

Original citation:

Whitty, Monica T., Doodson, James, Creese, Sadie and Hodges, Duncan. (2017) *A picture tells a thousand words : what Facebook and Twitter images convey about our personality.* Personality and Individual Differences

Permanent WRAP URL:

<http://wrap.warwick.ac.uk/84657>

Copyright and reuse:

The Warwick Research Archive Portal (WRAP) makes this work of researchers of the University of Warwick available open access under the following conditions.

This article is made available under the Creative Commons Attribution 4.0 International license (CC BY 4.0) and may be reused according to the conditions of the license. For more details see: <http://creativecommons.org/licenses/by/4.0/>

A note on versions:

The version presented in WRAP is the published version, or, version of record, and may be cited as it appears here.

For more information, please contact the WRAP Team at: wrap@warwick.ac.uk



Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

A picture tells a thousand words: What Facebook and Twitter images convey about our personality

Monica Therese Whitty^{a,b,*}, James Doodson^c, Sadie Creese^d, Duncan Hodges^e

^a Cyber Security Centre, University of Warwick, WMG, Warwick, United Kingdom

^b Media and Communications Department, Melbourne University, Melbourne, Australia

^c Department of Media and Communications, University of Leicester, Leicester, England, United Kingdom

^d Cyber Security Centre, Department of Computer Science, University of Oxford, Oxford, Oxfordshire, United Kingdom

^e Centre for Electronic Warfare, Information & Cyber, Cranfield University, Defence Academy of the United Kingdom, Shrivenham, United Kingdom

ARTICLE INFO

Article history:

Received 29 July 2016

Received in revised form 28 December 2016

Accepted 28 December 2016

Available online xxxxx

Keywords:

Cyberpsychology

Personality

Profile images

Big Five

Social network sites

Facebook

Twitter

ABSTRACT

Researchers have questioned whether there is a relationship between personality and patterns of online self-presentation. This paper examined, more specifically, whether personality predicts profile choices as well as image choice behaviour on two different SNSs: Twitter and Facebook. We found that personality does, to some extent, predict choices regarding profile images; however, not always in the direction we predicted and results differed across sites. We found that participants who scored higher on conscientiousness and lower on extraversion were more likely to change their Facebook profile image. Participants who scored lower on extraversion were more likely to choose a Twitter profile image that included a photograph of themselves compared to participants who scored higher on extraversion. For participants whose Facebook profile image was a photograph of themselves, a greater proportion of participants selected a recent photograph from the past six months. However, this was not the case for Twitter. We conclude that personality can predict some image choices and behaviours that might be useful for future work on authentication and identification, although other predictor variables are potentially also important when considering the types of individual characteristics which might predict online behaviour on SNSs.

© 2017 The Authors. Published by Elsevier Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>).

1. Introduction

Social networking sites (SNSs) have become a popular medium for communication and networking for individuals of all ages (Nadkarni & Hofmann, 2012; Subrahmanyam, Reich, Waechter, & Espinoza, 2008; Valkenburg & Peter, 2009). These sites can potentially provide valuable information about a person that could assist in authentication and identification. Moreover, they might provide the user with rich information (e.g., about potential dates or employees). In contrast, of course, users can perform different versions of the 'self' on these platforms (e.g., Turkle, 1995) or, as others would contend, express their 'true selves' in this space (e.g., Marriott & Buchanan, 2014; McKenna & Bargh, 2000). Although researchers are beginning to learn more about what online personal data presented on SNSs might tell us about a person, there is scope to learn much more about digital identities and what they reveal about the person behind the profile. This study focused, in particular, on whether personality predicts profile choices as well as image choice behaviour on two different SNSs: Twitter and Facebook.

Drawing from Goffman's (1959/1997) work, it has been theorised that SNSs provide an ideal environment for impression management. SNS users can be very selective in the information they choose to present on these sites, including, for example, their interests, activities, opinions and emotions. It has been argued that some users consciously select information to present in order to convey a certain impression (Wu, Change, & Yuan, 2015). Equally, however, some details might leak additional personal information about a person, unintended and sometimes unbeknownst to the user; for example, ethnicity, education or class (Whitty & Young, 2017).

Individuals who score higher on certain types of personality characteristics might choose to represent themselves in distinct ways (e.g., Back et al., 2010; Krämer & Winter, 2008). Extraverts, for example, are more likely to select self-representative photographs (Wu et al., 2015), less likely to post conservative pictures of themselves, have a greater number of online friends, and are more likely to use the communication function on SNSs (Krämer & Winter, 2008; Wang, Jackson, Zhang, & Su, 2012). Neurotic individuals are more likely to use the status update feature and agreeable individuals are more likely to write comments on others' profiles (Wang et al., 2012). Women low in agreeableness are more likely to use the instant messaging features on social networking sites, while men low in openness play more games via social networking

* Corresponding author at: Cyber Security Centre, University of Warwick, WMG, Warwick, United Kingdom.

E-mail address: MW@warwick.ac.uk (M.T. Whitty).

sites (Muscanell & Muscanell & Guadagno, 2012). Individuals who score high on narcissism are more likely to select pictures that are more physically attractive (Kapidzic, 2013; Wu et al., 2015).

Images and photographs, in and of themselves, might be used intentionally to convey a particular identity, including personality features (e.g., Wu et al., 2015). Kapidzic and Herring (2015), for example, found that females are more likely than males to select a seductive photograph as their profile picture. Zheng, Yuan, Chang, and Wu (2016) found that women are more likely to emphasize emotional expression in their profile pictures compared with men, whilst men were more likely to emphasize having fun. Users, however, might also unintentionally leak aspects about a person; such as age, ethnicity, hobbies, relationship status (Lee-Won, Shim, Joo, & Park, 2014). For example and perhaps unsurprisingly, it has been found that individuals who upload dyadic profile pictures on Facebook report feeling more satisfied with their relationship and closer to their romantic partners compared with individuals who do not (Saslow, Muise, Impett, & Dublin, 2012). Tifferet and Vilnai-Yavetz (2014) have found that men were more likely to have profile pictures which accentuate status and risk taking, while women were more likely to have photographs which including familial relations and showed emotional expression.

The research presented in this paper builds upon this previous literature by examining whether personality predicted users' profile image choices on SNSs. We focused on two different types of SNSs in our study, which serve different social purposes – Facebook and Twitter. Facebook is more privately oriented with a focus on maintaining connections with existing friendship groups and communicating with them via multiple methods (Raacke & Bonds-Raacke, 2008). Conversely, Twitter is more publically oriented and users' friends are more likely to be unknown compared with Facebook friends (Hughes, Rowe, Batey, & Lee, 2012; Marwick, 2011). We investigated whether personality predicts: how often users change their profile image; if individuals choose to use an *avatar* (an icon or figure that represents that person, but is not a photograph of that person) or a *photograph of themselves*; if users include a *recent photograph* of themselves; and if users select a profile image they believe *represents their personality*.

1.1. Hypotheses

We employed the Five Factor model (Costa & McCrae, 1992; Goldberg, 1990), which is commonly employed to measure personality. We hypothesised that those who score high on extraversion (H1) and conscientiousness (H2) will be more likely to change their images more frequently compared with those who score low on these two scales. Our first hypothesis is based on the assumption that because extraverts are outgoing and social they will be more likely to want to update how they present themselves. Our second hypothesis is based on the assumption that those who score high on conscientiousness will be more motivated to keep their profile up-to-date. It was further hypothesised that individuals who score low on openness to experience (H3) and high on extraversion (H4) will be more likely choose a photograph than an avatar. These hypotheses are based on the assumption that people who score higher on openness tend to be more creative and open to new ideas and therefore an avatar might be perceived as a more creative depiction of themselves, whilst, introverts might choose an avatar in preference to a photograph to divert attention away from themselves. The fifth hypothesis (H5) is that those who score high on conscientiousness will be more likely to include a recent photograph of themselves. Again, this is based on the assumption that conscientious people might be more likely to keep their profile up-to-date. The sixth and final hypothesis (H6) is that individuals who score low on openness to experience will choose an image that more closely represents their self-concept. This is based on the assumption that because individuals low on openness to experience are far less likely to be creative and experimental they will choose an image that more closely represents their self-concept.

2. Method

2.1. Participants

One thousand, two hundred and twenty four individuals were recruited from a 'Qualtrics' online panel. Of these individuals, 357 individuals reached the end of the study (29% completion rate), in the main due to screener questions, which eliminated participants due to not having a Twitter and a Facebook account (43%). This meant the drop out rate, due to incompleteness of the survey was only fairly small (28%). Another 150 individuals were then excluded for no longer using their Facebook or Twitter account (136), for withdrawing their consent for the study (8), for repetitive or inappropriate responding (4), or for incomplete responses (2). After exclusions, the final sample for this study consisted of 207 participants (115 male; 92 female). The mean age of the sample was 40.1 years ($SD = 13.1$) ranging from 19 to 77 years. For men, the mean age was 41.0 years ($SD = 12.8$) ranging from 19 to 68 years. For women, the mean age was 39.0 years ($SD = 13.3$) ranging from 20 to 77 years. All participants had both an active Facebook and Twitter account.

2.2. Materials

Data were collected using a questionnaire hosted on the Qualtrics online survey platform.

2.2.1. Big 5

Personality traits were measured using a Five-Factor Personality Inventory validated for use online (Buchanan, Johnson, & Goldberg, 2005). This 41-item inventory gives measures of Openness to Experience, Conscientiousness, Extraversion, Agreeableness, and Neuroticism. The subscales have high reliability and have been successfully used in a range of Internet-mediated studies. In our study, Cronbach's α ranged from 0.69 to 0.84.

2.2.2. Self-rating items

Participants were asked several questions about their Facebook and Twitter activities, including: frequency of use (on a 7-point scale from 'once a year or less' to 'more than once a day'); how regularly they changed their profile image (on a 7-point scale from 'once a year or less' to 'more than once a day'); whether the profile image was an *avatar* or a *photograph of themselves* (with three categories to choose from: 'yes, the image includes a recent photograph of me from the last six months'; 'yes, the image contains a photograph of me, although is more than six months old'; 'no, the image does not contain a photograph of me'); and how closely their profile image represented their personality with three categories to choose from ('not at all representative'; 'somewhat representative'; 'very representative') (see Table 1 for correlations between these items).

We appreciate that the question that asks participants how closely their profile image represented their personality might not be interpreted as personality representativeness per se. However, by this question we were more interested in the participants' perceptions of self-concept. We opted to use this phrasing given our piloting of questions suggested that participants felt more comfortable with the term personality, as this term was more commonly used in 'everyday speech'. Furthermore, we believed it was important to ask this question to all users (i.e., those who included an avatar or a photograph). This is based on previous research that has examined representation of self via the use of photographs (e.g., Fernandez, Stosic, & Terrier, 2017; Leikas, Verkasalo, & Lönnqvist, 2013) and avatars (e.g., Dunn & Guadagno, 2012).

Table 1
Spearman's rho correlations between self-rating items.

	1.	2.	3.	4.	5.	6.
1. Frequency of use of Facebook	1.00	0.275**	0.293**	0.140*	0.192**	0.163*
2. Frequency of use of Twitter		1.00	0.202**	0.405**	0.063	0.028
3. Regularity of changing profile image on Facebook			1.00	0.634**	0.136	0.116
4. Regularity of changing profile image on Twitter				1.00	-0.018	0.046
5. Represents personality: Facebook					1.00	0.622**
6. Represents personality: Twitter						1.00

Note: * $p < 0.05$, ** $p < 0.01$.

2.3. Procedure

We commissioned Qualtrics to recruit participants from their online panel. Participants were required to reside in the UK and have both a Facebook and a Twitter account. Participants were presented with information about the study and asked to indicate informed consent before proceeding. On the subsequent pages they were asked to complete a number of demographic items; self-rating items (described above), and complete the Five-Factor Personality Inventory.

3. Results

Our first two hypotheses were concerned with the frequency participants updated their profile image on Facebook and Twitter. To test our hypotheses a forced-entry multiple ordinal regression was calculated with the frequency of avatar change as the outcome variable and the Big Five personality traits as the predictor variables. Ordinal regression was considered appropriate given that the frequency of avatar change measure was ordered-categorical in nature. Separate regression models were calculated for Facebook and Twitter (frequency of participants' updates is shown in Table 2). The frequency with which participants used an online service was also controlled for in the regressions because participants who more frequently used a service would have more opportunity to change their profile images compared to those participants that used a service less frequently.

In line with the second hypothesis, participants who scored higher on conscientiousness more frequently updated their Facebook profile compared with those who scored lower on conscientiousness. However, although we obtained a significant finding for our first hypothesis, it was in the opposite direction to what we predicted. Participants who scored lower on extraversion were more likely to change their profile image compared with those who scored high on extraversion. None

Table 2
Frequencies for changing profile images.

Frequency of use	Service			
	Facebook (<i>n</i> = 207)		Twitter (<i>n</i> = 207)	
	<i>N</i>	%	<i>N</i>	%
More than once a day	7	3.4	5	2.4
Daily	4	1.9	3	1.5
Once a week	2	1.0	2	1.0
2–3 times a week	0	0.0	3	1.5
Once a month	17	8.2	9	4.4
2–3 times a month	20	9.7	9	4.4
Several times a year	77	37.2	44	21.3
Once a year or less	69	33.3	103	49.8
I do not have an image or avatar	11	5.3	29	14.0

of the Big Five personality measures predicted how often participants changed their Twitter profile image (see Table 3).

The third and fourth hypotheses predicted that those low on openness to experience as well as extraversion will be more likely to select a photograph of themselves in preference to an avatar. A Chi-square test indicated that on Facebook significantly more individuals choose a photograph to represent themselves ($n = 134$; 64.7%) than an avatar; ($n = 73$; 35.3%), $\chi^2_{(1)} = 17.98, p < 0.001$. However, there was no statistically significant difference in the proportion of individuals who chose a Twitter profile image that included a photograph of themselves ($n = 108$; 52.2%) compared with an avatar ($n = 99$; 47.8%), $\chi^2_{(1)} = 0.39, p = 0.532$.

A forced-entry binary logistic regression was used to explore the relationship between personality and whether a profile image was a photograph of themselves or an avatar. Separate models were calculated for Facebook and Twitter (see Table 4). The logistic regression model for Facebook profile images was not statistically significant ($\chi^2_{(5)} = 5.63, p = 0.344$) and explained a very small proportion of the variance (Nagelkerke $R^2 = 0.037$). Consequently, the third and fourth hypotheses were rejected for the Facebook profile images. In contrast, a logistic regression model that predicted the content of Twitter profile images was statistically significant ($\chi^2_{(5)} = 11.84, p = 0.037$), provided a good fit to the data (Hosmer & Lemeshow $\chi^2_{(8)} = 4.59, p = 0.801$) and explained a small proportion of the variance (Nagelkerke $R^2 = 0.074$). Contrary to the direction predicted in our fourth hypothesis, participants who scored lower on extraversion were more likely to choose a Twitter profile image that included a photograph of themselves compared to participants who scored higher on extraversion ($B = -0.07, S.E. = 0.03, Wald = 7.38, p = 0.007; ExpB = 0.93$) (H4). However, our third hypothesis was not supported.

For participants whose Facebook profile image was a photograph of themselves, a greater proportion of participants selected a recent photograph from the past six months ($n = 82$; 61.2%), in preference to an older photograph that was taken more than six months ago ($n = 52$; 38.8%), $\chi^2_{(1)} = 6.72, p = 0.010$. For participants whose Twitter profile image was a photograph, there was no statistically significant difference in the proportion of participants who used a photograph of themselves from the past six months ($n = 51$; 47.2%) and those who used an older photograph ($n = 57$; 52.8%), $\chi^2_{(1)} = 0.33, p = 0.564$.

The relationship between personality and whether the profile contained a recent photograph of the profile owner was tested using a forced entry binary logistic regression. Separate models were used for Facebook and Twitter profile images (see Table 5). Only participants who indicated that their profile image was a photograph of themselves were included in the model. The frequency with which participants

Table 3
Ordinal regression: personality and frequency of change of participants' profile images.

Predictor	<i>B</i>	<i>S.E.</i>	<i>Wald</i>	<i>df</i>	<i>p</i>	95% <i>CI</i>	
						Lower	Upper
Facebook (<i>n</i> = 207)							
Frequency service used	0.74*	0.15	24.20	1	0.000***	0.44	1.03
Extraversion	-0.05	0.02	4.92	1	0.027**	-0.09	-0.01
Neuroticism	0.04	0.03	2.69	1	0.101	-0.01	0.09
Conscientiousness	0.06	0.03	4.97	1	0.026**	0.01	0.11
Agreeableness	-0.02	0.04	0.28	1	0.595	-0.10	0.06
Openness to exp.	0.03	0.03	1.59	1	0.208	-0.02	0.08
Twitter (<i>n</i> = 207)							
Frequency service used	0.52	0.09	34.20	1	0.000***	0.34	0.69
Extraversion	-0.04	0.02	2.66	1	0.103	-0.08	0.01
Neuroticism	-0.02	0.03	0.45	1	0.500	-0.07	0.03
Conscientiousness	0.03	0.03	0.94	1	0.333	-0.03	0.08
Agreeableness	0.05	0.04	1.35	1	0.246	-0.03	0.13
Openness to exp.	0.02	0.03	0.55	1	0.457	-0.03	0.07

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

Table 4
Binary logistic regression: personality and photograph of participant.

Predictor	B	S.E.	Wald	df	p	Exp(B)
Facebook (n = 207)						
Constant	1.55*	1.46***	1.12	1	0.289	4.71
Extraversion	-0.05	0.03	3.66	1	0.056	0.95
Neuroticism	0.00	0.03	0.00	1	0.968	1.00
Conscientiousness	-0.01	0.03	0.17	1	0.680	0.99
Agreeableness	0.03	0.05	0.36	1	0.548	1.03
Openness to exp.	0.02	0.03	0.23	1	0.629	1.02
Twitter (n = 207)						
Constant	0.84	1.43	0.34	1	0.558	2.31
Extraversion	-0.07	0.03	7.39	1	0.007**	0.93
Neuroticism	0.02	0.03	0.40	1	0.526	1.02
Conscientiousness	0.00	0.03	0.00	1	0.949	1.00
Agreeableness	0.04	0.05	0.97	1	0.324	1.05
Openness to exp.	0.00	0.03	0.01	1	0.916	1.00

Note: 0 = participants choose a profile image that does not contain a photograph of themselves; 1 = participants choose a profile image that contains a photograph of themselves.

* p < 0.05.
** p < 0.01.
*** p < 0.001.

used an online service was controlled for because participants who more frequently used a service have more opportunity to change their profile image compared to those who use a service less frequently. The logistic regression model for Facebook profile images was statistically significant ($\chi^2_{(6)} = 27.63, p < 0.001$), provided a good fit to the data (Hosmer & Lemeshow $\chi^2_{(8)} = 10.46, p = 0.880$), correctly predicted a good number of cases (71.6%), and explained a moderate proportion of the variance (Nagelkerke $R^2 = 0.234$). The model for Twitter profile images was also statistically significant ($\chi^2_{(6)} = 23.92, p < 0.001$), provided a good fit to the data (Hosmer & Lemeshow $\chi^2_{(8)} = 7.07, p = 0.529$), correctly predicted a moderate number of cases (68.5%), and explained a moderate proportion of the variance (Nagelkerke $R^2 = 0.265$). However, none of the Big Five personality traits predicted whether participants selected a recent or an older photograph of themselves for either their Facebook or their Twitter profile images (Table 5). Consequently, our fifth hypothesis was rejected for both the Facebook and Twitter profile images.

Table 5
Binary logistic regression: personality and recent photograph of user.

Predictor	B	S.E.	Wald	df	p	Exp(B)
Facebook (n = 134)						
Constant	-3.41*	2.01**	2.89	1	0.089	0.03
Frequency service used	0.94	0.25	14.56	1	0.000***	2.55
Extraversion	0.02	0.03	0.27	1	0.603	1.02
Neuroticism	0.00	0.04	0.01	1	0.908	1.00
Conscientiousness	-0.05	0.04	1.20	1	0.274	0.95
Agreeableness	0.11	0.06	2.89	1	0.089	1.11
Openness to exp.	0.02	0.04	0.39	1	0.535	1.03
Twitter (n = 108)						
Constant	-2.48	2.64	0.88	1	0.347	0.08
Frequency service used	1.67	0.43	15.48	1	0.000***	5.32
Extraversion	-0.08	0.04	3.51	1	0.061	0.92
Neuroticism	-0.04	0.05	0.53	1	0.465	0.97
Conscientiousness	-0.02	0.05	0.18	1	0.670	0.98
Agreeableness	-0.03	0.07	0.14	1	0.704	0.97
Openness to exp.	0.10	0.05	3.48	1	0.062	1.10

Note: 0 = participants chose a profile image containing a less recent photograph of themselves from over six months preceding; 1 = participants chose a profile image containing a recent photograph of themselves from the preceding six months.

* p < 0.05.
** p < 0.01.
*** p < 0.001.

The sixth and final hypothesis was that individuals who score low on openness to experience would choose an image that is closer to their self-concept (see Table 6).

A forced-entry ordinal regression was used to explore the relationship between personality and the extent that participants selected a profile image representative of their self-concept. The ordinal regression model for Facebook profile images failed to reach statistical significance ($\chi^2_{(5)} = 11.36, p = 0.05$, Nagelkerke $R^2 = 0.067$; goodness of fit $\chi^2_{(371)} = 354.98, p = 0.716$). The ordinal regression for Twitter profile images also failed to reach statistical significance ($\chi^2_{(5)} = 11.27, p = 0.05$, Nagelkerke $R^2 = 0.071$; goodness of fit $\chi^2_{(371)} = 343.86, p = 0.358$). Consequently, our sixth hypothesis was rejected.

4. Discussion

In this paper we were interested in whether personality predicts profile image choices and behaviours carried out two SNSs: Facebook and Twitter. In line with previous research, we found personality does, to some extent, predict users' choice of profile images as well as online behaviours (e.g., Back et al., 2010; Dunn & Guadagno, 2012; Hughes et al., 2012; Kapidzic, 2013; Kapidzic & Herring, 2015; Lee-Won et al., 2014; Leikas et al., 2013; Saslow et al., 2012; Wang et al., 2012; Wu et al., 2015; Zheng et al., 2016), but not always in the direction we hypothesised. Given that the behaviours and the image choices we examined are not immediately obvious indicators of personality, the work here suggests that users leak information about themselves online, without necessarily intending to elucidate particular personality characteristics. These findings could be applied in work on authentication, identification or pre-screening (e.g., by cybersecurity professionals, employers) or by organisations that wish to be more selective in the types of information they target individuals (e.g., organisations wishing to carry out targeted advertising on SNSs). On the other hand, these findings also suggest that users might want to be wary of how they behave and what information they present about themselves to avoid personality characteristics being leaked to others.

Our second hypothesis, that people who are more conscientious are more likely to update their profile images compared with those who are less conscientious, was the only hypothesis that was supported by our data (although we note that significant findings were obtained for many of the other hypotheses, but in the opposite direction to what was predicted). This result might be particularly interesting to employers who are looking to employ conscientious workers. Given that employers are increasingly drawing from online sources to assist in employment decisions (Davison, Maraist, Hamilton, & Bing, 2012), this finding suggests there might be some utility in carrying out further research to examine other online indicators of conscientiousness.

Our research adds to the research that has found that extraverts behave on SNSs in distinct ways (e.g., Krämer & Winter, 2008; Wang et al., 2012; Wu et al., 2015); however, our findings were not in the direction we predicted. In our study, introverts were more likely than extraverts to update their profile images (Facebook only) and use a photograph in preference to an avatar to represent themselves (Twitter only). Perhaps our findings can be explained by previous work which suggests that introverts feel protected and safe using the Internet to socially interact

Table 6
Descriptive statistics: representative of participants' personality.

Type of profile image	Personality representativeness rating		
	Not at all representative	Somewhat representative	Very representative
All Facebook profile images			
N (n = 196)	23	58	115
%	11.7	29.6	58.7
All Twitter profile images			
N (n = 178)	34	52	92
%	19.1	29.2	51.7

with others, often preferring to communicate with others online (e.g., Amichai-Hamburger & Ben-Artzi, 2000). The introverts in our study might be focusing more of their energy on online communications and relationships compared to offline, thereby spending more time updating their profile images and feeling safer to display their 'real' image online.

In addition to our significant results, we found that hypothesis three and five were not significant for either SNSs. Hypothesis three predicted that individuals who score low on openness to experience will be more likely to select a photograph than an avatar. Perhaps this null result might be explained by recent research on SNSs. Wu et al. (2015), for example, found that profile pictures were believed by their users to reflect their personality and that personality could be reflected in both photographs and avatars. According to their findings, users believed that a variety of impressions could be made using their profile pictures, such as: socialising, playing sport, romantic, family, etc. The distinction, therefore, between photograph and avatar, as we have made in this paper, could be too limiting and future researchers might wish to categorise images when examining the type of profile images users with different personality choose to use to represent themselves. Hypothesis five predicted that users who score high on conscientiousness will be more likely to include a recent photograph of themselves. The null result for this hypothesis might be explained in a similar way. In addition, given that those who score high on conscientiousness were more likely to update their profile image, as we predicted, the issue of using an updated photograph might not be as a concern. Moreover, these findings suggests that other predictor variables, in addition to personality, should be considered when examining how individuals characteristically select profile images and image choice behaviour on SNSs. Previous studies on predictability of behaviour on SNS, for example, have examined Narcissism, cultural differences and the true self (see Whitty & Young, 2017, for a more in-depth discussion).

Our sixth and final hypothesis that individuals who score low on openness to experience will choose an image that more closely represents their self-concept, was not significant for Facebook or Twitter. In fact, none of the personality traits predicted whether a participant felt their chosen image more closely represented their self-concept. Perhaps other personality traits are more important to consider when examining the likelihood of chosen an image that represents one's self-concept (e.g., self-monitoring).

As a further point, our findings were not always consistent across SNSs. This is an important finding given that many previous studies have focused on one SNS (typically Facebook), assuming findings can be generalised to other SNSs. This study found that the same participants behaved somewhat differently across sites, suggesting that the platform itself plays a fairly substantial role. For example, individuals were far less likely to change their Twitter profile than their Facebook profile image (suggesting these platforms serve a different function). While this finding is perhaps not surprising, they do highlight the importance that future research into detecting personality online ought to pay attention to platform itself and not just the behaviours per se.

Although our study examined more than one SNS, this narrow focus might be perceived as a limitation and we would encourage future studies to focus on a wider selection of SNSs. Our findings, at least, suggest that this is a worthwhile exercise.

4.1. Conclusions

In conclusion, there is a growing interest in academia as well as in lay people's practices to predict psychological characteristics of a person by examining their online personal data. Our study suggests that our online behaviours can, perhaps unknowingly, leak aspects about our personality. Our study provides some evidence that personality predicts the types of profile photographs/images individuals select as well as the likelihood of updating profile images. Future research might consider image choices in more detail and across other types of sites.

Acknowledgment

The work reported in this paper was supported by award EP/J004995/1: An Exploration of Superidentity, from the UK Engineering and Physical Sciences Research Council.

References

- Amichai-Hamburger, Y. A., & Ben-Artzi, E. (2000). The relationship between extraversion and neuroticism and the different uses of the Internet. *Computers in Human Behavior*, 16, 441–449. [http://dx.doi.org/10.1016/S0747-5632\(00\)00017-0](http://dx.doi.org/10.1016/S0747-5632(00)00017-0).
- Back, M. D., Stopfer, J. M., Vazire, S., Gaddis, S., Schmukle, S. C., Egloff, B., & Gosling, S. D. (2010). Facebook profiles reflect actual personality not self-idealization. *Psychological Science*, 21, 372–374. <http://dx.doi.org/10.1177/0956797609360756>.
- Buchanan, T., Johnson, J. A., & Goldberg, L. R. (2005). Implementing a five-factor personality inventory for use on the Internet. *European Journal of Psychological Assessment*, 21, 115–127. <http://dx.doi.org/10.1027/1015-5759.18.1.116>.
- Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI): Professional manual*. Odessa, FL: Psychological Assessment Resources.
- Davison, H. K., Maraist, C. C., Hamilton, R. H., & Bing, M. N. (2012). To screen or not to screen? Using the Internet for selection decisions. *Employer Responsibilities and Rights Journal*, 24(1), 1–21. <http://dx.doi.org/10.1007/s10672-011-9178-y>.
- Dunn, R. A., & Guadagno, R. E. (2012). My avatar and me — Gender and personality predictors of avatar self discrepancy. *Computers in Human Behavior*, 28(1), 97–106. <http://dx.doi.org/10.1016/j.chb.2011.08.015>.
- Fernandez, S., Stosic, G., & Terrier, L. (2017). Does your résumé photograph tell who you are? *Personality and Individual Differences*, 104, 186–189. <http://dx.doi.org/10.1016/j.paid.2016.08.006>.
- Goffman, E. (1959/1997). *The presentation of self in everyday life*. In C. Lemert, & A. Branaman (Eds.), *The Goffman reader* (pp. 21–26). Oxford, UK: Blackwell Publishing Ltd.
- Goldberg, L. R. (1990). An alternative "description of personality": The big-five factor structure. *Journal of Personality and Social Psychology*, 59, 1216–1229. <http://dx.doi.org/10.1037/0022-3514.59.6.1216>.
- Hughes, D. J., Rowe, M., Batey, M., & Lee, A. (2012). A tale of two sites: Twitter vs. Facebook and the personality predictors of social media usage. *Computers in Human Behavior*, 28(2), 561–569. <http://dx.doi.org/10.1016/j.chb.2011.11.001>.
- Kapidzic, S. (2013). Narcissism as a predictor of motivations behind Facebook profile picture selection. *CyberPsychology, Behavior & Social Networking*, 16(1), 14–19. <http://dx.doi.org/10.1089/cyber.2012.0143>.
- Kapidzic, S., & Herring, S. C. (2015). Race, gender, and self-presentation in teen profile photographs. *New Media & Society*, 17(6), 958–976. <http://dx.doi.org/10.1177/146144813520301>.
- Krämer, N. C., & Winter, S. (2008). Impression management 2.0. *Journal of Media Psychology: Theories, Methods, and Applications*, 20, 106–116. <http://dx.doi.org/10.1027/1864-1105.20.3.106>.
- Lee-Won, R. J., Shim, M., Joo, Y. K., & Park, S. G. (2014). Who puts the best 'face' forward on Facebook? Positive self-presentation in online social networking and the role of self-consciousness, actual-to-total friends ratio, and culture. *Computers in Human Behavior*, 39, 413–423. <http://dx.doi.org/10.1016/j.chb.2014.08.007>.
- Leikas, S., Verkasalo, M., & Lönnqvist, J.-E. (2013). Posing personality: Is it possible to enact the big five traits in photographs? *Journal of Research in Personality*, 47(1), 15–21. <http://dx.doi.org/10.1016/j.jrp.2012.10.012>.
- Marriott, T. C., & Buchanan, T. (2014). The true self online: Personality correlates of preference for self-expression online, and observer ratings of personality online and offline. *Computers in Human Behavior*, 32, 171–177. <http://dx.doi.org/10.1016/j.chb.2013.11.014>.
- Marwick, A. E. (2011). I tweet honestly, I tweet passionately: Twitter users, context collapse, and the imagined audience. *New Media & Society*, 13(1), 114–133. <http://dx.doi.org/10.1177/1461444810365313>.
- McKenna, K. Y. A., & Bargh, J. A. (2000). Plan 9 from cyberspace: The implications of the internet for personality and social psychology. *Journal of Personality and Social Psychology*, 4, 57–75. http://dx.doi.org/10.1207/S15327957PSP0401_6.
- Muscianell, N. L., & Guadagno, R. E. (2012). Make new friends or keep the old: Gender and personality differences in social networking use. *Computers in Human Behavior*, 28, 107–112. <http://dx.doi.org/10.1016/j.chb.2011.08.016>.
- Nadkarni, A., & Hofmann, S. G. (2012). Why do people use Facebook? *Personality and Individual Differences*, 52(3), 243–249. <http://dx.doi.org/10.1016/j.paid.2011.11.007>.
- Raacke, J., & Bonds-Raacke, J. (2008). MySpace and Facebook: Applying the uses and gratifications theory to exploring friend-networking sites. *Cyberpsychology & Behavior*, 11(2), 169–174. <http://dx.doi.org/10.1089/cpb.2007.0056>.
- Saslow, L. R., Muise, A., Impett, E. A., & Dublin, M. (2012). Can you see how happy we are? Facebook images and relationship satisfaction. *Social Psychological and Personality Science*, 4(4), 411–418. <http://dx.doi.org/10.1177/1948550612560059>.
- Subrahmanyam, K., Reich, S. M., Waechter, N., & Espinoza, G. (2008). Online and offline social networks: Use of social networking sites by emerging adults. *Journal of Applied Developmental Psychology*, 29(6), 420–433. <http://dx.doi.org/10.1016/j.appdev.2008.07.003>.
- Tifferet, S., & Vilnai-Yavetz, I. (2014). Gender differences in Facebook self-presentation: An international randomized study. *Computers in Human Behavior*, 35, 388–399. <http://dx.doi.org/10.1016/j.chb.2014.03.016>.
- Turkle, S. (1995). *Life on the screen: Identity in the age of the Internet*. London: Weidenfeld & Nicolson.

- Valkenburg, P. M., & Peter, J. (2009). Social consequences of the Internet for adolescents: A decade of research. *Current Directions in Psychological Science*, 18(1), 1–5. <http://dx.doi.org/10.1111/j.1467-8721.2009.01595.x>.
- Wang, J. L., Jackson, L. A., Zhang, D. J., & Su, Z. Q. (2012). The relationships among the big five personality factors, self-esteem, narcissism, and sensation-seeking to Chinese University students' uses of social networking sites (SNSs). *Computers in Human Behavior*, 28, 2313–2319. <http://dx.doi.org/10.1016/j.chb.2012.07.001>.
- Whitty, M. T., & Young, G. (2017). *Cyberpsychology: The study of individuals, society and digital technologies*. Wiley.
- Wu, Y. -C. J., Change, W. -H., & Yuan, C. -H. (2015). Do Facebook profile pictures reflect user's personality? *Computers in Human Behavior*, 51, 880–889. <http://dx.doi.org/10.1016/j.chb.2014.11.014>.
- Zheng, W., Yuan, C. -H., Chang, W. -H., & Wu, Y. -C. J. (2016). Profile pictures on social media: Gender and regional differences. *Computers in Human Behavior*, 63, 891–898. <http://dx.doi.org/10.1016/j.chb.2016.06.041>.