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The relationship between addictive use of social media, narcissism, and self-esteem: Findings from a large national survey☆

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HIGHLIGHTS

- Addictive use of social media has become an area of increasing research interest.
- This study examined addictive social media use in over 23,500 participants.
- Addictive use of social media was associated with being young, female and single.
- Addictive use of social media was related to higher narcissism.
- Addictive use of social media was related to lower self-esteem.

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ABSTRACT

Social media has become an increasingly popular leisure activity over the last decade. Although most people's social media use is non-problematic, a small number of users appear to engage in social media excessively and/or compulsively. The main objective of this study was to examine the associations between addictive use of social media, narcissism, and self-esteem. A cross-sectional convenient sample of 23,532 Norwegians (M_{age} = 35.8 years; range = 16–88 years) completed an open web-based survey including the Bergen Social Media Addiction Scale (BSMAS), the Narcissistic Personality Inventory-16, and the Rosenberg Self-Esteem Scale. Results demonstrated that lower age, being a woman, not being in a relationship, being a student, lower education, lower income, lower self-esteem, and narcissism were associated with higher scores on the BSMAS, explaining a total of 17.5% of the variance. Although most effect sizes were relatively modest, the findings supported the notion of addictive social media use reflecting a need to feed the ego (i.e., narcissistic personality traits) and an attempt to inhibit a negative self-evaluation (i.e., self-esteem). The results were also consistent with demographic predictions and associations taken from central theories concerning "addiction", indicating that women may tend to develop more addictive use of activities involving social interaction than men. However, the cross-sectional study design makes inferences about directionality impossible.

1. Introduction

Over the last few years, the use of social media has become an increasingly popular leisure activity in many countries across the world (Kuss & Griffiths, 2011). Individuals visit social media sites to engage in many different types of entertainment and social activity including playing games, socializing, passing time, communicating, and posting pictures (Allen, Ryan, Gray, Mclnerney, & Waters, 2014; Ryan, Chester, Reece, & Xenos, 2014). Although this has quickly become a normal modern phenomenon (boyd & Ellison, 2007), concerns have been raised regarding the potential addictive use of social media (e.g., Andreassen, 2015, Griffiths, Kuss, & Demetrovics, 2014). Such excessive and compulsive use has been explained by general addiction models (Griffiths, 2005) and defined accordingly as "being overly concerned about social media, driven by an uncontrollable motivation to log on to or use social media, and devoting so much time and effort to social media that it impairs other important life areas" (Andreassen & Pallesen, 2014, p. 4054).

1.1. Addictive use of social media

The term 'Internet addiction' has been criticized for being too unspecific in terms of content. Consequently, some scholars have

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suggested content-related 'addiction subtypes' such as 'cybersexual addiction', 'social media addiction', 'net compulsions' (e.g., stock trading, gambling, shopping), 'information overload', and 'computer addiction' (e.g., games, programming) (Young, 1999, 2015).

When drawing the line between addictive and non-addictive (e.g., excessive, enthusiastic) behaviors, scholars use specific addiction criteria (Griffiths, 2005). Accordingly, addictive social media use should thus be manifested by being preoccupied by social media (salience), using social media in order to reduce negative feelings (mood modification), gradually using social media more and more in order to get the same pleasure from it (tolerance/craving), suffering distress if prohibited from using social media (withdrawal), sacrificing other obligations and/or causing harm to other important life areas because of the social media use (conflict/functional impairment), and desiring or attempting to control the use of social media without success (relapse/loss of control).

Consequently, as problematic social media use may represent a specific form of 'Internet addiction', the Bergen Facebook Addiction Scale was specifically developed in order to assess this behavior using the aforementioned addiction criteria (Andreassen, Torsheim, Brunborg, & Pallesen, 2012). Although the scale has demonstrated reliable and valid psychometric properties across several studies (e.g., Andreassen et al., 2012, 2013; Phanasathit, Manwong, Hanprathet, Khumsri, & Yingyeun, 2015; Wang, Ho, Chan, & Tse, 2015), a generic instrument capturing the totality of all social network sites, as opposed to measuring addictive use of one specific social network site only (i.e., *Facebook*), has been called for (Griffiths et al., 2014).

1.2. Addictive use of social media and demographics

Some studies have reported higher levels of addictive social media use among men (e.g., Çam & Isbulan, 2012; Ryan et al., 2014). However, research has more consistently shown that addictive use of social media is more prevalent among women than men (Andreassen, 2015; Griffiths et al., 2014), and it has been suggested that women are more inclined to develop addictive behaviors towards activities involving social interaction (Andreassen et al., 2013; Kuss, Griffiths, Karila, & Billieux, 2014; Van Deursen, Bolle, Hegner, & Kommers, 2015). Furthermore, studies also report higher scores on social media addiction scales in younger compared to older people (e.g., Andreassen et al., 2012; Kuss et al., 2014). This has good face validity as these online platforms play a crucial role in the leisure and social lives of adolescents and young adults (Allen et al., 2014). Young people have quickly become accustomed to being constantly "online", and appear to adapt to new technologies faster than their older counterparts (Prensky, 2001). In addition, social media may represent an arena where the younger generation can explore and develop their identities and culture without interruption from parents or those in a position of authority (Andreassen, 2015; Mazzoni & Iannone, 2014).

Research also suggests that individuals that are not in a personal relationship are more prone to developing addictive social media use than people who have partners (Kuss et al., 2014). Again, this has good face validity as sites that promote social interaction may represent ground for meeting potential partners, or serving as an important social function along with feelings of belongingness (Andreassen, Torsheim, & Pallesen, 2014; Ryan et al., 2014). Taken together, in the present study, it is hypothesized that individuals that are of younger age, women, and not in a relationship will score higher than their corresponding counterparts on a social media addiction scale (Hypothesis 1).

1.3. Addictive use of social media and narcissism

Research indicates that personality plays a role in addictive use of social media (e.g., Andreassen et al., 2012, 2013; Hong, Huang, Lin, & Chiu, 2014; Wilson, Fornasier, & White, 2010). The few studies exploring individual differences in terms of narcissism have found it to be positively associated to different online social networking activities (La Barbera, La Paglia, & Valsavoia, 2009; Malik & Khan, 2015; Ryan & Xenos, 2011; Wang, Jackson, Zhang, & Su, 2012). This appears to be meaningful as social media use allows individuals to express their ambitions and show their successes to a potentially large audience, and to obtain highly visible rewards and recognition through "likes" and positive comments from other social media users. Most contemporary studies refer to narcissism as a relatively broad behavioral trait domain, expressed by, among others, self-centered grandiosity, arrogance, manipulativeness, and similar features (Alarcón & Sarabia, 2012). However, the complexity of the narcissism construct needs highlighting.

Narcissistic personality disorder, a pathological form of narcissism, is formally recognized by the *Diagnostic and Statistical Manual of Mental Disorders* in terms of high levels of self-importance, fantasies of unlimited success, feeling special and unique, lack of empathy, envy, and arrogance (American Psychiatric Association, 2013). However, more moderate and non-clinical levels of narcissistic traits have sometimes been viewed as healthy by providing an outlet for self-confidence and self-assertion (Campbell, Reeder, Sedikides, & Elliot, 2000; Muller, 2014). Either way, as social media may represent a gratifying medium for individuals with elevated narcissistic traits in particular, it is hypothesized that narcissism will be positively related to addictive use of social media in the present study (Hypothesis 2).

1.4. Addictive use of social media and self-esteem

Core self-evaluations (e.g., self-esteem) also appear to play a role in addictive social media use (Andreassen, 2015). Such evaluations may involve core beliefs, attributions, schemata, and automatic thoughts – and that have the power to activate behavior in general (Beck, 1995), including social media activity. Hence, if an individual thinks "I am not likable" or "I have poor social skills" – while at the same time believing that having a large number of friends or followers will change such self-evaluations – this may facilitate addictive social media participation. In line with this, previous research has shown that people with low self-esteem regard social media as a safer place to express themselves than people with high self-esteem (Forest & Wood, 2012), and a negative relationship between self-esteem and addictive use of social media has been reported (Hong et al., 2014; Malik & Khan, 2015; Wang et al., 2012; Wilson et al., 2010). In short, it is hypothesized in the present study that self-esteem will be negatively associated with symptoms of addictive social media use (Hypothesis 3).

1.5. The present study

Against this theoretical and empirical background, data stemming from a large sample were analyzed in order to investigate whether demographics and dispositional traits were associated with addictive use of social media (Hypotheses 1–3). Although these hypotheses have to some extent been tested in previous research, most empirical studies to date have relied upon small opportunity and/or targeted samples (e.g., university students), often employing non-validated measures of addictive social media use (Andreassen, 2015; Ryan et al., 2014). Consequently, the present study contributes to the literature in at least two important ways. First, the data are not collected from an opportunity or targeted sample. The large sample size also boosts the statistical power and increases the chance of identifying correlates of addictive social media use. Second, the study utilizes psychometrically validated instruments in which addictive use of social media in general (instead of focusing on a specific platform, i.e., *Facebook*) is accounted for – making it a novel and specific addition to this research field.

2. Materials and methods

2.1. Procedure

Individuals were invited to participate anonymously in an open cross-sectional web-survey via the official websites of five nationwide Norwegian newspapers during Spring 2014. By clicking the link to the survey, participants were provided with information about the study before providing their answers. They were also informed upfront that they would receive immediate feedback on their own score concerning their social media habits after completing all the questions. The link to the survey was published up until a week on the different newspaper websites. All data were saved by the survey agency *SurveyXact*, before passing it on to the research team. Participants giving none or partial responses were deleted from the data set (n = 18,438). The study was carried out in accordance to the Helsinki Convention and the Norwegian Health Research Act.

2.2. Participants

In total, the sample included 23,532 participants comprising 8234 men (35%) and 15,298 women (65%). Their ages ranged from 16 to 88 years, with a mean age of 35.8 years (SD = 13.3). These proportions significantly differed from the corresponding Norwegian population distribution of 2014 (50.3% men vs. 49.7% women; $\chi^2 = 2206.2$, df = 1, $p < 0.0001$). There was also a statistically significant difference between the present sample and the general Norwegian population in terms of age groups: 16 and 30 years (40.7% vs. 25.0%), 31–45 years (35.0% vs. 26.3%), 46–60 years (19.8% vs. 24.5%), and 61–88 years (4.5% vs. 24.2%) ($\chi^2 = 6974.5$, df = 3, $p < 0.0001$). The sample represented a broad range of occupations, professional and income groups, but data on the population level were not available for sample comparison on these variables. Table 1 provides an overview of sample characteristics and mean scores on the Bergen Social Media Addiction Scale (see Section 2.3) within each demographic category.

2.3. Questionnaires

Bergen Social Media Addiction Scale (BSMAS) is a modified version of the previously validated *Bergen Facebook Addiction Scale* (BFAS; Andreassen et al., 2012). The modification involves using the words 'social media' instead of the word 'Facebook', with social media being defined as "*Facebook*, *Twitter*, *Instagram* and the like" in the instructions. Although BSMAS has not been used with other samples than the present study, the original scale (i.e., BFAS) was translated into several languages and has shown good psychometric properties. The scale is anchored in general addiction theory, and operationalizes social media addiction according to six basic addiction symptoms noted earlier (i.e., salience, conflict, mood modification, withdrawal, tolerance, and relapse) (Griffiths, 2005). All questions concern experiences occurring over the past year, and are rated on a 5-point Likert scale spanning from Very rarely (1) to Very often (5) (e.g., "How often during the last year have you become restless or troubled if you have been prohibited from using social media?"). The items correspond with diagnostic addiction criteria (American Psychiatric Association, 1994). Internal consistency of the BSMAS in the present study was high ($\alpha = 0.88$).

Narcissistic Personality Inventory-16 (NPI-16) is a shortened version of the original 40-item NPI (Raskin & Terry, 1988). The NPI-16 comprises 16 items assessing sub-clinical narcissism (Ames, Rose, & Anderson, 2006). Instead of using the forced-choice format suggested

Table 1
Descriptive sample statistics and analyses of variance comparing the Bergen Social Media Addiction Scale (BSMAS) scores (N = 23,532).

Variable		n	%	Mean (SD) BSMAS	$F_{df1,df2}$	*p*	η^2
Age[a,b]	16–25 years	6621	28.1	12.0 (5.4)	$426.89_{4,23527}$	0.000	0.068
	26–35 years	5767	24.5	10.6 (4.8)			
	36–45 years	5416	23.0	9.7 (4.3)			
	46–55 years	3705	15.7	8.9 (3.8)			
	56 years and older	2023	8.6	8.3 (3.2)			
Sex	Women	15,298	65.0	10.9 (5.0)	$833.51_{1,23530}$	0.000	0.034
	Men	8234	35.0	9.1 (4.1)			
Relationship status	In a relationship	15,372	65.3	9.9 (4.5)	$295.26_{1,23530}$	0.000	0.012
	Not in a relationship	8160	34.7	11.0 (5.2)			
Educational level	Primary school	2350	10.0	11.8 (5.6)	$101.63_{5,23526}$	0.000	0.021
	High school	5949	25.3	10.8 (5.0)			
	Vocational school	3989	17.0	9.6 (4.3)			
	University - Bachelor	7629	32.4	10.2 (4.6)			
	University - Master	3343	14.2	9.6 (4.3)			
	University - PhD	272	1.2	8.7 (4.1)			
Student	Yes	4962	21.1	12.3 (5.5)	$1118.05_{1,23530}$	0.000	0.045
	No	18,570	78.9	9.8 (4.4)			
Income[c]	0–99.999 NOK	3865	16.4	12.2 (5.5)	$136.81_{10,23521}$	0.000	0.055
	100.000–199.999	2475	10.5	11.5 (5.2)			
	200.000–299.999	2389	10.2	10.6 (4.8)			
	300.000–399.999	3781	16.1	10.2 (4.6)			
	400.000–499.999	4648	19.8	9.8 (4.4)			
	500.000–599.999	2807	11.9	9.3 (4.0)			
	600.000–699.999	1321	5.6	9.0 (3.9)			
	700.000–799.999	794	3.4	8.7 (3.6)			
	800.000–899.000	480	2.0	9.1 (4.1)			
	900.000–999.999	281	1.2	8.4 (3.4)			
	1 million or more	691	2.9	8.5 (3.8)			

n = subset of the sample; % = subset percentage of the sample; SD = standard deviation; $F_{df1,df2}$ = F value with corresponding degrees of freedom; p = probability value; η^2 = eta-squared value; In a relationship = married, common law partner, partner, boyfriend or girlfriend; Not in a relationship = single, divorced, separated, widow or widower; Income = Past year personal gross annual income (before tax) in Norwegian currency (i.e., NOK); NOK = Norwegian Krone.

[a] All groups differ ($p < 0.05$, Bonferroni correction).

[b] All groups except university education and vocational school differ ($p < 0.05$, Bonferroni correction).

[c] Group 3 and 4 do not differ, group 6 differs not from group 7–0, group 7 differs not from group 8–11, group 8 differs not from group 9–11, group 9 differs not from group 10–11 and group 10 and 11 do not differ; all other groups differ ($p < 0.05$, Bonferroni correction).

by Ames et al. (2006), the current scores comprise ratings on a 5-point Likert scale using anchors of Strongly disagree (1) to Strongly agree (5) (e.g., "I am apt to show off if I get the chance"). This scale is a unidimensional measure, thus the higher the total score, the more narcissistic the individual is. Internal consistency of the NPI-16 was high in the present study ($\alpha = 0.87$).

Rosenberg Self-Esteem Scale (RSES) is a 10-item scale for assessing levels of self-esteem (Rosenberg, 1965). All statements are rated on a 4-point Likert scale ranging from Strongly agree (0) to Strongly disagree (3). The scale measures both positive and negative feelings about the self (e.g., "All in all, I am inclined to feel that I am a failure" and "I am able to do things as well as most other people"). The five positive statements were recoded, meaning that the higher the overall score, the higher the self-esteem. Internal consistency of this scale was high in the present study ($\alpha = 0.89$).

2.4. Statistics

Descriptive statistics of the study variables were calculated. Group differences in terms of scores on the BSMAS within sample characteristics were analyzed using analysis of variance (ANOVA). Both statistical tests for significance (p values) and effect sizes (eta-squared [η^2] values) were calculated. Benchmarks for η^2 values are: 0.01 is small (but non-trivial), 0.06 is medium, and 0.14 is large (Cohen, 1988). Bonferroni-based post-hoc tests were performed. Pearson product-moment correlation coefficients were calculated to assess the relationships between addictive social media use, narcissism, and self-esteem. Benchmarks to define when the correlational strength is considered small, moderate or large in effect are r coefficients of about 0.1, 0.3, and 0.5, respectively (Cohen, 1988). (This statistical convention also applies for β (beta, i.e., standardized) coefficients in regression analyses). A linear multiple hierarchical regression analysis was conducted, where demographic variables, narcissism, and self-esteem were regressed upon the composite social media addiction score. More specifically, age, sex, relationship status, education, student status, and income were entered in Block 1, whereas narcissism and self-esteem scores were entered in Block 2. For the dummy coded education variable, having a Bachelor's degree was the largest group and therefore comprised the reference category. According to convention, multiple regression coefficients (R^2) of about 0.02, 0.13 and 0.26 were valued as small, medium and large effect sizes, respectively (i.e., Cohen's f^2 [R^2/1-R^2] of 0.02, 0.15 and 0.35) (Cohen, 1988). Preliminary analyses confirmed that there was no major contradiction of the assumptions of normality, linearity, multicollinerarity (tolerance over 0.10 and VIF under 5), and homoscedasticity. However, the distribution of BSMAS scores was moderately skewed to the right, which appears reasonable as most measures of problematic behaviors show right skewed distributions in non-clinical samples.

3. Results

3.1. Group differences

ANOVA revealed several group differences in terms of BSMAS scores (see Table 1). Scores on addictive use of social media were higher among younger compared to older age groups ($F_{4,23527} = 426.89$, $p < 0.001$, $\eta^2 = 0.07$); women compared to men ($F_{1,23530} = 833.51$, $p < 0.001$, $\eta^2 = 0.03$); those not in a relationship compared to those in a relationship ($F_{1,23530} = 295.26$, $p < 0.001$, $\eta^2 = 0.01$); lower educated compared to higher educated ($F_{5,23526} = 101.63$, $p < 0.001$, $\eta^2 = 0.02$); students compared to non-students ($F_{1,23530} = 1118.05$, $p < 0.001$, $\eta^2 = 0.05$); and lower income groups compared to higher income groups ($F_{10,23521} = 136.81$, $p < 0.001$, $\eta^2 = 0.06$). Overall, the η^2 values indicated small to medium sized effects ranging from 0.01 (relationship status) to 0.07 (age groups).

Table 2
Descriptive data and correlation coefficients between study variables (N = 23,532).

	Variable	1	2	3
1	Addictive social media use	–		
2	Narcissism	0.06**	–	
3	Self-esteem	−0.25**	0.42**	–
	Mean	10.30	44.12	29.23
	Standard deviation	4.77	10.11	5.34
	Skewness	1.28	−0.12	−0.43
	Kurtosis	1.35	−0.01	0.38
	Range	6–30	16–80	10–40
	Alpha	0.88	0.87	0.89
	Items	6	16	10

** $p < 0.01$.

3.2. Correlation analysis and descriptive data

Table 2 shows the mean scores, standard deviations, distributions, scale characteristics as well as inter-correlations of the study variables. For the BSMAS variable, the skewness was 1.28 and the kurtosis 1.35, indicating a moderate asymmetrical distribution. Positive and significant ($p < 0.01$) correlations were found between addictive use of social media and narcissism ($r = 0.06$) (trivial-to-small effect), and between narcissism and self-esteem ($r = 0.42$) (large-to-medium effect). A negative correlation was found between addictive social media use and self-esteem ($r = -0.25$) (medium-to-small effect).

Table 3
Results from the hierarchical regression analysis where age, sex, relationship status, education, student status, income, narcissism, and self-esteem were regressed upon the Bergen Social Media Addiction Scale score (N = 23,532).

	B	Std.Error	β	t	ΔR^2
Step 1					0.119***
Age	−0.074	0.003	−0.207	−27.142***	
Sex (1 = ♂, 2 = ♀)	1.903	0.065	0.190	29.189***	
Relationship status[a]	0.504	0.065	0.050	7.808***	
Education[b]					
Primary school	0.524	0.113	0.033	4.635***	
High school	−0.038	0.081	−0.003	−0.469	
Vocational school	−0.015	0.089	−0.001	−0.172	
Master's degree	−0.311	0.095	−0.023	−3.278**	
PhD degree	−0.634	0.278	−0.014	−2.282*	
Student status[c]	0.726	0.095	0.062	7.631***	
Incomed	−0.043	0.017	−0.022	−2.573*	
Step 2					0.057***
Age	−0.056	0.003	−0.156	−20.801***	
Sex (1 = ♂, 2 = ♀)	1.956	0.064	0.196	30.512***	
Relationship status[a]	0.354	0.063	0.035	5.646***	
Education[b]					
Primary school	0.334	0.110	0.021	3.046**	
High school	−0.098	0.079	−0.009	−1.241	
Vocational school	0.025	0.086	0.002	0.294	
Master's degree	−0.272	0.092	−0.020	−2.957**	
PhD degree	−0.532	−0.269	−0.012	−1.979*	
Student status[c]	−0.807	0.093	0.069	8.721***	
Income[d]	−0.008	0.017	−0.004	−0.493	
Narcissism	0.087	0.003	0.184	27.058***	
Self-esteem	−0.232	0.006	−0.260	−38.116***	

B = unstandardized regression coefficient; Std.Error = unstandardized standard error; β = standardized regression coefficient; t = t-test value; ΔR^2 = change in coefficient of determination between steps.

[a] In a relationship = 1, not in a relationship = 2.
[b] Bachelor's degree comprises the reference category.
[c] Student = 1, not student = 0.
[d] Past year personal gross annual income.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

3.3. Regression analysis

Table 3 displays the results of the regression analysis. Age, sex, relationship status, education, student status, and income were entered in Block 1, explaining 11.9% of the variance in addictive use of social media ($F_{10,23521} = 318.19$, $p < 0.001$), with an f^2 of 0.14 (medium effect size). Demographic factors contributed significantly including age ($\beta = -0.207$, $p < 0.001$), sex ($\beta = 0.190$, $p < 0.001$), relationship status ($\beta = 0.050$, $p < 0.001$), primary school ($\beta = 0.033$, $p < 0.001$), Master's degree ($\beta = -0.023$, $p < 0.01$), PhD degree ($\beta = -0.014$, $p < 0.05$), student status ($\beta = 0.062$, $p < 0.001$), and income ($\beta = -0.022$, $p < 0.05$). Age and sex contributed considerably.

Narcissism and self-esteem, entered in Block 2, additionally explained 5.7% of the variance, $\Delta R^2 = 0.057$, $\Delta F_{2,23519} = 809.50$, $p < 0.001$, with an f^2 of 0.06 (small effect size). In this final block, self-esteem ($\beta = -0.260$, $p < 0.001$) contributed the most, followed by sex ($\beta = 0.196$, $p < 0.001$), narcissism ($\beta = 0.184$, $p < 0.001$), age ($\beta = -0.156$, $p < 0.001$), student status ($\beta = 0.069$, $p < 0.001$), relationship status ($\beta = 0.035$, $p < 0.001$), primary school ($\beta = 0.021$, $p < 0.01$), Master's degree ($\beta = -0.020$, $p < 0.01$), and PhD degree ($\beta = -0.012$, $p < 0.05$). Overall, the independent variables' unique effects on the criterion variable were relatively small – although the displayed β coefficient for self-esteem, narcissism, age, and sex may be considered as more medium-sized effects. The whole model explained 17.5% of the variance in the social media addiction score ($F_{12,23519} = 418.31$, $p < 0.001$), with an f^2 of 0.21, indicating a medium effect size.

4. Discussion

The main aim of the present study was to investigate demographic, personality, and individual differences associated with addictive use of social media. Based on the number of participants, the present study represents one of the largest surveys undertaken on this topic. The findings were broadly consistent with hypotheses and previous research, with results showing that age, sex, relationship status, narcissism, as well as self-esteem contributed significantly to the explained variance (17.5%) in addictive use of social media. However, the effect sizes were generally modest and questions their practical importance in terms of predicting the construct.

4.1. The role of demographic factors

Demographics alone (entered in Block 1) explained 11.9% of the variance of addictive social media use in the regression analysis. In short, the study's findings demonstrated that those who were young, women, not in a relationship, a student, and less educated (primary school) tended to report higher scores on the social media addiction scale. Consequently, the first hypothesis was supported by the empirical data.

The effect size for sex was considered as small-to-medium, thus substantially meaningful, with women having higher addictive social media use score. This finding suggests that women are more at risk in developing addictive behaviors to activities involving elements of social interaction, whereas men tend to develop problematic use of more asocial and/or solitary activities (e.g., video gaming) (Andreassen et al., 2012, 2013; Kuss et al., 2014; Van Deursen et al., 2015). These findings confirm previous studies (Andreassen, 2015; Griffiths et al., 2014), although some studies have not reported social media is more prevalent among women (e.g., Çam & Isbulan, 2012; Ryan et al., 2014). Therefore, future studies should more specifically assess whether some online activities (e.g., connecting with existing contacts, forming new relationships) are more problematic and addictive to specific sexes.

The study also found – and in line with previous research – that younger people were more affected by addictive use of social media than older people (Andreassen, 2015). The effect size was between small and medium, thus contributes meaningfully to our understanding of addictive social media use. As noted earlier in the paper, this has good face validity as the new younger generation (the so-called 'digital natives' and 'screenagers' [Griffiths, 2010]) often uses such technologies in order to acquire, develop and maintain relationships, and may seek feedback on their behaviors and online persona as a way of forming and/or enhancing their social identity (Allen et al., 2014; Ryan & Xenos, 2011). Young people may also be more familiar with – and willing to learn about – new technological solutions and platforms (Andreassen & Pallesen, 2014).

Finally, it was hypothesized (and demonstrated) that those not in a current relationship would report higher levels of addictive social media use. However, although the findings were statistically significant, the impact of relationship status on addictive social media use was very small (and not likely to be meaningful in the current analysis), and therefore without any practical importance.

The measures of effect sizes clarified the "meaningfulness" of the significance of demographic variables. Effects in terms of relationship status, education, student status, and income, are likely better represented by age. That is, younger people are more likely to use the Internet, be unmarried, have lower education, be a student, and have lower income compared to older people. Any significance beyond age is thus likely an artifact of the relationship between age and Internet use – therefore the other demographic variables probably do not meaningfully contribute to our understanding of addictive use of social media in the current analysis. This notion is also supported by the low beta weights for all demographic variables beyond age and sex.

4.2. The role of narcissism

Narcissism was positively related to addictive use of social media, and appeared to have a small-to-medium sized effect after controlling for basic socio-demographics – thus being meaningfully related to the construct. This was in line with both the second hypothesis and previous research (Andreassen, 2015). *Facebook*, *Instagram*, *Snapchat* and other social media applications may serve as ideal social arenas for individuals who appreciate and are attracted to engaging in ego-enhancing activities (Ryan & Xenos, 2011; Wang et al., 2012), as they enable individuals to bolster their egos on the basis of instant feedback from potentially large numbers of other individuals. It could therefore be speculated that individuals with elevated narcissistic traits use social media excessively because these online platforms may fulfill a need for affiliation and confirms the sense of an idealized self. This is in line with studies showing that narcissism is positively related to profile updates regarding accomplishments, diet, and exercise (Marshall, Lefringshausen, & Ferenczi, 2015).

4.3. The role of self-esteem

The study's third and final hypothesis was supported by the empirical data because self-esteem was negatively related to addictive use of social media. More specifically, the effect size was medium, and the largest in the present study, and therefore substantially and meaningfully related to the construct. This is also in keeping with previous research (Hong et al., 2014; Malik & Khan, 2015; Wang et al., 2012; Wilson et al., 2010), and may imply that people use social media in order to obtain higher self-esteem (e.g., harvesting "likes"), and/or to escape from feelings of low self-esteem. People with low self-image, may also prefer communicating online instead of face-to-face. However, due to the cross-sectional nature of the data, the directionality is impossible to discern. Addictive social media use may by a consequence and/or a predictor of low self-esteem.

4.4. Study limitations and strengths

This study entails all the common shortcomings involved using an open access sampling methodology (e.g., self-selection bias, lack of

information about non-respondents, unknown response rate, etc.). Self-selection in web-based surveys may negatively influence representativeness (e.g., Khazaal et al., 2014) – as also indicated by the preponderance of young people and women in the present sample. Corresponding data on marital status and education were unavailable on the population level, but the included age and sex groups differed significantly from the population estimates ($p < 0.0001$). Age and sex were included as independent variables in the regression analyses and were adjusted for accordingly. However, the results associated with age and sex may still be skewed.

Furthermore, the study survey appeared in online newspaper articles about excessive behaviors, and may have attracted and potentially caused an overrepresentation of certain groups/participants concerned about their social media use such as young people and excessive online users. Consequently, the findings may not be generalizable and the study would arguably profit from collecting data on the time participants spent online. The method of measuring "relationship status" (in a relationship = married, common law partner, partner, boyfriend or girlfriend; not in a relationship = single, divorced, separated, widow or widower) may also be a limitation as this approach provide little differentiation between subgroups on this variable.

The cross-sectional study design also places restrictions on drawing causal effects – hence the directionality may very well be the other way around. Given that all the data were based on self-report and collected via a cross-sectional design, the findings may also have been influenced by the common method bias (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). Due to the large sample size providing power to the analyses, several small correlations may have turned out significant. Although some of the significant findings may reflect trivial relationships due to the large sample size (especially with regards to demographics excluding age and sex), some effect sizes in the regression analysis were relatively moderate, suggesting some substantial and meaningful relationships between study variables.

On the other hand, the very large sample size also represents one of the key strengths of the present study, as well as the use of validated instruments in assessing the study's key variables. A generic social media addiction instrument was also used, thus answering the call for such a measure (Griffiths et al., 2014), rather than focusing on one single social network site. Another strength of this study was that the survey was administrated in nationwide newspapers, and not local ones. These newspapers are also known for having very different reader groups. Hence, the sample probably represents a wide range of Norwegian people and is more representative than other studies that have used self-selected (e.g., often student) samples. This is also supported by the fact that 95% of the Norwegian population has Internet access (International Telecommunication Union, 2013), and are regarded as frequent newspaper readers (World Association of Newspapers and News Publishers, 2011).

Future research should combat the aforementioned shortcomings by using longitudinal designs with representative samples. Conducting a longitudinal study would better address the directionality between variables, as well as building models related to assumed relationships between study variables and testing these by appropriate analyses.

4.5. Conclusions

Overall, the present study suggests that basic demographic variables (primarily age and sex), narcissism, and self-esteem are all associated with addictive use of social media. Addictive social media use was related to lower age, being a woman, not being in a relationship, lower education, being a student, lower income, having narcissistic traits, and negative self-esteem. Conjointly, these variables had a moderate effect on addictive use of social media, while their relative importance was small overall. After controlling for all other variables in the equation, low self-esteem had the strongest effect on addictive social media use, followed by being a woman, narcissism, and lower age. Although using social media is a normal and widespread modern behavior, individuals with some of these characteristics could be targets for interventions with the aim of preventing addictive and destructive online participation. More research, preferably using representative and clinical samples, on these poorly studied relationships is warranted.

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