- Aronica, M., Piacentino, D., & Bonfanti, R. C. (2021). Social Media Adoption in Italian Firms. *Regional Science*. <https://doi.org/10.1111/pirs.12606>
- Bonfanti, R. C., Lo Coco, G., & Ruggieri, S. (2021). *Social Comparison on Facebook and its effects on individual's well-being*. New York: Nova Science Publishers.
- Albano, G., Bonfanti, R. C., Gullo, S., Salerno, L., & Lo Coco, G. (2021). The psychological impact of COVID-19 on people suffering from dysfunctional eating behaviours: a linguistic analysis of the contents shared in an online community during the lockdown. *Research in Psychotherapy, 24*(3), 557. <https://doi.org/10.4081/ripppo.2021.557>
- Mannino, G., Salerno, L., Bonfanti, R. C., Albano, G. & Lo Coco, G. (2021). The impact of Facebook use on self-reported eating disorders during the COVID-19 lockdown. *BMC Psychiatry, 21*, 611. <https://doi.org/10.1186/s12888-021-03628-x>
- Sideli, L., Lo Coco, G., Bonfanti, R. C., Borsarini, B., Fortunato, L., Sechi, C., & Micali, N. (2021). Effects of COVID-19 lockdown on eating disorders and obesity: A systematic review and meta-analysis. *European Eating Disorders Review, 29*(6), 826–841. <https://doi.org/10.1002/erv.2861>
- Ruggieri, S., Bonfanti, R. C., Passanisi, A., Pace, U., & Schimmenti, A. (2020). Electronic surveillance in the couple: The role of self-efficacy and commitment. *Computers in Human Behavior, 114*, 106577. <https://doi.org/10.1016/j.chb.2020.106577>



### **5.5 List of Presentations during PhD**

Bonfanti, R. C., Teti, A., Fortunato, L., Borsarini, B., Sechi, C., Micali, N., Sideli, L., & Lo Coco, G. (2022). Effects of covid-19 pandemic on dysfunctional eating behaviors and symptoms among the general population: A systematic review and meta-analysis. ITA-SPR meeting. Cremona, November 25-26, 2022.

Teti, A., Albano, G., Scrò, A., Bonfanti, R.C., Fortunato, L., Graffeo, M., Gullo, S., & Lo Coco, G. (2022). Therapist personal characteristics and their influence in the treatment of eating disorders: a systematic evaluation of the literature. XIV Congresso Nazionale Spr-Iag, Cremona 25-26 Novembre 2022.

Bonfanti, R. C., Fortunato, L., & Borsarini, B. (2022). Effects of covid-19 pandemic on dysfunctional eating behaviors and symptoms among the general population: A systematic review and meta-analysis. Congresso Nazionale AIP Sezione di Psicologia Clinica e Dinamica - Padova, 27-30 Settembre 2022.

Lo Coco, G., Sideli, L., Bonfanti, R. C., Borsarini, B., Sechi, C., Fortunato, L., & Micali, N. (2022). The impact of COVID-19 lockdown on eating disorders and obesity: A systematic review and meta-analysis. EU-SPR meeting. Rome, September 22-24, 2022.

Teti, A., Albano, G., Scrò, A., Bonfanti, R.C., Fortunato, L., Graffeo, M., Gullo, S., & Lo Coco, G. (2022). Therapist personal characteristics and their influence in the treatment of eating disorders: a systematic evaluation of the literature. EU-SPR meeting. Rome, September 22-24, 2022.

Lo Coco, G., Sideli, L., Bonfanti, R. C., Borsarini, B., Sechi, C., Fortunato, L., & Micali, N. (2021). Prevalence of symptomatic deterioration and levels of mental health distress among people with eating disorders and obesity: a systematic review and meta-analysis. XXVIIth Annual Meeting of the Eating Disorders Research Society. September 17-19, 2021

Salerno, L., Bonfanti, R. C., & Fortunato, L. (2021). Increased self-reported eating disorders during the Covid-19 pandemic: the role of fear of covid-19 and maladaptive Facebook use. Congresso Nazionale AIP Sezione di Psicologia Clinica e Dinamica - Lecce, 17-19 Settembre 2021.



Bonfanti, R. C., Bosarini, B., & Fortunato, L. (2021). Prevalence of symptomatic deterioration and levels of mental health distress among people with eating disorders and obesity: a systematic review and meta-analysis. Congresso Nazionale AIP Sezione di Psicologia Clinica e Dinamica - Lecce, 17-19 Settembre 2021.

Albano, G., Bonfanti R. C., & Salerno, L. (2020). The psychological impact of lockdown for people belonging to an eating disorders community: a linguistic analysis. Congresso Nazionale AIP Sezione di Psicologia Clinica e Dinamica - Lecce, 17-20 Settembre 2020.

## **5.6 Conclusions**

Overall, this thesis provides evidence about the role of online social comparison in predicting individuals' well-being through three research designs. It was seen how online social comparison typically negatively impacts well-being due to the excessively positive content shared online, and the tendency of people to compare themselves with others. At the same time, it may occasionally result in an increase of subjective well-being by being a protective factor in times of particular stress, and by stimulating feelings of inspiration or motivation to self-improve. Thus, the role of online social comparison seems to change according to the context and variables involved, and for this reason it is necessary to broaden the research on the topic. Consequently, research into the key components underlying the process of social comparison on SNSs may further enhance our understanding of the impact of social comparison on subjective well-being. As online social comparison is widespread among a large number of people in contemporary society, it is important to know the potential benefits and drawbacks of this psychological mechanism. Future research may develop interventions to break the vicious downward or upward cycles and protect individuals from the harmful consequences of social comparisons on SNSs.



## References

Acar, M., Akgul, S., Kizilkan, P., Tuzun, Z., Derman, O., & Kanbur, N (2020). Eating Attitudes and Physical Appearance Comparison with Others in Daily Life Versus on Social Media in Adolescents. *Journal of Adolescent*, 66(2), S59-S60. <https://doi.org/10.1016/j.jadohealth.2019.11.118>

Ahmad, A. R., & Murad, H. R. (2020). The impact of social media on panic during the COVID-19 pandemic in Iraqi Kurdistan: Online questionnaire study. *Journal of Medical Internet Research*, 22(5), e19556. <https://doi.org/10.2196/19556>

Alfasi, Y. (2019). The grass is always greener on my friends' profiles: The effect of Facebook social comparison on state self-esteem and depression. *Personality and Individual Differences*, 147, 111–117. <https://doi.org/10.1016/j.paid.2019.04.032>

Appel, H., Crusius, J., & Gerlach, A. L. (2015). Social comparison, envy, and depression on Facebook: A study looking at the effects of high comparison standards on depressed individuals. *Journal of Social and Clinical Psychology*, 34(4), 277–289. <https://doi.org/10.1521/jscp.2015.34.4.277>

Appel, H., Gerlach, A. L., & Crusius, J. (2016). Social Comparison, Envy, and Depression on Facebook: A Study Looking at the Effects of High Comparison Standards on Depressed Individuals. *Journal of Social and Clinical Psychology*, 34(4), 277-289. <https://doi.org/10.1521/jscp.2015.34.4.277>

Arroyo, A., & Brunner, S. R. (2016). Negative body talk as an outcome of friends' fitness posts on social networking sites: Body surveillance and social comparison as potential moderators. *Journal of Applied Communication Research*, 44(3), 216–235. <https://doi.org/10.1080/00909882.2016.1192293>

Baldwin, M., & Mussweiler, T. (2018). "The culture of social comparison": Correction. *PNAS Proceedings of the National Academy of Sciences of the United States of America*, 115(43), E10285. <https://doi.org/10.1073/pnas.1816586115>



- Błachnio, A., & Przepiórka, A. (2018). Facebook intrusion, fear of missing out, narcissism, and life satisfaction: A cross-sectional study. *Psychiatry Research*, *259*, 514–519. <https://doi.org/10.1016/j.psychres.2017.11.012>.
- Blackwell, D., Leaman, C., Tramposch, R., Osborne, C., & Liss, M. (2017). Extraversion, neuroticism, attachment style and fear of missing out as predictors of social media use and addiction. *Personality and Individual Differences*, *116*, 69–72. <https://doi.org/10.1016/j.paid.2017.04.039>.
- Blau, P. M. (1964). *Exchange and power in social life*. New York: Wiley.
- Bottesi, G., Ghisi, M., Altoè, G., Conforti, E., Melli, G., & Sica, C. (2015). The Italian version of the Depression Anxiety Stress Scales-21: Factor structure and psychometric properties on community and clinical samples. *Comprehensive Psychiatry*, *60*, 170–181. <https://doi.org/10.1016/j.comppsy.2015.04.005>
- Brooks, S. K., Webster, R. K., Smith, L. E., Woodland, L., Wessely, S., Greenberg, N., & Rubin, G. J. (2020). The psychological impact of quarantine and how to reduce it: rapid review of the evidence. *Lancet*, *395*, 912–920. [https://doi.org/10.1016/S0140-6736\(20\)30460-8](https://doi.org/10.1016/S0140-6736(20)30460-8)
- Brown, Z., & Tiggemann, M. (2016). Attractive celebrity and peer images on Instagram: Effect on women's mood and body image. *Body image*, *19*, 37–43. <https://doi.org/10.1016/j.bodyim.2016.08.007>
- Burke, T. J., & Rains, S. A. (2018). The Paradoxical Outcomes of Observing Others' Exercise Behavior on Social Network Sites: Friends' Exercise Posts, Exercise Attitudes, and Weight Concern. *Health communication*, *34*(4), 475–483. <https://doi.org/10.1080/10410236.2018.1428404>
- Burnell, K., George, M. J., Vollet, J. W., Ehrenreich, S. E., & Underwood, M. K. (2019). Passive social networking site use and well-being: The mediating roles of social comparison and the fear of missing out. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*. <https://doi.org/10.5817/CP2019-3-5>
- Buunk, A. P., & Gibbons, F. X. (2007). Social comparison orientation: a new perspective on those who do and those who don't compare with others. In S. Guimond (Eds.), *Social*





*Comparison and Social Psychology: Understanding cognition, intergroup relations and culture* (pp. 33-48). Cambridge: Cambridge University Press.

Buunk, A. P., & Gibbons, F. X. (2007). Social comparison: The end of a theory and the emergence of a field. *Organizational Behaviour and Human Decision Processes*, 102(1), 3–21. <https://doi.org/10.1016/j.obhdp.2006.09.007>

Buunk, B. P., & Gibbons, F. X. (1997). *Health, coping and well-being: Perspectives from social comparison theory*. Mahwah, NJ: Erlbaum.

Cao, W., Fang, Z., Hou, G., Han, M., Xu, X., Dong, J., & Zheng, J. (2020). The psychological impact of the COVID-19 epidemic on college students in China. *Psychiatry Research*, 287. <https://doi.org/10.1016/j.psychres.2020.112934>

Carlson Jones, D. (2004). Body Image Among Adolescent Girls and Boys: A Longitudinal Study. *Developmental Psychology*, 40(5), 823–835. <https://doi.org/10.1037/0012-1649.40.5.823>

Casale, S., & Fioravanti, G. (2020). Factor structure and psychometric properties of the Italian version of the fear of missing out scale in emerging adults and adolescents. *Addictive Behavior*, 102, 106179. <https://doi.org/10.1016/j.addbeh.2019.106179>.

Chang, L., Li, P., Loh, R. S. M., & Chua, T. H. H. (2019). A study of Singapore adolescent girls' selfie practices, peer appearance comparisons, and body esteem on Instagram. *Body image*, 29, 90–99. <https://doi.org/10.1016/j.bodyim.2019.03.005>

Chou, H. T. G., & Edge, N. (2012). “They are happier and having better lives than I am”: the impact of using Facebook on perceptions of others’ lives. *Cyberpsychology, Behavior, and Social Networking*, 15, 117–121. <https://doi.org/10.1089/cyber.2011.0324>

Choukas-Bradley, S., Maheux, A. J., Roberts, S. R., Hutchinson, E. A., Lu, C., Ladouceur, C. D., & Silk, J. S. (2022). Picture Perfect During a Pandemic? Body Image Concerns and Depressive Symptoms in U.S. Adolescent Girls During the COVID-19 Lockdown. *Journal of children and media*, 16(4), 481–492. <https://doi.org/10.1080/17482798.2022.2039255>

Choukas-Bradley, S., Nesi, J., Widman, L., & Galla, B. M. (2020). The Appearance-Related Social Media Consciousness Scale: Development and validation with adolescents. *Body image*, 33, 164–174. <https://doi.org/10.1016/j.bodyim.2020.02.017>





Chung, A., Pavel, A., Benyoucef, M, Aidan, D., & O'Reilly, P. (2017). Managing an organisation's social media presence: An empirical stages of growth model. *International Journal of Information Management*, 37, 1405-1417. <https://doi.org/10.1016/j.ijinfomgt.2016.10.003>

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Cohen, R., Newton-John, T., & Slater, A. (2017). The relationship between Facebook and Instagram appearance-focused activities and body image concerns in young women. *Body image*, 23, 183–187. <https://doi.org/10.1016/j.bodyim.2017.10.002>

Collins, R. L. (2000). Among the better ones: Upward assimilation in social comparison. In J. Suls, & L. Wheeler (Eds.), *Handbook of social comparison: Theory and research* (pp. 141-158). New York: Plenum Publishers.

Combs, J. G., Crook, T. R., & Rauch, A. (2019). Meta-Analytic Research in Management: Contemporary Approaches, Unresolved Controversies, and Rising Standards. *Journal of Management Studies*, 56(1), 1–18. <https://doi.org/10.1111/joms.12427>

Corning, A. F., Krumm, A. J., & Smitham, L. A. (2006). Differential social comparison processes in women with and without eating disorder symptoms. *Journal of Counseling Psychology*, 53(3), 338–349. <https://doi.org/10.1037/0022-0167.53.3.338>

Dantlgraber M., Wetzel E., Schutzenberger P., Stieger S., & Reips U. D. (2016). Simple construct evaluation with latent class analysis: An investigation of Facebook addiction and the development of a short form of the Facebook Addiction Test (F-AT). *Behavior Research Methods*, 48(3), 869–879. <https://doi.org/10.3758/s13428-016-0716-2>

Darley, J. M. (1966). Fear and social comparison as determinants of conformity behavior. *Journal of Personality and Social Psychology*, 4(1), 73–78. <https://doi.org/10.1037/h0023508>

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>



de Vries, D. A., & Kühne, R. (2015). Facebook and self-perception: Individual susceptibility to negative social comparison on facebook. *Personality and Individual Differences, 86*, 217–221. <https://doi.org/10.1016/j.paid.2015.05.029>

de Vries, D. A., & Kühne, R. (2015). Facebook and self-perception: Individual susceptibility to negative social comparison on facebook. *Personality and Individual Differences, 86*, 217–221. <https://doi.org/10.1016/j.paid.2015.05.029>

de Vries, D. A., Möller, A. M., Wieringa, M. S., Eigenraam, A. W., & Hamelink, K. (2018). Social comparison as the thief of joy: Emotional consequences of viewing strangers' Instagram posts. *Media Psychology, 21*(2), 222–245. <https://doi.org/10.1080/15213269.2016.1267647>

Dempsey, A. E., O'Brien, K. D., Tiamiyu, M. F., & Elhai, J. D. (2019). Fear of missing out (FOMO) and rumination mediate relations between social anxiety and problematic Facebook use. *Addictive Behaviors Reports, 9*, 100150. <http://dx.doi.org/10.1016/j.abrep.2018.100150>

Denti, L., Barbopoulos, I., Nilsson, I., Holmberg, L., Thulin, M., Wendebblad, M., Andén, L., & Davidsson, E. (2012). *Sweden's largest Facebook study*. Gothenburg: Gothenburg Research Institute

Di Blasi, M., Salerno, L., Albano, G., Caci, B., Esposito, G., Salcuni, S., Gelo, O., Mazzeschi, C., Merenda, A., Giordano, C., & Lo Coco, G. (2022). A three-wave panel study on longitudinal relations between problematic social media use and psychological distress during the COVID-19 pandemic. *Addictive behaviors, 134*, 107430. <https://doi.org/10.1016/j.addbeh.2022.107430>

di Fabio, A., & Palazzeschi, L. (2012). The Satisfaction With Life Scale (SWLS): A contribution to Italian validation with adult workers. *Counseling: Giornale Italiano di Ricerca e Applicazioni, 5*(2), 207–215.

Di Gesto, C., Matera, C., Policardo, G. R., & Nerini, A. (2022). Instagram As A Digital Mirror: The Effects of Instagram Likes and Disclaimer Labels on Self-awareness, Body Dissatisfaction, and Social Physique Anxiety Among Young Italian Women. *Current Psychology, 41*. <https://doi.org/10.1007/s12144-021-02675-7>



- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction with Life Scale. *Journal of Personality Assessment*, 49, 71-75. [https://doi.org/10.1207/s15327752jpa4901\\_13](https://doi.org/10.1207/s15327752jpa4901_13)
- Dong, H., Yang, F., Lu, X., & Hao, W. (2020). Internet addiction and related psychological factors among children and adolescents in China during the Coronavirus Disease 2019 (COVID-19) epidemic. *Frontiers in Psychiatry*, 11, 00751 <http://dx.doi.org/10.3389/fpsyt.2020.00751>
- Dorothy, M. D., Fiebert, M. S., & Warren, C. R. (2014). Examining Social Networking Site Behaviors: Photo Sharing and Impression Management on Facebook. *International Review of Social Sciences and Humanities*, 6(2), 111-116. <https://doi.org/10.14738/assrj.57.4842>
- Dowson, J., & Henderson, L. (2001). The validity of a short version of the Body Shape Questionnaire. *Psychiatry Research*, 102(3), 263–271. [https://doi.org/10.1016/S0165-1781\(01\)00254-2](https://doi.org/10.1016/S0165-1781(01)00254-2)
- Duan, L., & Zhu, G. (2020). Psychological interventions for people affected by the COVID-19 epidemic. *The Lancet Psychiatry*, 7(4). [https://doi.org/10.1016/S2215-0366\(20\)30073-0](https://doi.org/10.1016/S2215-0366(20)30073-0)
- Eckler, P., Kalyango, Y., & Paasch, E. (2017). Facebook use and negative body image among U.S. college women. *Women & health*, 57(2), 249–267. <https://doi.org/10.1080/03630242.2016.1159268>
- Eftekhar, A., Fullwood, C., & Morris, N. (2014). Capturing personality from Facebook photos and photo-related activities: How much exposure do you need? *Computers in Human Behavior*, 37, 162-170. <https://doi.org/10.1016/j.chb.2014.04.048>
- Egger, M., Davey Smith, G., Schneider, M., & Minder, C. (1997). Bias in meta-analysis detected by a simple, graphical test. *BMJ*, 315(7109), 629–634. <https://doi.org/10.1136/bmj.315.7109.629>
- Egger, M., Higgins, J. P. T., & Davey Smith, G. (2022). *Systematic reviews in health research: Meta-analysis in context* (Third edition). John Wiley & Sons, Inc.
- Elhai, J. D., Yang, H., McKay, D., & Asmundson, G. J. G. (2020). COVID-19 anxiety symptoms associated with problematic smartphone use severity in Chinese adults. *Journal*



of *Affective Disorders*, 274, 576-582.  
<https://doi.org/https://doi.org/10.1016/j.jad.2020.05.080>

Ellison, N., Heino, R., & Gibbs, J. (2006). Managing Impressions Online: Self-Presentation Processes in the Online Dating Environment. *Journal of Computer-Mediated Communication*, 11(2), 415–441. <https://doi.org/10.1111/j.1083-6101.2006.00020.x>

Enders, C., & Bandalos, D. (2001). The relative performance of full information maximum likelihood estimation for missing data in structural equation models. *Structural Equation Modeling*, 8, 430–457. [https://doi.org/10.1207/S15328007SEM0803\\_5](https://doi.org/10.1207/S15328007SEM0803_5)

Eyal, K., & Te'eni-Harari, T. (2013). Explaining the relationship between media exposure and early adolescents' body image perceptions: The role of favorite characters. *Journal of Media Psychology: Theories, Methods, and Applications*, 25(3), 129–141. <https://doi.org/10.1027/1864-1105/a000094>

Fairburn, C. G., & Beglin, S. J. (1994). Assessment of eating disorders: interview or self-report questionnaire? *The International journal of eating disorders*, 16(4), 363–370.

Fang, Y., Ji, B., Liu, Y., Zhang, J., Liu, Q., Ge, Y., Xie, Y., & Liu, C. (2022). The prevalence of psychological stress in student populations during the COVID-19 epidemic: a systematic review and meta-analysis. *Scientific Reports*, 12, 12118. <https://doi.org/10.1038/s41598-022-16328-7>

Fardouly, J., & Vartanian, L. R. (2016). Social media and body image concerns: Current research and future directions. *Current Opinion in Psychology*, 9, 1–5. <https://doi.org/10.1016/j.copsyc.2015.09.005>

Fardouly, J., & Vartanian, L. R. (2016). Social media and body image concerns: Current research and future directions. *Current Opinion in Psychology*, 9, 1–5. <https://doi.org/10.1016/j.copsyc.2015.09.005>

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>



- Fardouly, J., Diedrichs, P. C., Vartanian, L. R., & Halliwell, E. (2015). Social comparisons on social media: the impact of Facebook on young women's body image concerns and mood. *Body image, 13*, 38–45. <https://doi.org/10.1016/j.bodyim.2014.12.002>
- Fardouly, J., Pinkus, R.T., & Vartanian, L.R. (2017). The impact of appearance comparisons made through social media, traditional media, and in person in women's everyday lives. *Body image, 20*, 31-39. <https://doi.org/10.1016/j.bodyim.2016.11.002>
- Fardouly, J., Willburger, B. K., & Vartanian, L. R. (2018). Instagram use and young women's body image concerns and self-objectification: Testing mediational pathways. *New Media & Society, 20*(4), 1380–1395. <https://doi.org/10.1177/1461444817694499>
- Fatt, S. J., Fardouly, J., & Rapee, R. M. (2019). #malefitspo: Links between viewing fitspiration posts, muscular-ideal internalisation, appearance comparisons, body satisfaction, and exercise motivation in men. *New Media & Society, 21*(6), 1311–1325. <https://doi.org/10.1177/1461444818821064>
- Feingold, A., & Mazzella, R. (1998). Gender differences in body image are increasing. *Psychological Science, 9*(3), 190–195. <https://doi.org/10.1111/1467-9280.00036>
- Feinstein, B. A., Hershenberg, R., Bhatia, V., Latack, J. A., Meuwly, N., & Davila, J. (2013). Negative social comparison on Facebook and depressive symptoms: Rumination as a mechanism. *Psychology of Popular Media Culture, 2*(3), 161–170. <https://doi.org/10.1037/a0033111>
- Feltman, C. E., & Szymanski, D. M. (2018). Instagram use and self-objectification: The roles of internalization, comparison, appearance commentary, and feminism. *Sex Roles: A Journal of Research, 78*(5-6), 311–324. <https://doi.org/10.1007/s11199-017-0796-1>
- Ferrara, E., & Yang, Z. (2015). Quantifying the effect of sentiment on information diffusion in social media. *PeerJ Computer Science, 1*, e26. <https://doi.org/10.7717/peerj-cs.26>
- Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7*, 117–140. <https://doi.org/10.1177/001872675400700202>
- Fioravanti, G., & Casale, S. (2020). The active and passive use of Facebook: measurement and relationship to Facebook addiction. *Journal of Psychopathology, 26*, 176-182. [doi:10.36148/2284-0249-329](https://doi.org/10.36148/2284-0249-329)



Fioravanti, G., Bocci Benucci, S., Ceragioli, G., & Casale, S. (2022). How the Exposure to Beauty Ideals on Social Networking Sites Influences Body Image: A Systematic Review of Experimental Studies. *Adolescent Research Review*, 7, 419–458  
<https://doi.org/10.1007/s40894-022-00179-4>

Fioravanti, G., Casale, S., Benucci, S.B., Prostamo, A., Falone, A., Ricca, V., & Rotella, F. (2021). Fear of missing out and social networking sites use and abuse: A meta-analysis. *Computer in Human Behavior*, 122, 106839. <https://doi.org/10.1016/j.chb.2021.106839>

Foster, S., O'Mealey, M., Farmer, C., & Carvallo, M. (2022). The impact of snapchat usage on drunkorexia behaviors in college women. *Journal of American college health: J of ACH*, 70(3), 864–874. <https://doi.org/10.1080/07448481.2020.1775609>

Fox, J., & Moreland, J. J. (2015). The dark side of social networking sites: An exploration of the relational and psychological stressors associated with Facebook use and affordances. *Computers in Human Behavior*, 45, 168–176. <https://doi.org/10.1016/j.chb.2014.11.083>

Fox, J., & Vendemia, M. A. (2016). Selective Self-Presentation and Social Comparison Through Photographs on Social Networking Sites. *Cyberpsychology, behavior and social networking*, 19(10), 593–600. <https://doi.org/10.1089/cyber.2016.0248>

Garcia, S. M., Tor, A., & Gonzalez, R. (2006). Ranks and rivals: a theory of competition. *Personality & social psychology bulletin*, 32(7), 970–982. <https://doi.org/10.1177/0146167206287640>

Garner, D. M. (2002). *Body image and anorexia nervosa*. Guilford Press.

Gaspar, M.D., Amaral, T.F., Oliveira, B., & Borges, N. (2011). Protective effect of physical activity on dissatisfaction with body image in children – A cross-sectional study. *Psychology of Sport and Exercise*, 12, 563-569. <https://doi.org/10.1016/j.psychsport.2011.05.004>

Gerber, J. P., Wheeler, L., & Suls, J. (2018). A social comparison theory meta-analysis 60+ years on. *Psychological Bulletin*, 144, 177-197. <http://dx.doi.org/10.1037/bul0000127>

Gerson, J., Plagnol, A. C., & Corr, P. J. (2016). Subjective well-being and social media use: Do personality traits moderate the impact of social comparison on Facebook? *Computers in Human Behavior*, 63, 813–822. <https://doi.org/10.1016/j.chb.2016.06.023>





- Gibbons, F. X., & Buunk, B. P. (1999). Individual differences in social comparison: The development of a scale of social comparison orientation. *Journal of Personality and Social Psychology*, 76, 129-142. <https://doi.org/10.1037/0022-3514.76.1.129>
- Gilbert, P., Price, J., & Allan, S. (1995). Social comparison, social attractiveness and evolution: How might they be related? *New Ideas in Psychology*, 13(2), 149–165. [https://doi.org/10.1016/0732-118X\(95\)00002-X](https://doi.org/10.1016/0732-118X(95)00002-X)
- Gioia, F., Fioravanti, G., Casale, S., & Boursier, V. (2021). The Effects of the Fear of Missing Out on People's Social Networking Sites Use During the COVID-19 Pandemic: The Mediating Role of Online Relational Closeness and Individuals' Online Communication Attitude. *Frontiers in Psychiatry*, 12, 620442. <https://doi.org/10.3389/fpsyt.2021.620442>
- Gonzales, A. L., & Hancock, J. T. (2011). Mirror, mirror on my Facebook wall: Effects of exposure to Facebook on self-esteem. *Cyberpsychology, Behavior, and Social Networking*, 14(1-2), 79–83. <https://doi.org/10.1089/cyber.2009.0411>
- Gonzalez-Mulé, E., & Aguinis, H. (2018). Advancing Theory by Assessing Boundary Conditions With Meta-regression: A Critical Review and Best-Practice Recommendations. *Journal of Management*, 44(6), 2246–2273. <https://doi.org/10.1177/0149206317710723>
- Grabe, S., Ward, L. M., & Hyde, J. S. (2008). The role of the media in body image concerns among women: A meta-analysis of experimental and correlational studies. *Psychological Bulletin*, 134(3), 460–476. <https://doi.org/10.1037/0033-2909.134.3.460>
- Griffiths, S., Murray, S. B., Krug, I., & McLean, S. A. (2018). The contribution of social media to body dissatisfaction, eating disorder symptoms, and anabolic steroid use among sexual minority men. *Cyberpsychology, Behavior, and Social Networking*, 21(3), 149–156. <https://doi.org/10.1089/cyber.2017.0375>
- Haferkamp, N., & Kramer, N., C. (2011). Social comparison 2.0: examining the effects of online profiles on social-networking sites. *Cyberpsychology, Behavior, and Social Networking*, 14, 309–314. <https://doi.org/10.1089/cyber.2010.0120>
- Hai, R., & Yang, Y. (2022). Social Network Site Appearance Comparison's Prediction of Anxiety Among Chinese Females: The Mediation Effect of Body Area Satisfaction,



Overweight Preoccupation, and Self-Esteem. *Frontiers in psychiatry*, 13, 775782.  
<https://doi.org/10.3389/fpsy.2022.775782>

Hanna, E., Ward, L. M., Seabrook, R. C., Jerald, M., Reed, L., Giaccardi, S., & Lippman, J. R. (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>

Harriger, J. A., & Pfund, G. N. (2022). Looking beyond zoom fatigue: The relationship between video chatting and appearance satisfaction in men and women. *The International journal of eating disorders*, 55(7), 923–932. <https://doi.org/10.1002/eat.23722>

Hartling, L., Ospina, M., Liang, Y., Dryden, D. M., Hooton, N., Krebs Seida, J., & Klassen, T. P. (2009). Risk of bias versus quality assessment of randomised controlled trials: cross sectional study. *BMJ (Clinical research ed.)*, 339, b4012. <https://doi.org/10.1136/bmj.b4012>

Hawes, T., Zimmer-Gembeck, M. J., & Campbell, S. M. (2020). Unique associations of social media use and online appearance preoccupation with depression, anxiety, and appearance rejection sensitivity. *Body image*, 33, 66–76.  
<https://doi.org/10.1016/j.bodyim.2020.02.010>

Hemphill, K. J., & Lehman, D. R. (1991). Social comparisons and their affective consequences: The importance of comparison dimension and individual difference variables. *Journal of Social and Clinical Psychology*, 10, 372-394.  
<https://doi.org/10.1521/jscp.1991.10.4.372>

Hendrickse, J., Arpan, L. M., Clayton, R. B., & Ridgway, J. L. (2017). Instagram and college women's body image: Investigating the roles of appearance-related comparisons and intrasexual competition, *Computers in Human Behavior*, 74, 92-100.  
<https://doi.org/10.1016/j.chb.2017.04.027>.

Henry, J. D., & Crawford, J. R. (2005). The short form version of the Depression Anxiety Stress Scales (DASS-21): Construct validity and normative data in a large non-clinical sample. *British Journal of Clinical Psychology*, 44(2), 227-239.  
<https://doi.org/10.1348/014466505X29657>





- Holland, G., & Tiggemann, M. (2016). A systematic review of the impact of the use of social networking sites on body image and disordered eating outcomes. *Body Image, 17*, 100–110. <https://doi.org/10.1016/j.bodyim.2016.02.008>
- Hughes, M. E., Waite, L., Hawkey, L., & Cacioppo, J. T. (2004). A short scale for measuring loneliness in large surveys: Results from two population-based studies. *Research on Aging, 26*(6), 655–672. <https://doi.org/10.1177/0164027504268574>
- Jang, K., Park, N., & Song, H. (2016). Social comparison on Facebook: Its antecedents and psychological outcomes. *Computers in Human Behavior, 62*, 147–154. <https://doi.org/10.1016/j.chb.2016.03.082>
- Jarman, H. K., Marques, M. D., McLean, S. A., Slater, A., & Paxton, S. J. (2021). Social media, body satisfaction and well-being among adolescents: A mediation model of appearance-ideal internalization and comparison. *Body image, 36*, 139–148. <https://doi.org/10.1016/j.bodyim.2020.11.005>
- Johnson, B. K., & Knobloch-Westerwick, S. (2014). Glancing up or down: Mood management and selective social comparisons on social networking sites. *Computers in Human Behavior, 41*, 33–39. <https://doi.org/10.1016/j.chb.2014.09.009>
- Joshi, R., Herman, C. P., & Polivy, J. (2004). Self-enhancing effects of exposure to thin-body images. *The International journal of eating disorders, 35*(3), 333–341. <https://doi.org/10.1002/eat.10253>
- Jung, J., Barron, D., Lee, Y., & Swami V. (2022). Social media usage and body image: Examining the mediating roles of internalization of appearance ideals and social comparisons in young women. *Computers in Human Behavior, 135*. <https://doi.org/10.1016/j.chb.2022.107357>
- Kalpidou, M., Costin, D., & Morris, J. (2011). The relationship between Facebook and the well-being of undergraduate college students. *Cyberpsychology, behavior and social networking, 14*(4), 183–189. <https://doi.org/10.1089/cyber.2010.0061>
- Kim, J. W. (2018). Facebook Use for Profile Maintenance and Social Grooming and Young Korean Women's Appearance Comparison With Peers and Body Image Concerns. *Social Media + Society, 4*(2). <https://doi.org/10.1177/2056305118772835>



- Kim, J. W., & Chock, T. M. (2015). Body image 2.0: Associations between social grooming on Facebook and body image concerns. *Computers in Human Behavior*, 48, 331–339. <https://doi.org/10.1016/j.chb.2015.01.009>
- Kramer, A. D. I., Guillory, J. E., & Hancock, J. T. (2014). Experimental evidence of massive-scale emotional contagion through social networks. *PNAS Proceedings of the National Academy of Sciences of the United States of America*, 111(24), 8788–8790. <https://doi.org/10.1073/pnas.1320040111>
- Krasnova, H., Wenninger, H., Widjaja, T., & Buxmann, P. (2013). Envy on Facebook: A Hidden Threat to Users' Life Satisfaction? *Wirtschaftsinformatik*. <https://doi.org/10.7892/BORIS.47080>
- Kross, E., Verduyn, P., Demiralp, E., Park, J., Lee, D. S., Lin, N., Shablack, H., Jonides, J., & Ybarra, O. (2013). Facebook use predicts declines in subjective well-being in young adults. *PloS one*, 8(8), e69841. <https://doi.org/10.1371/journal.pone.0069841>
- Kruglanski, A. W., & Maysseless, O. (1990). Classic and current social comparison research: Expanding the perspective. *Psychological Bulletin*, 108(2), 195–208. <https://doi.org/10.1037/0033-2909.108.2.195>
- Kuss, D., & Griffiths, M. (2011). Online Social Networking and Addiction - A Review of the Psychological Literature. *International Journal of Environmental Research and Public Health*, 8, 3528e3552. <https://doi.org/10.3390/ijerph8093528>
- Leahey, T. M., & Crowther, J. H. (2008). An ecological momentary assessment of comparison target as a moderator of the effects of appearance-focused social comparisons. *Body image*, 5(3), 307–311. <https://doi.org/10.1016/j.bodyim.2008.03.002>
- Lee, E. J., & Cho, E. (2018). When using Facebook to avoid isolation reduces perceived social support. *Cyberpsychology, Behavior, and Social Networking*, 21, 32-39. <https://doi.org/10.1089/cyber.2016.0602>
- Lee, M. (2022). Exploring how Instagram addiction is associated with women's body image and drive for thinness. *The Social Science Journal*. <https://doi.org/10.1080/03623319.2022.2092380>



- Lee, M., & Lee, H. (2021). Social media photo activity, internalization, appearance comparison, and body satisfaction: The moderating role of photo-editing behavior. *Computers in Human Behavior*, *114*, 106579. <https://doi.org/10.1016/j.chb.2020.106579>.
- Lee, S. Y. (2014). How do people compare themselves with others on social network sites?: the case of Facebook. *Computers in Human Behavior*, *32*, 253–260. <https://doi.org/10.1016/j.chb.2013.12.009>
- Lee, S. Y., Lee, D., Nam, C. R., Kim, D. Y., Park, S., Kwon, J. G., Kweon, Y. S., Lee, Y., Kim, D. J., & Choi, J. S. (2018). Distinct patterns of Internet and smartphone-related problems among adolescents by gender: Latent class analysis. *Journal of behavioral addictions*, *7*(2), 454–465. <https://doi.org/10.1556/2006.7.2018.28>
- Lenhart, A. (2015). *Teens, Social Media & Technology Overview 2015*. <http://www.pewinternet.org/2015/04/09/teens-social-media-technology-2015>
- Lim, M., & Yang, Y. (2019). Effects of users' envy and shame on social comparison that occurs on social network services. *Computers in Human Behavior*, *51*, 300-311. <https://doi.org/10.1016/j.chb.2015.05.013>
- Lin, R., & Utz, S. (2015). The emotional responses of browsing facebook: Happiness, envy, and the role of tie strength. *Computers in Human Behavior*, *52*, 29–38. <https://doi.org/10.1016/j.chb.2015.04.064>
- Little, R. J. A. (1988). A test of missing completely at random for multivariate data with missing values. *Journal of the American Statistical Association*, *83*, 1198–1202.
- Liu, D., & Baumeister, R. F. (2016). Social networking online and personality of self-worth: A meta-analysis. *Journal of Research in Personality*, *64*, 79–89. <https://doi.org/10.1016/j.jrp.2016.06.024>
- Liu, D., Baumeister, R., Yang, C., & Hu, B. (2019). Digital Communication Media Use and Psychological Well-Being: A Meta-Analysis. *Journal of Computer-Mediated Communication*, *24*(5), 259-274. <https://doi.org/10.1093/jcmc/zmz013>
- Liu, Q., Zhou, Z., Yang, X., Niu, G., Tian, Y., & Fan, C. (2017). Upward social comparison on social network sites and depressive symptoms: A moderated mediation model of self-



esteem and optimism. *Personality and Individual Differences*, 113, 223–228.  
<https://doi.org/10.1016/j.paid.2017.03.037>

Lo Coco, G.L., Maiorana, A., Mirisola, A., Salerno, L., Boca, S., & Profita, G. (2018). Empirically-derived subgroups of Facebook users and their association with personality characteristics: a Latent Class Analysis. *Computers in Human Behavior*, 86, 190-198.  
<https://doi.org/10.1016/j.chb.2018.04.044>

Luchetti, M., Lee, J. H., Aschwanden, D., Sesker, A., Strickhouser, J. E., Terracciano, A., & Sutin, A. R. (2020). The trajectory of loneliness in response to COVID-19. *The American psychologist*, 75(7), 897–908. <https://doi.org/10.1037/amp0000690>

Lup, K. Trub, L., & Rosenthal, L. (2015). Instagram #Instasad?: Exploring Associations Among Instagram Use, Depressive Symptoms, Negative Social Comparison, and Strangers Followed. *Cyberpsychology, Behavior, and Social Networking*, 18(5), 247-252.  
<https://doi.org/10.1089/cyber.2014.0560>

Mackson, S. B., Brochu, P. M., & Schneider, B. A. (2019). Instagram: Friend or foe? The application's association with psychological well-being. *New Media & Society*, 21(10), 2160–2182. <https://doi.org/10.1177/1461444819840021>

McComb, S. E., & Mills, J. S. (2021). Young women's body image following upwards comparison to Instagram models: The role of physical appearance perfectionism and cognitive emotion regulation. *Body image*, 38, 49–62.  
<https://doi.org/10.1016/j.bodyim.2021.03.012>

Malik, A., Mahmood, K., & Islam, T. (2021). Understanding the Facebook Users' Behavior towards COVID-19 Information Sharing by Integrating the Theory of Planned Behavior and Gratifications. *Information Development*. <https://doi.org/10.1177/02666669211049383>

Manago, A. M., Graham, M. B., Greenfield, P. M., & Salimkhan, G. (2008). Self-presentation and gender on MySpace. *Journal of Applied Developmental Psychology*, 29(6), 446–458. <https://doi.org/10.1016/j.appdev.2008.07.001>

Marino, C., Gini, G., Vieno, A., & Spada, M. M. (2018a). The associations between problematic Facebook use, psychological distress and well-being among adolescents and



young adults: A systematic review and meta-analysis. *Journal of Affective Disorders*, *15*, 226, 274-281. <https://doi.org/10.1016/j.jad.2017.10.007>.

Marino, C., Gini, G., Vieno, A., & Spada, M. M. (2018b). A comprehensive meta-analysis on Problematic Facebook Use. *Computers in Human Behavior*, *83*, 262–277. <https://doi.org/10.1016/j.chb.2018.02.009>

Marsh, H. W., Hau, K.T., & Wen, Z. (2004). In search of golden rules: Comment on hypothesis testing approaches to setting cutoff values for fit indexes and dangers in overgeneralising Hu & Bentler's (1999) findings. *Structural Equation Modelling*, *11*, 320–341. [https://doi.org/10.1207/s15328007sem1103\\_2](https://doi.org/10.1207/s15328007sem1103_2)

McKinley, N. M., & Hyde, J. S. (1996). The Objectified Body Consciousness Scale: Development and validation. *Psychology of Women Quarterly*, *20*, 181-215. <http://dx.doi.org/10.1111/j.1471-6402.1996.tb00467.x>

Mehdizadeh, S. (2010). Self-presentation 2.0: Narcissism and self-esteem on Facebook. *Cyberpsychology, Behavior, and Social Networking*, *13*(4), 357–364. <https://doi.org/10.1089/cyber.2009.0257>

Meier, A., & Schaefer, S. (2018). The Positive Side of Social Comparison on Social Network Sites: How Envy Can Drive Inspiration on Instagram. *Cyberpsychology, Behavior, and Social Networking*, *21*(7), 411-417. <https://doi.org/10.1089/cyber.2017.0708>

Meier, E. P., & Gray, J. (2014). Facebook photo activity associated with body image disturbance in adolescent girls. *Cyberpsychology, behavior and social networking*, *17*(4), 199–206. <https://doi.org/10.1089/cyber.2013.0305>

Merton, R. K. (1968). *Social Theory and Social Structure*. New York: The Free Press.

Mills, J., Polivy, J., Herman, C. P., & Tiggemann, M. (2002). Effects of exposure to thin media images: Evidence of self-enhancement among restrained eaters. *Personality and Social Psychology Bulletin*, *28*, 1687–99.

Modica, C. A. (2019). Facebook, body esteem, and body surveillance in adult women: The moderating role of self-compassion and appearance-contingent self-worth. *Body image*, *29*, 17–30. <https://doi.org/10.1016/j.bodyim.2019.02.002>



- Modica, C. A. (2020). The Associations Between Instagram Use, Selfie Activities, Appearance Comparison, and Body Dissatisfaction in Adult Men. *Cyberpsychology, behavior and social networking*, 23. <https://doi.org/10.1089/cyber.2019.0434>
- Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., Shekelle, P., Stewart, L. A., & PRISMA-P Group (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic reviews*, 4(1), 1. <https://doi.org/10.1186/2046-4053-4-1>
- Morrison, T. G., Kalin, R., & Morrison, M. A. (2004). Body-image evaluation and body-image investment among adolescents: a test of sociocultural and social comparison theories. *Adolescence*, 39(155), 571–592.
- Mussweiler, T., Rüter, K., & Epstude, K. (2004). The Ups and Downs of Social Comparison: Mechanisms of Assimilation and Contrast. *Journal of Personality and Social Psychology*, 87(6), 832–844. <https://doi.org/10.1037/0022-3514.87.6.832>
- Muthén, B., & Muthén, L. (2012). *Mplus User's Guide, 7th edn*. Los Angeles, CA: Muthén & Muthén.
- Nadkarni, A., & Hofmann, S. G. (2012). Why do people use Facebook? *Personality and Individual Differences*, 52(3), 243–249. <https://doi.org/10.1016/j.paid.2011.11.007>
- Nagl, M., Jepsen, L., Linde, K., & Kersting, A. (2021). Social media use and postpartum body image dissatisfaction: The role of appearance-related social comparisons and thin-ideal internalization. *Midwifery*, 100, 103038. <https://doi.org/10.1016/j.midw.2021.103038>
- Nesi, J., & Prinstein, M. J. (2015). Using social media for social comparison and feedback-seeking: Gender and popularity moderate associations with depressive symptoms. *Journal of Abnormal Child Psychology*, 43(8), 1427–1438. <https://doi.org/10.1007/s10802-015-0020-0>
- Nesi, J., Choukas-Bradley, S., & Prinstein, M. J. (2018). Transformation of Adolescent Peer Relations in the Social Media Context: Part 1-A Theoretical Framework and Application to Dyadic Peer Relationships. *Clinical child and family psychology review*, 21(3), 267–294. <https://doi.org/10.1007/s10567-018-0261-x>





- Ortiz-Ospina, E. (2019). *The rise of social media*. <https://ourworldindata.org/rise-of-social-media>
- Ozimek, P. Baer, F., & Förster, J. (2017). Materialists on Facebook: The self-regulatory role of social comparisons and the objectification of Facebook friends. *Heliyon*, 3(11): e00449. <https://doi.org/10.1016/j.heliyon.2017.e00449>
- Ozimek, P., & Bierhoff, H.-W. (2020). All my online-friends are better than me – three studies about ability-based comparative social media use, self-esteem, and depressive tendencies. *Behaviour & Information Technology*, 39(10), 1110–1123. <https://doi.org/10.1080/0144929X.2019.1642385>
- Ozimek, P., Bierhoff, H.W., & Hanke, S. (2018). Do vulnerable narcissists profit more from social Facebook use than grandiose narcissists? An examination of narcissistic social Facebook use in the light of self-regulation and social comparison theory. *Personality and Individual Differences*, 124, 168–177. <https://doi.org/10.1016/j.paid.2017.12.016>
- Pan, W., Mu, Z., & Tang, Z. (2022). Social Media Influencer Viewing and Intentions to Change Appearance: A Large Scale Cross-Sectional Survey on Female Social Media Users in China. *Frontiers in psychology*, 13, 846390. <https://doi.org/10.3389/fpsyg.2022.846390>
- Park, S. Y., & Baek, Y. M. (2018). Two faces of social comparison on Facebook: The interplay between social comparison orientation, emotions, and psychological well-being. *Computers in Human Behavior*, 79, 83–93. <https://doi.org/10.1016/j.chb.2017.10.028>
- Patole, S. (2021). *Principles and Practice of Systematic Reviews and Meta-Analysis*. Springer International Publishing. <https://doi.org/10.1007/978-3-030-71921-0>
- Pedalino, F., & Camerini, A. L. (2022). Instagram Use and Body Dissatisfaction: The Mediating Role of Upward Social Comparison with Peers and Influencers among Young Females. *International journal of environmental research and public health*, 19(3), 1543. <https://doi.org/10.3390/ijerph19031543>
- Pempek, T. A., Yermolayeva, Y. A., & Calvert, S. L. (2009). College students' social networking experiences on Facebook. *Journal of Applied Developmental Psychology*, 30(3), 227–238. <https://doi.org/10.1016/j.appdev.2008.12.010>



- Perloff, R. M. (2014). Social media effects on young women's body image concerns: Theoretical perspectives and an agenda for research. *Sex Roles, 71*, 363e377. <https://doi.org/10.1007/s11199-014-0384-6>.
- Pettigrew, T. F. (1967). Social evaluation theory: Convergences and applications. *Nebraska Symposium on Motivation, 15*, 241–311.
- Pettigrew, T. F. (1967). Social evaluation theory: Convergences and applications. *Nebraska Symposium on Motivation, 15*, 241–311.
- Pfund, G. N., Hill, P. L., & Harriger, J. (2020). Video chatting and appearance satisfaction during COVID-19: Appearance comparisons and self-objectification as moderators. *The International journal of eating disorders, 53*(12), 2038–2043. <https://doi.org/10.1002/eat.23393>
- Pila, E., Stamiris, A., Castonguay, A., & Sabiston, C. M. (2014). Body-related envy: a social comparison perspective in sport and exercise. *Journal of sport & exercise psychology, 36*(1), 93–106. <https://doi.org/10.1123/jsep.2013-0100>
- Powell, E., Wang-Hall, J., Bannister, J. A., Colera, E., & Lopez, F. G. (2018). Attachment security and social comparisons as predictors of Pinterest users body image concerns. *Computers in Human Behaviors, 83*, 221–229. <https://doi.org/10.1016/j.chb.2018.01.039>
- Prichard, I., Kavanagh, E., Mulgrew, K. E., Lim, M. S. C., & Tiggemann, M. (2020). The effect of Instagram #fitspiration images on young women's mood, body image, and exercise behaviour. *Body image, 33*, 1–6. <https://doi.org/10.1016/j.bodyim.2020.02.002>
- Prieler, M., Choi, J., & Lee, H. E. (2021). The Relationships among Self-Worth Contingency on Others' Approval, Appearance Comparisons on Facebook, and Adolescent Girls' Body Esteem: A Cross-Cultural Study. *International Journal of Environmental Research and Public Health, 18*(3), 901. <http://dx.doi.org/10.3390/ijerph18030901>
- Primi, C., Fioravanti, G., Casale, S., & Donati, M.A. (2021). Measuring Problematic Facebook Use among Adolescents and Young Adults with the Bergen Facebook Addiction Scale: A Psychometric Analysis by Applying Item Response Theory. *International Journal of Environmental Research, 18*, 2979. <https://doi.org/10.3390/ijerph18062979>





Przybylski, A. K., Murayama, K., DeHaan, C. R., & Gladwell, V. (2013). Motivational, emotional, and behavioral correlates of fear of missing out. *Computers in Human Behavior*, 29, 1841-1848. <https://doi.org/10.1016/j.chb.2013.02.014>.

Rafati, F., Dehdashti, N., & Sadeghi, A. (2021). The relationship between instagram use and body dissatisfaction, drive for thinness, and internalization of beauty ideals: a correlational study of Iranian women. *Feminist Media Studies*. <https://doi.org/10.1080/14680777.2021.1979065>

Raggatt, M., Wright, C. J. C., Carrotte, E., Jenkinson, R., Mulgrew, K., Prichard, I., & Lim, M. S. C. (2018). "I aspire to look and feel healthy like the posts convey": engagement with fitness inspiration on social media and perceptions of its influence on health and wellbeing. *BMC public health*, 18(1), 1002. <https://doi.org/10.1186/s12889-018-5930-7>

Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical Linear Models: Applications and Data Analysis Methods* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Rettie, H., & Daniels, J. (2020). Coping and Tolerance of Uncertainty: Predictors and Mediators of Mental Health During the COVID-19 Pandemic. *American Psychologist*. Advance online publication. <http://dx.doi.org/10.1037/amp0000710>

Roberts, S. R., Maheux, A. J., Hunt, R. A., Ladd, B. A., & Choukas-Bradley, S. (2022). Incorporating social media and muscular ideal internalization into the tripartite influence model of body image: Towards a modern understanding of adolescent girls' body dissatisfaction. *Body image*, 41, 239–247. <https://doi.org/10.1016/j.bodyim.2022.03.002>

Robinson, A., Bonnette, A., Howard, K., Ceballos, N., Dailey, S., Lu, Y., & Grimes, T. (2019). Social comparison, social media addiction, and social interaction: an examination of specific social media behaviors related to major depressive disorder in a millennial population. *Journal of Applied Biobehavioral Research*, 24, 1-14. <https://doi.org/10.1111/jabr.12158>

Rousseau, A., Eggermont, S., & Frison, E. (2017). The reciprocal and indirect relationships between passive Facebook use, comparison on Facebook, and adolescents' body dissatisfaction. *Computers in Human Behavior*, 73, 336–344. <https://doi.org/10.1016/j.chb.2017.03.056>



Ruggieri S., Bonfanti R., Ingoglia S., & Lo Coco G. (2020). The role of online Social Comparison Orientation in protection of psychological distress: a longitudinal study during COVID-19 quarantine. *Personality and Individual Differences*, 171, 110486. <https://doi.org/10.1016/j.paid.2020.110486>

Ruggieri, S., Ingoglia, S., Bonfanti, R., & Lo Coco, G. (2021). The role of Online Social Comparison as a protective factor for psychological wellbeing: A longitudinal study during the COVID-19 quarantine. *Personality and Individual Differences*, 110486. <https://doi.org/10.1016/j.paid.2020.110486>

Ryan, T., & Xenos, S. (2011). Who uses Facebook? An investigation into the relationship between the Big Five, shyness, narcissism, loneliness, and Facebook usage. *Computers in Human Behavior*, 27(5), 1658–1664. <https://doi.org/10.1016/j.chb.2011.02.004>

Saunders, J. F., & Eaton, A. A. (2018). Snaps, Selfies, and Shares: How Three Popular Social Media Platforms Contribute to the Sociocultural Model of Disordered Eating Among Young Women. *Cyberpsychology, behavior and social networking*, 21(6), 343–354. <https://doi.org/10.1089/cyber.2017.0713>

Schachter, S. (1959). *The psychology of affiliation: Experimental studies of the sources of gregariousness*. Stanford Univer. Press.

Schettino, G., Fabbriatore, R., & Caso, D. (2022). “To Be Yourself or Your Selfies, That Is the Question”: The Moderation Role of Gender, Nationality, and Privacy Settings in the Relationship Between Selfie-Engagement and Body Shame. *Psychology of Popular Media*. <http://dx.doi.org/10.1037/ppm0000417>

Schimmenti, A., Billieux, J., & Starcevic, V. (2020). The four horsemen of fear: an integrated model of understanding fear experiences during the COVID-19 pandemic. *Clinical Neuropsychiatry*, 17,41–5. <https://doi.org/10.36131/CN20200202>

Schimmenti, A., Starcevic, V., Giardina, A., Khazaal, Y., & Billieux, J. (2020). Multidimensional Assessment of COVID-19-Related Fears (MAC-RF): A Theory-Based Instrument for the Assessment of Clinically Relevant Fears During Pandemics. *Frontiers in psychiatry*, 11, 748. <https://doi.org/10.3389/fpsy.2020.00748>

Scully, M., Swords, L., & Nixon, E. (2020). Social comparisons on social media: online appearance-related activity and body dissatisfaction in adolescent girls. *Irish journal of*



*psychological medicine*, 1–12. Advance online publication.  
<https://doi.org/10.1017/ipm.2020.93>

Seekis, V., & Barker, G. (2022). Does #beauty have a dark side? Testing mediating pathways between engagement with beauty content on social media and cosmetic surgery consideration. *Body image*, 42, 268–275. <https://doi.org/10.1016/j.bodyim.2022.06.013>

Seekis, V., Bradley, G. L., & Duffy, A. L. (2020). Does a Facebook-enhanced Mindful Self-Compassion intervention improve body image? An evaluation study. *Body image*, 34, 259–269. <https://doi.org/10.1016/j.bodyim.2020.07.006>

Shensa, A., Escobar-Viera, C. G., Sidani, J. E., Bowman, N. D., Marshal, M. P., & Primack, B. A. (2017). Problematic social media use and depressive symptoms among U.S. young adults: A nationally-representative study. *Social science & medicine*, 182, 150–157. <https://doi.org/10.1016/j.socscimed.2017.03.061>

Shensa, A., Sidani, J. E., Dew, M. A., Escobar-Viera, C. G., & Primack, B. A. (2018). Social Media Use and Depression and Anxiety Symptoms: A Cluster Analysis. *American journal of health behavior*, 42(2), 116–128. <https://doi.org/10.5993/AJHB.42.2.11>

Sherlock, M., & Wagstaff, D. L. (2019). Exploring the relationship between frequency of Instagram use, exposure to idealized images, and psychological well-being in women. *Psychology of Popular Media Culture*, 8(4), 482–490. <https://doi.org/10.1037/ppm0000182>

Sherlock, M., & Wagstaff, D. L. (2019). Exploring the relationship between frequency of Instagram use, exposure to idealized images, and psychological well-being in women. *Psychology of Popular Media Culture*, 8(4), 482–490. <https://doi.org/10.1037/ppm0000182>

Singer, J. D., & Willett, J. B. (2003). *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence*. London, UK: Oxford University Press.

Skowronski, M., Busching, R., & Krahé, B. (2021). Predicting adolescents' self-objectification from sexualized video game and Instagram use: A longitudinal study. *Sex Roles: A Journal of Research*, 84(9-10), 584–598. <https://doi.org/10.1007/s11199-020-01187-1>



Statista, (2022a). *Daily time spent on social networking by internet users worldwide from 2012 to 2022*. <https://www.statista.com/statistics/433871/daily-social-media-usage-worldwide/>

Statista, (2022b). *Number of monthly active Facebook users worldwide as of 3rd quarter 2022*. <https://www.statista.com/statistics/264810/number-of-monthly-active-facebook-users-worldwide/>

Statista, (2022c). *Number of monthly active Instagram users from January 2013 to December 2021*. <https://www.statista.com/statistics/253577/number-of-monthly-active-instagram-users/>

Statista. (2022d). *Social media use during COVID-19 worldwide - Statistics & Facts*. <https://www.statista.com/topics/7863/social-media-use-during-coronavirus-covid-19-worldwide/>

Steers, M.-L. N., Wickham, R. E., & Acitelli, L. K. (2014). Seeing everyone else's highlight reels: How Facebook usage is linked to depressive symptoms. *Journal of Social and Clinical Psychology, 33*(8), 701–731. <https://doi.org/10.1521/jscp.2014.33.8.701>

Steinbeis, N., & Singer, T. (2013). The effects of social comparison on social emotions and behavior during childhood: The ontogeny of envy and Schadenfreude predicts developmental changes in equity-related decisions. *Journal of Experimental Child Psychology, 115*(1), 198–209. <https://doi.org/10.1016/j.jecp.2012.11.009>

Steinfeld, C., Ellison, N. B., & Lampe, C. (2008). Social capital, self-esteem, and use of online social network sites: A longitudinal analysis. *Journal of Applied Developmental Psychology, 29*(6), 434–445. <https://doi.org/10.1016/j.appdev.2008.07.002>

Stice, E., & Whitenton, K. (2002). Risk factors for body dissatisfaction in adolescent girls: A longitudinal investigation. *Developmental Psychology, 38*(5), 669–678. <https://doi.org/10.1037/0012-1649.38.5.669>

Strubel, J., Petrie, T. A., & Pookulangara, S. (2018). “Like” me: Shopping, self-display, body image, and social networking sites. *Psychology of Popular Media Culture, 7*(3), 328–344. <https://doi.org/10.1037/ppm0000133>



Suls, J., & Wheeler, L. (Eds.). (2000). *Handbook of social comparison: Theory and research*. Kluwer Academic Publishers.

Suls, J., & Wills, T. A. (Eds.). (1991). *Social comparison: Contemporary theory and research*. Lawrence Erlbaum Associates, Inc.

Suls, J., Martin, R., & Wheeler, L. (2000). Three Kinds of Opinion Comparison: The Triadic Model. *Personality and Social Psychology Review*, 4(3), 219-237. [https://doi.org/10.1207/S15327957PSPR0403\\_2](https://doi.org/10.1207/S15327957PSPR0403_2)

Sun, J., Schwartz, H. A., Son, Y., Kern, M. L., & Vazire, S. (2020). The language of well-being: Tracking fluctuations in emotion experience through everyday speech. *Journal of Personality and Social Psychology*, 118(2), 364–387. <https://doi.org/10.1037/pspp0000244>

Sun, Y., Li, Y., Bao, Y., Meng, S., Sun, Y., Schumann, G., Kosten, T., Strang, J., Lu, L., & Shi, J. (2020). Brief report: Increased addictive internet and substance use behavior during the COVID-19 pandemic in China. *American Journal on Addictions*, 29(4), 268–270. <https://doi.org/10.1111/ajad.13066>.

Tein, J. Y., Coxe, S., & Cham, H. (2013). Statistical power to detect the correct number of classes in latent profile analysis. *Structural Equation Modeling: A Multidisciplinary Journal*, 20(4), 640–657.

Tennen, H., Affleck, G., Armeli, S., & Carney, M. A. (2000). A daily process approach to coping: Linking theory, research, and practice. *American Psychologist*, 55(6), 626–636. <https://doi.org/10.1037/0003-066X.55.6.626>

Teo, N. S. Y., & Collinson, S. L. (2019). Instagram and risk of rumination and eating disorders: An Asian perspective. *Psychology of Popular Media Culture*, 8(4), 491–508. <https://doi.org/10.1037/ppm0000205>

Thorisdottir, I. E., Sigurvinsdottir, R., Asgeirsdottir, B. B., Allegrante, J. P., & Sigfusdottir, I. D. (2019). Active and Passive Social Media Use and Symptoms of Anxiety and Depressed Mood Among Icelandic Adolescents. *Cyberpsychology, behavior and social networking*, 22(8), 535–542. <https://doi.org/10.1089/cyber.2019.0079>



Tiggemann, M., & Slater, A. (2013). Netgirls: The Internet, Facebook, and body image concern in adolescent girls. *International Journal of Eating Disorders*, 46(6), 630–633. <https://doi.org/10.1002/eat.22141>

Tiggemann, M., & Slater, A. (2013). NetGirls: the Internet, Facebook, and body image concern in adolescent girls. *The International journal of eating disorders*, 46(6), 630–633. <https://doi.org/10.1002/eat.22141>

Tiggemann, M., Hayden, S., Brown, Z. & Veldhuis, J. (2018). The effect of Instagram “likes” on women’s social comparison and body dissatisfaction. *Body Image*, 26, 90–97. <https://doi.org/10.1016/j.bodyim.2018.07.002>

Tiggemann, M., Hayden, S., Brown, Z., & Veldhuis, J. (2018). The effect of Instagram “likes” on women’s social comparison and body dissatisfaction. *Body Image*, 26, 90–97. <https://doi.org/10.1016/j.bodyim.2018.07.002>

Tiggemann, M., Polivy, J., & Hargreaves, D. (2009). The processing of thin ideals in fashion magazines: A source of social comparison or fantasy? *Journal of Social and Clinical Psychology*, 28(1), 73–93. <https://doi.org/10.1521/jscp.2009.28.1.73>

Underwood, M. K., & Ehrenreich, S. E. (2017). The power and the pain of adolescents’ digital communication: Cyber victimization and the perils of lurking. *American Psychologist*, 72(2), 144–158. <https://doi.org/10.1037/a0040429>

Valkenburg, P. M., van Driel, I. I., & Beyens, I. (2022). The associations of active and passive social media use with well-being: A critical scoping review. *New Media & Society*, 24(2), 530–549. <https://doi.org/10.1177/14614448211065425>

Van Der Heide, B., D'Angelo, J. D., & Schumaker, E. M. (2012). The effects of verbal versus photographic self-presentation on impression formation in Facebook. *Journal of Communication*, 62(1), 98–116. <https://doi.org/10.1111/j.1460-2466.2011.01617.x>

Van Der Heide, B., D'Angelo, J. D., & Schumaker, E. M. (2012). The effects of verbal versus photographic self-presentation on impression formation in Facebook. *Journal of Communication*, 62(1), 98–116. <https://doi.org/10.1111/j.1460-2466.2011.01617.x>





- Verduyn, P., Gugushvili, N., & Kross, E. (2021). The impact of social network sites on mental health: Distinguishing active from passive use. *World Psychiatry, 20*(1), 133–134. <https://doi.org/10.1002/wps.20820>
- Verduyn, P., Gugushvili, N., Massar, K., Taht, K., & Kross, E. (2020). Social comparison on social networking sites. *Current opinion in psychology*. <https://doi.org/10.1016/j.copsyc.2020.04.002>
- Verduyn, P., Gugushvili, N., Massar, K., Täht, K., & Kross, E. (2020). Social comparison on social networking sites. *Current opinion in psychology, 36*, 32–37. <https://doi.org/10.1016/j.copsyc.2020.04.002>
- Verduyn, P., Lee, D. S., Park, J., Shablack, H., Orvell, A., Bayer, J., Ybarra, O., Jonides, J., & Kross, E. (2015). Passive Facebook usage undermines affective well-being: Experimental and longitudinal evidence. *Journal of Experimental Psychology: General, 144*(2), 480–488. <https://doi.org/10.1037/xge0000057>
- Verduyn, P., Ybarra, O., Résibois, M., Jonides, J., & Kross, E. (2017). Do social network sites enhance or undermine subjective well-being? A critical review. *Social Issues and Policy Review, 11*(1), 274–302. <https://doi.org/10.1111/sipr.12033>
- Verduyn, P., Ybarra, O., Résibois, M., Jonides, J. & Kross, E. (2017). Do social network sites enhance or undermine subjective well being? A critical review. *Social Issues and Policy Review, 11*(1), 274–302. <https://doi.org/10.1111/sipr.12033>
- Vogel, E. A., Rose, J. P., Okdie, B. M., Eckles, K., & Franz, B. (2015). Who compares and despairs? The effect of social comparison orientation on social media use and its outcomes. *Personality and Individual Differences, 86*, 249–256. <https://doi.org/10.1016/j.paid.2015.06.026>
- Vogel, E. A., Rose, J. P., Roberts, L. R., & Eckles, K. (2014). Social Comparison, Social Media, and Self-Esteem. *Psychology of Popular Media Culture, 3*, 206. <https://doi.org/10.1037/ppm0000047>
- Walker, M., Thornton, L., De Choudhury, M., Teevan, J., Bulik, C. M., Levinson, C. A., & Zerwas, S. (2015). Facebook Use and Disordered Eating in College-Aged Women. *The*



*Journal of adolescent health: official publication of the Society for Adolescent Medicine*, 57(2), 157–163. <https://doi.org/10.1016/j.jadohealth.2015.04.026>

Wang, C., Pan, R., Wan, X., Tan, Y., Xu, L., Ho, C.S., & Ho, R.C. (2020). Immediate Psychological Responses and Associated Factors during the Initial Stage of the 2019 Coronavirus Disease (COVID-19) Epidemic among the General Population in China. *International Journal of Environmental Research and Public Health*, 17, 17-29. <https://doi.org/10.3390/ijerph17051729>

Wang, Y., Geng, J., Di, K., Chu, X., & Lei, L. (2022). Body talk on social network sites and body dissatisfaction among college students: The mediating roles of appearance ideals internalization and appearance comparison. *Cyberpsychology: Journal of Psychosocial Research on Cyberspace*, 16(3). <https://doi.org/10.5817/CP2022-3-2>

Wills, T. A. (1981). Downward comparison principles in social psychology. *Psychological Bulletin*, 90(2), 245–271. <https://doi.org/10.1037/0033-2909.90.2.245>

Wood, J. V. (1989). Theory and research concerning social comparisons of personal attributes. *Psychological Bulletin*, 106, 231–248. <https://doi.org/10.1037/0033-2909.106.2.231>

World Health Organization, (2020). *Considerations for quarantine of individuals in the context of containment for coronavirus disease (COVID-19)*. [https://apps.who.int/iris/bitstream/handle/10665/331497/WHO-2019-nCoV-IHR\\_Quarantine-2020.2-eng.pdf](https://apps.who.int/iris/bitstream/handle/10665/331497/WHO-2019-nCoV-IHR_Quarantine-2020.2-eng.pdf)

Yang, C. C. (2016). Instagram use, loneliness, and social comparison orientation: Interact and browse on social media, but don't compare. *Cyberpsychology, Behavior, and Social Networking*, 19(12), 703–708. <https://doi.org/10.1089/cyber.2016.0201>

Yang, C., Holden, S., & Carter, M. (2018). Social Media Social Comparison of Ability (but not Opinion) Predicts Lower Identity Clarity: Identity Processing Style as a Mediator. *Journal of Youth and Adolescence*, 47(10), 2114-2128. <https://doi.org/10.1007/s10964-017-0801-6>

Yang, F., Wei, C., & Tang, J. (2019). Effect of Facebook Social Comparison on Well-being: A Meta-Analysis. *Journal of Internet Technology*, 20, 1829-1836.





Yang, J., Fardouly, J., Wang, Y., & Shi, W. (2020). Selfie-Viewing and Facial Dissatisfaction among Emerging Adults: A Moderated Mediation Model of Appearance Comparisons and Self-Objectification. *International journal of environmental research and public health*, 17(2), 672. <https://doi.org/10.3390/ijerph17020672>

Yao, L., Niu, G. & Sun, X. Body Image Comparisons on Social Networking Sites and Chinese Female College Students' Restrained Eating: The Roles of Body Shame, Body Appreciation, and Body Mass Index. *Sex Roles*, 84, 465–476 (2021). <https://doi.org/10.1007/s11199-020-01179-1>

Yoon, S., Kleinman, M., Mertz, J., & Brannick, M. (2019). Is social network site usage related to depression? A meta-analysis of facebook–depression relations. *Journal of Affective Disorders*, 248, 65–72. <https://doi.org/10.1016/j.jad.2019.01.026>

Yue, Z., Zhang, R., & Xiao, J. (2022). Passive social media use and psychological well-being during the COVID-19 pandemic: The role of social comparison and emotion regulation. *Computers in Human Behavior*, 127, 107050. <https://doi.org/10.1016/j.chb.2021.107050>.

Zhang, Y., Trusov, M., Stephen, A. T., & Jamal, Z. (2017). Online Shopping and Social Media: Friends or Foes? *Journal of Marketing*, 81(6), 24–41. <https://doi.org/10.1509/jm.14.0344>

Zhao, S., Grasmuck, S., & Martin, J. (2008). Identity construction on Facebook: Digital empowerment in anchored relationships. *Computers in Human Behavior*, 24(5), 1816–1836. <https://doi.org/10.1016/j.chb.2008.02.012>

Zimmer-Gembeck, M. J., Hawes, T., & Pariz, J. (2021). A closer look at appearance and social media: Measuring activity, self-presentation, and social comparison and their associations with emotional adjustment. *Psychology of Popular Media*, 10(1), 74–86. <https://doi.org/10.1037/ppm0000277>