



Article

# The Intersection of Personality Traits and Social Media Usage: Large-Scale Representative Samples of Internet Users in Sweden

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Abstract: This paper aims to explore the relationship between the Big Five model of personality traits and social media usage in a Swedish context. The paper consists of three representative studies of the Swedish population in the age range 16 to 85. In Study 1 (N = 6542), the Big Five personality factors were measured by HP5i. In Study 2 (N = 3322) and Study 3 (N = 3302), the Big Five personality factors were measured by BFI-10. Different personality inventories and time periods for data collection were the basis for the breakdown of the studies. In all three studies, social media usage was measured by a self-reported estimation of frequencies. For each study, correlation matrixes between the study variables were first presented, followed by hierarchical regression analyses to test if personality factors predicted internet users' social media usage. Gender and age were control variables. Over and above the effects of gender and age, all three studies found that social media usage is positively associated with extraversion. The first two studies also found that social media usage is associated with a high degree of openness to experiences and a low degree of conscientiousness. The reliability of the findings is strengthened through different personality inventories, large-scale representative samples of the Swedish population, and replications over time. However, since personality and social media usage vary between different cultures and time periods, caution should be taken in generalizing the results.

**Keywords:** social media; personality; Big Five; inclusive design; digital inclusiveness; digital divides; rich get richer model



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## 1. Introduction

Social media sites, e.g., Facebook, are highly interactive platforms which enable individuals and communities to share, co-create, discuss, and modify user-generated content [1]. The rapid growth of social media during the first decade of the 2000s brought notable changes to the Internet landscape and to human behavior online. A number of popular social media platforms were launched around the turn of the millennium and during the subsequent decade, for instance MSN Messenger in 1999, Myspace in 2003, Facebook in 2004, Twitter in 2006, Instagram in 2010, and Snapchat in 2011.

Since social media has grown continuously since the turn of the millennium, and since social media certainty has had an impact on the human–internet interaction, it might be interesting to know more about what kind of people frequently use social media platforms. The demographic factors regarding social media users (such as age and gender) are well-studied and reported in nationally representative studies, such as the "Pew Internet & American Life Project", Ref. [2] for the U.S. population, and "The Swedes and the Internet", Ref. [3] for the Swedish population. From previous research, it is well-known that social media usage is negatively related to age, and that women are more active than men [4–6].

The psychological factors, such as personality traits, are less considered in nationally representative studies, even if such factors are suggested to be promising for understanding

online human behavior [7]. Studies that have examined the relationship between personality and social media have yielded conflicting results [8] and are largely based on non-representative samples [9–11]. In the present study, we use eight nationally representative and yearly samples (i.e., 2009–2014, and 2019–2020) to examine how personality traits might predict frequency of social media usage. The eight samples are divided into three groups, based on personality inventories and time periods for data gathering. The study design makes it possible to examine consistency between personality traits and social media usage over time and across different personality inventories. In accordance with most previous studies on personality traits and social media usage, the present study will be based on the Big Five model of personality.

## 2. The Big Five Model and Social Media Usage

## 2.1. The Big Five Model

The Big Five model is a broad classification of personality traits that proposes that personality is composed of five major factors; openness to experience, conscientiousness, extraversion, agreeableness, and neuroticism [12]. Within each of these five broad factors, a range of more specific facets are represented.

The tendency to be open-minded and engage in situations that are new to the individual is characterized as openness to experience. Openness to experience includes curiosity and behavior flexibility [12,13]. Openness to experience describes the breadth, depth, and complexity of an individual's mental and experiential life and includes facets such as imagination, aesthetics, and intellect [12,14]. Openness to experience is connected to artistic and investigative interests [15].

Dutifulness, responsibility, and achievement-striving belong to conscientiousness. Efficiency, planning, and self-discipline are characteristics related to conscientiousness [12,13]. A low degree of conscientiousness implies difficulties in controlling impulses, which might have a negative impact on planning and goal-oriented behavior [12,14].

Extraversion is a tendency toward outgoing social behavior, spontaneity, and experiences of positive emotions. Characteristics correlating to extraversion are a high demand for activity, energy, excitement-seeking, and sociability [12–14]. Extraversion relates to social and enterprising interests [15]. A person with a low degree of extraversion is described as introverted [12].

Agreeableness relates to trusting and caring about others, and includes facets such as altruism and tender-mindedness [12]. Characteristics regarding agreeableness include being friendly and showing considerate behavior, as well as avoiding conflicts [12,13]. Agreeableness contrasts with an antagonistic orientation toward others [12,14].

Neuroticism is related to experiencing negative emotions, especially anxiety, and to difficulties coping with stress. Neuroticism represents facets associated with anxiety, nervous tension, and negative affect [12,14]. Neuroticism contrasts to emotional stability, which characterizes relaxed people who behave the same way, regardless of environmental circumstances [13].

## 2.2. The Big Five Model Related to the Use of Social Media

### 2.2.1. Openness to Experience and the Use of Social Media

Previous research has shown that people who are more open to new experiences use social media more frequently [4,8,11]. People with a high degree of openness to experience report and post more on others' walls [16] and use social media to learn about others and to plan offline activities [17]. The positive relationship between openness to experiences and the use of social media might also be explained by curiosity, unconventional attitudes, and willingness to engage in new situations, which characterize people with a high degree of openness to experiences [12,13].

From previous research and the Big Five model, we propose the following hypothesis:

**Hypothesis 1.** Openness to experience is positively related to the use of social media.

#### 2.2.2. Conscientiousness and the Use of Social Media

Regarding conscientiousness, previous research reports mixed findings. Some researchers have found that social media usage is positively associated with conscientiousness [8,11]. The reason is that highly conscientiousness people use social media for professional networking and other work-related tasks [8,11]. In contrast, other researchers have found that highly conscientiousness people avoid social media because it promotes procrastination and serves as a distraction from more important tasks [10,18]. Highly conscientiousness people also have a more cautious nature, which prevents them from posting pictures and comments on social media sites, compared to their more impulsive counterparts [19].

Based on the Big Five model [12], it is plausible that social media could be a tool for efficient and planning people to advance in their careers. On the other hand, based on the Big Five model [12], it could also be seen from the opposite direction—that social media is mainly entertainment and relaxation for people who are not particularly efficient or goal-oriented and who have a low degree of self-discipline and achievement-striving.

Since both previous research and reasoning based on the Big Five model provide support for hypotheses in both directions, we constructed the following undirected hypothesis:

**Hypothesis 2.** Conscientiousness is significantly related to the use of social media.

## 2.2.3. Extraversion and the Use of Social Media

Two different and opposite models for understanding the relationship between extraversion and social media usage have been proposed [20]. The first model, "the social compensation model", suggests that introverts use social media more because they prefer to communicate in online settings rather than offline settings [9,21,22]. The second model, "the rich get richer model", suggests that extraverts use social media more because social media relies on offline networks and allows extraverts to add members to their already rich social networks. This model has been supported by more recent studies, finding that extraversion is positively related to social media usage [4,8,16,18,23–25]. It appears as if recent applications have changed the social media landscape so that it now benefits extraverts rather than introverts [4,23,24]. Accordingly, social media has come to include more and more activities which, according to the Big Five model [12], are especially relevant for highly extroverted people—namely those who strive for excitement and positive emotions.

With recent research in this field and the development of the social media landscape, we have formulated the following hypothesis:

#### **Hypothesis 3.** Extraversion is positively related to the use of social media.

#### 2.2.4. Agreeableness and the Use of Social Media

Regarding agreeableness, previous research reports mixed findings. Some research indicates that social media usage is positively associated with agreeableness [8,19]. Highly agreeable people use social media (i.e., Facebook) in order to fulfill belonging needs, as it enables peer acceptance and relationship development [19]. However, as this trait is associated with conflict avoidance, agreeable people might also avoid social media with its high visibility in order to avoid discussions of a negative nature [26]. The contradictory nature of previous findings gives us limited empirical support, nor does the Big Five model [12] provide much guidance for the relationship between agreeableness and the use of social media. Social media can be used both by people with a high degree of agreeableness to express friendly messages and by people with a low degree of agreeableness to express more hostile messages. Therefore, we formulate the following undirected hypothesis:

**Hypothesis 4.** Agreeableness is significantly related to the use of social media.

#### 2.2.5. Neuroticism and the Use of Social Media

People with a high degree on neuroticism use social media more frequently [4,8]. Highly neurotic people use social media to gain a sense of belonging and as self-therapy to reduce negative emotions [19,27].

According to the Big Five model [12], people with a high degree of neuroticism experience more negative emotions, especially anxiety. Since previous research indicates that people with a high degree of neuroticism use social media to relieve stress and regulate negative emotions, we formulate the following hypothesis:

**Hypothesis 5.** *Neuroticism is positively related to the use of social media.* 

#### 3. Materials and Methods

#### 3.1. Participants and Procedures

The SOM Institute (The Institute for Society, Opinion, and Media) at the University of Gothenburg in Sweden annually surveys attitudes and behavior representing the Swedish population. The research is approved by the National Committee for Ethics in Sweden, and the data are available for academic purposes. All the participants in the survey participated voluntarily. The participants are anonymous and non-traceable.

The data for the present study was gathered in the years 2009–2014, and 2019–2020. Personality traits, in accordance with the Big Five model, were measured through two different inventories: HP5i, during the period 2009–2012, and BFI-10, during the period 2013–2014 and 2019–2020. The eight samples are presented in three studies, based on different personality inventories and time periods. For every year in Study 1 (i.e., 2009– 2012), a postal survey was distributed to 3000 randomly selected Swedish residents in the age range of 16–85. The response rate was 59% in 2009 [28], 61% in 2010 [29], 57% in 2011 [30], and 57% in 2012 [31]. Every year during the period of 2013–2014, a postal questionnaire was sent out to 3200 randomly selected Swedish residents in the age range of 16–85. The response rate was 52% in 2013 [32], and 53% in 2014 [33]. Every year during the period of 2019–2020, a postal questionnaire was sent out to 3200 randomly selected Swedish residents in the age range 16–85. The response rate was 52% in 2019 [34] and 52% in 2020 [35]. Given attrition and missing values, the final total sample size of the study was 13166, with 6542 for Study 1, 3322 for Study 2, and 3302 for Study 3. In total, the mean age was 51.06 (s = 17.96) years of age, with 53.4% women and 46.6% men. In Study 1, among the 6542 respondents, 53.5% were women, and 46.5% were men. The mean age was 50.66 (s = 17.99). In Study 2, among the 3322 respondents, 53.1% were women, and 46.9% were men. The mean age was 51.86 (s = 17.86) years. In Study 3, among the 3302 respondents, 52.5% were women, and 47.5% were men. The mean age was 51.91 (s = 17.85) years.

#### 3.2. Measures

Social media usage was measured with the questions, "How often have you used Social media during the last twelve months?" for which the respondents were asked to indicate their frequency of usage on a seven-point Likert scale, ranging from 1 ("no time") to 7 ("every day").

Personality factors in Study 1 were measured by the HP5i [36]. HP5i is a Big Five Inventory, developed with the intention of predicting longitudinal health outcomes [36]. A total of 15 self-reported items, using a 1–4 Likert scale, comprise this measure. Regarding internal consistency, Cronbach alpha coefficients have previously been checked and reported regarding the present data [37]. Personality factors in Study 2 and 3 were measured through the Big Five Inventory, BFI-10 [38]. This is an inventory consisting of ten items where two items measure each personality factor. The BFI-10 shows convergent and discriminant validity, as well as test-retest reliability at satisfactory levels [38]. Internal consistency in terms of inter-correlation items have previously been checked and reported on the present data [39].

Age and gender were used as control variables. Age was requested as an open-ended question. Gender was coded as a dummy-variable, with female coded as 0 and male as 1. The respondents' age and gender were used as control variables, since previous research show that age and gender influence the use of social media [4,8,9].

## 3.3. Statistical Analyses

For each study, we first report correlational matrixes between the study variables—the Big Five personality factors and social media usage. In each study, we thereafter conducted a hierarchical regression model in order to examine the effects of the Big Five personality factors on social media usage. In the first step, we entered the Big Five personality factors, reasoning that personality was the focus of the present study. In a second and third step, respectively, gender and age were entered as control variables. For the regression analyses, we only included Internet users and respondents who had completed the personality inventories. As a result, the number of units in the hierarchical regression models is slightly different from the actual sample sizes that are presented above.

## 4. Findings

#### 4.1. Study 1

Table 1 shows that social media usage is positively correlated with openness to experiences, extraversion, and neuroticism, while negatively correlated with conscientiousness and agreeableness.

Table 1. Intercorrelations of study variables: social media usage, Big Five (HP5i), age.

	2	3	4	5	6	7
1. Social media	0.13 **	-0.16 **	0.12 **	-0.09 **	0.07 **	-0.57 **
2. Openness		0.18 **	0.19 **	0.31 **	-0.11 **	-0.16**
3. Conscientiousness			-0.05 **	0.40 **	-0.29 **	0.15 **
4. Extraversion				0.01	-0.25 **	-0.08 **
5. Agreeableness					-0.13**	0.16 **
6. Neuroticism						-0.04**
7. Age						

Note: N = 6542; \*\* p < 0.01.

After controlling for gender and age, personality factors significantly (p < 0.001) explain the variance in social media usage. Our findings from Study 1 show that frequent usage of social media is predicted by a high degree of openness to experiences and extraversion, and a low degree of conscientiousness (i.e., impulsiveness), over and above the effects of gender and age (Table 2).

**Table 2.** Hierarchical regression model exploring how personality factors (HP5i), gender, and age predict social media usage.

	Step 1: HP5i B	Step 2: HP5i, Gender B	Step 3: HP5i, Gender, Age B
Openness	0.163 ***	0.143 ***	0.061 ***
Conscientiousness	-0.136 ***	-0.127 ***	-0.083 ***
Extraversion	0.092 ***	0.085 ***	0.066 ***
Agreeableness	-0.086 ***	-0.103 ***	-0.012
Neuroticism	0.060 ***	0.043 **	0.017
Gender		-0.073 ***	-0.051 ***
Age			-0.533 ***
Age R <sup>2</sup>	0.063 ***	0.067 ***	0.334 ***

Note: N = 5110; B = Beta, the standardized regression coefficient; gender, 1 = male; \*\* p < 0.01; \*\*\* p < 0.001.

## 4.2. Study 2

Social media usage is positively correlated with openness to experiences, extraversion, and neuroticism, while negatively correlated with conscientiousness (Table 3).

Table 3. Intercorrelations of study variables 1: social media usage, Big Five (BFI-10), age.

	2	3	4	5	6	7
1. Social media 2. Openness	0.15 **	-0.06 ** -0.08 **	0.11 ** 0.05 **	-0.01 -0.05 **	0.05 * 0.12 **	-0.50 ** -0.16 **
3. Conscientiousness		0.00	0.24 **	0.27 **	-0.23 **	0.10 **
<ul><li>4. Extraversion</li><li>5. Agreeableness</li></ul>				0.17 **	$-0.27 ** \\ -0.23 **$	-0.02 0.06 **
6. Neuroticism 7. Age						-0.09 **

Note. N = 3322; \*\* p < 0.01; \* p < 0.05.

Personality factors significantly (p < 0.001) explain the variation in social media usage (Table 4). Over and above the effects of gender and age, our findings from Study 2 show that frequent usage of social media is predicted by a high degree of openness to experiences and extraversion, and a low degree of conscientiousness (Table 4).

**Table 4.** Hierarchical regression model exploring how personality factors (BFI-10), gender, and age predict social media usage.

	Step 1: BFI-10	Step 2: BFI-10, Gender	Step 3: BFI-10, Gender, Age	
	$\boldsymbol{B}$	В	В	
Openness	0.127 ***	0.123 ***	0.072 ***	
Conscientiousness	-0.072***	-0.085 ***	-0.039 *	
Extraversion	0.140 ***	0.124 ***	0.103 ***	
Agreeableness	0.008	0.004	0.014	
Neuroticism	0.056 **	0.031	-0.004	
Gender		-0.114 ***	-0.092 ***	
Age			-0.479***	
Age R <sup>2</sup>	0.040 ***	0.052 ***	0.273 ***	

Note. N = 2737, B = Beta, the standardized regression coefficient; gender, 1 = male. \* p < 0.05; \*\*\* p < 0.01; \*\*\* p < 0.001.

## 4.3. Study 3

Table 5 shows that social media usage is positively correlated with openness to experiences, extraversion, and neuroticism, while negatively correlated with conscientiousness.

Table 5. Intercorrelations of study variables 2: social media usage, Big Five (BFI-10), age.

	2	3	4	5	6	7
<ol> <li>Social media</li> <li>Openness</li> <li>Conscientiousness</li> <li>Extraversion</li> <li>Agreeableness</li> <li>Neuroticism</li> <li>Age</li> </ol>	0.13 **	-0.04 * -0.06 *	0.09 ** 0.04 * 0.25 **	-0.01 -0.01 0.18 ** 0.16 **	0.06 ** 0.11 ** -0.21 ** -0.26 ** -0.20 **	-0.39 ** -0.15 ** 0.12 ** 0.08 ** 0.08 ** -0.14 **

Note. N = 3302; \*\* p < 0.01; \* p < 0.05.

After controlling for gender and age, personality factors significantly (p < 0.001) explain the variation in social media usage (Table 6). Our findings from Study 3 show that frequent usage of social media is predicted by a high degree of extraversion, over and above the effects of gender and age (Table 6).

Table 6. Hierarchical regression model exploring how personality factors (BFI-10, 2019, 2020), gender	,
and age predict social media usage.	

	Step 1: BFI-10 B	Step 2: BFI-10, Gender B	Step 3: BFI-10, Gender, Age B
Openness	0.072 ***	0.069 ***	0.023
Conscientiousness	-0.053 **	-0.064 **	-0.027
Extraversion	0.113 ***	0.096 ***	0.111 ***
Agreeableness	-0.001	-0.016	0.000
Neuroticism	0.071 ***	0.037	-0.004
Gender		-0.073 ***	-0.157 ***
Age			-0.390 ***
Age R <sup>2</sup>	0.023 ***	0.046 ***	0.19 ***

Note. N = 3077, B = Beta, the standardized regression coefficient; gender, 1 = male; \*\* p < 0.01; \*\*\* p < 0.001.

#### 5. Discussion

From the previous research, we expected a positive relationship between openness to experiences and social media usage (Hypothesis 1). The first two studies are consistent with the previous research and support Hypothesis 1, while the results of Study 3 conflicts these findings [4,8,11,16,17]. As social media has become more mainstream in Sweden, it is likely that the innovative aspect of social media that has attracted people with a high degree of openness to experiences has diminished. Further research is needed in countries with high levels of social media usage to verify Study 3.

Conscientiousness was found to be negatively related to the use of social media in Study 1 and Study 2, but unrelated to the use of social media in Study 3 (after controlling for age and gender). There have been widely contradictory reports on the relationship between conscientiousness and the use of social media. Our results from the first two studies are consistent with the notion that social media is primarily used as spontaneous amusement rather than for work and study [10,18,19]. People who score high on conscientiousness avoid social media because it takes time from activities that they consider to be more meaningful. However, that the effect has disappeared in Study 3, indicates that in Sweden, social media is currently also used by people with a higher degree of conscientiousness. Perhaps, social media usage is changing from leisure to more and more serious information seeking and professional networking, consistent with previous findings [8].

Not unexpectedly, extraversion is positively related to social media usage. This makes it consistent with Hypothesis 3. People who score high in extraversion have many friends, and they have a tendency to be more outgoing and social than those with a lower degree of extraversion [12–15]. However, this implies that, over a long period of time (i.e., 2009–2020), social media platforms have made people with rich social networks even richer, and vice versa. Our finding is therefore consistent with most recent studies in the field and support "the rich get richer model", rather than the "social compensation model". Perhaps there are future opportunities for web designers to develop social media platforms that compensate for the introverted nature of its user, in line with "the social compensation model", as well as inclusive design.

Regarding agreeableness, Hypothesis 4 was rejected, since we could not find any intersection between agreeableness and social media usage. Perhaps there are conflicting needs in terms of belonging and conflict-avoidance among people who score high in agreeableness that go in opposite directions related to social media usage [19,26].

We found that neuroticism is unrelated to the use of social media, which is inconsistent with Hypothesis 5, and with most previous research, which found a positive relationship between neuroticism and the use of social media [4,8,19,27]. The differences might be explained by differences in cultures, the use of non-representative samples in the previous studies, or that some of the previous studies did not control for age and gender. Our conclusion is that neuroticism is unrelated to social media usage in a Swedish context, and

that therefore, frequent users of social media do not show a higher degree of anxiousness than the general population, when we control for age and gender.

Consistent with previous research, we also found that age is negatively associated with the use of social media and that women use social media more than men. However, the measurements over time, as presented here, make an interesting contribution, which goes beyond the primary purpose of the study. Namely, that the effects regarding both personality and demography decrease the longer social media has been in existence. Is this what happens, when social media becomes mainstream?

The reliability of the findings is strengthened through two different personality inventories (i.e., HP5i and BFI-10), eight large-scale representative samples of the Swedish population, and replications over time. However, since personality and social media usage vary between different cultures and time periods, caution should be taken in generalizing the results.

The findings should also be interpreted in terms of methodological limitations, i.e., self-estimation instead of actual behavior [40], a single-item for measuring social media usage, short-scales for measuring the Big Five model, and only two control variables (i.e., age and gender).

#### 6. Conclusions

We found that a high degree of Extraversion is positively associated with the use of social media, which also is consistent with previous research. This relationship applies in all three studies and is independent of measures for the Big Five model. Because of the inconsistency over time, we are not able to map any other relationship between the Big Five model and social media usage beyond what is already explained by age and gender.

One implication of the present study is that the relationship between the Big Five model and social media usage needs to be further explored and continuously measured, since the relationship appears to differ across cultures [8] and over time. It is worth noting that the present-study findings differ from those of the previous study [8] which explored the intersections between the Big Five model and social media usage with representative samples from 20 countries. In the previous study, Sweden was not included, but apparent contradictions were nevertheless reported [8]. The present study also leads us to the conclusion that the intersection between the Big Five model and social media usage appears to change over time. This change can be noted in the variations in the findings from Study 2 and Study 3, despite having used the same personality inventory. However, it is of great importance to use longitudinal studies of the same users, conducted over time, to gain a better understanding.

Since, to a great extent, social media today is used by people with a high degree of extraversion, which makes them quick to perceive, understand, and take advantage of new areas for usage [12,13], the challenge is to make those who are more reserved more involved in social media services. It may be that we need to take a step back to consider why certain people use social media to a lesser extent in order not to overlook the silent group of potential users of our technological advances. Social media is a constantly changing phenomenon, and society needs to better understand social media users in order to reduce digital divides and inequality. Collaborative efforts between researchers, internet designers, and social psychologists are suggested for promoting digital inclusiveness.

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**Institutional Review Board Statement:** The study was conducted in accordance with the Declaration of Helsinki, and the data collection method used in this study was approved by the Swedish Ethical Review Authority (2018/296-18; 2015/130-15; 2014/182-14; 2013/062-13).

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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