Reanalyzing Through the Lens of Structural Equation Modeling: The Relationship between Facebook and Indicators of Psychopathology

Milena Waterschoot – 01809657

Jolien De Clercq – 01809798

Ayala Denul – 01802163

Course Supervisor: prof. Daniele Marinazzo

Project submitted for the course Case Studies in the Analysis of Experimental Data

Introduction

In this study, data by Faelens et al. (2019) was reanalyzed. Faelens et al. (2019) collected data to explore the relationship between Facebook use, rumination, social comparison, contingent self-esteem, global self-esteem, and mental health. The relationship between these constructs was investigated using network analysis. Faelens et al. (2019) opted for network analysis as it is a powerful tool to identify key variables in a network. Network analysis is particularly useful if the direction of causality between variables is unknown, as it does not assume a fixed model and allows for a data-driven exploration of the relationships between variables.

While Faelens et al. (2019) approach their research question in an exploratory manner, they also identify a mediation model based on the existing literature. More specifically, in their paper, a mediation model is proposed in which social comparison on Facebook negatively impacts one's self-esteem, which in turn leads to depression, anxiety, and stress symptoms. Faelens et al. (2019) differentiate between two types of self-esteem, namely global self-esteem and contingent self-esteem. Global self-esteem is conceptualized as a general attitude one has toward oneself (Bos et al., 2010; Faelens et al., 2019; Tomaka et al., 2013). Contingent self-esteem is the degree to which one's self-esteem is dependent on the extent one has reached one's standards (Bos et al., 2010; Faelens et al., 2019; Tomaka et al., 2013). Previously, both low global self-esteem and high contingent self-esteem have been found to be related to (the development of) affective disorders. Furthermore, online social comparison has been found to impact global and contingent self-esteem. Based on these associations, Faelens et al. (2019) propose that contingent and global self-esteem potentially mediate the relationship between social comparison on Facebook and depression, anxiety, and stress symptoms. So, Faelens et al. (2019) hypothesize that high social comparison on Facebook will directly and indirectly, via a lower global self-esteem and higher contingent self-esteem, lead to (the development of) affective disorder. The mediating role of (contingent) self-esteem in the relationship between social comparison and indicators of well-being and affective disorders

has already been demonstrated in previous research (Liu et al., 2017; Patrick et al., 2004; Wang et al., 2017).

If there are a-priori hypotheses or theories regarding the relationship between variables, structural equation modeling (SEM) can be equally to more useful than network analysis. SEM allows to test a set of pre-specified directional hypotheses about the relationship between variables. So, compared to the exploratory nature of network analysis, SEM allows for a confirmatory analysis. On top of this, using SEM, the mediation effect of one or more variables can be assessed.

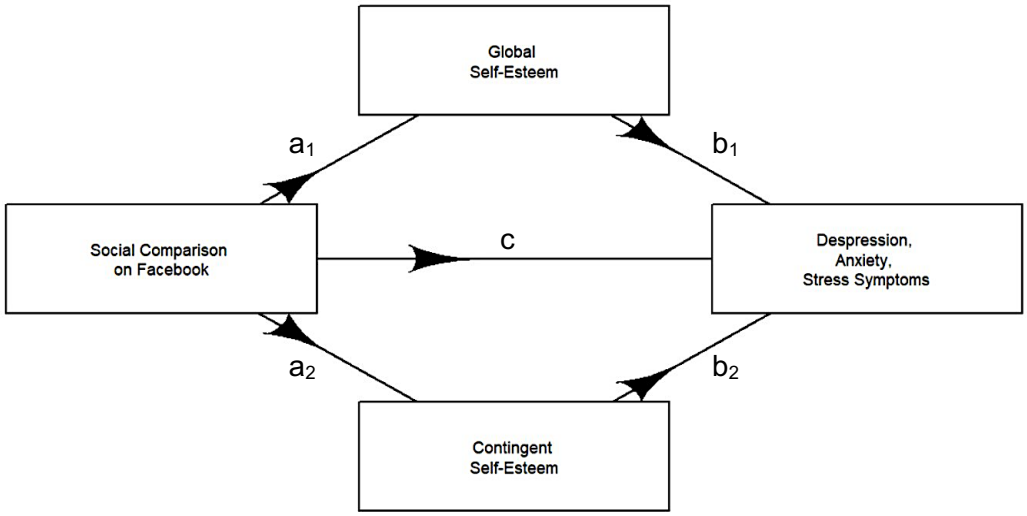
In our study, we tested the proposed mediation model using SEM. We focused specifically on the variables 'social comparison on Facebook' (SCF), 'global self-esteem' (GSE), 'contingent self-esteem' (CSE), and 'depression, anxiety, and stress symptoms'. In the first model, both CSE and CSE were hypothesized to mediate the relationship between SCF and depression, anxiety, and stress symptoms (Figure 1). No link between GSE and CSE was included. As there are three dependent variables (i.e., depression, anxiety, stress), a multivariate mediation model was fitted. In the second model, a link between CSE and GSE was included as well (Figure 2). This path was tested as previous literature has shown that contingent self-esteem negatively impacts global self-esteem (Barzoki et al., 2018; Chen-Bouck & Patterson, 2016; Stapleton et al., 2017). More specifically, high contingent self-esteem in a specific domain has been shown to be detrimental for global self-esteem. So, we wanted to test whether the effect of social comparison on the outcomes via global self-esteem, is further mediated by contingent self-esteem.

Additionally, we tested which type of Facebook use is the strongest predictor of social comparison on Facebook since Faelens et al. (2019) argue that evidence on this is lacking. We thus wanted to examine the relationship between types of Facebook use and social comparison on Facebook, to validate this part of Faelens et al. (2019) their network. Three types of Facebook use were investigated by Faelens et al. (2019), namely passive Facebook use, which is monitoring others on Facebook without interaction, active private Facebook use, which involves interacting with other Facebook users by using, for example, private chats, and

active public Facebook use, which involves interacting with other Facebook users by using public means such as updating a status or uploading a picture.

Figure 1

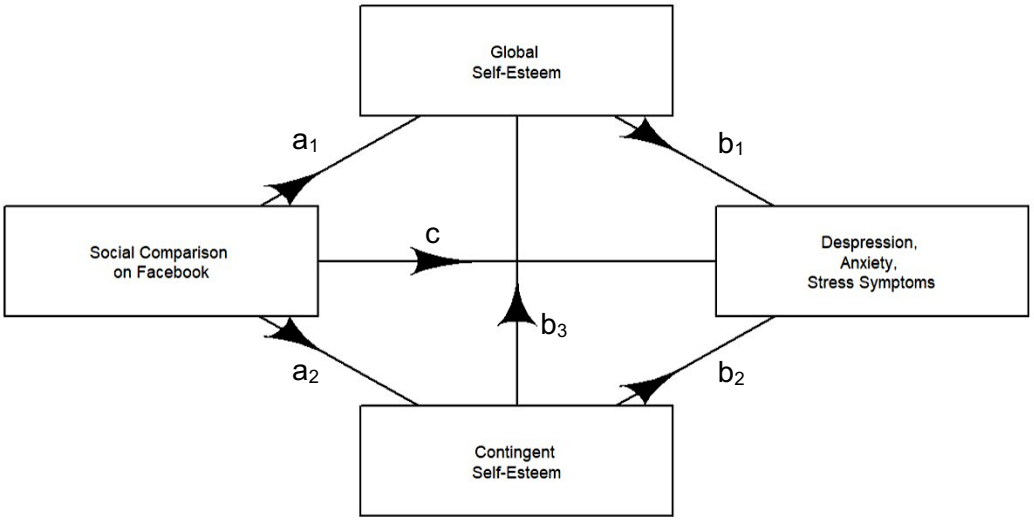
Representation of Model 1



Note. Model 1 fits the effect of 'social comparison on Facebook' on 'depression, anxiety, and stress symptoms' and includes both global and contingent self-esteem as mediators. No link between global and contingent self-esteem is included.

Figure 2

Representation of Model 2



Note. Model 2 fits the effect of 'social comparison on Facebook' on 'depression, anxiety, and stress symptoms' and includes both global and contingent self-esteem as mediators, and a path between contingent and global self-esteem is included.

Materials & Methods

Dataset

The data collected by Faelens et al. (2019) was retrieved from the Open Science Framework (https://osf.io/v7gch/). The researchers conducted two identical studies. First, an exploratory study with 207 participants, and second, a preregistered replication study with 468 participants. The data collected in studies 1 and 2 were combined in our analyses as the same variables were collected in both studies. This increased the total sample size (n = 675) of our study, which is beneficial for the power. Faelens et al. (2019) recruited the participants via Prolific Academic. The study consisted of an online survey.

The concepts were measured by means of scales. First, social comparison on Facebook was estimated via the 11-item Comparison Orientation Measure for Facebook (Steers et al., 2014). Regarding the two types of self-esteem, contingent self-esteem was measured with the 15-item Contingent Self-Esteem Scale (Paradise & Kernis, 1999), and global self-esteem was assessed with the 10-item Rosenberg Self-Esteem Scale (Rosenberg, 1965). The Depression, Anxiety, and Stress Scales (Lovibond & Lovibond, 1995), each scale consisting of seven items, were utilized to assess the degree of depression, anxiety, and stress symptoms in the participants. Finally, the types of Facebook use were measured with the 9-item Multidimensional Scale of Facebook Use.

Plan of Analysis

SEM Analysis

The data analysis was performed in R Statistical Software (R Core Team, 2022). The mediation models were fitted using structural equation modeling with the R-package *lavaan* (Rosseel, 2012). The effects were tested using the bootstrap method with 1000 bootstrap samples. For both models, we assessed the goodness of the bootstrap parameter estimates and the explained variance of the model. Further, we directly compared our results with the regularized partial correlation networks obtained by Faelens et al. (2019).

Two models (Model 1 and 2) were fitted that included both CSE and GSE as mediator variables. Both models included a direct effect of SCF on depression, anxiety and stress symptoms, an indirect effect of SCF on depression, anxiety and stress symptoms through CSE, and an indirect effect of SCF on depression, anxiety and stress symptoms through GSE. Additionally, in Model 2, a pathway from CSE to GSE was also specified. Figures 1 and 2 represent Model 1 and Model 2, respectively. Subsequently, a model comparison test was performed to assess which model could explain the observed data best. We used the likelihood-ratio test as this is often used to compare nested models.

Linear Model

To examine which type of Facebook use is the strongest predictor of social comparison, a linear model was fitted with social comparison on Facebook as the dependent variable and passive, private, and public Facebook use as predictors. An ANOVA was performed on this model.

Attempted Power Analysis

We also attempted a power analysis. However, we did not report it in the main text because the power analysis does not fully fit the mediation analysis we performed. Specifically, the R function we used allowed us to calculate the power for a mediation model with one mediator only (Zhang et al., 2018). In contrast, the mediation analyses we performed included two mediators simultaneously, and in one of our models there was also a serial mediation through both mediators. Nevertheless, we included the results of this power analysis in Appendix A to provide a complete overview of all attempted analyses and because it can be used as an indication of the increased power due to analyzing both samples together.

Results

SEM Analysis

Figures 3 and 4 present the estimates of the standardized path coefficients of Model 1 and 2, respectively. Table 1 reports the estimates, standard errors, p-values and confidence intervals of the (un)standardized path coefficients in Model 1 (top) and 2 (bottom). Table 2 reports the estimates, standard errors, p-values, and confidence intervals of the (un)standardized direct effect, indirect effects, and total effect in Model 1 (top) and Model 2 (bottom). Table 3 provides an overview of the coefficients used to construct the effects reported in Table 2.

In Model 1, the total effect is significant which indicates that higher SCF is related to higher depression, anxiety and stress symptoms. Both the direct effect and indirect effect via GSE are significant. The indirect effect via CSE is not significant. Table 1 shows that SCF is positively associated with depression, anxiety and stress symptoms, and negatively associated with GSE which in turn is negatively associated with depression, anxiety and stress symptoms. Model 1 could explain 29% of the variance in stress symptoms, 29% of the variance in anxiety symptoms and 27% of the variance in depression symptoms.

In Model 2, the total effect is again significant. Similar to Model 1, the direct effect is significant indicating that SCF is positively associated with depression, anxiety and stress symptoms. In contrast to Model 1, the indirect effects via GSE or CSE are not significant. However, the indirect effect via the sequential pathway through both CSE and GSE is significant. Table 1 shows that SCF is positively associated with CSE, which in turn is negatively associated with GSE, which in turn is negatively associated with depression, anxiety and stress symptoms. Model 2 could explain 30% of the variance in stress symptoms, 30% of the variance in anxiety symptoms, and 27% of the variance in depression symptoms. The likelihood ratio test showed a significant effect between the two nested models $\chi^2(1, N = 675) = 84.69$, $p < .001$, indicating that Model 2 fits the data better.

Figure 3

Standardized Path Coefficient Estimates of Model 1.

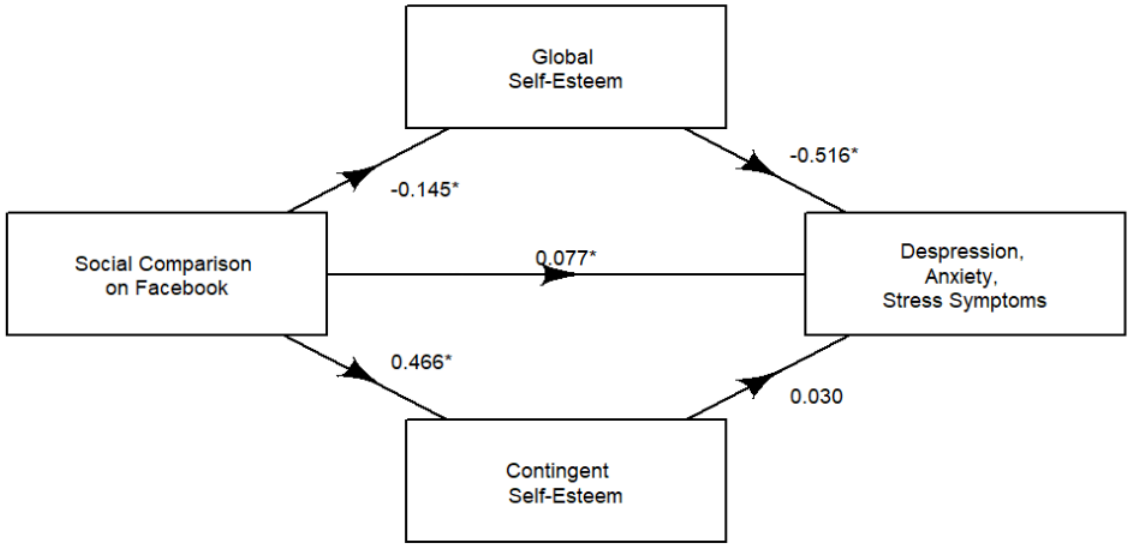


Figure 4

Standardized Path Coefficient Estimates of Model 2.

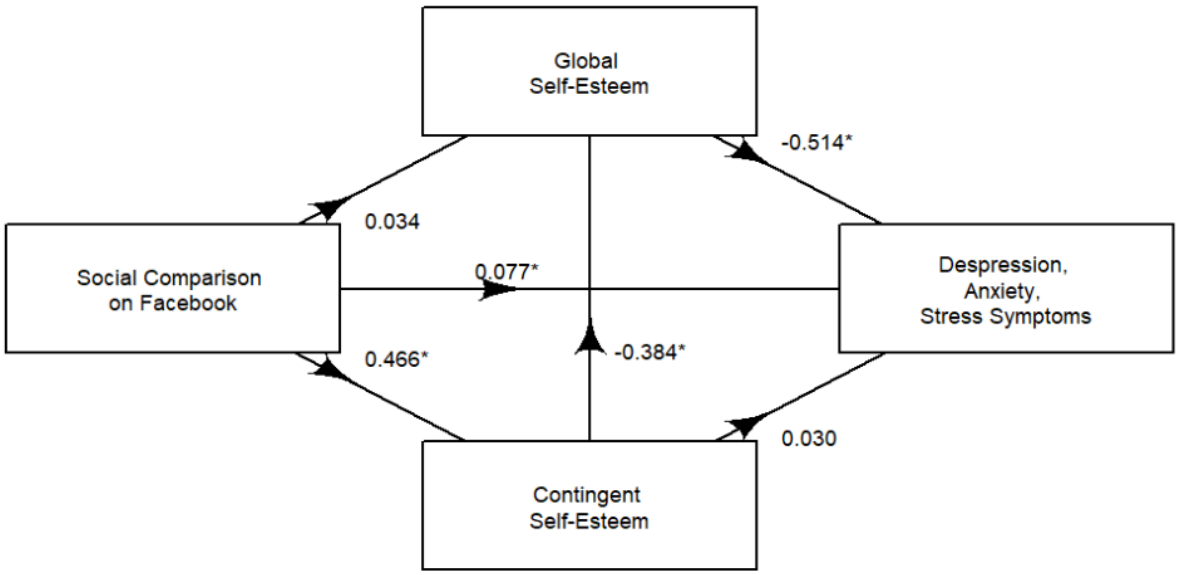


Table 1

Estimates, Standard Errors and P-Values of the (Un)Standardized *Path Coefficients in Model 1 and Model 2*.

Model	Path Coefficient	Unstandardized Parameter Estimate	Standardized Parameter Estimate	SE	CI		p-value
					Lower	Upper	
Model 1	c	0.043	0.077	0.019	0.004	0.083	.027
	a1	-0.103	-0.145	0.032	-0.159	-0.037	.001
	b1	-0.404	-0.516	0.036	-0.338	-0.404	<.001
	a2	0.480	0.466	0.040	0.402	0.561	<.001
	b2	0.016	0.030	0.022	-0.027	0.057	.444
Model 2	c	0.043	0.077	0.020	0.004	0.083	.033
	a1	0.024	0.034	0.032	-0.033	0.089	.480
	b1	-0.404	-0.514	0.035	-0.476	-0.333	< .001
	a2	0.480	0.466	0.042	0.396	0.558	< .001
	b2	0.016	0.030	0.021	-0.026	0.057	.447
	b3	-0.264	-0.384	0.031	-0.325	-0.200	< .001

Note. For both models: The direct effect from SCF on depression, anxiety and stress symptoms is represented by the coefficient c, the effect from SCF on GSE is represented by the coefficient a1, the effect from GSE on depression, anxiety and stress symptoms is represented by the coefficient b1, the effect from SCF on CSE is represented by the coefficient a2 and the effect from CSE on depression, anxiety and stress symptoms is represented by the coefficient b2. For Model 2 additionally: The effect from CSE on GSE is represented by the coefficient a3. The coefficients are represented in Figure 1 and Figure 2.

Table 2

Estimates, Standard Errors and P-Values of the (Un)Standardized *Direct, Indirect, and Total Effects in Model 1 and 2*.

Model	Effect	Unstandardized Parameter Estimate	Standardized Parameter Estimate	SE	CI		p-value
					Lower	Upper	
Model 1	Direct effect	0.043	0.077	0.019	0.004	0.083	.027
	Indirect effect via GSE	0.042	0.075	0.014	0.015	0.069	.002
	Indirect effect via CSE	0.008	0.014	0.011	-0.014	0.028	.463
	Total effect	0.092	0.166	0.021	0.052	0.134	< .001
Model 2	Direct effect	0.043	0.077	0.020	0.004	0.083	.033
	Indirect effect via GSE	-0.010	-0.017	0.013	-0.038	0.013	.453
	Indirect effect via CSE	0.008	0.014	0.010	-0.013	0.028	.453
	Indirect effect via CSE & GSE	0.051	0.092	0.010	0.034	0.073	< .001
	Total effect	0.092	0.165	0.021	0.054	0.134	< .001

Note. CSE = Contingent Self-Esteem, GSE = Global Self-Esteem.

Table 3

Overview of the coefficients of the total effects, indirect effects and direct effects.

Model	Effect	Coefficient
Model 1	Direct effect	c
	Indirect effect via GSE	a1*b1
	Indirect effect via CSE	a2*b2
	Total effect	c + (a1*b1) + (a2*b2)
Model 2	Direct effect	c
	Indirect effect via GSE	a1*b1
	Indirect effect via CSE	a2*b2
	Indirect effect via CSE & GSE	a1*b3*b2
	Total effect	c + (a1*b1) + (a2*b2) + (a1*b3*b2)

Note. CSE = Contingent Self-Esteem, GSE = Global Self-Esteem.

Linear Model

The strongest predictor of social comparison on Facebook was passive Facebook use ($\beta = 0.51$, $F(1, 671) = 50.31$, $p < .001$). Moreover, active public Facebook use also predicted social comparison on Facebook ($\beta = 0.31$, $F(1, 671) = 11.61$, $p < .001$). Private Facebook use did not predict social comparison on Facebook ($F(1, 671) = 0.05$, $p = .83$). The model could explain 15% of the variance ($R^2 = .15$).

Discussion

Serial Mediation

The focus of this project was on the relationship between social comparison and indicators of psychopathology. In particular, we examined to what extent global and contingent self-esteem mediated this relationship. To this end, two mediation models were fitted and compared. In both models, CSE and GSE functioned as mediators but in the first model, CSE and GSE were independent of each other, while in the second model, a sequential pathway from CSE to GSE was defined. The model comparison test identified the second model as the best fit for the data. In this model, there was a partial mediation, which means that there was both a significant direct and indirect pathway from SCF to depression, anxiety, and stress symptoms. As to the direct pathway, SCF was positively associated with depression, anxiety, and stress symptoms. For the indirect effects, the separate pathways through CSE and GSE were not significant. However, the sequential path through both CSE and GSE was significant. Hence, our results support a serial mediation effect between SCF and depression, anxiety, and stress symptoms through CSE and GSE. As can be seen in Figure 4, heightened SCF is associated with increased CSE, which, in turn, is associated with reduced GSE. Finally, reduced GSE is associated with heightened depression, anxiety, and stress symptoms. Importantly, the indirect effect via CSE and GSE (standardized parameter estimate = 0.09) is relatively stronger than the direct effect (standardized parameter estimate = 0.08).

To summarize, these results indicate that social comparison on Facebook has detrimental effects on individuals' global self-esteem through increased contingent self-esteem. In turn, lower global self-esteem is positively associated with psychopathological indicators. Hence, the impact of Facebook, and potentially social media in general, on individuals' self-esteem should not be underestimated. Social comparison on Facebook is positively associated with depression, anxiety, and stress and a substantial part of this association can be explained through changes in self-esteem.

These findings are consistent with previous studies. For instance, Liu et al. (2017) showed that self-esteem partially mediated the relationship between social comparison on

social network sites and depressive symptoms. Similarly, in a study by Wang et al. (2017), social comparison and self-esteem mediated the relationship between social media use and well-being. Finally, specifically for contingent self-esteem, Patrick et al. (2004) observed a worse impact of social comparison on well-being in participants that had high contingent self-esteem. This shows that the results of the current study support the growing body of literature that points to the detrimental effects of social media usage on well-being and the prominent role of self-esteem in this.

Types of Facebook Use

Given that social comparison on Facebook is linked with depression, anxiety, and stress, both directly and indirectly through self-esteem, it would be relevant to know which factors predict social comparison on Facebook. To this end, we tested which types of Facebook use predicted social comparison on Facebook. Both passive and active public Facebook use predicted social comparison, with the strongest effects of passive Facebook use. Hence, monitoring others on Facebook (a) without interactions (i.e., passive Facebook use) or (b) with interactions but only in the public sphere (i.e., active public Facebook use) may increase the amount of social comparison. The detrimental effects of passive usage of social networking sites have also been identified by Wang et al. (2017).

Comparison with Faelens et al. (2019)

In the study of Faelens et al. (2019), the network analyses revealed two clusters of nodes. The first cluster encompassed the different types of Facebook use (public, private, passive), and the second cluster comprised the indicators of psychopathology, that is, the depressive, anxiety, and stress symptoms as well as rumination. These two clusters were connected through social comparison, contingent self-esteem, and global self-esteem. In other words, social comparison and self-esteem hold a crucial role in the relationship between social media and psychopathological outcomes.

Faelens et al. (2019) conducted two studies and the corresponding network structures were evaluated as structurally equivalent. Nevertheless, there were slight differences between the two studies. The network structures of both studies can be consulted in Appendix B. In the

first study, social comparison was only indirectly connected to the psychopathological outcomes. More specifically, social comparison was strongly connected to contingent self-esteem, which, in turn, was strongly connected to global self-esteem. Finally, it was the global self-esteem node that was directly linked to the cluster that contained rumination and the depressive, anxiety, and stress symptoms. In addition to the global self-esteem node, the contingent self-esteem node showed one direct connection to the psychopathological outcomes, namely to stress.

In the second study, social comparison was again strongly connected with contingent self-esteem. However, contrary to the first study, social comparison also showed a weak, direct, connection to rumination and stress. Likewise, contingent self-esteem, in addition to its strong connection with global self-esteem, showed a direct connection with rumination in the second study. However, similar to the first study, global self-esteem had the strongest connection to the psychopathological outcomes.

In sum, the pathway from social comparison to contingent self-esteem to global self-esteem to, finally, psychopathological outcomes was the strongest in both studies. Nevertheless, in the second study, a few direct connections between the psychopathological outcomes and both social comparison and contingent self-esteem were observed as well. The fact that these direct effects were observed in the second study, is probably a result of the larger sample size in the second study compared to the first study. A larger sample enhances the power to detect weak connections.

The results of our study are in accordance with the overall conclusion of Faelens et al. (2019) that social comparison and (contingent and global) self-esteem bridge social media use and psychopathological outcomes. The mediation model that fit the data best was the model with a pathway from social comparison to contingent self-esteem to global self-esteem to, finally, depressive, anxiety, and stress symptoms. This pathway is very similar to the structure of the network of Faelens et al. (2019). Furthermore, there is a direct effect of social comparison on the pathological outcomes. This is also in line with the second network analysis

of Faelens et al. (2019) wherein a direct connection from the social comparison node to rumination and stress was observed.

Regarding the types of Facebook use, passive Facebook use was related to social comparison on Facebook in both models. In the second study, there was also a connection that was not present in the first study, namely a connection between public Facebook use and social comparison. Hence, the results of our linear model are also consistent with the network analysis of Faelens et al. (2019). That the connection with public Facebook use was observed only in the second model is, again, most likely the result of the larger sample in the second study, which made it possible to identify weaker connections. That the link between social comparison and public Facebook use weaker is, is also consistent with our results: public Facebook use was a less strong predictor of social comparison than passive Facebook use.

Limitations and Future Research

It is important to note that while our results support a serial mediation between social comparison on Facebook and depression, anxiety, and stress symptoms through contingent and global self-esteem, the design of the study by Faelens et al. (2019) does not allow for strong causal claims. The observed serial mediation provides evidence for a plausible mechanism, but further research is needed to establish causality. To this end, future studies should examine the effects of self-esteem on the relationship between social comparison on social media and pathological indicators through experimental or longitudinal designs.

Conclusion

Through the employment of SEM, we examined the relationship between social comparison on Facebook and psychopathological indicators, with a focus on the mediating roles of contingent self-esteem and global self-esteem. The findings revealed that social comparison on Facebook had a direct positive association with depression, anxiety, and stress symptoms and that a serial mediation effect through contingent and global self-esteem provided the best fit for the data. Furthermore, we identified passive and active public

Facebook use as significant predictors of social comparison, with passive use having the strongest influence.

Our study supports the findings of the research done by Faelens et al. (2019). An advantage of our study is that we tested pre-specified directional hypotheses about the relationship between the variables. Therefore, we were able to perform a confirmatory analysis which allowed us to draw stronger conclusions. In comparison, the network analysis of Faelens et al. (2019) solely gave insight into the connections between concepts, and not into their directionality.

To summarize, our study uniquely contributes to the existing knowledge of the complex interplay between social comparison, self-esteem, and psychopathology in the context of social media use. Continued investigation in this area is crucial for comprehending the impact of social media on individuals' well-being.

Data Availability Statement

The data collected by Faelens et al. (2019) was retrieved from the Open Science Framework (https://osf.io/v7gch/). The used datasets and R-script can be found on our github repository: https://github.com/MilenaWaterschoot/Case-Studies.git

References

Barzoki, M. H., Vahedi, M., Nourmohamadi, S., & Kalantari, S. E. (2018). The Mediating Role of Contingent Self-Esteem in the Association Between Self-Objectification and Self-Esteem. *Sexuality & Culture*, *22*(4), 1300-1309. https://doi.org/10.1007/s12119-018-9533-3

Bos, A. E. R., Huijding, J., Muris, P., Vogel, L. R. R., & Biesheuvel, J. (2010). Global, contingent and implicit self-esteem and psychopathological symptoms in adolescents. *Personality and Individual Differences*, *48*(3), 311-316. https://doi.org/https://doi.org/10.1016/j.paid.2009.10.025

Chen-Bouck, L., & Patterson, M. M. (2016). Contingent Self-worth in Chinese Adolescents and Young Adults: Relations with Global Self-Esteem and Depressive Symptoms. *Social Development*, *25*(4), 846-865. https://doi.org/https://doi.org/10.1111/sode.12173

Faelens, L., Hoorelbeke, K., Fried, E., De Raedt, R., & Koster, E. H. W. (2019). Negative influences of Facebook use through the lens of network analysis. *Computers in Human Behavior*, *96*, 13-22. https://doi.org/https://doi.org/10.1016/j.chb.2019.02.002

Liu, Q.-Q., Zhou, Z.-K., Yang, X.-J., Niu, G.-F., Tian, Y., & Fan, C.-Y. (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/https://doi.org/10.1016/j.paid.2017.03.037

Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, *33*(3), 335-343. https://doi.org/https://doi.org/10.1016/0005-7967(94)00075-U

Paradise, W. A., & Kernis, M. A. (1999). *Development of the contingent self-esteem scale* [unpublished data].

Patrick, H., Neighbors, C., & Knee, C. R. (2004). Appearance-Related Social Comparisons: The Role of Contingent Self-Esteem and Self-Perceptions of Attractiveness.

Personality and Social Psychology Bulletin, *30*(4), 501-514. https://doi.org/10.1177/0146167203261891

R Core Team. (2022). *R: A language and environment for statistical computing. R Foundation for Statistical Computing*. In (Version 4.2.1) https://www.R-project.org/

Rosenberg, M. (1965). *Society and the Adolescent Self-Image*. Princeton University Press. http://www.jstor.org/stable/j.ctt183pjjh

Rosseel, Y. (2012). lavaan: An R Package for Structural Equation Modeling. *Journal of Statistical Software*, *48*(2), 1 - 36. https://doi.org/10.18637/jss.v048.i02

Stapleton, P., Crighton, G. J., Carter, B., & Pidgeon, A. (2017). Self-esteem and body image in females: The mediating role of self-compassion and appearance contingent self-worth. *The Humanistic Psychologist*, *45*, 238-257. https://doi.org/10.1037/hum0000059

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

Tomaka, J., Morales-Monks, S., & Shamaley, A. G. (2013). Stress and Coping Mediate Relationships between Contingent and Global Self-Esteem and Alcohol-Related Problems among College Drinkers. *Stress and Health*, *29*(3), 205-213. https://doi.org/https://doi.org/10.1002/smi.2448

Wang, J.-L., Wang, H.-Z., Gaskin, J., & Hawk, S. (2017). The Mediating Roles of Upward Social Comparison and Self-esteem and the Moderating Role of Social Comparison Orientation in the Association between Social Networking Site Usage and Subjective Well-Being [Original Research]. *Frontiers in Psychology*, *8*. https://doi.org/10.3389/fpsyg.2017.00771

Zhang, Z., Mai, Y., Yang, M., & Zhang, M. Z. (2018). *Package 'WebPower'. Basic and Advanced Statistical Power Analysis Version.*

Appendix A: Attempted Power Analysis

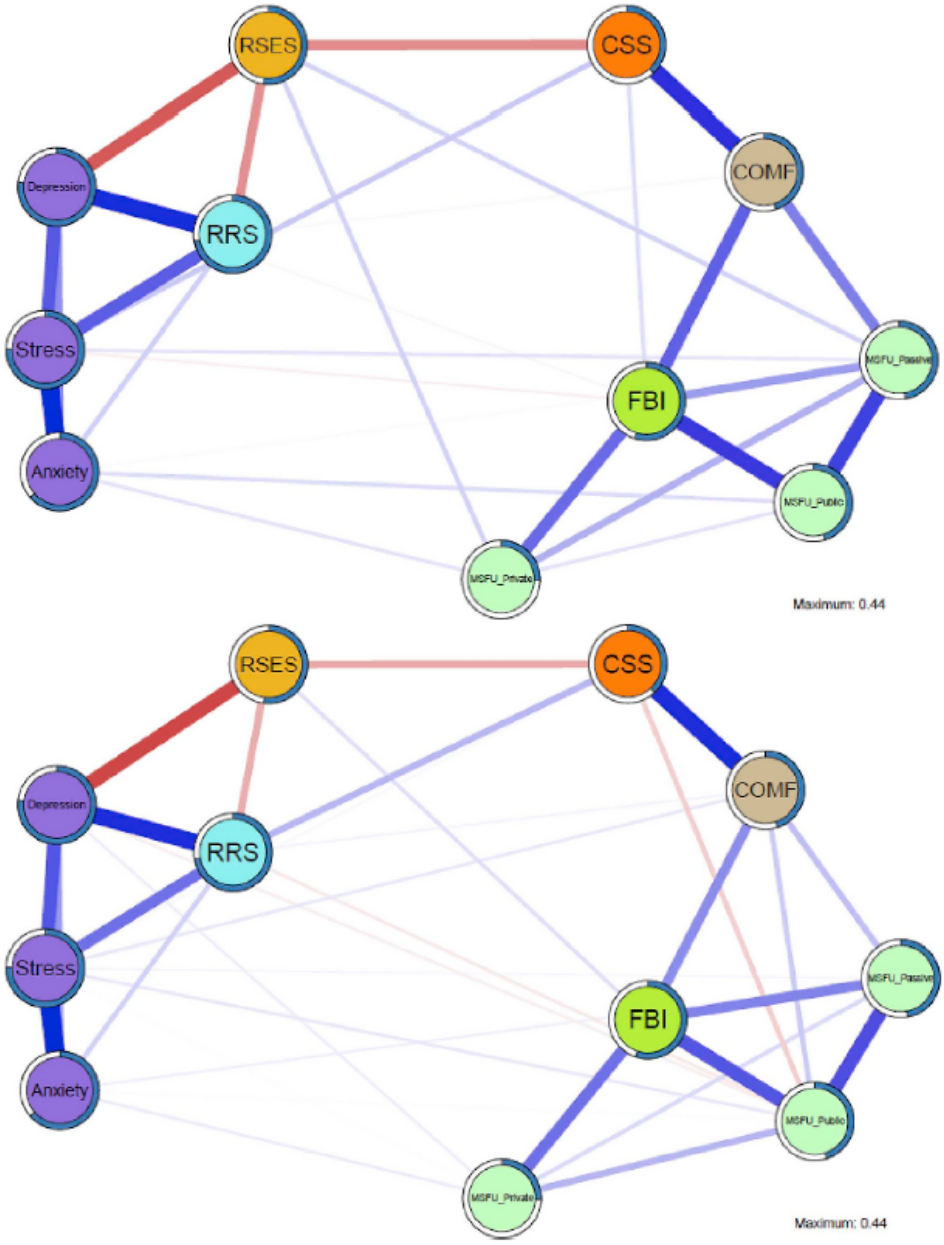
We also attempted an additional power analysis, which was not reported in the main text as our model proved to be too complex for the employed analysis techniques. We report this analysis in the appendix and github repository to provide a complete overview of all attempted analyses.

For the power analysis we used the *WebPower* package in R (Zhang et al., 2018). This package makes it possible to conduct advanced and basic power analyses for mediation analyses. Through the power analysis we found that a basic mediation analysis with 675 participants had a power of 96% to detect effect sizes of 0.2 for the a and b path.

Appendix B: The Network Structures of Faelens et al. (2019)

Figure 1B

The Network Structure of Study 1 (Above) and Study 2 (Below) from Faelens et al. (2019).



Note. From “Negative influences of Facebook use through the lens of network analysis” by L., Faelens, K., Hoorelbeke, E., Fried, R., De Raedt, & E.H.W., & Koster, 2019, *Computers in Human Behavior*, *96*, p. 18 (https://doi.org/10.1016/j.chb.2019.02.002). Copyright 2019 by Elsevier.