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The effect of social media on depression, FoMO and self-esteem

A thesis submitted for the degree of Master of Science in Child and Adolescence Psychology by Sophie Speer

Master Thesis - Child & Adolescent Psychology

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Abstract

Social media are increasingly gaining more users, especially among younger generations. It is still debatable if the use of social media has beneficial or detrimental effects on mental health. Factors that have previously been related to social media consumption are depression, fear of missing out (FoMO) and self-esteem. In order to investigate, whether a reduction in social media use has beneficial effects upon the aforementioned mental health variables, the current study conducted a two-weeks smartphone reduction intervention. Through this smartphone reduction intervention, participants were also expected to reduce their social media engagement. The experimental group was compared to a control group to which participants were randomly allocated. It was hypothesised that depression and FoMO scores would reduce after the intervention, whereas self-esteem scores would increase. The mediating or moderating role of FoMO between social media use and depression was additionally examined. Contrary to what was expected, the intervention group did not significantly reduce their social media use. Results of the analyses did not find an association between social media use and depression, FoMO or self-esteem. Furthermore, FoMO did not significantly moderate or mediate social media use and depression. However, these non-significant findings should be interpreted with caution due to insufficient differences in social media use between the control and intervention group. Future studies controlling for these errors are needed to research potential benefits of smartphone reduction interventions on mental health variables.

Keywords: social media use, depression, FoMO, self-esteem, mental health

Introduction

With the first invention of a smartphone by Apple in 2007, companies have increasingly invested in new advancements of such technologies. Smartphone ownership expanded over the years. In 2011 only 35% of the American population owned a smartphone, but numbers have drastically increased over the past 8 years, currently reaching a striking 81% (Pew Research Center, 2002-2019). The popularity of smartphones is especially apparent in younger generations aged 18-29 (96%) followed by 30-49-year-old adults (92%) and is even present in people at the age of 65 years and older (53%) (Pew Research Center, 2002-2019).

The central advancement of smartphones are applications, so-called apps, which can fulfil various functions, including communication, route planning, entertainment and many more. These apps can be divided into various categories, one of which is 'social media'. 'Social media' compromises any app that facilitates communication and exchange of information between individuals. From 2006 onwards, social media apps have gained many users; particularly, 90% of young adults (18-29 years) currently use at least one social media platform, followed by 30-49-year-olds (82%) and 50-64-year-olds (69%) (Pew Research Center, 2005-2019). Most Americans use Facebook (68%) and YouTube (73%) but a shift between generations is visible, whereby Instagram and Snapchat are preferred amongst young adults between the age of 18 and 29 years. After Facebook and YouTube, Snapchat is the most popular social media platform with 78% users and Instagram with 71%. These social media platforms are all checked daily by more than 50% of their users. Facebook is leading in daily checks with 74% of all users, followed by Instagram (63%), Snapchat (61%) and YouTube (51%) (Pew Research Center, 2012-2019).

The use of social media has several advantages, e.g., staying in contact with people all around the world, and having quick and easy access to information. Whether social media

have beneficial or detrimental effects on mental well-being is still disputable. Some research indicates negative effects (Barry, Sidoti, Briggs, Reiter & Lindsey, 2017; Dhir, Yossatorn, Kaur & Chen, 2018; Hunt, Marx, Lipson, & Young, 2018; Siddiqui & Singh, 2016), whereas other studies report the opposite (Kim & Lee, 2011; Siddiqui & Singh, 2016). In this study, we will examine the effects of a smartphone reduction intervention on mental health. The use of social media apps is expected to reduce following limitations on smartphone usage. Consequently, the effects of social media reduction on depression, FoMO and self-esteem will be the major focus of this study. The following paragraphs will first elaborate on how social media usage affects depression and FoMO and how those factors might be interlinked. Furthermore, the relationship between social media usage and its effect on self-esteem will be clarified. Finally, the current study and its aims will be outlined.

Social Media and Depression

Depression is one of the most common mood disorders and affects approximately 322 million people world-wide, that is 4.4% of the global population (World Health Organisation, 2017). Depression is, according to the DSM-V, marked by melancholy, loss of interest in pleasant activities, sleep disturbances, increased fatigue, feeling worthless and attention difficulties (American Psychiatric Association, 2013; Davey, 2015). Between 2005 and 2015 the rate of diagnosed depression increased by 18.4%, whereby depression became one of the four most prominent disorders causing disabilities and suicide attempts in adolescents (World Health Organization, 2017; World Health Organization, 2019; World Health Organization, 2019).

The development of depression stems from a complex interaction between genetics and the environment (Davey, 2015; Miller et al., 2013; Karg et al., 2011). It was found that a greater stress exposure in genetically predisposed individuals is linked to depression (Davey, 2015; Karg et al., 2011; Miller et al., 2013). Since studies identified social media as a stress-

inducing source, it is plausible that social media might increase the odds of developing depression (Lee et al., 2016; Reinecke et al., 2017; Bucher et al., 2013; Derks et al., 2014). An interesting mechanism enhancing stress and depression is the concept of Fear of Missing Out (FoMO) (Milyavskaya, 2018). FoMO is a phenomenon in which individuals are afraid to miss out on important updates of other people, e.g., activities, and is especially present in social media users (Milyavskaya, 2018). Striving for popularity and belonging are two important factors underlying FoMO among adolescents (Beyens, Frison & Eggermont, 2016).

The relationship between depression, FoMO and social media use has been examined but their underlying mechanisms still need to be explored more thoroughly (Barry, Sidoti, Briggs, Reiter & Lindsey, 2017; Reer, Tang & Quandt, 2019; Oberst et al., 2016; Przybylski Murayama, DeHaan & Gladwell, 2013). According to Przybylski et al. (2013), FoMO mediates individual differences, including depression, and social media engagement. Hence, it can be suggested that reducing social media use could help individuals not only to lessen FoMO but also to help with their depression. Furthermore, individuals experiencing greater FoMO were found to use social media more often, which consequently indirectly influenced the development of depressive symptoms (Dhir, Yossatorn, Kaur & Chen, 2018; Hunt, Marx, Lipson, & Young, 2018; Oberst, Wegmann, Stodt, Brand, & Chamarro, 2017). It can be inferred that individuals who use social media to relieve their fear of missing out on the life of others are likely not to feel relieved after all. Instead, it seems that checking social media accounts only leads to an increase in their FoMO and depression. Thereby, introducing these individuals to a vicious cycle. These findings hint towards harmful effects of social media usage upon mental health. However, whether a reduction of social media use can improve the mental state has not been investigated thoroughly yet. Hunt, Marx Lipson & Young (2018) probed for improvements in depressive symptoms and depression by limiting the participants' social media use to 10 minutes per day over a period of three weeks. Their results indicate

that depressive symptoms as well as FoMO scores improved after the intervention, whereby especially individuals scoring higher on depression benefitted significantly (Hunt et al., 2018). Since social media is primarily used by adolescents, the beneficial effects of reducing smartphone usage are important to be studied.

Social media and Self-esteem

Another important factor associated with mental well-being and social media use is self-esteem, which is defined as the positive or negative view of oneself (Sowislo & Orth, 2013; Hawi & Samaha, 2017). Studies investigating this relationship have found mixed results. On the one hand, some studies hint towards detrimental effects of social media use on self-esteem (Appel, Gerlach & Crusius, 2015; Vogel, Rose, Roberts & Eckles, 2014; Woods & Scott, 2016). On the other hand, there is evidence supporting completely opposite results (Burrow & Rainone, 2016; Valkenburg, Peter & Schouten, 2006).

Many people post contents on their social media accounts to create a positive picture of themselves (Appel, Gerlach & Crusius, 2015). Consequently, many social media platforms are biased, displaying only positive content but completely neglecting the negative moments in peoples' lives. The problem arises when social media users constantly consume these distorted profiles and compare themselves and their lives to such unrealistic standards. These comparisons are summarised under the term 'social upward comparison' which is defined as the comparison between oneself and another better-performing person in a domain of interest (Appel, Gerlach & Crusius, 2015; Vogel, Rose, Roberts & Eckles, 2014). Upward social comparison on social media platforms were found to not only to cause negative feelings such as envy and depression, but also to reduce self-esteem (Appel, Gerlach & Crusius, 2015; Vogel, Rose, Roberts & Eckles, 2014). This phenomenon goes along with the finding of Lup, Trub and Rosenthal (2015) that following a greater number of unknown profiles on social media is related to more upward comparisons. Unknown profiles are social media accounts of

individuals that the social media user does not know personally. Through upward comparisons, following more unknown social media profiles results in greater depression symptoms. However, greater depressive symptoms have not been found when following more profiles of known individuals (Lup, Trub & Rosenthal, 2015). This finding illustrates that viewing social profiles of unknown persons creates the flawed impression that these people handle their lives better and leaves the social media user with a negative impression about themselves. Especially, users who feel emotionally connected to social media profiles are at greater risk (Woods & Scott, 2016). As a contrast, social media users who view profiles of known individuals are already aware of their life style; hence, biases are spotted more easily (Lup, Trub & Rosenthal, 2015).

Additionally, the effect of social media on self-esteem is further influenced by reactions of users on specific content. In the form of likes, views and comments people can receive a feedback on their posted content. It was found that negative feedback on social media, e.g., in the form of less likes, threatens the self-esteem of affected individuals (Valkenburg, Peter & Schouten, 2006). On the contrary, receiving more positive feedback on Facebook is associated with greater self-esteem (Burrow & Rainone, 2016; Valkenburg, Peter & Schouten, 2006). For popular individuals who receive more positive feedback on their social media accounts, this could work as a self-esteem boost; whereas, those who are not very popular, might experience the detrimental effects of social media usage. Thus, it could be argued that with increasing social media exposure, individuals engage more in social comparisons and become more vulnerable to negative feedback from the internet.

Current Study

Most of the above-mentioned studies are correlational. In order to establish causation a ‘smartphone detox’ intervention could reveal important mechanisms underlying social media use, depression, FoMO and self-esteem. Hunt et al. (2018) found evidence to support

beneficial effects on FoMO scores and depressive symptoms through smartphone use reductions in the experimental group.

Similar to Hunt et al.'s study (2018), the current research investigated the causal relationship between social media, FoMO and depression as well as the effect of social media on self-esteem by the means of a reduction in smartphone use. It was assumed that through the limitation of smartphone use, participants would also have less time to spent on social media apps. Since smartphones and social media are already integrated in our daily life, this intervention did not completely prohibit the use of smartphones, but instead instructs participants limit their smartphone use as much as possible. The current study investigated whether this relationship holds true in an intervention context. It was, hence, hypothesised that the experimental group will show reduced levels of depression and FoMO after the smartphone intervention (hypothesis 1).

Hypothesis 1: FoMO and depression decrease after the intervention in the experimental group.

Previous findings already suggested that greater levels of FoMO are associated with depression (Reer, Tang & Quandt, 2019) as well as social media engagement (Hunt et al., 2018; Reer, Tang & Quandt, 2019). However, literature inspecting FoMO as a potential moderator is rare (Sarmiento et al., 2020). Particularly the moderating role of FoMO between the variables 'social media use' and 'depression' in a smartphone reduction intervention has not been investigated yet (Sarmiento et al., 2020). Hence, the current study investigates whether, individuals who score high on FoMO and social media use will show a significant decrease in depressive symptoms, compared to individuals with low FoMO scores, after a smartphone intervention. It was hypothesised that FoMO significantly moderates the relationship between social media use and depression (hypothesis 2).

Hypothesis 2: FoMO moderates the relationship between social media use and depression (depicted by *Figure 1*).

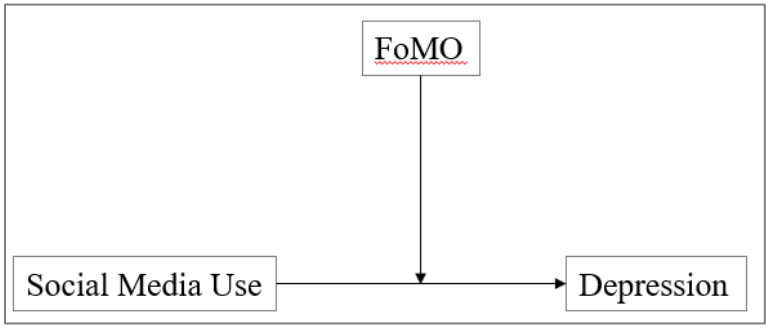

Figure 1. *Proposed moderation model of FoMO on the relationship between social media use and depression*

Contrary to previous findings inspecting the moderating role of FoMO, more literature exists on the mediating role of FoMO (Reer, Tang & Quandt, 2019; Oberst et al., 2016; Przybylski et al, 2013). FoMO has been found to mediate social media use and variables related to mental health, including depression (Reer, Tang & Quandt, 2019; Oberst et al., 2016; Przybylski et al, 2013). In order to expand findings upon this relationship, statistical analysis will also investigate whether FoMO mediates the relationship between social media use and depression. It was hypothesised that through a social media use reduction FoMO scores decrease which ultimately decreases scores on depression in the experimental group (hypothesis 3).

Hypothesis 3: FoMO mediates the relationship between social media use and depression (depicted by *Figure 2*).

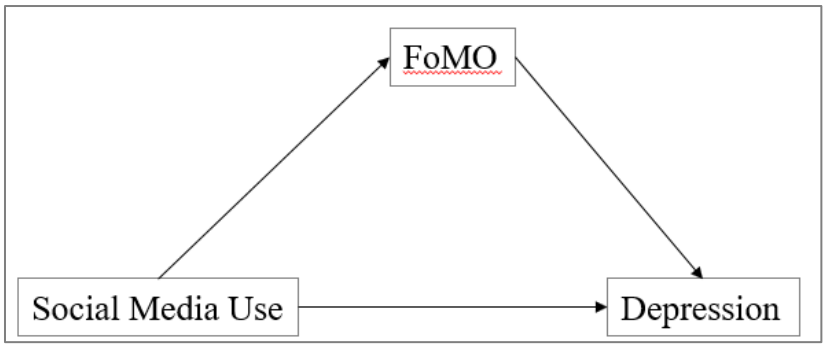

Figure 2. *Proposed moderation model of FoMO on the relationship between social media use and depression*

Literature regarding social media use and self-esteem still reveals mixed results, thus the current study investigated the relationship between social media use and self-esteem. Since an association between depression and self-esteem has been found (Sowislo & Orth, 2013) it might be possible that if depression scores decrease after the smartphone intervention, self-esteem levels will show an improvement too. Thus, it was hypothesised that self-esteem significantly increases in the intervention group after the limitation of social media exposure (hypothesis 3).

Hypothesis 4: Post-intervention self-esteem scores significantly increase in the intervention group.

Method

Particpants

Forty-two Leiden University students, aged 17-23 years (M_{age} = 19.48, SD= 1.44) took part in this study. Inclusion criteria compromised (a) being a student at Leiden University, (b) being fluent in Dutch and (c) owning a smartphone. This study aimed to include 120 participants; however, amid the Covid-19 pandemic, this objective was put on hold. In total, 60 students participated in the current study, of which 14 participants had to be excluded due to incomplete data. Boxplot analysis of the pre- and post-intervention measures as well as the

according difference scores, separated by group, were inspected to reveal extreme outliers. 'Extreme cases' are identified by the SPSS program by adding to the upper quartile three times the inter quartile range and subtracting three times the inter quartile range from the lower quartile (Field, 2013). Pre-intervention depression scores revealed 1 outlier within the intervention group. Further, 2 outliers were detected within the post-intervention depression (waiting list group) and social media use (intervention group) scores. The fourth and last outlier was found within the difference scores of the pre- and post-intervention depression measures (intervention group). These outliers were removed from the data set. The final sample for the statistical analysis consisted of 42 participants. In total, 92.9% of the participants were female (N = 39), whereby 4.8% (N = 2) of the participants were male and 2.4% (N = 1) were unspecified. Participants were randomly assigned to the intervention or control condition. The intervention group consisted of 19 participants with 5.3% (N = 1) males and 94.7% (N = 18) female. The 'waiting list' control group included 23 participants with 4.3% (N = 1) male, 91.3% females (N = 21) and 4.3% (N = 1) unspecified.

Measures

Actual Time Spent on Smartphone. Participants were required to report the time spent on their phone by reporting the average time spent on their smartphone over 1 week using the screentime apps 'Screentime' (for Apple) or 'MyPhone Time' (for Android).

Actual Time Spent on specific Apps. Participants were asked to report how much time they have spent on their 10 mostly used apps by inspecting their data on either 'Screentime' or 'MyPhone Time'. The apps Facebook, Messenger, Instagram, Snapchat, WhatsApp, TikTok and Twitter defined social media use. Time spent on these apps was summed to calculate the total time spent on social media.

Depression, Anxiety and Stress. Participants were provided with the Depression, Anxiety and Stress Scale (DASS-21) (Crawford & Henry, 2003; Depression Scale: α =.95, 95% CI = .94–.95), which assesses the levels of depression along the factors 'dysphoria', 'helplessness', 'devaluation of life', 'self-deprecation', 'anhedonia', and 'inertia' (Lovibond & Lovibond, 1995). Participants had to indicate on a 4-Point-Likert Scale (0= '*Did not apply to me'*; 1= '*Applied to me to some degree, or some of the time*'; 2= '*Applied to me to a considerable degree or a good part of time*'; 3= *'Applied to me very much, or most of the time*') how far statements, such as '*I couldn't seem to experience any positive feeling at all*' or '*I found it difficult to work up the initiative to do things*', applied to them (Lovibond & Lovibond, 1995, p.339). High scores on the depression subscale indicate more severe depressive symptoms. Since the current study only focuses on depression, only the DASS-21 depression subscale was used. The remaining anxiety and stress subscales were disregarded during the statistical analyses. Interestingly, this questionnaire did not include factors elaborating on suicidal thoughts. In the debriefing, participants were given referral options to seek mental health support if they require it (Lovibond & Lovibond, 1995).

Self-esteem. Participants were asked to fill out the 10-items Rosenberg Self-Esteem Scale (Rosenberg, 1965; α = 0.92), which assesses on a 5-point Likert-Scale to which extent individuals agree with statements related to self-esteem (e.g., '*On the whole, I am satisfied with myself*'; *'I feel that I have a number of good qualities*'). Responses range from 1 (strongly disagree) to 5 (strongly agree), whereby higher scores indicate a greater self-esteem (Rosenberg, 1965).

Fear of Missing Out (FoMO). FoMo is defined by the wish to stay continuously updated of other's activities, whereby the fear of being excluded of positive experiences is particularly relevant (Przybylski et al., 2013). The 10-item Fear of Missing Out Scale (FoMOS; α = .89) measures along a 5-point Likert-Scale (1= '*not at all true of me*'; 2=

'*slightly true of me*'; 3= '*moderately true of me*'; 4= '*very true of me*'; 5= '*extremely true of me*') in how far examinees agree with the statements (e.g., '*I fear my friends have more rewarding experiences than me.*'; '*I get anxious when I don't know what my friends are up to*') (Przybylski et al., 2013, p. 1847). Higher scores on the 10-item Fear of Missing Out Scale indicate greater FoMO levels.

Procedure

This study was approved by the Ethical Committee of Leiden University prior to data collection. The current study consisted of a between-subjects design, comparing the experimental group, which underwent a treatment to limit daily smartphone use, to a control group to which participants were randomly assigned to. The study consisted of two sessions, in which participants had to complete all online measures during the first and second assessment. The intervention proceeded over a two-weeks period between the first and second session. Within-subject comparisons will explore the pre- and post-intervention effects, whereas between-subject comparisons will reveal whether there are any significant differences between social media use, as well as depression, FoMO and self-esteem scores.

During the first session participants were invited to the laboratory space at University Leiden where they first received an information sheet and consent letter. After the students signed the informed consent, participants were introduced to the questionnaires, which asked for demographics and smartphone use. Prior the first session, Android users were instructed to download the 'MyPhone Time' app to track how many hours participants have spent on their smartphone. Apple users already had the app 'Screentime' installed on their smartphones to assess the time spent on their smartphones. Both apps provide precise average times spent on the smartphone and on each app. Participants needed to report how many hours they had spent on their smartphones and which apps they had used over the past two weeks. Afterwards, participants had to complete the DASS-21, the Rosenberg Self-Esteem Scale, the Fear of

Missing Out Scale as well as the online questionnaire measuring smartphone use. Once the questionnaires were filled-out, the participants were told whether they were put on the intervention group or the waiting list (control group), depending which group they were randomly assigned to. The experimental group was given the instructions for the intervention. During the second session, two weeks later, the participants were given same questionnaires as used for the first session. Participants from the intervention group were further required to report on their experience. Following the second session, all participants were debriefed. The control group was additionally given the same instructions for the smartphone 'detox' procedure as the experimental group. This was supposed to give participants of the control group the opportunity to undergo the smartphone treatment by themselves in their free time.

The experimental conditions

After filling-out the questionnaires, participants in the intervention group were given further information on the intervention. They had to disable all notifications and set a new password ('isditechtnodig?') to open their lock screen. Furthermore, the students were instructed to limit their smartphone use to as little as possible during the intervention, to check their phone for updates maximum five times per day, to not use their smartphone in bed, to not use social media on their laptops or computers, and finally to inspect and report their daily screen time statistics into a diary. The purpose of this diary was to keep participants motivated to continue with the intervention and was not used for subsequent analysis. Instead, the weekly average times spent on social media were used for the statistical analysis. For the analysis, these numbers were retrieved from the previously installed apps and were documented in the online questionnaires. To ensure privacy and confidentiality, the diaries did not contain any identifying information and were disposed in the secure bins at the university upon completion.

While participants assigned to the intervention group received instructions to reduce

their smartphone use, participants assigned to the waiting list group were explained that they were put on a waiting list and that they must return to the laboratory after two weeks.

Statistical Analyses

The statistical analyses were executed by means of the statistical analysis program 'SPSS' (IBM SPSS Statistics version 26). First, descriptive statistics were calculated for the variables gender, treatment group, depression, social media use and FoMO.

Second, three two-way repeated measures MANOVA were conducted to inspect whether there were significant differences in social media use between the experimental and control group, and whether FoMO and depression decreased after the intervention (hypothesis 1). Assumptions of the multivariate normal distribution within the dependent variables, homogeneity of covariance matrices and sphericity had to be met before analysing the data (Field, 2013; Pituch & Stevens, 2015). In the case of assumption violations, those will be reported and discussed in the limitations section. Since there is no non-parametric test that could replace the MANOVA, the MANOVA test will be performed despite assumption violations. Multivariate normality was assessed by inspecting the univariate normality of the dependent variables depression, FoMO, social media use, and self-esteem, split by treatment group. The Shapiro-Wilk test was used as a univariate normality estimate, due to its increased power to detect normality violations, in addition to a visual inspection of the Q-Q plots (Field, 2013; Pituch & Stevens, 2015). Homogeneity of covariances matrices assumption was checked by means of the Box's test of equality of covariance matrices. Sphericity was assumed along all measured variables since the within-subjects factor had only two levels (i.e., pre- and post-measurement). As a consequence, reported results within the multivariate tests and tests of within-subjects effects were equal.

The third step aimed at inspecting whether FoMO moderates (hypothesis 2) or mediates (hypothesis 3) the relationship between social media and depression. By using the

Hayes (2020) PROCESS macro, Model 1, the moderation model was inspected. The potential mediating role of FOMO was investigated by using a mediated regression analysis with Hayes' (2020) PROCESS macro, Model 4. During both moderation and mediation analyses, difference scores between pre- and post-intervention of the variables social media use, depression and FOMO were used to estimate the effect of the intervention. Furthermore, the moderated as well as mediated regression analyses were only performed for the intervention group. In order to perform both, a mediated and moderated multiple regression analysis, the assumptions linearity, homoscedasticity and normality had to be met (Casson & Farmer, 2014; Field, 2013). Linearity and homoscedasticity were assessed by inspecting the P-P plot of the standardised residuals and the scatterplot of the standardised residuals and predicted values, whereby normality was checked by a visual examination of the Q-Q plot in addition to the test of normality, i.e., Shapiro-Wilk test (Casson & Farmer, 2014; Field, 2013). Collinearity between the variables FoMO and social media use was investigated by calculating the correlation between both variables and by inspecting the collinearity statistics, i.e., VIF (Field, 2013). The Cook's distance was used to detect outliers, whereby the cut-off score was set to 1.

The fourth hypothesis, namely whether the intervention leads to a significant self-esteem increase in the experimental group compared to the control group, was investigated by the means of a fourth two-way repeated measures MANOVA.

The significance level of all analysis was set to $\alpha \leq .05$.

Results

Descriptive Statistics

Mean and standard deviations were calculated for social media use, depression, FoMO and self-esteem for the experimental (intervention) and control (waiting list) group. Results

for pre-intervention measures are reported in Table 1, whereby results for post-intervention measures are displayed in Table 2.

Table 1

Descriptive statistics for the pre-intervention measures of the main variables 'Social Media Use', 'FoMO', 'Depression' and 'Self-Esteem'

Variable	Intervention			Waiting List		
	N	*M*	*SD*	*N*	*M*	*SD*
Social Media Use	19	104.53	46.68	23	131,61	63.57
FoMO	19	24.42	6.55	23	27.61	5.67
Depression	19	2.53	2.50	23	2.39	2.45
Self-Esteem	19	8.11	3.62	23	9.04	4.32

Note. Social media use is reported in minutes. N = number of participants; M = Mean; SD = Standard Deviation; FoMO = Fear of Missing Out.

Table 2

Descriptive statistics for the post-intervention measures of the main variables 'Social Media Use', 'FoMO', 'Depression' and 'Self-Esteem'

Variable	Intervention			Waiting List		
	N	*M*	*SD*	*N*	*M*	*SD*
Social Media Use	19	112.79	50.46	23	127.00	59.30
FoMO	19	23.42	6.74	23	25.91	5.32
Depression	19	2.53	3.32	23	2.48	2.33
Self-Esteem	19	6.90	4.27	23	8.83	3.82

Note. Social media use is reported in minutes. N = number of participants; M = Mean; SD = Standard Deviation; FoMO = Fear of Missing Out.

The effect of the intervention on social media use, depression and FoMO

To test hypothesis 1, namely whether the intervention affected social media use**,** depression and FoMO differently along the two groups, three two-way repeated measures MANOVA were conducted.

The outcome of the first two-way repeated-measures MANOVA, inspecting whether social media use decreased in the intervention group, is depicted in Table 3. Pre-intervention social media use was not found to be normally distributed in the waiting list group, $F(23) = .92$, $p = .053$. The assumption of homogeneity of covariances has been met, $F(3,1049109.725) = .73$, $p = .535$. Results of interaction effect between social media use and group were not significant, $F(1,40) = .52$, $p = .476$, indicating there was no significant difference between both groups in their use of social media. Additionally, main effects were reported insignificant as well, $F(1,40) = .04$, $p = .839$.

Table 3

Results of the two-way repeated measures MANOVA: Within- and between-subjects differences in social media use

	SS	*Df*	*MS*	*F*	*p*	*Partial η²*
Within-Subjects						
SMU	69.48	1	69.48	.04	.839	.00
*SMU*Group*	861.95	1	861.95	.52	.476	.01
Error	66673.58	40	1666.84			
Between-Subjects						
Group	8870.60	1	8870.60	1.92	.173	.05
Error	184651.79	40	4616.30			

Note. N = 42; SMU = Social media use; SS = Sum of squares; Df = degrees of freedom; MS = Mean Square; Partial η^2 = effect size. The larger the ratio between SS and MS, the greater the effectiveness of the intervention on the variable 'social media use'. The variable 'social media use' was measured before and after the intervention.
** $p \leq .05$*
*** $p \leq .01$*

To inspect whether the intervention had a significant effect on depression, a second two-way repeated measures MANOVA was calculated. Results are reported in Table 4. Pre-intervention depression scores of the waiting list group were found to be non-normally distributed for both the control group, $F(23) = .81$, $p = .001$, as well as the intervention group, $F(19) = .86$, $p = .009$. Post-intervention depression measures again revealed violations of normality for both groups; the control group, F(23) = .85, p = .003, and the intervention group, $F(19) = .78$, $p = .001$. The inspection of the Box's test of equality of covariance matrices shows that the assumption of homogeneity of covariances has been met, $F(3, 1049109.725) = 1.62$, $p = .183$. Results of the two-way repeated measures MANOVA showed no significant interaction effects between the groups and depression scores at both time points, $F(1,40) = .02$, $p = .879$. Furthermore, main effects of the variable depression are insignificant, $F(1,40) = .02$, $p = .879$ as well.

Table 4
Results of the two-way repeated measures MANOVA: Within- and between-subjects differences in depression

	SS	*Df*	*MS*	*F*	*p*	*Partial η²*
Within-Subjects						
Depression	.04	1	.04	.02	.879	.00
Depression*Group	.04	1	.04	.02	.879	.00
Error	66.91	40	1.67			
Between-Subjects						
Group	.174	1	.17	.01	.906	.00

Error	495.78	40	12.39

Note. N = 42; SS = Sum of squares; Df = degrees of freedom; MS = Mean Square; Partial η^2 = effect size. The larger the ratio between SS and MS, the greater the effectiveness of the intervention on the variable 'depression'. The variable 'depression' was measured before and after the intervention.
** $p \leq .05$*
*** $p \leq .01$*

A third two-way repeated measures MANOVA was conducted to assess whether FoMO scores change after the intervention and whether there are any reported differences between both groups. Results are portrayed in Table 5. Homogeneity of covariances is assumed, $F(3, 1049109.725) = .72$, $p = .538$. The interaction effect of the variables FoMO and treatment group was insignificant, $F(1,40) = .28$, $p = .601$. However, the main effect of the variable FoMO showed significant results, $F(1,40) = 4.17$, $p = .048$. Hence, both the intervention and waiting list group revealed significant FoMO reductions between pre- and post-intervention measures.

Table 5
Results of the two-way repeated measures MANOVA: Within- and between-subjects differences in FoMO

	SS	*Df*	*MS*	*F*	*p*	*Partial η²*
Within-Subjects						
FoMO	37.80	1	37.80	4.17	.048*	.09
FoMO*Group	2.52	1	2.52	.28	.601	.01
Error	362.44	40	9.06			
Between-Subjects						
Group	167.82	1	167.82	2.62	.113	.06
Error	2558.13	40	63.95			

Note. N = 42; SS = Sum of squares; Df = degrees of freedom; MS = Mean Square; Partial η^2 = effect size. The larger the ratio between SS and MS, the greater the effectiveness of the intervention on the variable 'FoMO'. The variable 'FoMO' was measured before and after the intervention.

* $p \leq .05$
** $p \leq .01$

Overall, the variables social media use, depression and FoMO did not report significant interaction effects with the variable treatment group. Social media and depression measures did not reveal significant main effects over the two time points. Interestingly, a decrease in FoMO scores along the intervention as well as the control group was detected. When inspecting the of the pre-intervention ($M_{intervention}$ = 24.42; $M_{control}$ = 23.42) and the post-intervention ($M_{intervention}$ = 27.61; $M_{control}$ = 25.91) FoMO means, a decrease between FoMO pre- and post-intervention means are detectable. Since there were no differences between the both conditions, the FoMO reduction is unlikely to be retraced to an effect of the intervention. Consequently, hypothesis 1 is rejected.

Moderated Multiple Regression Analyses

The required assumptions to perform a moderated multiple regression analysis have been met. Neither the P-P plot of the standardised residuals nor the scatterplot indicate violations of linearity or homoscedasticity. The normality distribution of the residuals of the difference scores of the variables social media use, depression and FOMO of the intervention group revealed no violation of normality assumption after the inspection of the Shapiro-Wilk results, $F(19) = .97$, $p = .689$, and the inspection of the Q-Q diagrams. The variables FoMO and social media did not show collinearity, as visible through the collinearity statistics, $VIF_{social\ media\ use} = 1.000$; $VIF_{FoMO} = 1.000$, and the Kendall-Tau-b correlation, $r = -.02$, $p = .915$. Furthermore, the Cook's distance scores did not indicate any significant outliers.

To inspect whether FoMO moderates social media use and depression (hypothesis 2), a moderated multiple regression analysis, using Model 1 on Hayes' (2020) PROCESS macro, was conducted. Results are reported in Table 6 and are illustrated by *Figure 3*. The overall, insignificant model explains only 5% of the variances, $F(3,15) = .05$, $p = .984$, $R^2 = .05$. The addition of the interaction of social media and FoMO to the overall model explains 0.01% of

the reported 5% explained variance, $F(1,15) = .01$, $p = .925$, R^2-*change* = .01. Neither social media use, $b = .01$, $t(15) = .35$, $p = .733$, nor FoMO, $b = .02$, $t(15) = .08$, $p = .938$, were found to predict depression scores. The interaction between social media use and FOMO on depression scores was insignificant, $b = -.00$, $t(15) = -.10$, $p = .925$, indicating that FOMO does not moderate the relationship between social media use and depression. Moreover, a close examination of the moderator showed that neither low, $b = .01$, $t(15) = .36$, $p = .726$, average, $b = .01$, $t(15) = .35$, $p = .733$, nor high FoMO scores, $b = 01$,$t(15) = .16$, $p = .872$, moderated social media use and depression scores. These results indicate that FOMO does not moderate the relationship between social media use and depression in the intervention group. Hence, hypothesis 2 is rejected.

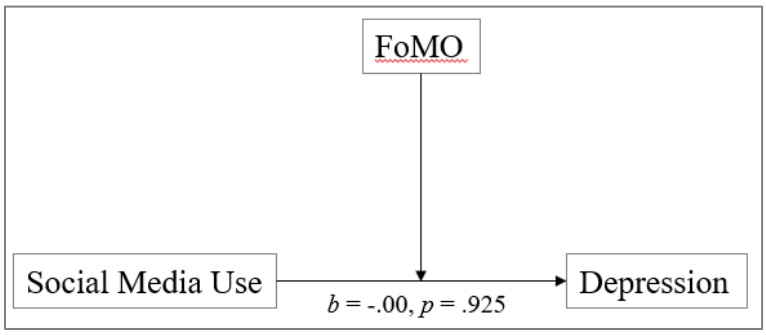

Figure 3. *Unstandardized regression coefficients of the moderated multiple regression analysis.*

Table 6

Results of the moderated multiple regression analysis

Predictors	Model				
	b	*SE*	*t*	*p*	*95% CI*
SMU	.01	.02	.347	.733	[-.04, .05]
FoMO	.02	.21	.079	.938	[-.42, .46]

SMU*FoMO	-.00	.01	-.096	.925	[-.01, .01]
F	.05	3.30		.984	
R2	.05				
R2-change	.00				

Note. N = 42. SMU= social media use, FoMO= fear of missing out, SE = Standard Error; 95% CI = 95% Confidence Interval. The Model summarises the b-, t- and p-values as well as the standard errors and 95% confidence intervals of the moderated multiple regression analysis. For the moderated multiple regression analysis difference scores of the intervention group only were used.
** $p \leq .05$*
*** $p \leq .01$*

Mediated Multiple Regression Analyses

All assumptions have been met in order to investigate whether FoMO mediates the relationship between social media use and depression by means of a mediated multiple regression analysis. This was executed by using Model 4 in Hayes' (2020) PROCESS macro. The final results of the direct pathway are pictured in *Figure 4* and results of the indirect pathway are pictured in *Figure 5*.

The mediated multiple regression analysis revealed an insignificant, direct effect of social media use on depression (c-pathway), b = .01, $t(17)$ = .63, p = .538, indicating that social media use does not predict depression. The indirect pathway (c'-pathway) showed insignificant results, b = .01, $t(16)$ = .57, p = .575. Social media use was not related to FOMO, b = -.00, $t(17)$ = -.06, p = .956, which consequently did not predict depression, b = .01, $t(16)$ = .14, p = .889. Hence, FoMO does not mediate the relationship between social media use and depression in the intervention group. Overall, the mediated multiple regression analysis

produced insignificant mediation effects of FoMO (*Indirect* = .00, *SE* = .00, *95% CI* [-.00, .01]). Conclusively, results of the mediated multiple regression analysis reject hypothesis 3.

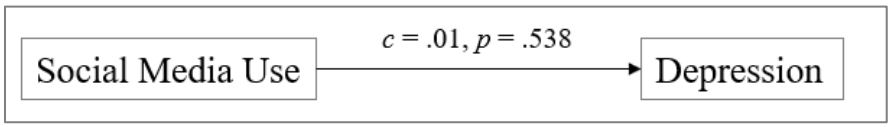

Figure 4. *Unstandardized regression coefficients of the direct pathway of the mediated multiple regression analysis.*

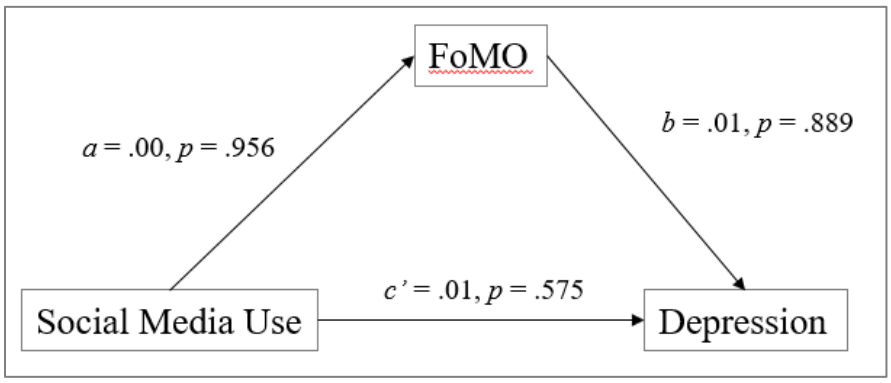

Figure 5. *Unstandardized regression coefficients of the indirect pathway of the mediated multiple regression analysis.*

Effects of the intervention on self-esteem

To test hypothesis 4, a fourth two-way repeated measures MANOVA was performed and results are depicted in Table 7. Post-intervention self-esteem measures revealed violations of normality, $F(23) = .92$, $p = .054$. Covariances of the self-esteem measures, $F(3,1049109.73) = 2.48$, $p = .059$, are assumed to be equal. The interaction between group and self-esteem was insignificant, $F(1,40) = 1.28$, $p = .265$. Main effects of the variable self-esteem were found to be insignificant as well, $F(1,40) = 2.64$, $p = .112$. This indicates that no significant changes in self-esteem between the first and second measures were observed and reports no significant differences between the intervention and experimental group. Consequently, hypothesis 4 is rejected.

Table 7

Results of the two-way repeated measures MANOVA: Within- and between-subjects differences in self-esteem

	SS	*Df*	*MS*	*F*	*p*	*Partial η²*
Within-Subjects						
Self-esteem	*10.61*	*1*	*10.61*	*2.64*	*.112*	*.06*
*Self-esteem*Group*	*5.13*	*1*	*5.13*	*1.28*	*.265*	*.03*
Error	*160.54*	*40*	*4.01*			
Between-Subjects						
Group	*42.84*	*1*	*42.84*	*1.51*	*.226*	*.04*
Error	*1135.30*	*40*	*28.38*			

Note. N = 42; SS = Sum of squares; Df = degrees of freedom; MS = Mean Square; Partial η^2 = effect size. The larger the ratio between SS and MS, the greater the effectiveness of the intervention on the variable 'self-esteem'. The variable 'self-esteem' was measured before and after the intervention.

*$p \leq .05$

**$p \leq .01$

Discussion and Limitations

The aim of the current study was to assess whether a reduction in social media use improves depression, FoMO as well as self-esteem. Additionally, the potential mediating and moderating role of FoMO on the relationship between the variables social media use and depression were examined. It was hypothesised that after the intervention participants will show lower levels of depression and FoMO (hypothesis 1) as well as greater self-esteem levels (hypothesis 4). To examine how FoMO affects the relationship between social media use and depression, it was hypothesised that FoMO moderates both variables, meaning that the negative effect of social media use on depression is enhanced by greater FoMO scores (hypothesis 2). FoMOs' mediating role between the variables social media use and

depression, i.e., greater social media use increase FoMO scores, which ultimately raise depression, (hypothesis 3), has been inspected too. The results obtained from our analyses were generally not significant, hence failed to support all our hypotheses.

The effectiveness of the intervention

First and foremost, our findings must be interpreted with caution. The aim of this study was to assess how a reduction in social media use affects depression, FoMO and self-esteem. It was assumed that with a reduction in smartphone use participant would also reduce their social media use. Contrarily to what was expected, results of the first MANOVA indicated that the social media use between pre- and post-intervention measures neither declined nor showed any differences between the control and the intervention group. It seems to be the case that participants of the intervention group had troubles limiting their smartphone use. At the end of the study, participants reported that these technologies are, next to their social lives, tightly intertwined with their work and academic lives. They receive important mails, notifications and messages from the university as well as from work through smartphones. Some participants even reported that the limitation in smartphone use has caused them to check their e-mails more frequently. Consequently, limiting their smartphone use, as instructed in the intervention, was difficult to implement into their daily routines. The fact that social media use did not reduce significantly in the intervention group must be kept in mind when interpreting the results of the current study.

Furthermore, the measure of social media usage influences the findings. A variety of studies let the participants estimate how much time they have spent on social media platforms (Hunt et al., 2018; Przybylski et al., 2013; Reer, Tang & Quandt, 2019; Shensa et al., 2017). However, this is a subjective estimation and might be biased. Hunt et al.'s (2018) study analysed in how far participants estimated social media use relates to their objectively measured time spent on social media overlap. Their results assume that participants cannot

adequately estimate their actual smartphone use (Hunt et al., 2018). Hence, the question arises whether objectively or subjectively measured time spent on social media is influential on depression. The current study is one of the experimental studies that investigated how objectively measured time spent on social media influences depression and FoMO. However, results of the current study are inconclusive whether a reduction in objectively measured social media use has an effect on depression, FoMO and self-esteem. A factor that has not been investigated by the present study, but has previously been found to be a significant contributor, is subjective estimations of social media use. Previous studies found a link between subjectively estimated social media use and depression and FoMO (Przybylski et al., 2013; Reer, Tang & Quandt, 2019; Oberst at al., 2017). A reason why there might be great differences between estimated and actual time spent on social media might be explained by the perception of time when engaging with pleasing activities. Enjoyable activities have been found to be experienced as passing by quicker (Gable & Poole, 2012; Wittmann, 2009). This could indicate that time spent on social media will be estimated shorter than it actually was. Social media might be a useful tool to avoid negative emotions for instance as a medium to procrastinate or to overcome boredom (Schnauber-Stockmann, Meier & Reinecke, 2018; Lukoff, Yu, Kientz & Hiniker, 2018). In the context of negative situations, social media use is experienced as pleasing and consequently might lead to a loss of time perception. Following, more time is spent on social media than planned.

The present study aimed at collecting objectively measured social media use to estimate how actual time spent on apps influences mental well-being. This study is one of the few studies that has examined objective social media use. Since the intervention was unsuccessful, the question remains whether subjectively or objectively measured social media use are more predictive of depression and FoMO levels.

Not only can actual time spent on social media and subjective estimates on social

media use explain a great variety in findings, but also how the construct of social media use is defined. For instance, Shensa et al. (2017) argues that the frequency of checking social media apps, and not the total time spent on social media, is associated with depression. According to another study is the frequency of checking social media networks in addition to time spent on social media linked to depression (Yoon et al., 2019). Some other researchers argue that it is the number of social media accounts or the number of social media apps adolescents have is significant in predicting depression (Barry, 2017, Primack, 2017). Hence, not only subjective or objective measures of social media use influence the findings but also how the construct 'social media use' is conceptualised.

Effects of the intervention on FoMO and depression

The first hypothesis, namely a reduction in depression and FoMO scores due to the intervention, was rejected. Depression scores did not significantly decline after the intervention and, further, did not show any significant differences between both conditions. According to these findings, it can be concluded that our intervention did not reduce depression. Nevertheless, these findings did not only contradict findings that found an association between an increased social media use and depression (Barry, 2017; Jeri-Yabar, 2019; Robinson et al., 2019; Keles, McCrae & Grealish, 2020; Woods, 2016; Yoon, Kleinman, Mertz, Brannick, 2019) but also Hunt et al.'s (2018) results, which argue that limiting social media use decreases depression. These differences in results could be explained by the depression scores of the participants. Participants of the current study had a depression mean within the normal range before and after the intervention. It has previously been found that individuals scoring ≥ 14 on the Becks Depression Inventory II, classified with 'mild depression', were more likely to benefit statistically as well as clinically from a limitation of social media use of 10 minutes per app each day (Hunt, 2018). In the current study, the DASS-21 depression subscale was used to measure depression whereby a score of

10 would indicate a ‘mild depression’. Here, no participant scored ≥ 10 on the DASS-21 depression subscale, which is the reason why this study could not estimate whether individuals with mild depression could have benefitted significantly from our intervention.

Another important aspect to take into consideration is individuals scoring higher on depression might flee into social media to receive social support (Frison & Eggermont, 2017; Frison & Eggermont, 2015). It has previously been established that depressed individuals tend to use social more often in order to search for social support online (Reer, Tang & Quandt, 2019; Frison & Eggermont, 2015). This interpretation of the results has also been found by the Heffer et al.’s (2018) longitudinal study. Their results suggest that social media use is not predictive of depression scores. Rather, it seems to be the other way around, whereby depressive symptoms are associated with increased social media use (Heffer 2018; Reer, Tang & Quandt, 2019). Especially posting contents on Instagram was found to increase when individuals experience depressive moods (Frison & Eggermont, 2017). A potential mechanism to manage negative emotions through social media next to social support is searching for social connection, or reducing self-uncertainty through social comparison (Reer, Tang & Quandt, 2019; Heffer, Good, Daly, MacDonell & Willoughby, 2019; Radovic, Gmelin, Stein & Miller, 2017; Frison & Eggermont, 2017; Frison & Eggermont, 2015). The current study’s insignificant findings upon a decrease in depression after a social media reduction might validate previous findings. Since participants of the current study did not have clinically significant depression scores beforehand, it might be the case that they did not use social media as a mean to find social support or social connection.

Contrary to what was hypothesised, FoMO scores showed a significant reduction after the intervention. However, this FoMO reduction did not differ between the waiting list and intervention condition, meaning that this effect is unlikely to have stemmed from the intervention. When interpreting these results, it must be kept in mind that social media use did

not differ between the control and intervention group and that there was no statistical difference in FoMO scores between both groups. Taking these points into consideration, the main effect between pre- and post-intervention FoMO scores cannot be attributed to any effects of the intervention. It seems likely that external factors, which affected most participants, influenced their FoMO scores. Since the participants of the present study are students from the Leiden University it is possible that the exam period influenced their FoMO scores. Additionally, post-intervention scores might have been influenced by the Covid-19 pandemic. It is possible that at this time point participants did not worry about missing out on the life of others but were more concerned about their academic performance and how to deal with the pandemic. Consequently, FoMO scores decreased in the studied sample.

Moderating and mediating effects of FoMO

The second and third hypotheses focused on assessing whether FoMO moderates or mediates the relationship between social media use and depression. Previous findings already suggested that greater levels of FoMO are associated with depression (Reer, Tang & Quandt, 2019) as well as drives individuals to engage more with social media platforms (Hunt et al., 2018; Reer, Tang & Quandt, 2019). FoMO has been found to be a mediator between various variables related to mental well-being, i.e., depression, and social media use (Reer, Tang & Quandt, 2019; Oberst et al., 2016; Przybylski et al, 2013). However, the current study does not support the hypothesis that FoMO mediates or moderates the relationship between the variables social media use and depression. It is likely that individuals who already show depressive symptoms are a risk group of maintaining these symptoms through an increased social media exposure and not, as tested in the current study, vice versa (Hunt et al., 2018). Even though the current study argues against any effects of social media on depression, more research is needed to establish causality between social media use and depression.

Compared to studies investigating the mediating role of FoMO, only a limited number

of studies exist that investigated into moderating factors between social media use and depression. Gender was most consistently found to moderate social media and depression but these effects also depended on how social media was used (Sarmiento et al., 2018). Nevertheless, the moderating role of FoMO between social media use and depression has not been inspected extensively, which was one of the aims of the current study. Results of the present study indicate that FoMO neither moderates nor mediates social media and depression. Here again, the assumption that social media use has an influence on depression scores might have led to insignificant findings. Since literature upon FoMO as a moderator between social media use and depression is lacking, it is also possible that FoMO does not moderate this relationship.

Effects of the intervention on self-esteem

Contrary to what was expected, self-esteem did not increase after the intervention and did not show any significant group difference. Most studies found an association between self-esteem and social media use; yet, this relationship seemed rather complex. Through upward comparisons, social media consumers compare their own lives with distorted pictures of other people which increases the odds to develop negative mental health outcomes, including depression and low self-esteem (Appel, Gerlach & Crusius, 2015; Vogel, Rose, Roberts & Eckles, 2014). However, social media consumption does not necessarily have to lead to detrimental effects on well-being. It was found that positive feedback on social media, i.e., in the form of likes and comments, can also enhance self-esteem (Burrow & Rainone, 2016; Valkenburg, Peter & Schouten, 2006). The insignificant findings of the association between social media use and self-esteem could be justified by the argument that participants of the current study are well-connected to their friends through social media. Since those might mainly be persons they know, they might be aware how their lives truly are and detect the created images of a seemingly perfect life. It was found that individuals that mostly follow

persons they know on social media engage more often in positive social comparisons (Lup, Trub & Rosenthal, 2015). Accordingly, the less someone relates to unknown people on social media, the more the individual's self-esteem benefits. Another factor that plays into this relationship is which feedback people receive through social media. If most reactions on social media are positive, i.e., in the form of likes and nice comments, social media can even enhance the self-esteem of a social media user (Valkenburg, Peter & Schouten, 2006). Applying both findings to the current study, it might be the case that the studied participants mainly use social media, first, to stay connected with their friends, and, second, mostly receive positive feedback by their friends through social media.

A methodological limitation of the current study is related to the studied sample. Since the present study was conducted on students of the Leiden University the results can only be generalised to young, Western adults with a higher education. Furthermore, the present findings cannot be generalised to males due to the greatly unbalanced ratio between male and female participants. Depressive symptoms are more frequently experienced by adolescent females than males (Nesi & Prinstein, 2015; Oberst at al., 2017). According to this finding, the current depression scores might be biased compared to studies with balanced gender ratios. Along with the risk to experience greater depressive symptoms concurrently the likelihood to experience greater levels of FoMO increases in the current sample. This could finally lead to more frequent social media engagement as a coping mechanism (Nesi & Prinstein, 2015; Obers at al., 2016t; Frison & Eggermont, 2015; Heffer et al., 2019). Conclusively, depression and FoMO scores as well as social media use estimates might be biased due to the great number of female participants.

Future Directions

In order to overcome the drawbacks of the current study several adjustments should be implemented. First, in order to guarantee an objective smartphone reduction, apps that limit

the amount of time spent on specific apps could be installed. Newer smartphone versions have systems to limit the use of specific apps already installed. Consequently, the experimenter, together with the participant, could set the time limit for social media on the smartphone. By limiting only specific social media apps the participant can still use apps which are important for their work and university. This could assure the experimenter a reduction in social media use in the experimental condition.

Limiting only specific social media apps, which are unnecessary for academic or work achievements, might also motivate more people to participate in the study. Participants reported that they appreciated to limit their time on unnecessary and time-consuming apps. When replicating the current study in order to be able to draw meaningful conclusions a large enough sample size is key. The normality assumption along the variables social media use, depression and self-esteem has been violated. Additionally, the sample sizes of the both groups were also small, hence, the central limit theorem does not apply (Field, 2013). Consequences of violated normality in small samples are distorted p-values (Field, 2013). However, it needs to be remembered, that especially depression scores are naturally found to be skewed in the general population since the majority of young adults does not report significant depressive symptoms (National of Mental Health, 2017; World Health Organisation, 2017). The National Institute of Mental Health (2017) reported 13.1% of young adults, between the age of 18- 25 years. The current study inspected healthy, young adults, consequently, the majority of the participants did not show significant depression scores. Hence, the depression scores were not normally distributed. Not only were the sample sizes of both groups not large enough but had also unequal sample sizes. Due to the unequal sample size between treatment groups in MANOVA tests, “robustness cannot be assumed” (Field, 2013, p. 1895) and the probability of reported statistics of the covariance matrices tend to be biased increases (Field, 2013). With the inclusion of depressed individuals in future studies,

depression scores might be normally distributed. This could also help to check whether a reduction of social media use could help depressed individuals not only to significantly but also clinically improve their depression.

Furthermore, the subjective time spent on social media should be included to check whether objective or subjective social media use has an effect on depression, FoMO and self-esteem. Despite Hunt et al.'s (2018) study, no other study has investigated the difference in subjective and objectively measured social media use and its effects. Subjective estimations of social media use have previously been used to show significant relationships between social media use, depression and FoMO (Przybylski et al., 2013; Reer, Tang & Quandt, 2019; Oberst at al., 2017; Hunt et al., 2018). Thus, it might be likely that the individual experience upon social media is more influential than the objectively measured use of social media (Przybylski et al., 2013; Reer, Tang & Quandt, 2019; Oberst at al., 2017; Hunt et al., 2018). Since subjective estimations were found to deviate from the actual social media use, when interpreting other studies' findings readers must be aware of how social media use was measured. It is of importance to gain deeper insights of the effects of subjective and objective social media use, especially when programs claim positive effects of social media reductions upon mental health variables.

Most studies have found a positive association between depression and social media use, where individuals scoring higher on depression also engage with social media more often (Barry, 2017; Jeri-Yabar, 2019; Robinson et al., 2019; Keles, McCrae & Grealish, 2020; Woods, 2016; Yoon, Kleinman, Mertz, Brannick, 2019). Furthermore, FoMO was also found to be related to social media (Dhir et al., 2018; Hunt et al., 2018; Oberst et al., 2017; Przybylski et al., 2013). However, whether objectively measured social media use can also lead to depression and FoMO remains inconclusive. In order to gain deeper insights of the effects of social media use on mental health, i.e., depression and FoMO, this study should be

replicated. Additionally, FoMO as a potential mediator or moderator should be examined again to understand mechanisms connecting social media use and depression. A smartphone reduction intervention could be a helpful tool for clinicians to improve the mental health of their patients. To establish true beneficial effects of a smartphone limitation intervention, replicating the current study is key.

Conclusion

The current study tried to investigate how a reduction in social media use affects depression, FoMO and self-esteem and whether FoMO mediates or moderates the relationship between social media use and depression. All hypotheses were rejected, suggesting that the current intervention did not influence depression, FoMO and self-esteem scores to decrease. Furthermore, FoMO neither mediated or correlated social media and depression scores. Since the present findings further showed no differences in social media use between the experimental and control group, effects of the intervention are unlikely. Despite the insignificant findings, the current study is one of the few experimental studies limiting social media use, while measuring this construct objectively. Future studies should replicate the current intervention while making sure participants of the intervention condition significantly reduce their social media use. Furthermore, it is of importance to explore whether objectively or subjectively measured social media use is crucial in predicting mental well-being and which mechanisms have detrimental or even protective outcomes on mental health. Studies shedding more light upon the above-mentioned factors could help create programmes to prevent and treat mental-health problems by tailoring their social media use towards their needs.

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