The Relationship Between Fear Of Missing Out and Depressive Symptoms in Dutch Adolescents: The Mediating Role of Social Comparison and Social Media Self-Regulation Failure

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Abstract

Given that mental health is a growing concern in today's society, in the current study it was examined whether FOMO had an effect on depressive symptoms among Dutch adolescents over time and whether the effect is mediated by social comparison and Social Media Self-Regulation Failure (SMSRF). Social comparison refers to evaluating how you are doing by comparing yourself to others. SMSRF is defined as the failure to exert self-control over your social media use. The data set of the Digital Youth Project was used to answer the research question. A non-significant longitudinal relationship between higher levels of FOMO and higher levels of depressive symptoms was found. However, higher levels of FOMO was found to be associated with higher levels of depressive symptoms in cross-sectional data. Nevertheless, a significant longitudinal association was found between higher levels of social comparison and higher levels of depressive symptoms. Additionally, findings showed that higher levels of FOMO were related to higher levels of SMSRF, which in turn were related to higher levels of depressive symptoms. These results contribute to understanding the underlying mechanisms that could lead to depression in adolescence.

Keywords: FOMO, depression, social comparison, SMSRF, adolescence

Abstract

Gezien het feit dat mentale gezondheid een groeiende zorg is in de huidige samenleving, werd in de huidige studie het effect onderzocht van FOMO op depressieve symptomen bij Nederlandse adolescenten in de loop van de tijd en of het effect wordt gemedieerd door sociale vergelijking en Social Media Self-Regulation Failure (SMSRF). Sociale vergelijking verwijst naar het evalueren van de zelf door te vergelijken met anderen. SMSRF wordt gedefinieerd als het niet uitoefenen van zelfbeheersing over het gebruik van sociale media. De dataset van het Digital Youth Project werd gebruikt om de onderzoeksvraag te beantwoorden. Een significant longitudinaal verband tussen FOMO en depressieve symptomen werd niet gevonden. De resultaten suggereerden dat FOMO en depressieve symptomen gerelateerd zijn in cross-sectionele data. Tevens werd een significante longitudinale associatie gevonden tussen sociale vergelijking en depressieve symptomen. Bovendien toonden de bevindingen aan dat FOMO gerelateerd was aan SMSRF, wat op zijn beurt gerelateerd was aan depressieve symptomen. Deze resultaten dragen bij aan het begrijpen van de onderliggende mechanismen die kunnen leiden tot depressie in de adolescentie.

Keywords: FOMO, depressie, sociale vergelijking, SMSRF, adolescentie

The Relationship Between Fear Of Missing Out and Depressive Symptoms in Dutch
Adolescents: The Mediating Role of Social Comparison and Social Media Self-
Regulation Failure

Mental health is a growing concern in today's society. The World Health Organization states that there can be 'no health without mental health' (Prince et al., 2007). One mental health concern is depression, which is a treatable condition that negatively affects your mood (American Psychiatric Association, 2013). Symptoms can vary and can include feeling sad, loss of interest and thoughts of death (American Psychiatric Association, 2013). Adolescence is an important time regarding depressive symptoms, since prevalence rates increase dramatically during this time (Gijzen et al., 2018; McLaughlin & King, 2015; Wartberg et al., 2018). Depression in adolescence can have severe consequences like depression during adulthood, drug use and suicide (Gijzen et al., 2018).

Since depression can have negative consequences, it is important to examine possible predictors. One predictor could be Fear Of Missing Out (FOMO) (Baker et al., 2016; Stead & Bibby, 2017; Przybylski et al., 2013). FOMO is a type of social anxiety defined as 'a psychological state in which people become anxious that others within their social spheres are leading much more interesting and socially desirable lives' (Przybylski et al., 2013). FOMO is not limited to adolescence (Barry & Wong, 2020). In fact, it is suggested that more than half of adolescents experience some degree of FOMO (Hop & Delver, 2012). The threat of social exclusion and missing out on desirable activities can negatively impact the need to belong, which is essential for mental well-being (Roberts & David, 2019). Likewise, FOMO was found to lead to an increase in negative emotions and a decrease in positive emotions (Milyavskaya et al., 2018). Indeed, it was found that FOMO was a significant predictor for subjective well-being (Roberts & David, 2019).

Mediation may explain the relationship between FOMO and depression (Roberts & David, 2019). Social comparison as well as Social Media Self-Regulation Failure (SMSRF) could be mediators in the relationship between FOMO and depression. Social comparison refers to the desire to take away any uncertainty about yourself and to evaluate how you are doing by comparing your opinions and abilities to those of others (Reer et al., 2019). It was found that social comparison negatively affected psychological well-being (Lee, 2020). SMSRF is defined as the failure to exert self-control over your social media use and for instance result in more time spent online (Du et al., 2018). The ability to self-regulate continues to develop during adolescence (Steinberg, 2004), making adolescents more likely to fail than adults. To fail in self-regulation can illicit depressive symptoms (Du et al., 2018;

Klenk et al., 2011; Strauman, 2002). Since depression in adolescence can have severe consequences (Gijzen et al., 2018), it is important to understand the underlying mechanisms that could lead to depression in adolescence. This study aims to understand how FOMO contributes to depression and in particular the mediating role of social comparison and SMSRF.

Fear of Missing Out and Depressive Symptoms: Social Comparison

The relationship between FOMO and depressive symptoms could be mediated by social comparison. FOMO is mostly linked to upward social comparison, in which you think others are more capable or superior (Lee, 2020). Social comparison often happens online and is particularly appealing for upward social comparison (Yang, 2016). Regarding social media, people often only show the positive, joyful experiences (Li, 2017). As a result, you compare yourself with positively skewed versions of others (Przybylski et al., 2013). However, social comparison can increase depressive symptoms (Lee, 2020). People tend to overestimate the positive experiences and underestimate the negative experiences of others compared to their own (Stead & Bibby, 2017). They misperceive the information and often consider others to have better lives than they do (Stead & Bibby, 2017). This overestimation and misperception in social comparison could lead to feelings of envy and inferiority and increase the risk for depressive symptoms (Feinstein et al., 2013; Li, 2017). Evaluating the self with the positively skewed online representations (Rosenthal-von der Pütten et al., 2019) could also lead to negative self-perceptions, which may result in depressive symptoms (Feinstein et al., 2013).

Empirical evidence regarding the effect of FOMO on social comparison was hard to find. However, research suggests that FOMO is strongly linked to one's general tendency to engage in social comparison on social media (Reer et al., 2019). The effect of social comparison on depressive symptoms is studied more frequently, but they mostly focused on adults. In general, studies found a positive relationship between social comparison and depressive symptoms (e.g., Appel et al., 2015; Lee, 2020). Cross-sectional studies among adults found that social comparison was negatively associated with depressive symptoms (Lee, 2020; Liu et al., 2017). In addition, a study among adults showed that upward social comparison could illicit feelings of inferiority and depressive symptoms (Appel et al., 2015). Furthermore, researchers even found that upward social comparison influences depressive symptoms not only immediately but also over time (Feinstein et al., 2013).

Fear of Missing Out and Depressive Symptoms: Social Media Self-Regulation Failure

The relationship between FOMO and depressive symptoms may also be explained by the underlying mechanisms of SMSRF. The Self-Control Theory argues that self-control is

the effort to regulate the self and its behavior (Alutaybi et al., 2020). FOMO is characterized by a desire for constant connectivity (Przybylski et al., 2013), which is made easy by the omnipresence of social media platforms (O'Keeffe & Clarke-Pearson, 2011). However, the desire to use social media seems to be the most difficult to resist (Du et al., 2018). Due to the desire for constant connectivity one can fail to exert self-control (Trouvala et al., 2019). The ability to self-regulate can be depleted or fatigued when there is too much that requires self-regulation resulting in failure (Vohs & Heatherton, 2000). In addition, adolescents are still developing self-regulation skills (Steinberg, 2004) making them more vulnerable for SMSRF. Furthermore, SMSRF may result in depressive symptoms (Klenk et al., 2011; Strauman, 2002). To fail in regulating social media use can lead to feelings of guilt and therefore increase depressive symptoms (Du et al., 2018). The feeling of being unsuccessful in self-regulation can lead to negative affect (Strauman et al., 2001). In addition, social media use often gets in the way of obtaining your goals and the lack of progress may increase depressive symptoms (Klenk et al., 2011).

There is hardly any longitudinal research on the effect of FOMO on SMSRF among adolescents. However, results from a qualitative study among 42 British adolescents showed that self-control was compromised due to FOMO and the desire to stay connected (Trouvala et al., 2019). Alternatively, the effect of FOMO on social media use is studied often. As mentioned before, social media use and in particular time spent online can be seen as an indicator for SMSRF (Du et al., 2018). In general, studies found that among university students FOMO was positively related to time spent online (e.g. Hunt et al., 2018). An experimental study among 143 American students found that FOMO positively predicted social media use (Hunt et al., 2018). Another study among 386 American university students also showed that FOMO was positively associated with time spent online (Baker et al., 2016). In general, research on the effect of self-regulation on depressive symptoms was cross-sectional and included adolescents. Cross-sectional research showed that low self-control was associated with depression among adolescents (Frinkenauer et al., 2005; de Wall et al., 2012). In addition, studies found that social media use was correlated with depressive symptoms (Baker et al., 2016; Hunt et al., 2018). Moreover, cross-sectional studies among university students showed that high mobile phone use predicted more depressive symptoms one year later (Thomée et al., 2011). In sum, FOMO was found to be related to more social media use and time spent online (e.g. Baker et al., 2016), which in turn were found to be associated with depressive symptoms (e.g. Hunt et al., 2018).

The Current Study

Previous research focused mostly on adults including university students. Even if the sample consisted adolescents, they were not Dutch. Most empirical studies also did not have a longitudinal design. Since there is hardly any longitudinal research regarding the effect of FOMO on depression among Dutch adolescents, this study aims the answer the question: What is the relationship between 'Fear Of Missing Out' and 'depressive symptoms' in Dutch adolescents over time? And is this relationship mediated by 'social comparison' and 'Social Media Self-Regulation Failure'? First it is hypothesised that adolescents who experience higher levels of FOMO are more likely to experience depressive symptoms over time than adolescents who experience lower levels of FOMO. Secondly, it is hypothesised that social comparison mediates the relationship between FOMO and depressive symptoms. That is, adolescents with higher levels of FOMO experience higher levels of social comparison than adolescents with lower levels of FOMO (H2a) and adolescents with higher levels of social comparison are more likely to experience depressive symptoms than adolescents with lower levels of social comparison (H2b). The last hypothesis is that SMSRF mediates the relationship between FOMO and depressive symptoms. Specifically, adolescents with higher levels of FOMO experience higher levels of SMSRF than adolescents with lower levels of FOMO (H3a) and adolescents with higher levels of SMSRF are more likely to experience depressive symptoms than adolescents with lower levels of SMSRF (H3b). The research question and the hypotheses are shown in Figure 1.

Figure 1

Research Model
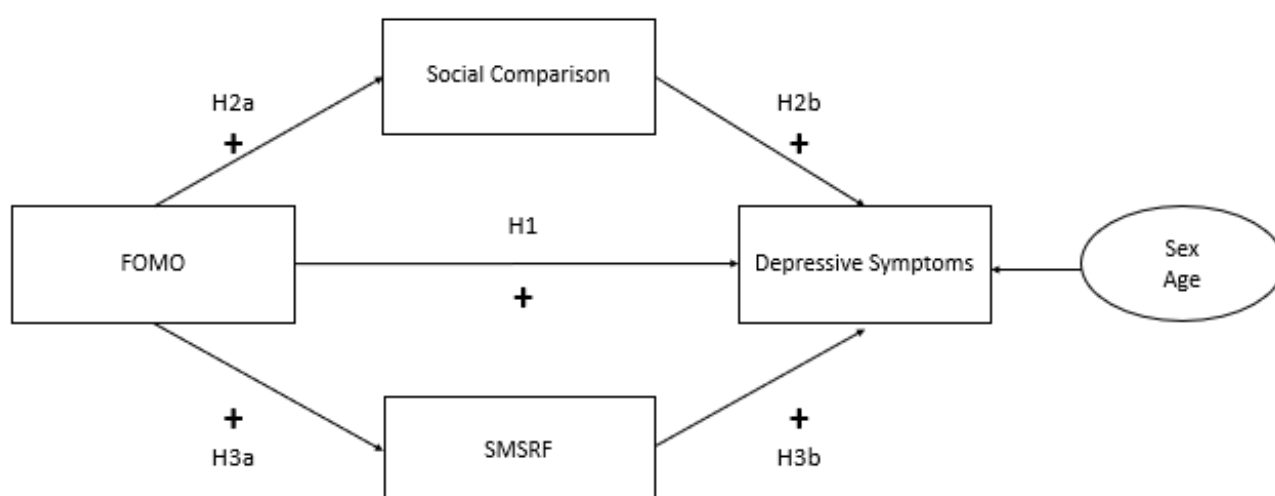
Method

Design

To answer the research question in this study, the data set of the Digital Youth Project (DiYo) was used and in particular the research on 'Social Media and Youth'. The DiYo project is an ongoing quantitative, longitudinal and nationally representative study on problematic use of social media and games of school-aged youth between the age of 12 and 16 years. The data was collected through an online Dutch self-report questionnaire using Qualtrics survey software. The study contains five waves from 2015 to 2019. Depressive symptoms was not measured in the first wave and SMSRF was only measured in the fifth wave. To examine three consecutive waves, the waves 3, 4 and 5 (2017-2019) (referred to as T1, T2 and T3) were used in this study.

Sample

There were 4716 participants in total in the DiYo study. In T1 there were 2708 participants of which 319 participated in all three waves (T1, T2 and T3). The mean age in this final sample was 12.86 (SD = 0.921) with 58.9% girls and 41.1% boys. The education level of the participants was 2.2% VMBO, 23.2% VMBO/HAVO, 55.5% HAVO/VWO and 19.1% VWO.

Drop-out was mainly due to class withdrawal or difficulty to schedule time for the school to participate in at least one of the three waves. An attrition analysis was conducted using an independent sample t-test. Welch's t-test was used to compare the average of depressive symptoms, level of comparison and level of FOMO between those who dropped out and those who participated in all three waves. The dropout group did not significantly differ from those who participated in all three waves on depressive symptoms ($t(438)$ = 1.66, p = .098, two-tailed). The two groups also did not significantly differ on the average social comparison score ($t(394.95)$ = -0.01, p = .991, two-tailed). Lastly, the two groups did not score significantly different on the level of FOMO ($t(430.58)$ = 1.15, p = .252, two-tailed). This suggest that those who dropped out and those who completed the study have similar levels of depressive symptoms, social comparison and FOMO at T1.

Procedure

The study was ethically approved by the board of ethics of the Faculty of Social Sciences at Utrecht-University (FETC16-076 Eijnden). Prior to the survey, parents were informed about the content of the study and were able to refuse their child's participation by withholding informed consent. Participants were made aware that they could withdraw from

the study at any moment and that participation was voluntary. Adolescents who participated completed an online survey during school hours supervised by a research assistant.

Measures

Fear of Missing Out

FOMO was measured using the *Fear of Missing Out scale* (Przybylski et al., 2013) with five items such as "I am afraid others have more fun than me". Participants had to report how they identified with the statements based on a 5-point Likert scale, ranging from 1 (*not correct at all*) to 5 (*completely correct*). A mean score for the items was used, with a higher score indicating more FOMO.

Depressive Symptoms

Depressive Symptoms were measured with the question 'How often have you experienced these feelings in the past 12 months?' with six different items based on the Depressive Mood List (Kandel & Davis, 1982). Items included feelings such as "I feel too tired to do anything" or "I feel unhappy, sad or depressed". All items were rated on a 5-point Likert scale, ranging from 1 (*never*) to 5 (*always*). A mean score for the items was used, with a higher score indicating more depressive symptoms.

Upward Social Comparison

Upward Social Comparison was measured with the question "How often do you have the following thought when you look at the messages, photos and videos of peers on social network sites?" There were five items such as "He or she does more fun things than I do" with a 5-point Likert scale, ranging from 1 (*never*) to 5 (*very often*). A mean score for the items was used, with a higher score indicating more upward social comparison. Cronbach's alpha indicated a very good reliability ($\alpha = .86$).

Social Media Self-Regulation Failure

Social Media Self-Regulation Failure was measured with three items. An example of one of the items is "How often do you use social media, while the use of social media at that time makes you spend your time less useful.". All items were answered on a 5-point Likert scale, ranging from 1 (*never*) to 5 (*very often*). A mean score for the items was used, with a higher score indicating more SMSRF. Cronbach's alpha indicated a very good reliability ($\alpha = .84$).

Control Variables

The variable gender was measured by one question: 'Are you a boy or a girl?'. The answer options were boy and girl, and coded as 1 = boy and 2 = girls. The variable age was

measured by one question: 'What is your age?'. Participants could fill in their age in years and answers varied between 11 and 17 years old.

Data-Analysis

In the current study, FOMO is the predictor and depressive symptoms is the outcome variable. Social comparison and SMSRF are considered mediators. The Baron and Kenny method was used to test the hypotheses for mediation. Linear regressions were used to test the hypotheses. A multiple regression was then used to test for full or partial mediation. All analyses were performed using IBM SPSS Statistics Version 26.

Prior to using the linear regression analysis the assumptions were checked. Q-Q plots indicate that the variables were normally distributed and free from univariate outliers. A scatterplot of the residuals suggested that the assumptions of linearity and homoscedasticity of residuals were met. Multicollinearity was checked with the VIF values. Values were below 5.00, so multicollinearity was assumed not to be a problem.

Results

The sample used in this study consisted of 319 participants who completed the questionnaire in all three waves. In Table 1, the descriptive statistics of all study variables are presented. Mean scores of FOMO and social comparison were at the lower end of the scale, whereas depression and SMSRF scores were around the midpoint of the scale. Mean scores of FOMO and depression showed an increase over time, whereas the mean score of social comparison seemed to remain te same one year later.

Table 1

Descriptive statistics of all study variables.

	Mean	Standard Deviation
C: Leeftijd	12.86	0.92
MfomoT1	1.71	0.67
MfomoT3	1.90	0.73
McomT1	1.89	0.78
McomT2	1.84	0.80
MsmsrfT3	2.78	0.89
MdepT1	2.21	0.71
MdepT3	2.39	0.76

Table 2 reports the correlations between the different variables. All variables were significantly related to one another in the expected directions. Some variables were strongly correlated, but they were all below $r = .60$, which indicates that multicollinearity should not be a problem. Additionally, confounders were checked with the correlations between the different variables and demographic information including age and gender. Results showed that gender was significantly correlated with the independent and dependent variables in T3. Age was also significantly correlated with FOMO at T1 and depressive symptoms at T3. Eventhough these correlations were weak, they indicate that gender and age could be confounders and should therefor be included in the analysis.

Table 2

Bivariate correlations for all study variables.

	1.	2.	3.	4.	5.	6.	7.	8.	9.
1. C: Geslacht	1								
2. C: Leeftijd	-.056	1							
3. MfomoT1	.005	.125*	1						
4. MfomoT3	.171**	-.044	.381**	1					
5. McomT1	.104	.051	.546**	.388**	1				
6. McomT2	.166**	.083	.323**	.490**	.529**	1			
7. MsmsrfT3	.214**	.007	.237**	.359**	.210**	.270**	1		
8. MdepT1	.093	.053	.399**	.266**	.388**	.300**	.244**	1	
9. MdepT3.	.286**	-.159**	.216**	.447**	.276**	.308**	.368**	.428**	1

Note. *. Correlation is significant at the 0.05 level (2-tailed)

**. Correlation is significant at the 0.01 level (2-tailed)

Hypothesis 1

As mentioned before, all hypotheses were tested with a linear regression, including the hypothesis that FOMO is positively related to depressive symptoms. The control variables age, gender and depressive symptoms at T1 predicted 27.1% of the variance in depressive symptoms at T3, $R^2 = .27$, $F(3, 294) = 36.48$, $p < .001$. The addition of the variable FOMO at T1 in step 2 predicts another 0.6% of the variance in depressive symptoms at T3, $\Delta R^2 = .01$, $\Delta F(1, 293) = 2.24$, $p = .135$. In combination, the predictors explained 27.7% of the variance in depressive symptoms at T3, $R^2 = .28$, adjusted $R^2 = .27$, $F(4, 293) = 28.04$, $p < .001$.

FOMO at T1 was non-significantly related to depressive symptoms at T3, $b = .093$, $t(293) = 1.50$, $p = .135$, when controlled for age, gender and depressive symptoms at T1. The hypothesis that adolescents who experience higher levels of FOMO are more likely to experience depressive symptoms over time than adolescents who experience lower levels of FOMO is not supported.

Hypothesis 2

Results suggest that the control variables age, gender and the level of comparison at T1 predicted 30.1% of the variance in the level of comparison at T2, $R^2 = .30$, $F(3, 276) = 39.65$, $p < .001$. The addition of the variable FOMO at T1 in step 2 predicts another 0.3% of the variance in the level of comparison at T2, $\Delta R^2 = .00$, $\Delta F(1, 275) = 1.14$, $p = .278$. In combination, the predictors explained 30.4% of the variance in the level of comparison at T2, $R^2 = .30$, adjusted $R^2 = .29$, $F(4, 275) = 30.04$, $p < .001$. FOMO at T1 had a non-significant relationship with the level of comparison at T2, $b = .078$, $t(275) = 1.07$, $p = .287$, when controlled for age, gender and the level of comparison at T1. The hypothesis that adolescents with higher levels of FOMO are more likely to experience social comparison than adolescents with lower levels of FOMO is not supported.

Subsequently, results suggest that the control variables age, gender and depressive symptoms at T1 predicted 27.3% of the variance in the level of comparison at T2, $R^2 = .27$, $F(3, 271) = 33.88$, $p < .001$. The addition of the variable level of comparison at T2 in step 2 predicts another 3.2% of the variance in depressive symptoms at T3, $\Delta R^2 = .03$, $\Delta F(1, 270) = 12.45$, $p < .001$. In combination, the predictors explained 30.5% of the variance in the depressive symptoms at T3, $R^2 = .31$, adjusted $R^2 = .30$, $F(4, 270) = 29.60$, $p < .001$. The level of comparison at T2 was significantly related to depressive symptoms at T3, $b = .181$, $t(270) = 3.53$, $p < .001$, but with a small effect ($\beta = .188$) when controlled for age, gender and the depressive symptoms at T1. The hypothesis that adolescents who experience social comparison are more likely to experience depressive symptoms than adolescents who compare themselves less is supported. However, since there is no main effect to be mediated, the hypothesis that social comparison mediated the relationship could not be supported.

Hypothesis 3

SMSRF was only assessed in the last wave. Therefor, analyses were done with variables of the same wave. Results suggest that the control variables age and gender predicted 8.9% of the variance in the level of depression at T3, $R^2 = .09$, $F(2, 289) = 14.12$, $p < .001$. The addition of the variable FOMO at T3 in step 2 predicts another 16.2% of the variance in depressive symptoms at T3, $\Delta R^2 = .16$, $\Delta F(1, 288) = 62.21$, $p < .001$. In

combination, the predictors explained 25.1% of the variance in depressive symptoms at T3, R^2 = .25, adjusted R^2 = .24, F (3, 288) = 32.15, $p < .001$. FOMO at T3 was significantly related to depressive symptoms at T3 with a large effect, $b = .414$, $t(288) = 7.89$, $p < .001$, $\beta = .409$, when controlled for age and gender. The hypothesis that adolescents who experience higher levels of FOMO are more likely to experience depressive symptoms at T3 than adolescents who experience lower levels of FOMO is supported.

The analysis for hypothesis 3a suggest that the control variables age and gender predicted 5.0% of the variance in the level of SMSRF at T3, R^2 = .05, F (2, 289) = 7.57, p = .001. The addition of the variable FOMO at T3 in step 2 predicts another 10.7% of the variance in the level of SMSRF at T3, ΔR^2 = .11, ΔF (1, 288) = 36.52, $p < .001$. In combination, the predictors explained 15.7% of the variance in the level of SMSRF at T3, R^2 = .16, adjusted R^2 = .15, F (3, 288) = 17.84, $p < .001$. FOMO at T3 was significantly related to the level of SMSRF at T3 when controlled for age and gender. The relationship between FOMO and the level of SMSRF was significant, $b = .393$, $t(288) = 6.04$, $p < .001$, with a large effect ($\beta = .332$). The hypothesis that adolescents with higher levels of FOMO are more likely to experience SMSRF than adolescents with lower levels of FOMO is supported.

Finally, results suggest that control variables age and gender predicted 10.6% of the variance in depressive symptoms at T3, R^2 = .11, F (2, 295) = 17.49, $p < .001$. The addition the level of SMSRF at T3 in step 2 predicts another 9.4% of the variance in depressive symptoms at T3, ΔR^2 = .09, ΔF (1, 294) = 34.56, $p < .001$. In combination, the predictors explained 20% of the variance in depressive symptoms at T3, R^2 = .20, adjusted R^2 = .19, F (3, 294) = 24.51, $p < .001$. The level of SMSRF at T3 was significantly related to the depressive symptoms at T3 when controlled for age and gender. The relationship between SMSRF and depressive symptoms is significant, $b = .272$, $t(294) = 5.88$, $p < .001$, with a large effect ($\beta = .316$). The hypothesis that adolescents who experience SMSRF are more likely to experience depressive symptoms than adolescents with less SMSRF is supported. However, since there is no main longitudinal effect (H1) to be mediated, the hypothesis that SMSRF mediated the relationship could not be supported.

Discussion

This study aimed to understand how FOMO contributes to depression and in particular the mediating role of social comparison and SMSRF. Results suggest that there is a non-significant relationship between FOMO and depressive symptoms over time when controlling for age, gender and depressive symptoms at the beginning. Adolescents with higher levels of FOMO did not report more depressive symptoms two years later. Consequently, the

hypotheses for mediation could not be supported. However, results suggest that FOMO was non-significantly related to higher levels of social comparison and that social comparison was significantly related to higher levels depressive symptoms over time. In addition, participants with higher levels of FOMO at T3 reported significantly higher levels of depressive symptoms at T3. Furthermore, higher levels of FOMO was related to higher levels of SMSRF which, in turn, was related to higher levels of depressive symptoms in the same wave.

Contradicting the first hypothesis, the findings suggest that FOMO did not predict more depressive symptoms over time. Existing literature indicates that FOMO can be related to depressive symptoms (Baker et al., 2016; Stead & Bibby, 2017; Przybylski et al., 2013). These studies were mostly cross-sectional and with university students. This association may not stand the test of time and only exist in cross-sectional data. In the current study, it was found that higher levels of FOMO at T3 was related to higher levels of depression at T3. Further studies could use the same data to see if the association is significant in other waves besides T3. Eventhough a longitudinal relationship for Dutch adolescents was not found, further studies could research if a longitudinal relationship can be found for university students or adults.

Since there is no main relationship to be mediated, the hypothesis that social comparison mediated the relationship between FOMO and depressive symptoms was not supported. The findings suggest that adolescents with higher levels of FOMO are not more susceptible to compare themselves with others over time. However, results did suggest that those who compared more often reported more depressive symptoms a year later. These findings are in line with the theory that the evaluation of the self with the positively skewed online representations (Alutaybi et al., 2020; Przybylski et al., 2013) may result in depressive symptoms (Feinstein et al., 2013). However, the results are not in line with existing studies which suggest that FOMO is linked to engage in social comparison (Reer et al., 2019). Results showed a non-significant relation over time, but Table 2 shows a stronger correlation at the same wave. The relationship between FOMO and social comparison may only exist in cross-sectional data. This study adds to the existing literature by providing a longitudinal association between social comparison and depressive symptoms among adolescents, since research was mostly done with a university or adult sample (e.g. Przybylski et al., 2013).

In agreement with the third hypothesis, the findings show that adolescents with higher levels of FOMO are more vulnerable to SMSRF. Those with higher levels of SMSRF in turn showed more depressive symptoms. These findings are in line with the empirical data that suggest that self-control is compromised by FOMO (Trouvala et al., 2019) and that FOMO is

related to more time spent online (e.g. Hunt et al., 2018). This study supports the theory that FOMO can lead to a failure to exert self-control on social media and that this in turn may increase depressive symptoms (Du et al., 2018).

The current study has its strengths and limitations. First, the data consisted of a large number of participants. Second, this study focused on adolescents, where previous studies mostly focused on university students or adults. Third, this study has longitudinal data, whereas previous studies were also mostly cross-sectional. Fourth, the current study is one of the first to study SMSRF in relation to FOMO and depression among Dutch adolescents. The scale that was used to measure SMSRF was found to be a reliable instrument. On the other side, the dropout was large. Nevertheless, an attrition analysis showed that those who dropped out and those who completed three waves did not significantly differ on the variables in this study. Also, SMSRF was only measured in the final wave, which can be seen as a limitation of this study. Since longitudinal data was not available a relationship over time could not be studied, which was possible for the relationships regarding social comparison. Further research could continue this study to obtain longitudinal insights on the relationship between SMSRF and depression in adolescents. In the current study, the relationship between FOMO, social comparison and depression was not researched cross-sectionally, like it was with SMSRF. Future research could use the DiYo dataset to study cross-sectionally if FOMO is significantly associated with social comparison and depressive symptoms among Dutch adolescents.

This study adds to the growing body of literature on FOMO. It empirically supports the association between FOMO and depressive symptoms among adolescents. Additionally, it establishes SMSRF as a variable to study in the association between FOMO and depressive symptoms. The significant associations found in this study suggest that FOMO, social comparison and SMSRF can be considered important factors in the battle against depression in adolescence.

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Appendix – Syntax

GET
  FILE='\\soliscom.uu.nl\users\5666651\master thesis\DiYo\Digital Youth Project - Compleet (T1 - '+ 'T5) ORIGINAL.sav'.
DATASET NAME DataSet2 WINDOW=FRONT.

*save as working file to keep the original intact.
SAVE OUTFILE='\\soliscom.uu.nl\users\5666651\master thesis\DiYo\Digital Youth Project - concept T1-T3.sav'
  /COMPRESSED.

*removed the waves A and B, as I am not interested in those
*there are no system missings in the variable inlogcode, but those who dont have a inlogcode have a missing in the variable gender

*check if they responded to all the questions for dep t1.
FREQUENCIES VARIABLES=CV70_1 CV70_2 CV70_3 CV70_4 CV70_5 CV70_6
  /ORDER=ANALYSIS.

*check if they responded to all the questions for fomo t1.
FREQUENCIES VARIABLES=CV36_1 CV36_2 CV36_3 CV36_4 CV36_5
  /ORDER=ANALYSIS.

*check if they responded to all the questions of up com t2.
FREQUENCIES VARIABLES=DV25_1 DV25_3 DV25_4 DV25_5 DV25_7
  /ORDER=ANALYSIS.

*check if all responded to all fomo t3.
FREQUENCIES VARIABLES=EV36_1 EV36_2 EV36_3 EV36_4 EV36_5
  /ORDER=ANALYSIS.

*check if all responded to all dep t3.
FREQUENCIES VARIABLES=EV70_1 EV70_2 EV70_3 EV70_4 EV70_5 EV70_6

```
  /ORDER=ANALYSIS.


*check if all responded to all smsrf t3.
FREQUENCIES VARIABLES=EV101_1 EV101_2 EV101_3
  /ORDER=ANALYSIS.


*variable dep t1 - control.
COMPUTE MdepT1=MEAN(CV70_1,CV70_2,CV70_3,CV70_4,CV70_5,CV70_6).
EXECUTE.


*variable dep t3 - outcome.
COMPUTE MdepT3=MEAN(EV70_1,EV70_2,EV70_3,EV70_4,EV70_5,EV70_6).
EXECUTE.


*variable com t1 -mediator.
COMPUTE McomT1=MEAN(CV25_1,CV25_3,CV25_4,CV25_5,CV25_7).
EXECUTE.


*variable com t2 -mediator.
COMPUTE McomT2=MEAN(DV25_1,DV25_3,DV25_4,DV25_5,DV25_7).
EXECUTE.


*variable smsrf t3 - mediator.
COMPUTE MsmsrfT3=MEAN(EV101_1,EV101_2,EV101_3).
EXECUTE.


*variable fomo t1 - predictor.
COMPUTE MfomoT1=MEAN(CV36_1,CV36_2,CV36_3,CV36_4,CV36_5).
EXECUTE.


*variable fomo t3 - predictor for smsrf pathway.
COMPUTE MfomoT3=MEAN(EV36_1,EV36_2,EV36_3,EV36_4,EV36_5).
EXECUTE.
```

*reliability dep scale t1.

```
RELIABILITY
  /VARIABLES=CV70_1 CV70_2 CV70_3 CV70_4 CV70_5 CV70_6
  /SCALE('scale dep t1') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

*reliability scale fomo t1.

```
RELIABILITY
  /VARIABLES=CV36_1 CV36_2 CV36_3 CV36_4 CV36_5
  /SCALE('scale fomo t1') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

*reliability scale comparison t2.

```
RELIABILITY
  /VARIABLES=DV25_1 DV25_3 DV25_4 DV25_5 DV25_7
  /SCALE('scale com t2') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

*reliability scale smsrf t3.

```
RELIABILITY
  /VARIABLES=EV101_1 EV101_2 EV101_3
  /SCALE('scale smsrf t3') ALL
  /MODEL=ALPHA
  /STATISTICS=DESCRIPTIVE SCALE CORR
  /SUMMARY=TOTAL MEANS CORR.
```

*filter those who participated in all waves.

```
USE ALL.
```

```
COMPUTE filter_$=(NMISS(CV3,DV3,EV3)<1).
VARIABLE LABELS filter_$ 'NMISS(CV3,DV3,EV3)<1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.


*make a variable with the two groups from the filter.
RECODE filter_$ (0=1) (1=2) INTO All_waves.
EXECUTE.


*frequencies of the n=319 all waves sample.
FREQUENCIES VARIABLES=CV3 CV4 CV_opleiding
  /STATISTICS=STDDEV MEAN
  /ORDER=ANALYSIS.


*remove filter so I can compare all participants as two groups at T1.


*t-test attrition.
T-TEST GROUPS=All_waves(1 2)
  /MISSING=ANALYSIS
  /VARIABLES=MdepT1 McomT1 MfomoT1
  /CRITERIA=CI(.95).


*re-run the filter so further analyses only use the correct sample.
USE ALL.
COMPUTE filter_$=(NMISS(CV3,DV3,EV3)<1).
VARIABLE LABELS filter_$ 'NMISS(CV3,DV3,EV3)<1 (FILTER)'.
VALUE LABELS filter_$ 0 'Not Selected' 1 'Selected'.
FORMATS filter_$ (f1.0).
FILTER BY filter_$.
EXECUTE.


*descriptives.
```

DESCRIPTIVES VARIABLES=CV4 MfomoT1 MfomoT3 McomT1 McomT2 MsmsrfT3
MdepT1 MdepT3
  /STATISTICS=MEAN STDDEV MIN MAX.

*correlations.
CORRELATIONS
  /VARIABLES=CV3 CV4 MfomoT1 MfomoT3 McomT1 McomT2 MsmsrfT3 MdepT1
MdepT3
  /PRINT=TWOTAIL NOSIG
  /MISSING=PAIRWISE.

*test normality.
EXAMINE VARIABLES=MfomoT1 McomT2 MdepT3
  /PLOT BOXPLOT HISTOGRAM NPPLOT
  /COMPARE GROUPS
  /STATISTICS DESCRIPTIVES
  /CINTERVAL 95
  /MISSING LISTWISE
  /NOTOTAL.

*regression H1 with control variables.
REGRESSION
  /MISSING LISTWISE
  /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE ZPP
  /CRITERIA=PIN(.05) POUT(.10)
  /NOORIGIN
  /DEPENDENT MdepT3
  /METHOD=ENTER MdepT1 CV3 CV4
  /METHOD=ENTER MfomoT1
  /SCATTERPLOT=(*ZRESID ,*ZPRED)
  /RESIDUALS NORMPROB(ZRESID)
  /SAVE MAHAL COOK.

*regression H2a fomo on com with control.

REGRESSION

 /MISSING LISTWISE

 /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE ZPP

 /CRITERIA=PIN(.05) POUT(.10)

 /NOORIGIN

 /DEPENDENT McomT2

 /METHOD=ENTER CV3 CV4 McomT1

 /METHOD=ENTER MfomoT1

 /SCATTERPLOT=(*ZRESID ,*ZPRED)

 /RESIDUALS NORMPROB(ZRESID)

 /SAVE MAHAL COOK.

*regression H2b com on dep with control.

REGRESSION

 /MISSING LISTWISE

 /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE ZPP

 /CRITERIA=PIN(.05) POUT(.10)

 /NOORIGIN

 /DEPENDENT MdepT3

 /METHOD=ENTER CV3 CV4 MdepT1

 /METHOD=ENTER McomT2

 /SCATTERPLOT=(*ZRESID ,*ZPRED)

 /RESIDUALS NORMPROB(ZRESID)

 /SAVE MAHAL COOK.

*H3 effect fomo T3 on dep T3 with control age en gender.

REGRESSION

 /MISSING LISTWISE

 /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE ZPP

 /CRITERIA=PIN(.05) POUT(.10)

 /NOORIGIN

 /DEPENDENT MdepT3

 /METHOD=ENTER EV3 EV4

 /METHOD=ENTER MfomoT3

/SCATTERPLOT=(*ZRESID ,*ZPRED)
 /RESIDUALS NORMPROB(ZRESID)
 /SAVE MAHAL COOK.

*H3a fomo t3 on smsrf with control.
REGRESSION
 /MISSING LISTWISE
 /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE ZPP
 /CRITERIA=PIN(.05) POUT(.10)
 /NOORIGIN
 /DEPENDENT MsmsrfT3
 /METHOD=ENTER EV3 EV4
 /METHOD=ENTER MfomoT3
 /SCATTERPLOT=(*ZRESID ,*ZPRED)
 /RESIDUALS NORMPROB(ZRESID)
 /SAVE MAHAL COOK.

*H3b smsrf on dep with control.
REGRESSION
 /MISSING LISTWISE
 /STATISTICS COEFF OUTS CI(95) R ANOVA COLLIN TOL CHANGE ZPP
 /CRITERIA=PIN(.05) POUT(.10)
 /NOORIGIN
 /DEPENDENT MdepT3
 /METHOD=ENTER EV3 EV4
 /METHOD=ENTER MsmsrfT3
 /SCATTERPLOT=(*ZRESID ,*ZPRED)
 /RESIDUALS NORMPROB(ZRESID)
 /SAVE MAHAL COOK.