

# Focus on self-presentation on social media across sociodemographic variables, lifestyle, and personality: A cross-sectional study

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## Research Article

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# Abstract

Aspects of self-presentation on social media such as feedback-seeking, strategic self-presentation, and social comparison, may represent risk factors for experiencing negative mental health effects of social media use. The aim of this exploratory study was to assess how adolescents differ in aspects of self-presentation on social media, and whether these differences are linked to sociodemographic variables, lifestyle, or personality. The study was based on a cross-sectional survey performed in Bergen, Norway, and included 2,023 senior high school pupils (response rate 54%, mean age 17.4, 44% males). Nine self-presentation items were assessed using factor analysis, and latent class analysis was used to identify latent classes with distinct patterns of responses across the seven retained items. Associations between identified latent classes and covariates were assessed using regression analyses as well as non-parametric approaches. The self-presentation items converged into one factor, called 'focus on self-presentation'. We identified three groups of adolescents with low, intermediate, and high focus on self-presentation. Membership in the high-focus group was associated with female gender, higher extraversion, lower emotional stability, more frequent alcohol consumption, and having tried tobacco. These results suggest some characteristics that are associated with a higher focus on self-presentation and that could inform targeted interventions.

## 1. Introduction

Social media are widely used and the most popular social media platforms have up to 2.9 billion active users [1]. Social media “employ mobile and web-based technologies to create highly interactive platforms via which individuals and communities share, co-create, discuss, and modify user-generated content” [2, p. 1]. Adolescents are particularly active users, with nearly half saying that they use social media “almost constantly” [3]. Among Norwegian 16–18 year-olds, nearly 100% are on social media [4] and 77–79% of senior high school students spend a minimum of three hours on social media every day [5].

There is a growing literature on the potential consequences of adolescents' social media use [6]. Overall, meta-analyses point to a small negative effect of social media use on adolescents' mental health and well-being [7, 8]. However, most of these studies have focused primarily on the duration and frequency of social media use [6, 7, 9], and provide little insight into how specific types of social media use may be differentially related to mental health and well-being [7]. Some studies have, however, demonstrated that the associations between social media use and mental health depends on the type of use [10–12], the motivations for use [13], and the emotional investment in social media [14–17].

One important aspect of social media use that has gained research attention regarding effects on mental health is self-presentation [18]. Self-presentation is the innate tendency of attempting to manage how other people perceive us [19], and entails putting up a desired image of oneself with the hope of gaining positive feedback and social approval from others [20, 21]. Social media affordances allow users to self-present when and how they want, with the potential to reach a wide audience. The influential dual-factor model proposed by Nadkarni & Hofman [22] posits that alongside the need for belonging, the need for self-presentation is a fundamental motivation for using social media.

On social media, feedback comes in the form of likes, comments, and other indicators of approval or disapproval. In order to elicit a more favourable response, people may engage in strategic self-presentation, such as editing photos or deleting content that does not receive the desired number of likes [23]. Self-presentation on social

media which is motivated by getting positive feedback, referred to as feedback-seeking or status-seeking, has been associated with negative outcomes such as depressive symptoms [24], lower body satisfaction, and lower well-being [13]. Feedback-seeking has also been reported to be associated with lifestyle factors such as substance abuse and sexual risk behaviour [23]. In order to create a favourable impression on others and gain positive feedback, some people may present themselves in an inauthentic or more idealized manner. Inauthentic self-presentation on social media has been associated with elevated levels of social anxiety and lower self-esteem [25]. Others may self-present in a way that reflects their true or core self, which has been associated with increased levels of self-esteem and perceived social support. Social media may also function as a social arena for expressing aspects of the self that are considered unwanted in offline social networks, thus allowing people to engage in a more authentic self-presentation online than offline [26].

Social comparison is a central phenomenon when considering self-presentation on social media. Social comparison is the tendency to compare ones abilities and opinions to other people to gain information about how we are doing relative to others [27]. Upward social comparison happens when one compares oneself to someone who is viewed as better in some respect. It has been argued that people tend to emphasize desirable characteristics on social media [28], and thus social media is dominated by idealized and unrealistic presentations of peoples' lives (and looks). One study found that social media users generally assumed that other users have more friends, are happier, and have better lives than themselves [29]. In addition, by following a large number of people on social media, the reference group to which adolescents compare themselves may include a very large number of people and even high-status celebrities and "influencers" [30]. Consequently, social media is a fertile ground for upward social comparison. Upward social comparison has been associated with more depressive symptoms [24] and body dissatisfaction among adolescents [31], and with suicidal ideation among young adults [12, 32]. One recent study found that increased levels of feedback-seeking and social comparison was associated with more depressive symptoms, anxiety, and reduced well-being among adolescents [33].

Taken together, aspects of self-presentation on social media such as feedback-seeking, strategic self-presentation, and social comparison, may represent risk factors for experiencing negative effects of social media use. Importantly, it is likely that individuals differ in the importance they place on social media feedback and how much they engage in upward social comparison. For example, adolescent girls have been found to report higher levels of feedback-seeking and social comparison than boys [24, 33]. They have also been shown to post more self-focused images ("selfies") than adolescent boys, and to be more focused on their physical appearance and more concerned about peer-feedback [34]. Additionally, research on personality traits has shown that agreeableness and conscientiousness are associated with a lower likelihood of using Facebook to seek attention from others [35], and that neuroticism is associated with the tendency to present an idealized or inauthentic version of oneself [25]. Increased knowledge about individual differences in self-presentation on social media may help identify those at risk of negative effects of their social media use. The aim of the present study was to explore how adolescents differ in aspects of self-presentation, including feedback-seeking and social comparison, and to assess whether such differences were associated with sociodemographic variables, lifestyle, and personality.

## 2. Methods

### 2.1 Study design and setting

The present study was based on cross-sectional data from an online survey conducted in Bergen, Norway in 2020. Bergen is the second-largest city and a municipality in Vestland county in Western Norway, with a population around 300,000. All senior high school pupils in Bergen municipality of 16 years or older were invited to complete the survey. The survey was completed during school hours in collaboration with school personnel. Pupils from 12 schools participated, while two schools did not have the capacity to prioritize the survey and declined participation. Thus, a total of 3,959 pupils were invited to participate in the survey, of which 2,116 accepted to participate (54%). Those with missing data on gender and/or age were excluded from the analyses ( $n = 71$ ), and those reporting non-binary gender were excluded due to privacy concerns ( $n = 13$ ), leaving a total number of respondents of 2023.

## 2.2 Variables

### 2.2.1 Social media use: Background information

To assess the participants' frequency of social media use, we asked them the following question: "How often do you use social media?" The response alternatives were "almost never", "several times a month, but rarer than once a week", "1–2 times per week", "3–4 times per week", "5–6 times per week", "every day", "several times each day", and "almost constantly". For the purpose of the present study, we differentiated between "daily or less" (21%), "many times a day" (51%), and "almost constantly" (28%). To assess participants' duration of social media use, we asked the following question: "On the days that you use social media, approximately how much time do you spend on social media?" The response alternatives ranged from "less than 30 minutes" to "more than 5 hours". For the purpose of this study, we differentiated between "<2 hours" (28%), "2–4 hours" (36%), "4–5 hours" (21%), and ">5 hours" (14%).

### 2.2.2 Self-presentation

To assess aspects of participants' self-presentation on social media, they were asked to indicate how much the following claims pertained to them:

1. I use a lot of time and energy on the content I post on social media
2. It is important to me that my posts receive many likes and/or comments
3. It is important to me to have many followers on social media
4. I delete posts on social media that do not receive enough likes and/or comments
5. I retouch pictures of myself to look better before I post them on social media
6. It's easier to be myself on social media
7. What others post on social media (images/status updates/stories) makes me feel less content with myself and my life
8. The response I get for what I post (images/status updates/stories) impacts how I feel
9. I don't care about how many likes or comments I receive on social media

The response categories were “not at all”, “very little”, “sometimes/partly true”, “a lot” and “very much”, coded 1–5. The self-presentation items were developed based on focus group interviews with adolescents attending senior high school [36]. See Skogen et al. [33] for a more thorough description of the item development process.

## 2.2.3 Sociodemographic and background variables

The participants reported age and gender, which education programme they attended, and their country of birth. In Norway, pupils can choose a study preparation programme to achieve a general university admissions certification, or a vocational education leading to vocational competence in skilled trades. Subjective socioeconomic status (SES) was assessed using the following question: “How well off do you consider your own family to be compared to others?” The response categories ranged from 0 (“Very poor”) to 10 (“Very well off”). For this study, age was recoded so that all participants of 18 years or more (max 21) were combined into one group (18+). SES was recoded to a tripartite variable of low SES (scores 0–4; 6.2%), medium SES (5–7, 51.3%), and high SES (8–10, 42.4%).

## 2.2.4 Lifestyle factors

The participants indicated how often they exercised each week, following this description of exercise: “By exercise we mean that you go for a walk, go skiing, swimming, or other exercise activities/sports”. Response alternatives were: “Never”, “less than once a week”, “once a week”, “2–3 times a week”, “4–6 times a week”, “about every day”. The variable was dichotomized to “low/moderate exercise” (2–3 times a week or less; 57%) and “high exercise” (4–6 times a week or more; 43%).

The participants were asked how often they drank alcohol, smoked cigarettes, and used snus (under-lip smokeless tobacco). The participants indicated how often they normally drink over a two-week period, and a variable with four levels was created: Never tried alcohol (“Never”; 24%), less often than once in two weeks (“Rarely”; 28%), 1–2 times in two weeks (“Regularly”; 41%), and more often than 2 times in two weeks (“Often”; 7%). For cigarettes and snus, the response alternatives were combined, and the variables dichotomized in order to compare those who had ever tried cigarettes (39%) or snus (36%), with those who had not (61% for cigarettes, and 64% for snus).

## 2.2.5 Personality

Personality was assessed using the Ten-Item Personality Inventory (TIPI) [37]. The TIPI measures the Big Five personality dimensions of extraversion, agreeableness, conscientiousness, emotional stability, and openness to new experiences using ten items measuring two opposing traits for each dimension. The ten items are preceded by the heading “I see myself as”, followed by trait descriptive adjectives. The response categories range from 1 (strongly disagree) to 7 (strongly agree). Each participant received a total score for each personality trait by recoding the reverse-scored items and taking the average of the two items. For the purpose of this study, we created tripartite variables for each personality trait denoting a low (1st -33rd percentile), moderate (34th -66th percentile), and high (67th -100th percentile) score on each trait. In our sample, the proportion scoring low, moderate, and high was 32%, 35%, and 33% for extraversion, 25%, 33%, and 41% for agreeableness, 29%, 38%, and 33% for conscientiousness, 28%, 34%, and 37% for emotional stability, and 28%, 44%, and 28% for openness.

## 2.3 Analysis

Nine responses were excluded from the analyses as they were duplicates (i.e., completed the survey twice).

### 2.3.1 Structural validity of the self-presentation items

Exploratory factor analysis was used to examine the number of underlying factors in the self-presentation scale, and internal validity was assessed by Cronbach's alpha, using the 'jmv' package in R [38]. A confirmatory analysis (CFA) was performed using the 'lavaan' package in R [39].

## 2.3.2 Identifying the number of classes and description of retained classes

Latent class analysis (LCA) was used to identify classes of participants sharing similar response patterns on the items of the self-presentation scale [40]. LCA is person-centred, model-based, and assumes a parametric statistical model and uses the observed data to estimate parameter values for the selected model [41]. Several statistical criteria were used to establish the most appropriate number of latent classes. For the Akaike information criterion (AIC) and Bayesian information criterion (BIC), lower values indicate better model fit [42]. Relative entropy (range 0–1) assesses the quality of classification, where a higher value indicates better discrimination between the classes, and the Lo-Mendell-Rubin ad hoc adjusted likelihood ratio test (LMR-LR) indicates whether a given model performs better than a model with  $k-1$  classes. The LCA was performed using the 'poLCA' package in R [43], while relative entropy and LMR-LR was calculated using Mplus [44].

## 2.3.3 Class belongingness and covariates

Multinomial logistic regression was used to assess the relationship between class membership and sociodemographic variables, lifestyle, and personality, and expressed in relative risk ratios with corresponding 95% confidence intervals. The multinomial logistic regression was performed using the 'nnet' package in R [45]. The associations were estimated separately for each covariate. For SES and personality, linear regressions using z-scores were run to corroborate findings from the multinomial logistic regressions. For non-normal data, Kruskal-Wallis rank sum test and Wilcoxon rank sum test were used.

## 2.3.4 Missing data

There were some missing data for the self-presentation data (from 2.8% on "followers important" to 4.9% on "I don't care"). For the CFA, listwise deletion is the default [46]. In the LCA, cases with missing values are retained and class membership is estimated based on the available information [43]. In all analyses of associations, pairwise deletion was used to retain as much of the data as possible.

## 3. Results

Mean age of the sample was 17.36 years (SD 0.85) and 56% were female (Table 1).

Table 1 Sociodemographic and background variables across gender

	Male (N = 899, 44%)	Female (N = 1124, 56%)	Total (N = 2023)	P-value
<b>Age*</b>				0.133
Mean (SD)	17.32 (0.85)	17.38 (0.85)	17.36 (0.85)	
<b>Study year<sup>§</sup></b>				0.005
1	16 (1.8%)	8 (0.7%)	24 (1.2%)	
2	493 (55.2%)	566 (50.5%)	1059 (52.9%)	
3	384 (43.0%)	547 (48.8%)	931 (45.2%)	
<b>Type of study<sup>§</sup></b>				< 0.001
Study preparation	674 (75.2%)	966 (86.0%)	1640 (81.2%)	
Vocational	222 (24.8%)	157 (14.0%)	379 (18.8%)	
<b>Country of birth<sup>§</sup></b>				0.154
Norway	819 (91.3%)	1005 (89.4%)	1824 (90.2%)	
Other country	78 (8.7%)	119 (10.6%)	197 (9.8%)	
<b>Self-reported SES*</b>				< 0.001
Mean (SD)	7.43 (1.76)	6.98 (1.75)	7.18 (1.77)	
Range	0.00–10.00	0.00–10.00	0.00–10.00	
Note. SES = socioeconomic status				
*Linear model ANOVA				
<sup>§</sup> Pearson's Chi square test				

Table 2 shows the frequency and duration of social media use in total and separately for males and females. There were significant differences between males and females in frequency and duration of use. Eighty-three percent of the females indicated that they used social media several times each day or 'almost constantly', compared to 74% among males.

**Table 2** Frequency and duration of social media use across gender.

	Males (N = 899)	Females (N = 1124)	Total (N = 2023)	p value
<b>Frequency of use</b>				< 0.001
Daily or less	226 (25.51%)	190 (16.95%)	416 (20.73%)	
Many times a day	439 (49.55%)	582 (51.92%)	1021 (50.87%)	
Almost constantly	221 (24.94%)	349 (31.13%)	570 (28.40%)	
<b>Duration of use</b>				< 0.001
<2 hours	320 (36.32%)	246 (22.02%)	566 (28.33%)	
2–4 hours	326 (37.00%)	402 (35.99%)	728 (36.44%)	
4–5 hours	134 (15.21%)	284 (25.43%)	418 (20.92%)	
>5 hours	101 (11.46%)	185 (16.56%)	286 (14.31%)	
Note. Differences between groups assessed using Pearson’s Chi-squared test.				

## 3.2 Structural validity of the self-presentation items

The correlation matrix including the nine self-presentation items revealed that the item “It is easier to be myself on social media” and “I don’t care about how many likes or comments I receive on social media” had no correlations with other items of  $> .30$ , suggesting that these items should be excluded. The correlation matrix is available as supplementary material (Table S1). The seven remaining self-presentation items were subjected to an exploratory factor analysis (EFA) with no rotation, using principal axis factoring as the data had a non-normal distribution. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.86, verifying the sampling adequacy of the analysis [47]. Bartlett’s test of sphericity  $\chi^2(21) = 6993, p < .001$ , supported the factorability of the correlation matrix. The eigenvalue was 3.59 for one factor, and dropped to 0.27 for two factors, strongly suggesting a unidimensional scale. With one factor, the model explained 51% of the variance.

A CFA was completed with the 7 retained items. Item 2 (likes important) and 3 (followers important), and item 6 (others posts impact feelings) and 7 (response impacts feelings) had highly correlated error terms, and these correlations were allowed in the final model. The CFA resulted in a Comparative Fit Index (CFI) of 0.999, a root mean square error of approximation (RMSEA) of .050 (95%CI .039-.062,  $p = .489$ ), and a Standardized root mean square residual (SRMR) of 0.021, all signalling good fit [48]. The loadings of item 1–7 varied from 0.60 (item 6: “others’ posts affect feelings”) to 0.92 (item 2: “likes are important”) with a mean of 0.77 (Fig. 1).

[Insert Fig. 1 here]

## 3.3 Number and characteristics of latent classes

In the LCA, models with 1–7 latent classes were run with 50 repetitions each, with random starting values to assess model identifiability [49]. Table 3 shows the fit for models with 1–5 latent classes. AIC, BIC, and relative entropy all improved up to 3 classes, after which they decreased only slightly. The LMR-LR indicated a statistically significant improvement of the model when moving from a 2-class to a 3-class model, and no improvement when

moving to a 4-class model. Based on these fit criteria and a visual inspection of the meaningfulness of models with 2, 3, 4, and 5 classes, a 3-class solution was chosen.

**Table 3** AIC, BIC, relative entropy and LMR-LR for 1–6 classes in the latent class analysis

Number of classes	AIC	BIC	Relative entropy	LMR-LR
1	34358.99	34526.14	-	-
2	29549.39	29914.30	0.904	P < .001
3	<i>28306.27</i>	<i>28788.93</i>	0.879	P < .001
4	27902.47	28547.89	0.878	P < .759
5	27687.25	28495.43	0.877	P < .759

Note. Data in italics indicates the best fitting model relative to the other models tested

AIC = Akaike information criterion; BIC = Bayesian information criterion; LMR-LR = Lo-Mendell-Rubin ad hoc adjusted likelihood ratio test.

The classes represent self-presentation patterns across the seven self-presentation items. The predicted class membership by modal posterior probability was 42% in class 1, 33% in class 2, and 25% in class 3. Figure 2 shows the distribution of most probable responses for each item in each of the three latent classes. Table 4 shows the probability of endorsing (i.e., responded “sometimes/partly true” or higher) the items for each class. In the first class, there were low probabilities of endorsing the items. The highest probabilities were found for item 1, 6 and 7 (8%, 21% and 9%, respectively). In class 2, the probabilities of endorsing the items ranged from 5–46%, where items 1, 2, and 6 had the highest probabilities of endorsement (38%, 38%, and 46%, respectively). In class 3, there were high probabilities of endorsement of all items (29–99%). In this class, the items with the highest probabilities of endorsement were item 2 and 3 (99 and 95%), followed by item 6 (81%). Based on the conditional probabilities results of classes 1, 2, and 3, we named class 1 “Low focus on self-presentation”, class 2 “Intermediate focus on self-presentation”, and class 3 “High focus on self-presentation”.

**[Insert Fig. 2 here]**

**Table 4** The probability of endorsing (i.e., responding “sometimes/partly true”, “a lot”, or “very much”) each of the items across retained classes

	Class 1 (n = 839; 42%)	Class 2 (n = 671; 33%)	Class 3 (n = 513; 25%)
1. I use a lot of time and energy on the content I post on social media	7.5%	38.3%	80.4%
2. It is important to me that my posts receive many likes and/or comments	< 1.0%	38.7%	98.8%
3. It is important to me to have many followers on social media	< 1.0%	24.0%	94.5%
4. I delete posts on social media that do not receive enough likes and/or comments	< 1.0%	5.7%	50.4%
5. I retouch pictures of myself to look better before I post them on social media	< 1.0%	5.1%	29.3%
6. What others post on social media (images/status updates/stories) makes me feel less content with myself and my life	20.9%	46.0%	81.1%
7. The response I get for what I post (images/status updates/stories) impacts how I feel	8.6%	27.7%	76.5%

### 3.4 Class belongingness and covariates

Table 5, 6, and 7 shows the results of the multinomial logistic regression, both with and without controlling for gender. Figures 3, 4, 5 and 6 show the estimated proportions across sociodemographic, lifestyle, and personality variables (not controlled for gender).

**Sociodemographic factors.** Females were more likely to be in higher classes (i.e., higher focus on self-presentation) compared to lower classes for all class comparisons (see Table 5). Those with intermediate SES were more likely than those with high SES to be in class 3 compared to class 1. This association became non-significant when controlling for gender. There was no statistically significant difference in age across classes.

**Table 5 Comparison of class belongingness across sociodemographic variables**

	Class 2 vs class 1 (intermediate vs low focus on self-presentation)	Controlled for gender	Class 3 vs class 1 (high vs low focus on self-presentation)	Controlled for gender	Class 3 vs class 2 (high vs intermediate focus on self-presentation)	Controlled for gender
	RRR (95CI)	RRR (95CI)	RRR (95CI)	RRR (95CI)	RRR (95CI)	RRR (95CI)
<b>Gender</b>						
Male	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Female	2.99 (2.42-3.59)****	-	7.48 (5.77-9.70)****	-	2.50 (1.91-3.27)****	-
<b>Age</b>						
16	0.97 (0.69-1.36)	1.04 (0.73-1.47)	0.99 (0.69-1.43)	1.11 (0.75-1.65)	1.03 (0.70-1.51)	1.08 (0.73-1.59)
17	1.01 (0.81-1.25)		0.96 (0.76-1.25)		0.96 (0.75-1.22)	
18	Ref.	1.06 (0.84-1.32)	Ref.	1.04 (0.81-1.34)	Ref.	0.99 (0.77-1.26)
				Ref.		Ref.
<b>SES</b>						
Low	1.22 (0.78-1.90)	0.97 (0.61-1.53)	1.47 (0.92-2.35)	1.00 (0.61-1.66)	1.20 (0.74-1.95)	1.04 (0.64-1.69)
Intermediate	1.14 (0.92-1.41)		1.41 (1.12-1.77)***		1.23 (0.97-1.57)	
High (ref)	Ref.	1.02 (0.82-1.27)	Ref.	1.17 (0.92-1.50)	Ref.	1.15 (0.90-1.46)
		Ref.		Ref.		Ref.

Note: 95CI = 95% confidence interval; Ref = Reference (base) class for comparison of two classes, RRR = Relative risk ratio. \*p<.05. \*\*p<.01, \*\*\*p<.005, \*\*\*\*p<.001

**Lifestyle.** Compared to those who had never tried alcohol, those who consumed alcohol more than twice in two weeks were more likely to be in higher classes for all class comparisons when controlling for gender (Table 6). Those who consumed alcohol 1–2 times in two weeks were more likely to be in class 2 and 3 compared to class 1, while those who consumed alcohol less than once in two weeks were more likely to be in class 2 compared to class 1. Those who had tried cigarettes or snus were more likely to be in higher classes for all class comparisons. Those with low/moderate physical activity were more likely to be in class 3 compared to class 1, but this association became non-significant when controlling for gender.

[Insert Table 6 here]

**Table 6 Comparison of class belongingness across lifestyle variables.**

Note: 95CI = 95% confidence interval; Ref = Reference (base) class for comparison of two classes, RRR = Relative risk ratio. \* $p < .05$ . \*\* $p < .01$ , \*\*\* $p < .005$ , \*\*\*\* $p < .001$

**Personality.** Compared to low extraversion, those with intermediate or high extraversion were more likely to be in class 2 and 3 compared to class 1 (Table 7). When controlling for gender, those with high agreeableness (vs. low agreeableness) had a lower likelihood of belonging to class 3 compared to class 1. For conscientiousness, those with high scores had a lower likelihood of being in class 3 compared to class 1 (when controlling for gender) and class 2. Compared to high emotional stability, those with low or intermediate emotional stability were more likely to be in higher classes compared to lower classes for all class comparisons. When controlling for gender, the increased likelihood of being in class 3 vs class 2 for those with intermediate emotional stability became non-significant. There were no statistically significant differences for agreeableness across classes.

**Table 7 Comparison of class belongingness across personality variables**

	Class 2 vs class 1 (intermediate vs low focus on self-presentation)	Controlled for gender	Class 3 vs class 1 (high vs low focus on self-presentation)	Controlled for gender	Class 3 vs class 2 (high vs intermediate focus on self-presentation)	Controlled for gender
<b>Extraversion</b>						
Low	Ref.	Ref.	Ref.		Ref.	
Intermediate	1.49 (1.15-1.91)***	1.58 (1.22-2.05)****	1.54 (1.17-2.03)***	1.71 (1.28-2.31)****	0.92 (0.68-1.25)	0.96 (0.70-1.31)
High	2.04 (1.57-2.65)****	2.16 (1.65-2.83)****	2.04 (1.54-2.71)****	2.25 (1.66-3.05)****	0.95 (0.73-1.23)	0.98 (0.75-1.28)
<b>Agreeableness</b>						
Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Intermediate	1.07 (0.81-1.40)	0.95 (0.71-1.25)	1.08 (0.81-1.45)	0.87 (0.63-1.19)	1.02 (0.78-1.34)	0.97 (0.73-1.27)
High	1.20 (0.92-1.55)	0.97 (0.74-1.27)	1.05 (0.79-1.39)	0.73 (0.53-0.99)	0.90 (0.67-1.20)	0.78 (0.58-1.05)
<b>Conscientiousness</b>						
Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Intermediate	1.15 (0.89-1.48)	1.09 (0.84-1.42)	1.01 (0.77-1.32)	0.92 (0.69-1.23)	0.91 (0.68-1.21)	0.89 (0.66-1.19)
High	1.29 (0.99-1.67)	1.15 (0.88-1.51)	0.85 (0.64-1.13)	0.71 (0.52-0.96)	0.69 (0.52-0.90)**	0.64 (0.49-0.85)***
<b>Emotional stability</b>						
Low	2.11 (1.61-2.75)****	1.45 (1.09-1.93)*	5.95 (4.39-8.06)****	3.24 (2.34-4.49)****	2.85 (2.03-4.02)****	2.20 (1.54-3.14)****
Intermediate	1.61 (1.27-2.05)****	1.29 (1.00-1.65)*	3.21 (2.40-4.30)****	2.19 (1.61-2.98)****	1.70 (1.18-2.46)***	1.45 (1.00-2.10)
High	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
<b>Openness</b>						
Low	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Intermediate	1.15 (0.89-1.48)	1.15 (0.88-1.49)	0.87 (0.67-1.14)	0.87 (0.65-1.16)	0.98 (0.74-1.29)	0.97 (0.73-1.28)
High						

1.19 (0.90-1.58)	1.28 (0.96-1.71)	0.91 (0.68-1.23)	1.03 (0.75-1.42)	0.90 (0.68-1.19)	0.94 (0.71-1.25)
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Note: 95CI = 95% confidence interval; Ref = Reference (base) class for comparison of two classes, RRR = Relative risk ratio. For emotional stability, high was used as reference category to increase comparability. \* $p < .05$ . \*\* $p < .01$ , \*\*\* $p < .005$ , \*\*\*\* $p < .001$

[Insert Fig. 3 here]

[Insert Fig. 4 here]

[Insert Fig. 5 here]

[Insert Fig. 6 here]

The linear regression with z-scored SES as the dependent variable and class membership as the predictor show that that increasing class membership (i.e., higher focus on self-presentation) is associated with a decrease in SES of -0.08 SD ( $p = .007$ ), which was no longer significant when controlling for gender ( $p = .505$ ). In the linear regression with personality traits (z-scored), extraversion increased by 0.16 SD ( $p < .001$ ; 0.18 SD,  $p < .001$  when controlling for gender) with increasing class and emotional stability decreased by 0.37 SD ( $p < .001$ ; 0.22 SD,  $p < .001$  when controlling for gender). In contrast to the significant comparisons for agreeableness and conscientiousness found in the logistic regression, the linear models for these personality traits, as well as for openness, were not significant.

The non-parametric Kruskal-Wallis rank sum test showed that the three classes differed significantly in terms of SES ( $p = .017$ ). A pairwise comparison using Wilcoxon rank sum test showed that this difference was due to a significantly lower SES in class 3 compared to class 1 ( $p = .014$ ), although the linear regression suggest that this difference is explained by gender differences. There were also significant differences between the classes in mean level of extraversion ( $p < .001$ ), where both class 2 and class 3 had significantly higher mean extraversion scores than class 1 (both  $p$ 's  $< .001$ ). The classes differed significantly also in terms of emotional stability ( $p < .001$ ), where class 2 had significantly lower mean emotional stability than class 1 ( $p < .001$ ) and class 3 had significantly lower emotional stability than class 1 and class 2 (both  $p$ 's  $< .001$ ). There were no significant differences between the classes in agreeableness ( $p = .164$ ), conscientiousness ( $p = .083$ ), or openness to new experiences ( $p = .542$ ).

## 4. Discussion

In this exploratory study, we assessed differences among adolescents in their focus on self-presentation on social media, and whether these differences were related to gender, age, SES, lifestyle factors, or personality. Over 2,000 Norwegian senior high school pupils participated in the study. The results showed that feedback-seeking, strategic self-presentation, and social comparison on social media could be combined into one factor, here called "focus on self-presentation". The experience of it being easier to be oneself on social media did not correlate with the other aspects of self-presentation measured in this study and was excluded from the self-presentation scale. It is possible that this item taps into other aspects of social media use. For example, some people may be less shy

and withdrawn online than offline [50–52], or aspects of the self that are hidden or suppressed in offline interactions can be more freely expressed on social media [53].

The latent class analysis identified three groups of adolescents who varied in their focus on self-presentation. We named the classes “low focus on self-presentation” (class 1), “some focus on self-presentation” (class 2), and “high focus on self-presentation” (class 3). Group membership was associated with gender, lifestyle factors, and personality traits, where female gender, intermediate and high extraversion, low and intermediate emotional stability, consuming alcohol, and having tried cigarettes and snus, increased the likelihood of a higher focus on self-presentation. There was some indication that those with high agreeableness and high conscientiousness were less likely to have a high focus on self-presentation. The associations between focus on self-presentation and SES and between focus on self-presentation and low/moderate physical activity both became non-significant when controlling for gender. Focus on self-presentation was not related to age or the personality trait of openness to new experiences.

Using the same self-presentation items as in the present study, Skogen et al. [33] found a higher focus on self-presentation among adolescent females than males. Our results corroborate these findings, using a larger and more heterogeneous sample (pupils from twelve schools in rural and central areas). Class 1 (low focus on self-presentation) was dominated by males, while class 2 (intermediate focus on self-presentation) and class 3 (high focus on self-presentation) were characterized by successively larger estimated proportions of females. On a similar note, studies have shown that females both post selfies and retouch selfies before posting them to a greater degree than males [11, 54]. The higher proportion of females in class 2 and 3 can be understood in context of the stronger tendency among adolescent females to have a relational orientation and increased reactivity to interpersonal stressors compared to males [55, 56]. Some studies suggest that the association between social media use and negative mental health outcomes is stronger among females [57, 58]. The increased focus on self-presentation may be one contributing factor to this relationship.

There was some evidence for a relationship between SES and group membership, with an increased relative risk of having high focus on self-presentation for those with intermediate as compared to high SES. This relationship, however, became non-significant when controlling for gender. To the authors’ knowledge, no other studies have assessed the relationship between self-presentation and SES, but SES has been related to other aspects of social media use and, more generally, to screen use. For instance, low SES has been associated with social media addiction among children and adolescents [59], and access to media devices in the bedroom is more common among adolescents from low-income families compared to high-income families [60]. Overall, our sample was characterized by relatively high SES, and studies on more diverse populations should be conducted to better illuminate the relationship between focus on self-presentation and SES.

The lack of an association between age and group membership may be due to the limited age range of the participants in this study. Social media use is common from a young age, and among Norwegian children, one fourth of boys and one third of girls use Snapchat already at the age of 9–10 years [4]. Adolescents’ online self-presentation has been shown to change with age [61] and to be influenced by identity development [62]. Among 13–18 year-olds, Fullwood et al. [61] showed that younger adolescents were more likely than older adolescents to present an idealized or false version of themselves online, and to experiment with multiple self-presentations. Among emerging adults, Michikyan [62] found that those high in identity confusion were less realistic, less truthful, and more socially desirable in their self-presentation online than those high in identity coherence.

We found that the personality traits extraversion and emotional stability was associated with class membership. Those with high extraversion were more likely to have a higher focus on self-presentation than those with low extraversion. These findings correspond to the findings of Zywicki & Danowski [63], who found that a larger proportion of extraverts relative to introverts reported that it was important to look popular on Facebook. Associations between extraversion and other aspects of social media use may also be related to the present findings. For instance, meta-analytic evidence has shown that extraversion is positively associated with the amount of social media use [64], the number of friends on social media [65], and using social media for social interaction [66]. One may speculate that extraverts use social media to fulfil their social needs, and that they consequently consider social media as an important part of their social lives and become more focused on how they appear online, compared to introverts.

Emotional stability was even more strongly associated with class membership than extraversion, where the estimated proportions of low, intermediate, and high emotional stability shifted substantially with increasing focus on self-presentation. The proportion of intermediate and low emotional stability increased with higher focus on self-presentation, and high emotional stability decreased. This can be seen in context of the results of Twomey & O'Reilly [25], who showed that neuroticism (i.e., low emotional stability) was associated with individuals' tendency to present an idealized or inauthentic version of themselves online. Neuroticism has also been associated with posting more status updates [67]. More generally, emotional stability is negatively associated with the amount of social media use [64, 66].

For agreeableness and conscientiousness, those with high scores were less likely to have a high focus on self-presentation. This is in line with a study of undergraduate students, where agreeableness and conscientiousness were associated with a lower likelihood of using social media to seek attention from others [35]. Importantly, the associations of agreeableness and conscientiousness were not supported by the linear regression or the non-parametric analyses, and this association is thus less clear than for extraversion and emotional stability. There was no relationship between class membership and openness to new experiences. High scores on openness has been associated with more social media use in studies of adults [66, 68], but as social media use is ubiquitous among adolescents, this personality trait may be a more important predictor of social media use among older people [68].

Finally, our results show that those who consumed alcohol more frequently and those who had tried smoking and snus had increased probabilities of having a moderate or high focus on self-presentation. This finding mirrors the findings of Nesi & Prinstein [23], who demonstrated that digital status seeking (i.e., efforts to obtain likes and comments), was longitudinally associated with substance use. The authors of that study hypothesized that digital status seekers are at risk of engaging in risky offline behaviours that are considered popular among peers, in an attempt to increase their social status [23]. For physical activity, there were increased probabilities of a high focus on self-presentation for those with low/moderate physical activity compared to high physical activity, although not when controlling for gender. To our knowledge, no studies have looked specifically at self-presentation on social media and physical activity, however, studies have shown that low physical activity is associated with smartphone addiction [69] and more generally with high overall screen time [70].

## 4.2 Implications

Grouping adolescents by their focus on self-presentation may be one way to bring structure to the heterogeneity of adolescents' social media use, but further work is needed to assess whether the three-class solution in the present study is relevant in other populations. Given the associations between aspects of self-presentation, such as feedback-seeking and upward social comparison, and negative mental health outcomes [12, 13, 24, 31–33], increasing focus on self-presentation may be associated with a higher risk of mental health challenges. Further work is needed to assess how focus on self-presentation is related to important adolescence outcomes such as mental health, satisfaction with life and educational attainment. Importantly, social media use is likely to differ in other areas than self-presentation as well, however, self-presentation itself seems to be a meaningful dimension that warrants further study. The present results can help identify groups of adolescents that are at risk of experiencing negative effects of their social media use. Our results suggest that among adolescents, female gender, high extraversion, and low emotional stability are associated with an increased risk of being highly focused on self-presentation. Public health interventions promoting healthy social media use could target these groups in particular. Furthermore, it has been hypothesized that self-presentation behaviour on social media triggers an increased dependence on social approval in the form of likes and comments [71]. Thus, efforts to reduce self-presentation behaviour on social media may also reduce focus on self-presentation. Importantly, positive self-presentation, defined as showing positive aspects of the self online has been shown to increase subjective well-being, possibly because it supports a positive self-image [72]. Thus, the relationship between focus on self-presentation, the act of self-presenting on social media, and well-being is complex and needs further investigation.

The present study did not consider how focus on self-presentation may vary across different social media platforms. For example, self-presentation on social media can vary depending on the perceived target audience [73, 74]. In a qualitative study, Taber & Whittaker [74], university students explained that they were more authentic and less socially desirable on social media accounts where only their close friends could access their content. Furthermore, how one self-presents on social media can be influenced by the level of anonymity, the durability of the content [e.g., ephemeral vs. permanent content; 75], and the visibility of the content [73]. It is unclear whether also one's focus on self-presentation, beyond how one self-presents, vary across platforms. As focus on self-presentation is associated with personality traits, it may be assumed that it is a relatively stable individual characteristic. But one may also speculate that some social media platforms augment users' focus on self-presentation, for example platforms with visual content and feedback from others as central features. Thus, it is possible that some of the gender difference in focus on self-presentation is based on gender differences in platform preference, above and beyond any differences in focus on self-presentation between males and females in the first place.

## **4.3 Strengths and limitations**

A strength of the present study is the use of survey items developed based on focus interviews with the target group, increasing the likelihood that the items were relevant to the participants. The data collection is recent, and the study included a large number of participants, allowing for a meaningful investigation of focus on self-presentation on social media and its covariates.

The study also has some important limitations. The study is cross-sectional, which means that we are unable to draw conclusions about cause-and-effect. Furthermore, the participant rate was somewhat low (54%). It is possible that those highly invested in social media completed the survey to a larger extent than those not invested in social media, thus causing a bias in the results. Hence, the estimated proportions of the latent classes should

be interpreted with caution. However, associations are less vulnerable to bias caused by low participation rates than prevalences [76], and the associations between class membership and covariates may be considered valid despite a relatively low participation rate.

As participants were recruited through their school, adolescents not attending school did not have the opportunity to participate in the study. However, the rate of school attendance among Norwegian adolescents is very high, with 94% of 16–18 year-olds attending senior high school [77]. Participants were drawn from a limited geographical area, and the results may not be generalizable to other countries or cultures. For example, Kolesnyk et al. [78] found that deceptive self-presentation for physical attractiveness (e.g., retouching images to increase attractiveness) was lower in countries with more gender equality.

Only one of the self-presentation items asked explicitly about visual self-presentation, specifically about the retouching of photos to look better. Self-presentation may entail photos of oneself, but also photos of friends or activities, sharing music and movies, posting opinions, among other things. Future studies should consider if self-presentation through posting photos of oneself differ from other self-presentation, for example due to links with appearance-related concerns [79–81]. Furthermore, we used the word “retouching”, which may not fully reflect the range of ways adolescents edit their photos. For example, built-in image filters on applications such as Snapchat are frequently used by adolescents but may not have been captured by the question about retouching. Retouching may have been interpreted as more elaborate and advanced photo-editing.

## 5. Conclusion

In this exploratory study, we showed that feedback-seeking, strategic self-presentation, and social comparison on social media converged into one factor, here called “focus on self-presentation”. Using a data-driven approach, we identified three groups of adolescents with low, intermediate, and high focus on self-presentation. Membership in the high-focus group was associated with female gender, higher extraversion, lower emotional stability, more frequent alcohol consumption, and having tried tobacco. Further work is needed to assess how focus on self-presentation is related to important adolescence outcomes such as mental health, satisfaction with life, and educational attainment. However, given the association of aspects of self-presentation with negative mental health outcomes shown in previous research, efforts to reduce focus on self-presentation could be warranted. The present results suggest some characteristics that are associated with a higher focus on self-presentation and that could inform targeted interventions. Importantly, specific social media affordances and the act of self-presentation may augment one’s focus on self-presentation, and these complex associations warrants further investigation.

## Declarations

## Funding

The present study is associated with a larger innovation-project lead by Bergen municipality in Western Norway related to the use of social media and mental health and well-being. The innovation project is funded by a programme initiated by the Norwegian Directorate of Health and aims to explore social media as platform for health promotion among adolescents. Hjetland’s postdoc position is funded by the DAM Foundation and supported by the Norwegian Council for Mental Health (grant number 2021/F0347287). This work was partly

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## Ethical statement

The data collection was conducted according to the guidelines of the Declaration of Helsinki and was approved by the Regional Ethics Committee (REK) in Norway (REK #65611). Eligible participants were informed about the purpose of the study and provided informed electronic consent upon participation. Participants were also informed that participation was voluntary. All invited participants were 16 years or older and were therefore deemed competent to consent on their own behalf.

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## Author contributions

Conceptualization, GJH and JCS; methodology, GJH and JCS; formal analysis, GJH and JCS; investigation, GJH, RTH, and JCS; writing – original draft preparation, GJH and JCS; writing – review and editing, GJH, TRF, BS, IC, RTH, and JCS; visualization, GJH; project administration, JCS. All authors have read and agreed to the published version of the manuscript.

## Conflict of interest

The authors declare no conflict of interest.

## Availability of data and materials

The dataset analysed during the current study are not publicly available, as it contains sensitive information and the ethical approval of the study does not include this option. The dataset will be available from the corresponding author on reasonable request.

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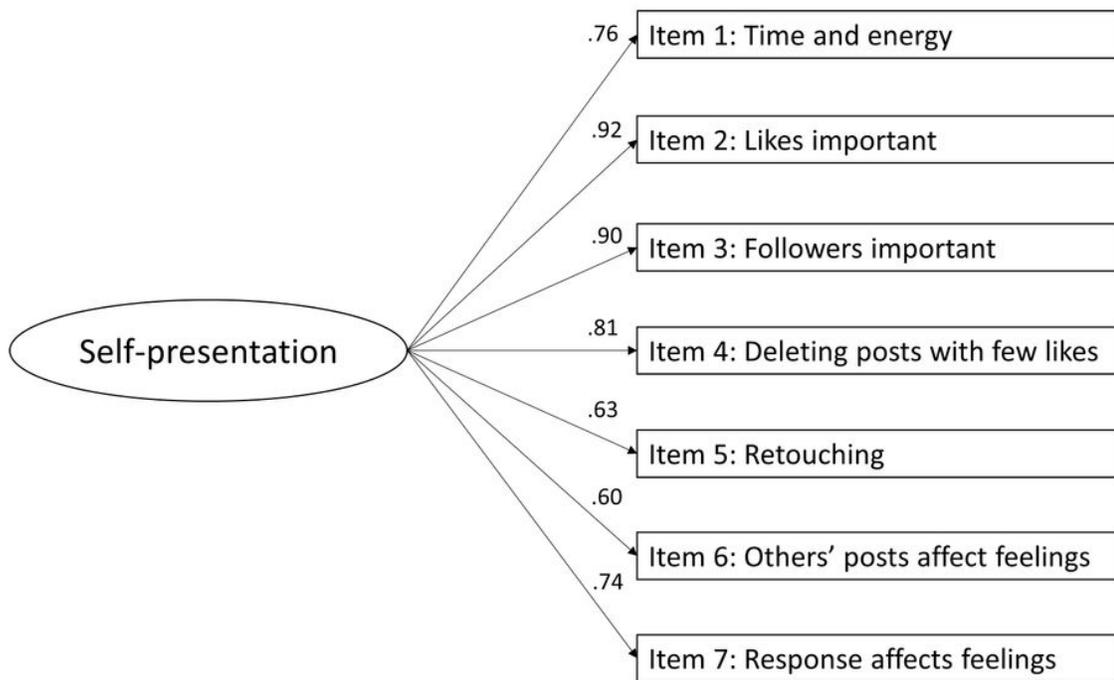
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## Table 6

Table 6 is not available with this version.

## Figures



CFI = .999  
 RMSEA = .050,  $p = .489$

Figure 1

*Results of confirmatory factor analysis: One-factor model with the items 'easier to be myself' and 'I don't care' deleted.*

Note. CFI = Comparative Fit Index, RMSEA = Root mean square error of approximation

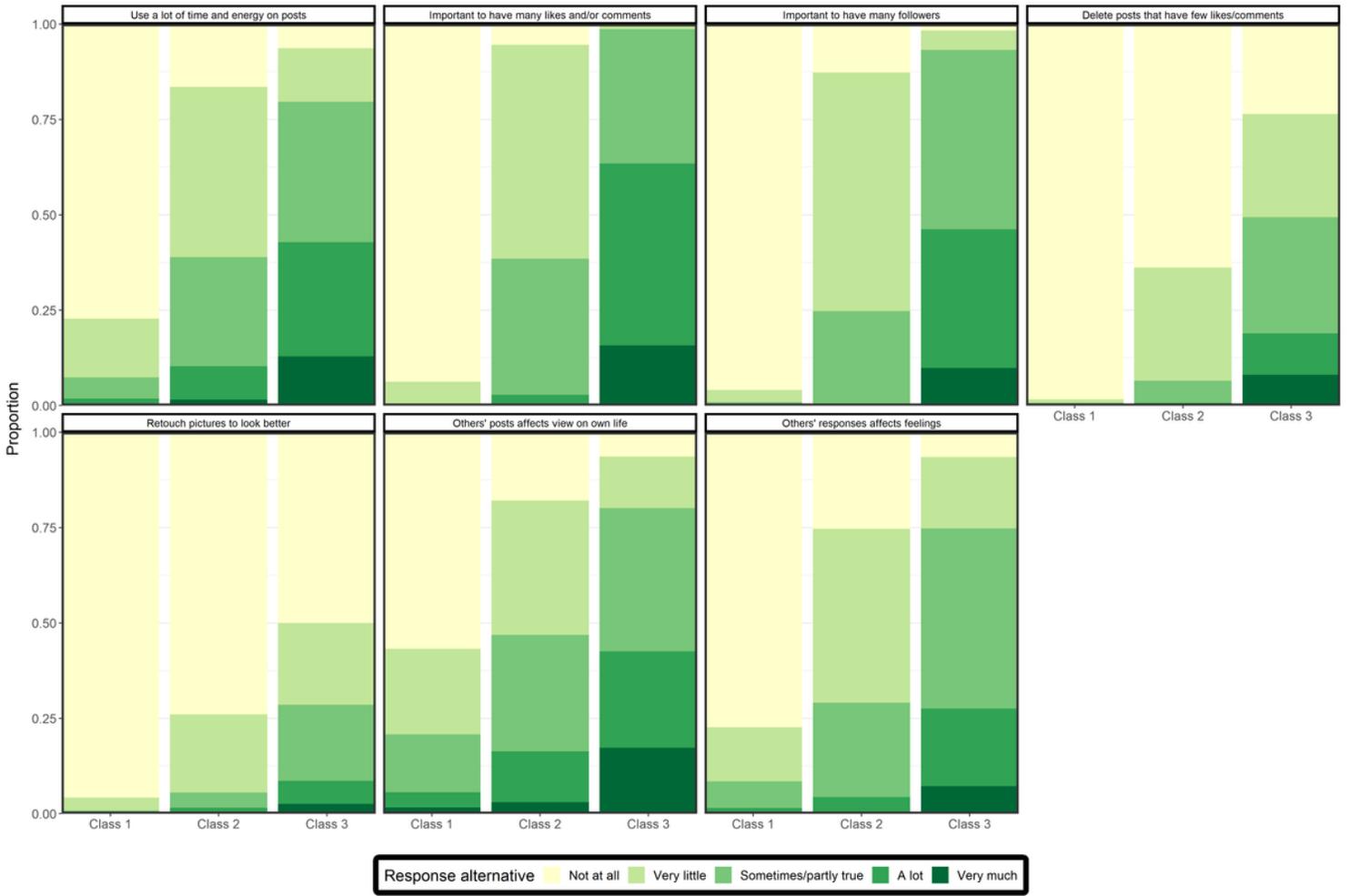


Figure 2

Response probabilities on the self-presentation scale across retained classes

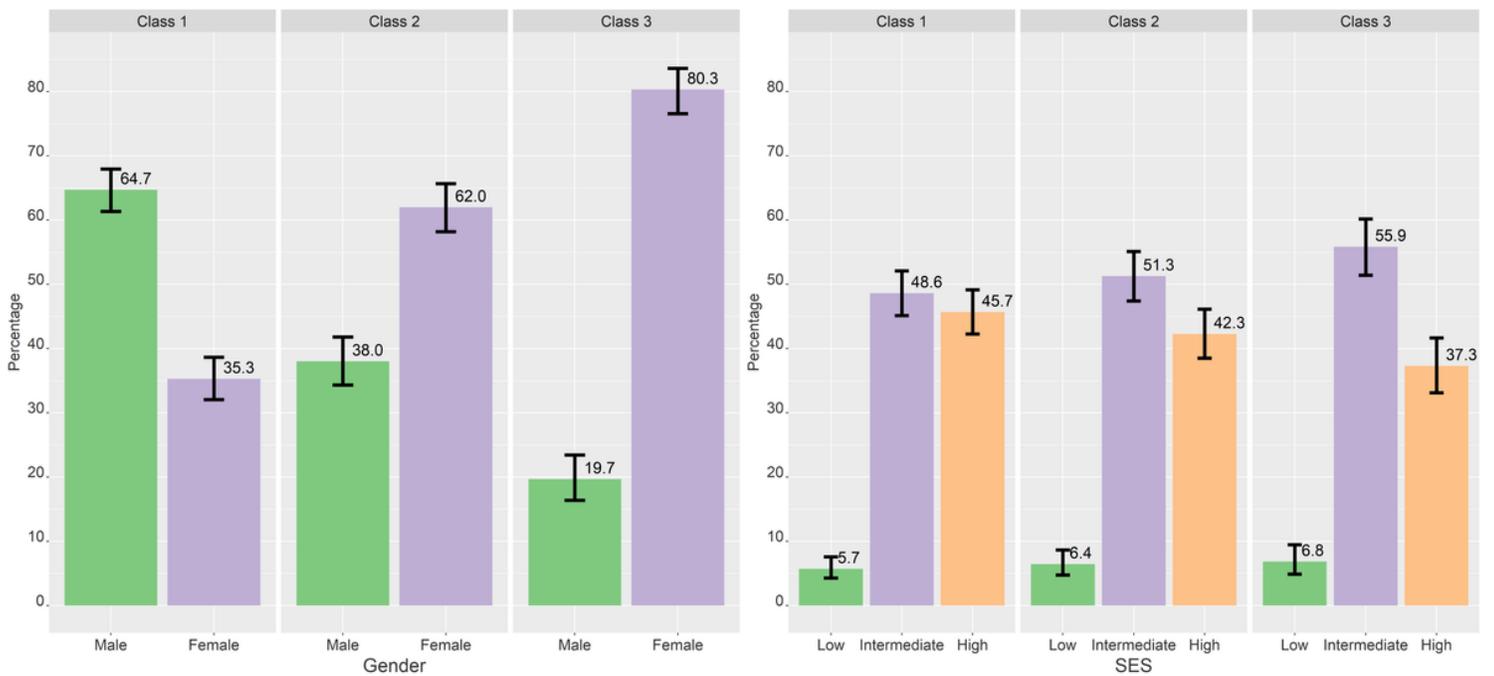


Figure 3

Crude proportions for each class across gender, age, and subjective socioeconomic status

Note: Proportions based on most probable class belongingness. The error bars denote 95% confidence intervals

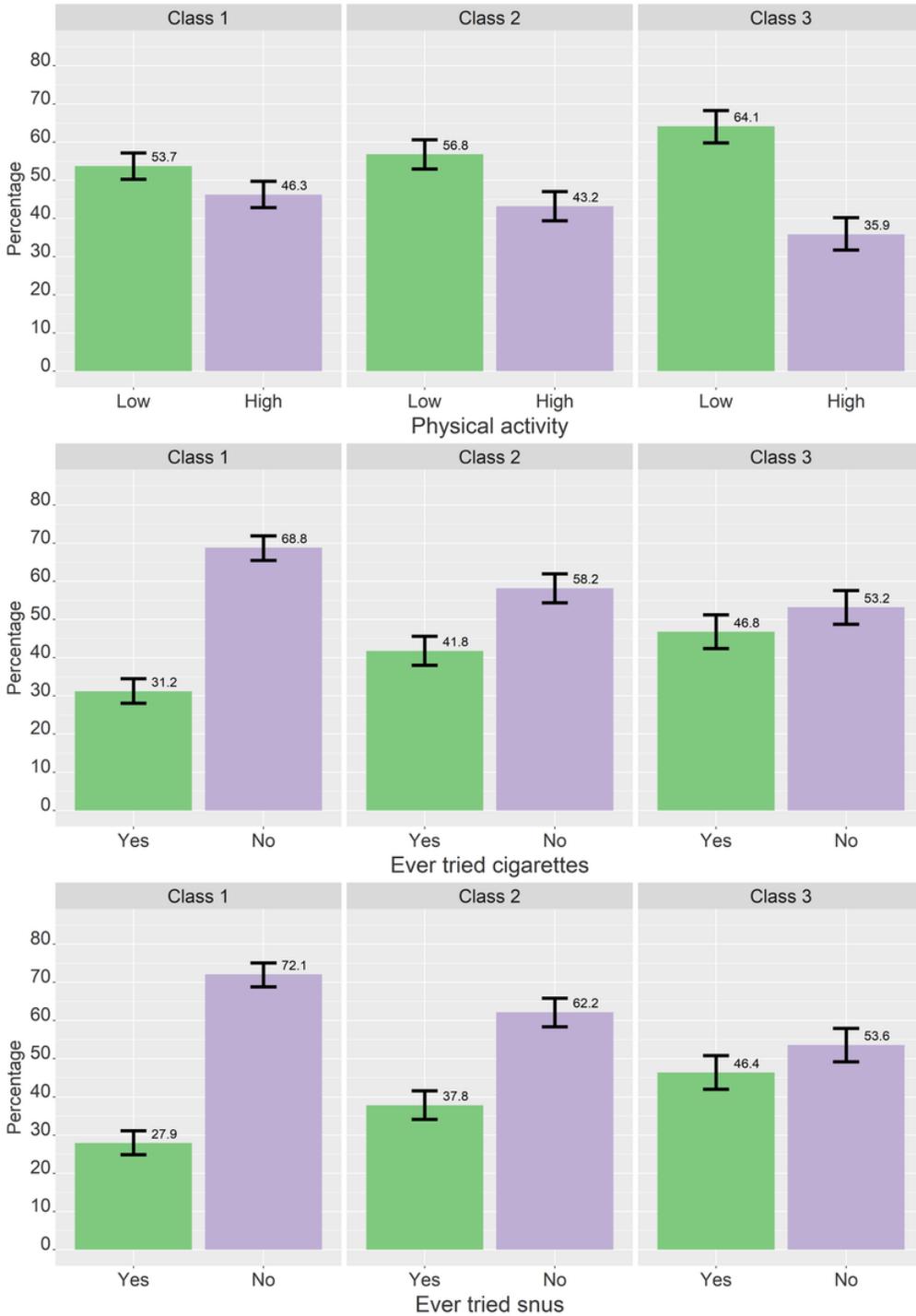
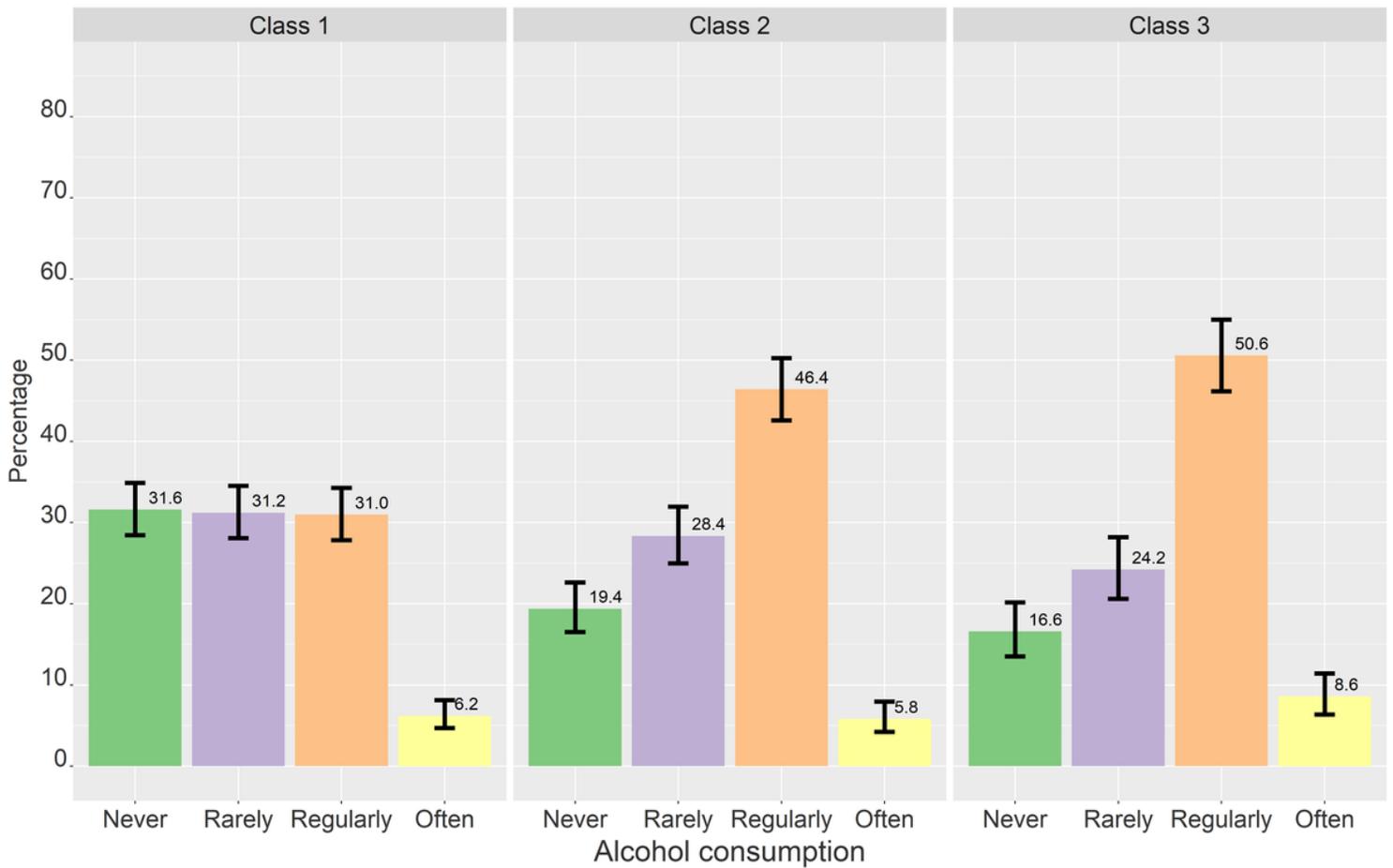


Figure 4

Crude proportions for each class across physical activity, cigarettes (ever tried, yes/no), and snus (ever tried, yes/no).

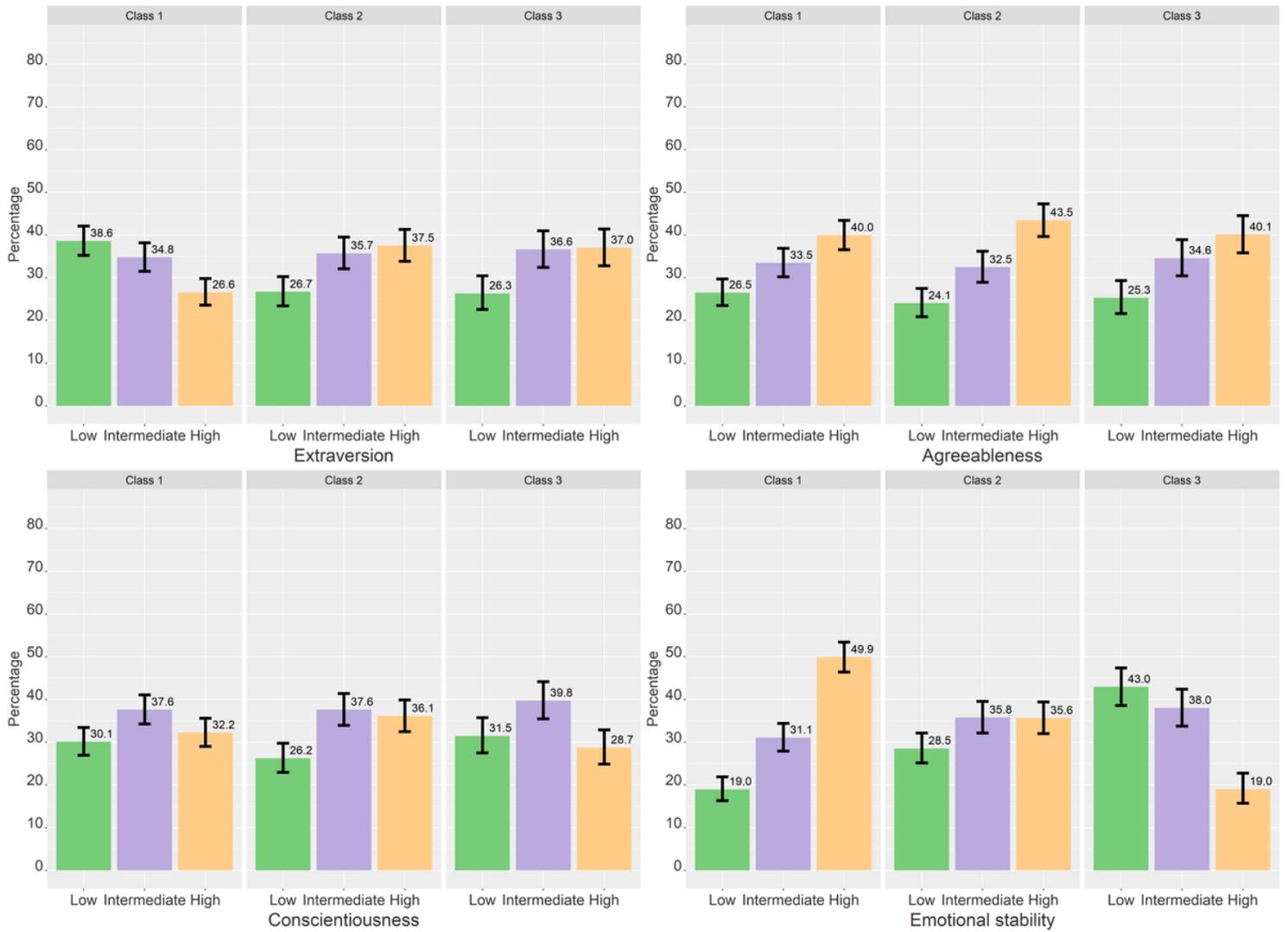
Note: Proportions based on most probable class belongingness. The error bars denote 95% confidence intervals.



**Figure 5**

*Crude proportions for each class across alcohol consumption.*

Note: Proportions based on most probable class belongingness. The error bars denote 95% confidence intervals.



**Figure 6**

*Crude proportions for each class across personality traits.*

Note. Proportions based on most probable class belongingness. The error bars denote 95% confidence intervals.

## Supplementary Files

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