

Facebook Reactions: How Are They Used and Which Personality Factors Predict Their Use?

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The recent expansion of Facebook's 'like' to six emotional reactions (love, haha, wow, sad, angry) represents the first update related to feedback, allowing users to respond to shared content, in almost a decade. We surveyed 260 Facebook users to investigate how reactions are utilized, and in response to what type of online content (status updates, pictures, links, timehops and events). We also measured Big Five personality and narcissism. Users were most likely to react using like, followed by positive reactions (love, haha, wow), and were least likely to employ the negative reactions sad and

angry. Status updates and pictures were the types of content most likely to be responded to, and events least likely. Neuroticism, extraversion and openness positively predicted, and narcissism negatively predicted, utilization of reactions, and likelihood of responding. Established online norms and the affordances of Facebook features provide explanation for the findings.

Keywords: Facebook, social media, reactions, personality, Big 5, narcissism

Since Facebook became publicly available in 2006, the social networking site (SNS) has undergone a number of updates and transformations. The majority of these relate to the affordances offered to users which allow them to communicate with their online network, or to the layout of profiles/newsfeeds: how this information is displayed. In 2016, Facebook introduced a range of emotional reactions (love, haha, wow, sad, angry) with which users could respond to content posted by others. This allowed detailed many-to-one feedback to be provided about shared content, an action previously limited to comments or to the 'like' button. The current study aims to investigate how users utilize these new reactions, which types of content they react to, and whether personality factors drive their use.

LITERATURE REVIEW

Communication on Facebook

Facebook is the world's largest SNS with over 2 billion active users (Facebook Newsroom, 2019). Originally launched as a resource exclusively for students of Harvard University, it quickly expanded to include users from other higher education institutions, and then in 2006 any member of the public over 13 years of age. Online social networking domains, particularly Facebook, have become an almost ubiquitous aspect of social communication and are used to supplement interactions between offline friends, family, and peers (Ambady & Skowronski, 2008; Boyd & Ellison, 2007; Scott & Hand, 2016). The nature of communication in offline and online communities are necessarily different, and the features available to Facebook users dictate the ways in which they can communicate. Although users' off- and on-line networks overlap, the way in which they interact in these two domains are separate and distinct. Throughout its history, Facebook has undergone multiple transformations (e.g., Peckham, 2016), typically introducing new features which promote different types of communication. The majority of these have either increased the number of ways in which users can share information, or have modified the way in which this information is displayed to other users via individual profiles or real-time newsfeeds. These changes have influenced the ways in which users can broadcast information to their online networks and how this information is viewed, and potentially responded to, by others.

The most common communication style on Facebook, and most other SNSs, is one-to-many, whereby users share content which is then visible to a number of other individuals online (Chiou, Chen, & Liao, 2014; Chou, & Lee, 2013). One-to-many communication allows users to sustain social connections and broadcast information to a larger audience than would be possible offline (Haythornthwaite, 2005). As Facebook has evolved, increasing importance has been placed on shared one-to-many, specifically picture-based, content, over personal information and text-based content (e.g., Mullins, 2016). When Facebook was launched in 2004 it was a text-only platform on which users could provide personal information and provide status updates to inform their online friends of their offline activities (Peckham, 2016). By 2006 users were able to share photos, videos, and external links, and a year later Facebook began to support platform apps

which users could download to add more personalized content to their profiles. Since then, as web technology has advanced, users have used these features to share other types of pictorial content such as memes and GIFs, and to tag themselves in different locations (Loomer, 2012; Mullins, 2016).

The way in which this content is displayed to other users has also evolved, with Facebook placing more emphasis on shared one-to-many content. An example of this is the 2007 introduction of the news-feed which provides real-time updates on friends' activity (Loomer, 2012). In 2011, Facebook profiles were revamped and relabeled as timelines. Changes included a banner image header, enlarged photographic content, and an emphasis on shared content over personal information (Albanesius, 2014; Peckham, 2016).

One-to-many communication, while afforded by a number of features in SNS environments, is relatively uncommon offline, and has been compared to monologues in small-group real world interactions (Faye, Garrod, & Carletta, 2000). The most common style of communication offline is one-to-one, but this is supported on Facebook by relatively few features (Xia, Huang, Duan, & Whinston, 2007). Users have always been able to post content directly onto the walls or timelines of their online friends (though as this is viewable by friends of both individuals, it could also be classified as one-to-many communication). In 2008, Facebook Chat was launched, which allowed users to engage in private one-to-one messaging within the domain, and in 2010, the chat feature was renamed as Facebook messenger and was updated to include voice and video calls (Loomer, 2012). Many-to-many communication is also facilitated by a limited number of Facebook features. The groups function allows this style of communication, with the group page functioning as a forum, and since 2010 multiple individuals can also communicate via group chat using Facebook Messenger (Mullins, 2016).

Facebook also facilitates limited many-to-one communication whereby multiple viewers can provide feedback on shared content. This is a potentially important aspect of online communication. When communicating via SNSs, where audiences are larger than in off-line social scenarios and sites principally afford the broadcasting of information, communication is less interactive and users become less aware of those with whom they are communicating (Buffardi & Campbell, 2008; Chiou et al., 2014). As a result, cognitions become more egocentric (Chou & Lee, 2013; Mor & Winquist, 2002) which can negatively

impact behaviour (e.g., Chiou et al., 2014) and impressions formed by third parties (Bohnert & Ross, 2010; Scott, Sinclair, Short, & Bruce, 2014). By providing feedback options with which viewers can respond to others' one-to-many communications, and by ensuring sufficient diversity of feedback, such features could enhance the interactivity of SNS communication, increasing users' awareness of their audience.

While Facebook users have always been able to comment on content posted by their online friends, since 2009 they have also had the option of 'liking' content. They do so by pressing a 'thumbs up' icon and the total number likes is displayed alongside the comments under said content (Albanesius, 2014). Although commenting costs users time and effort, liking represents ballot box communication (BBC), allowing feedback to be given with the single click of a button. This encourages viewers to engage with content rather than passively view it, resulting in greater feedback being provided to posters, as liking is less costly and more likely to be utilized than the comments feature (Xia et al., 2007).

Whereas BBC on Facebook was long restricted to the single positive response of *like*, in 2016 the company expanded this function to allow users to react to SNS content using a range of emotional reactions: 'love', 'haha', 'wow', 'sad', and 'angry', and their use was expanded to comments in 2017 (Abutaleb & Nair, 2016; Collins, 2017). The inclusion of both positive and negative emotional reactions represents the first major update to many-to-one communication implemented by Facebook in almost a decade. This is significant as although positively valenced content is most frequently shared on Facebook (Lee-Won, Shim, & Joo, 2014), users may want to respond to content but not feel that *like* is appropriate or reflective of their views (e.g., if content is negatively valenced). The reactions update allows users to receive more complex feedback on shared content, providing a more accurate picture of how their activity is received by their audience. It may also encourage feedback by individuals whose personalities did not motivate them to utilize the limited feedback offered by the like reaction (e.g., Ryan & Xenos, 2011).

Personality and Behaviour on Facebook

Users' personalities can be accurately perceived from their social media behaviour (e.g., Youyou, Kosinski, & Sillwell, 2005), and personality is related to many SNS behaviours (e.g., Amichai-Hamburger & Vinitzky, 2010; Correa et al., 2010; Ryan &

Xenos, 2010). Personality traits are defined as individual differences in the consistency of thought and action (McCrae & Costa, 1990). The dominant view is that there are five broad personality dimensions: neuroticism, extraversion, openness, agreeableness and conscientiousness (Digman, 1990; McCrae & Costa, 1990; Norman, 1963). This has been termed the 'Big Five' or the 'Five Factor Model' (FFM) of personality (Costa & McCrae, 1985; Digman, 1990; Goldberg, 1992). Narcissism, the antithesis of agreeableness, has also been found to influence SNS behaviours (e.g., Buffardi & Campbell, 2008; Ryan & Xenos, 2011).

Extraversion is commonly linked with the use of SNSs. This refers to the individual's sociability and a person high on extraversion will be active, assertive and excitement-seeking (Goldberg, 1992). Such individuals use Facebook to socialize with others (Seidman, 2013), spend longer engaging in SNS activity (Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011; Wilson, Fornasier, & White, 2010), and utilize a more diverse range of available features (Gosling et al., 2011; Ryan & Xenos, 2010). This supports the 'rich get richer' hypothesis (Kraut et al., 2002) which states those who are high in extraversion, and already socially 'rich' offline, will utilize online platforms to further enhance their social networks. Extraverts tend to have more online friends, be members of more groups on SNSs, and utilize these sites to express their personalities and to communicate with other users (Amichai-Hamburger & Vinitzky, 2010; Ross et al., 2009; Ryan & Xenos, 2010; Seidman, 2013). They upload more photos, and write more postings related to themselves (Eftekhari, Fullwood, & Morris, 2014; Gosling et al., 2011), however, while extraverts are more likely to frequently replace their profile pictures and share photos, they are less likely to post photos of themselves alone (Gosling et al., 2011). Extraversion has correlated with private messaging, as this provides instant social feedback (Ryan & Xenos, 2011). In addition, it has been associated with increased emotional expression and with the use of emotional icons in other online domains (Riggo & Riggo, 2002). Individuals high in extraversion may utilize emotional reactions on Facebook due to their inclination to exploit a fuller range of available online features, and through their desire to express emotion and engage in complex interactions.

Neuroticism concerns the level of emotional stability within individuals and involves the likelihood of experiencing negative emotions such as anxiety, hostility,

depression and vulnerability (Judge & Bono, 2000). Those high in neuroticism also utilize SNSs regularly, engaging more frequently but staying connected for shorter periods of time, using them as tools to engage in impression management (Correa et al., 2010). This may be a result of the increased experience of anxiety associated with neurotic personalities (Kashdan, 2002; Ross et al., 2009) and thus a higher need to manage an impression which is desirable to others. Indeed, those high in neuroticism are typically more cautious when presenting themselves online and are more likely to express aspects of their ideal- rather than actual-selves in an effort to positively self-present (Leary & Allen, 2011). Neuroticism has been correlated with using the wall and posting photos (Ross et al., 2009; Ryan & Xenos, 2011). There is some evidence of a relationship between neuroticism and utilizing private messaging, possibly because such individuals find this easier than face to face interactions (Ehrenberg, Juckes, White, & Walsh, 2008) however, this has not always been replicated (Ryan and Xenos, 2011). Neuroticism also interacts with extraversion: users with low extraversion and high neuroticism spend more time online than those high in extraversion but low in neuroticism (Amichai-Hamburger, Wainapel, & Fox, 2002). In the case one many-to-one feedback neuroticism may be positively associated with the use of reactions as an impression management tool.

Openness concerns how open individuals are to new experiences and a willingness to consider new ideas. Those high on openness will be imaginative and unconventional whereas a person scoring low on this dimension will prefer familiar experiences to new ones (McCrae & John, 1992), suggesting that openness may be related to willingness to experiment with new SNS features. Those high in openness not only use social media more but write on others' walls more, possibly supplementing offline interactions (Carpenter, Green, & LaFlam, 2011; Ross et al., 2009). Such individuals are more likely to disclose personal information online (Amichai-Hamburger & Vinitzky, 2010; Seidman, 2013). Openness was found to predict use of the like feature on Facebook three years after it was introduced (Bachrach, Kosinski, Graepel, Kohli, & Stillwell, 2012), though more recent evidence suggests this may no longer be the case (Lee, Hansen & Lee, 2016) as the feature is no longer new and unfamiliar. Openness may be associated with the use of the new Facebook reactions both because of their novelty, and their function of communicating directly with others.

Agreeableness concerns factors that are important in social interaction such as trust, modesty, compliance, helpfulness and compassion (McCrae & Costa, 2003). Conscientiousness relates to the amount of self-discipline and control an individual exhibits. Both factors have produced mixed evidence with regards to their influence in SNS use and have not been correlated with the use of specific Facebook features (Moore & McElroy, 2012; Ryan & Xenos, 2010; Ross et al., 2009). Research is therefore required to further our understanding of the role of these personality traits.

Narcissism is characterized by self-aggrandizing, vain, and exhibitionistic tendencies (Raskin & Terry, 1988). Individuals high on this trait will boast about achievements and devote considerable attention to their physical appearance in attempts to gain attention and admiration (Vazire, Naumann, Rentfrow, & Gosling, 2008). Those high in narcissism are likely to engage in a range of social networking behaviour, possibly because it allows them to present themselves to a wide audience and receive feedback from that audience in the form of comments and BBC, resulting in boosts to their ego (Andreassen, Pallesen, & Griffiths, 2017; Buffardi & Campbell, 2008; Ryan & Xenos, 2011). Those high in narcissism post more about their achievements, and more photos of themselves, using SNSs as a source of validation (Buffardi & Campbell, 2008; Gosling et al., 2011). Narcissism is related to reasons for using SNS, e.g., having as many online friends as possible, wanting friends to know what they were doing, believing others were interested in what they are doing, and having their SNS profiles project a positive self-image (Bergman, Fearington, Davenport, & Bergman, 2011). It is likely that narcissism will not be related to any BBC online communication unless such a communication would facilitate the self-promotion of the individual providing the feedback.

Despite these correlations between personality factors and online behaviour, to our knowledge, no study has specifically investigated many-to-one BBC communication on SNSs. The recent expansion of the Facebook 'like' function to six emotional reactions provides a timely opportunity to investigate this type of behaviour. Results will likely diverge from those outlined above because whereas other features principally afford one-to-many communication, with the opportunity for self-expression, impression management and potential boosts to self-esteem, BBC feedback is likely driven by distinct motivations associated with different personality factors.

The current study

The current study sought to investigate how and when Facebook users utilize reactions, and what aspects of personality might predict such use. We asked active Facebook users about their likelihood to utilize the reactions in response to five different types of Facebook content. These were chosen to represent the diversity of ways in which users can share information and receive many-to-one feedback (status updates and pictures: the most basic form of sharing text or photos; links: sharing external content; events: an activity to which the user is personally invited; and timehop: an example of a platform app which, when downloaded, accesses users' accounts and collates past activity on your current timeline in the form of memories). We also measured participants' Big Five personality traits (John & Srivastava, 1991) and narcissism (Ames, Rose, & Anderson, 2006).

It was predicted that users would utilize all available reactions, but that they would be more likely to use the 'like' function because it is the most established reaction, having been the only BBC feedback option for many years. It is also predicted that some types of shared content will be more likely to elicit reactions than others, and that different reactions will be differentially associated with different types of content. Further, we predicted that personality factors would influence how likely individuals were to use different reactions to five distinct categories of shared content. Specifically, individuals high in extraversion, neuroticism and openness would use a wider range of emotional reactions due to their tendency to engage more with SNS and its associated features (Ryan & Xenos, 2011).

METHODS

Design

A cross-sectional design examined participants' likelihood of using the Facebook reactions (like, love, haha, wow, sad, and angry) on 5 distinct categories of newsfeed content (status, picture, link, event, and timehop). The study also examined how this behaviour was related to the Big Five personality traits (openness, conscientiousness, extraversion, agreeableness, and neuroticism), and narcissism.

Participants

A total of 260 participants, 100 males and 160 females ranging in age from 16 to 59 years ($M=26.89$, $SD=7.24$) took part. All indicated on a yes/no question that they currently have a Facebook account. The majority of participants were British (96.54%), 1.92% were European, 0.77% were North American, and 0.38% were Asian. All participants were recruited via adverts on Facebook and completed the questionnaire voluntarily.

Measures

Facebook Reactions. Use of Facebook reactions was measured by asking participants to indicate, on a 7-point scale (*very unlikely – very likely*), how likely they would be to use each of the six reactions afforded by Facebook (like, love, haha, wow, sad, and angry) in response to five distinct categories of content (status, picture, link, event, and timehop) appearing on their newsfeed (e.g., “*How likely are you be to use the like reaction to respond to a status update?*”).

The Big Five. The Big Five personality traits were measured using the Big Five Inventory (BFI-44: John & Srivastava, 1991). This measured the Big Five personality traits on 8- to 10-item, 7-point sub-scales. Conscientiousness scores were calculated using the mean of nine items (e.g. ‘I am someone who does things efficiently’). The scale was found to be reliable ($\alpha = .80$). Extraversion was measured using the mean of eight items (e.g., ‘I am someone who is outgoing, sociable’; $\alpha = .81$). Neuroticism was assessed using the mean of eight items (e.g. ‘I am someone who worries a lot’; $\alpha = .82$). The mean of ten items was used to assess openness (e.g., ‘I am someone who is original, comes up with new ideas’; $\alpha = .68$). Finally, the mean of nine items was used to calculate agreeableness (e.g., ‘I am someone who is considerate and kind to almost everyone’; $\alpha = .78$).

Narcissism. Narcissism was measured using the Narcissistic Personality Inventory (NPI-16: Ames, Rose, & Anderson, 2006). This calculated a total score out of 16 by having participants choose one of 16 pairs of statements (e.g., ‘I try not to be a show off’ or ‘I will usually show off if I get the chance’) which they felt were most applicable to themselves.

Procedure

After obtaining ethical approval, the questionnaire was presented to participants via the online survey tool QuestionPro, which participants accessed via links on Facebook.

To ensure anonymity, participants entered a unique identifier before beginning the questionnaire, which took approximately 10 minutes to complete.

RESULTS

We conducted two analyses. First, we examined whether or not there were any significant differences between the likelihood of participants using each reaction to respond to the distinct types of Facebook content. Second, we used correlation and linear regression to investigate whether the Big Five personality types and narcissism predicted likelihood of using each of the reactions and reacting to different types of content.

Reactions to Facebook Content

We conducted a 6 (Reaction: like, love, haha, wow, sad, angry) x 5 (Content: status, picture, link, event, timehop) repeated measures Analysis of Variance (ANOVA). The Means (Standard Deviations) for each condition are presented in Table 1. There was a significant main effect of Reaction [$F(5,1295) = 395.293, p < 0.001, \eta^2 = 0.604$], a significant main effect of Content [$F(4,1036) = 51.730, p < 0.001, \eta^2 = 0.166$], and a significant Content x Reaction Interaction [$F(20,5180) = 16.057, p < 0.001, \eta^2 = 0.058$]. Bonferroni follow-up contrasts were carried out to examine the differences between each level of Reaction and Content, and of the interaction.

Within Reaction, each emotional reaction was significantly different from all the others. Like was most likely to be used, followed by love, haha, wow, sad, then angry (see Table 1 for means and SDs). Wow was significantly different from sad at the $p < 0.005$ level, all other differences were significant at the $p < 0.001$ level. Within Content there was no significant difference between status update and picture [$p = 1.00$] or between link and timehop [$p = 0.938$]. All other differences were significant at the $p < 0.001$ level. The bottom and right show aggregate scores and indicates that Picture and Status Update were the content type most likely to received any reaction and Like was the most likely reaction across all content types.

Table 1

Means (Standard Deviations) of likelihood of reacting to Facebook Content Types status, picture, link, event and timehop with Reactions like, love, haha, wow, sad, and angry.

	Like	Love	Haha	Wow	Sad	Angry	Agg
Status	5.99(1.57)	4.00(1.97)	3.71(2.07)	2.44(1.65)	2.60(1.79)	2.12(1.56)	3.48(2.27)
Picture	6.11(1.58)	4.53(2.21)	3.39(2.11)	2.91(1.99)	2.38(1.79)	2.02(1.62)	3.56(2.38)
Link	5.52(1.95)	3.45(2.20)	3.00(1.97)	2.51(1.85)	2.37(1.79)	2.22(1.77)	3.18(1.92)
Event	5.08(2.34)	3.12(2.14)	2.19(1.71)	2.00(1.60)	1.67(1.31)	1.55(1.23)	2.60(1.77)
Timehop	4.93(2.35)	3.53(2.34)	3.24(2.21)	2.47(1.91)	2.26(1.77)	1.86(1.57)	3.05(2.03)
Agg	5.53(3.22)	3.73(2.17)	3.11(2.01)	2.47(1.80)	2.26(1.69)	1.95(1.55)	

Notes. Agg = Aggregate

The results of the Bonferroni follow-up contrasts within each type of content are presented in Table 2 and also graphically in Figure 1. The general pattern of Reaction use (like followed by love, haha, wow, sad, then angry) manifest within each type of Content, and the majority of differences were statistically significant at the $p < 0.001$ level. There was no difference between the likelihood to react using love and haha within either status update or timehop; there was no difference between haha and wow within event; there was no difference between wow and sad within status update, link, or timehop; or between wow and angry within status update. There was no difference between sad and angry within event.

Table 2

P-values for Bonferroni follow-ups of the Reaction x Content interaction

		Status	Picture	Link	Event	Timehop
Like	Love	<0.001	<0.001	<0.001	<0.001	<0.001
	Haha	<0.001	<0.001	<0.001	<0.001	<0.001
	Wow	<0.001	<0.001	<0.001	<0.001	<0.001
	Sad	<0.001	<0.001	<0.001	<0.001	<0.001
	Angry	<0.001	<0.001	<0.001	<0.001	<0.001
Love	Haha	.330	<0.001	0.001	<0.001	.134
	Wow	<0.001	<0.001	<0.001	<0.001	<0.001
	Sad	<0.001	<0.001	<0.001	<0.001	<0.001
	Angry	<0.001	<0.001	<0.001	<0.001	<0.001
Haha	Wow	<0.001	<0.001	<0.001	.060	<0.001
	Sad	<0.001	<0.001	<0.001	<0.001	<0.001
	Angry	<0.001	<0.001	<0.001	<0.001	<0.001
Wow	Sad	1.00	<0.001	1.00	<0.001	.131
	Angry	.017	<0.001	0.012	<0.001	<0.001
Sad	Angry	<0.001	<0.001	0.022	.092	<0.001

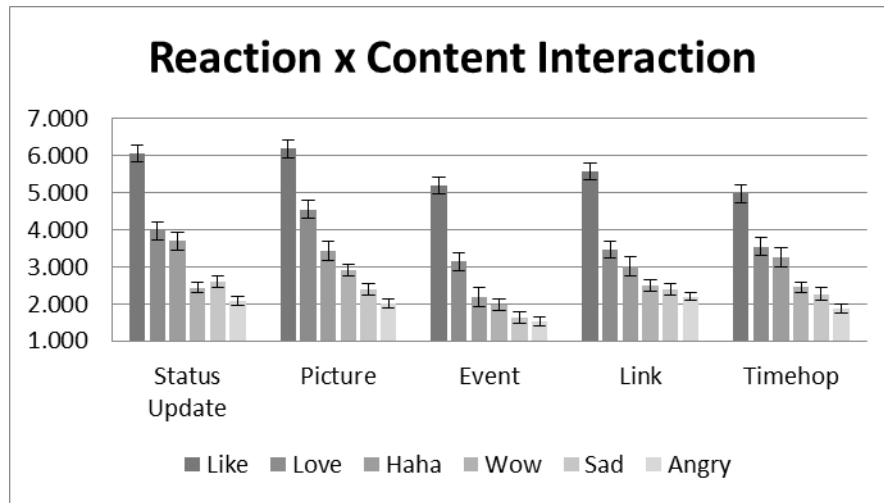


Figure 1 Reaction x Content Interaction: Bar chart with standard error bars for the interaction between Reaction and Content.

Personality as Predictor of Reaction and Content

Next, we examined the relationship between personality, use of the Facebook reactions (like, love, haha, wow, sad, and angry), and responses to types of content (status, picture, link, event, and timehop). First, we examined the personality distributions of our sample, with the means and standard deviations presented in Table 3.

Table 3

Means and standard deviation of the Big Five personality factors and narcissism

	Mean	Standard Deviation
Openness	4.527	0.759
Conscientiousness	4.898	0.923
Extraversion	4.739	0.997
Agreeableness	5.293	.0882
Neuroticism	3.625	1.118
Narcissism	2.603	2.780

Correlational analysis (see Table 4) indicated that neuroticism was positively related to the use of the love, sad and angry reactions. Participants higher on neuroticism were significantly more likely to react using these emotions. Neuroticism was also positively correlated with reacting to status, picture, and link. Openness was positively correlated with using the wow, sad, and angry emotional reactions and reacting to pictures. Finally, narcissism was negatively related to using the like and love reactions.

Those higher in narcissism were less likely to use these reactions. No other significant relationships between personality and reaction to content were found.

Regression analysis was used to identify whether personality traits were significant predictors of the use of emotional reactions or reactions to particular content. Six analyses were run using the sums of likelihoods of using each emotional reaction (like, love, haha, wow, sad, and angry) as the outcome variable and openness, conscientiousness, extraversion, agreeableness, neuroticism and narcissism as predictor variables. Results indicated that personality accounted for small but statistically significant proportion of the variance for the love, sad, and angry reactions. Summaries of these models are presented below and details of the coefficients are presented in Table 5. For the love reaction, personality predicted 11.4% of the variance [$R^2=0.114$, $F(6,259)=5.416$, $p<0.001$]. Both neuroticism and extraversion were significant positive predictors of using the love reaction, and narcissism was a significant negative predictor. This suggests that individuals higher in extraversion and neuroticism, and lower in narcissism, were more likely to react to Facebook content using love. For the sad reaction, personality predicted 5.3% of the variance [$R^2=0.053$, $F(6,259)=2.363$, $p=0.031$]. Neuroticism was the only significant positive predictor of using the sad reaction, although extraversion and openness were marginally significant. This suggests that participants scoring higher on these traits were more likely react using the sad emotion. For the angry reaction, personality predicted 4.9% of the variance [$R^2=0.049$, $F(6,259)=2.162$, $p=0.047$]. Both neuroticism and openness were significant positive predictors of using this reaction. Those who reported higher levels of neuroticism and openness were more likely to use the angry reaction. The models for like [$R^2=0.020$, $F(6,259)=0.864$, $p=0.522$], haha [$R^2=0.041$, $F(6,259)=1.786$, $p=0.102$], and wow [$R^2=0.044$, $F(6,259)=1.941$, $p=0.075$] were not statistically significant.

We then used regression to examine the role of personality on reacting to different Facebook content by conducting a further 5 analyses with the outcome variables the sums of likelihoods of using status, picture, link, event, and timehop. Results showed that personality accounted for a small but significant proportion of the variance in relation to reacting to pictures, links, and timehops. Summaries of these models are presented below and details of the coefficients are presented in table 4. For reactions to pictures,

personality predicted 6.4% of the variance [$R^2=0.064$, $F(6,259)=2.874$, $p=0.010$]. Both neuroticism and openness were significant predictors, while extraversion was marginally significant. Participants higher on these traits were more likely to react to links posted by Facebook friends. For reactions to links, personality predicted 7.6% of the variance [$R^2=0.076$, $F(6,259)=3.483$, $p=0.003$]. Neuroticism, extraversion, and openness were significant positive predictors, while narcissism was marginally negatively significant. Participants higher in neuroticism, extraversion, and openness but lower in narcissism were more likely to react to links.

Finally, personality accounted for 5.3% of the variance for reactions to timehop [$R^2=0.053$, $F(6,259)=2.377$, $p=0.030$]. Extraversion, neuroticism, and narcissism were significant predictors. Individuals higher in neuroticism and extraversion but lower in narcissism were more likely to react to timehop. The models for status update [$R^2=0.039$, $F(6,259)=1.701$, $p=0.121$] and event [$R^2=0.019$, $F(6,259)=0.811$, $p=0.562$] were not statistically significant.

Table 4

Bivariate Correlations, Means and Standard Deviations for SNS Behaviour, Reactions and Personality Variables

	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	M	SD	
1. Like	.37**	.25**	.14*	.12*	.02	.32**	.29**	.36**	.44**	.37**	-.03	-.03	-.01	.03	.06	-.13*	27.63	7.68	
2. Love		.64**	.62**	.59**	.44**	.73**	.52**	.76**	.69**	.69**	.06	.06	.07	.11	.18*	-.16*	18.64	8.72	
3. Haha			.79**	.70**	.55**	.73**	.60**	.79**	.73**	.72**	.11	-.02	.07	-.02	.02	-.07	15.53	8.03	
4. Wow				.80**	.69**	.71**	.68**	.77**	.72**	.76**	.13*	-.06	.07	-.03	.11	.005	12.33	7.38	
5. Sad					.87**	.72**	.66**	.78**	.69**	.76**	.12*	-.04	.05	.02	.14*	-.04	11.29	6.77	
6. Angry						.60**	.61**	.66**	.58**	.68**	.14*	-.04	.03	-.06	.15*	.03	9.76	6.20	
7. Status							.48**	.79**	.60**	.64**	.10	-.02	.01	-.001	.13*	-.07	20.87	7.42	
8. Event								.55**	.51**	.53**	.04	.01	.08	.08	-.01	-.06	15.61	7.38	
9. Pic									.67**	.73**	.13*	-.04	.03	.01	.17*	-.07	21.34	8.01	
10. Time										.67**	.08	-.01	.09	.01	.10	-.09	18.29	9.31	
11. Link											.12	-.04	.04	-.03	.19*	-.07	19.06	8.91	
12. Ope												-.04	.16*	.08	-.01	.27**	4.53	.76	
13. Cons														.20**	.32**	-.28**	.03	4.90	.92
14. Extr															.17**	-.44**	.33**	4.73	1.00
15. Agree																-.33**	-.30**	5.29	.88
16. Neur																	-.17**	3.63	1.12
17. Narc																		2.60	2.78

Note: Like= Total Like; Love= Total love; Haha= Total haha; Wow= Total wow; Sad= Total sad; Angry= Total angry; Status= Total status; Event= Total event; Pic= Total picture; Time= Total timehop; Link= Total link; (where 'total' for 1-6 = the average Reaction response for an individual across all content types; and 'total' for 7-11 = the average Status response for an individual across all reaction types) Open= Openness; Consc= Conscientiousness; Extr=Extraversion; Agree= Agreeableness; Neuro=Neuroticism; Narc=Narcissism.

** $p < .001$; * $p < .05$.

Table 5

Personality as a Predictor of Reacting to Status Posts

Predict	<i>Love Use</i>		<i>Sad Use</i>		<i>Angry Use</i>		<i>Picture Reaction</i>		<i>Link Reaction</i>		<i>Timehop Reaction</i>	
	β	p	β	p	B	p	β	p	β	p	β	P
Open	.074	.847	.115	.081	.131	.046*	.135	.040*	.134	.040*	.094	.151
Consc	.081	.210	-.020	.761	.005	.941	-.001	.984	.008	.907	-.007	.910
Extra	.212	.003*	.133	.068	.098	.179	.130	.071	.171	.017*	.197	.007*
Agree	.082	.263	.042	.573	-.300	.487	.017	.820	-.033	.660	-.027	.715
Neurot	.290	.001*	.202	.006*	.180	.015*	.214	.004*	.230	.002*	.152	.039*
Narcis	-.181	.013*	-.060	.420	-.015	.846	-.104	.159	-.134	.070	-.156	.037*

Note: Open=openness, Consc=conscientiousness, Extra=extraversion, Agree=agreeableness, Neurot=neuroticism, Narc=narcissism. $F_{\text{changeLove}}=2.37$, $F_{\text{changeSad}}=2.36$, $F_{\text{changeAngry}}=2.36$, $F_{\text{changePicture}}=2.87$, and $F_{\text{changeTimehop}}=2.38$, $F_{\text{changeLink}}=3.48$.

* $p < 0.05$

DISCUSSION

This study aimed to investigate how Facebook users utilize the new reactions tool to respond to online content. Particularly, we sought to discover which of the six emotional reactions were utilized most, which type of content users reacted to, and which personality factors predicted reaction use. A clear pattern of use emerged, with like being the reaction most likely to be used, followed by the positive reactions of love, haha, and wow, and then the negative reactions of sad and angry. Users were most likely to react to status updates and pictures and least likely to react to events. Neuroticism, extraversion, openness positively predicted, and narcissism negatively predicted, reaction use, specifically likelihood of utilizing the love reaction, and of reacting to pictures, links, and timehops.

Utilization of reactions

One of the clearest findings was that we like to like. Like was the most utilized reaction overall, and was also significantly most likely to be used to respond to each type of content. One possible explanation is that this behaviour is habitual: like was the only method of BBC feedback available to Facebook users from 2009 until 2016. It is possible that users feel comfortable using this reaction and due to established online norms are confident such feedback will be well received by others. Liking could also be most likely to be used because it remains the default response. When presented with content on

Facebook users have the option to like, react, or comment. To like they must click the ‘thumbs up’ like button. To respond using one of the other reactions they must hover over the like button (or hold their finger on it if using a mobile device) and wait for the other options to appear. This extra cost in terms of time and effort could result in decreased utilization of the five newer reactions.

Users were more likely to respond using positive (love, haha, wow) than negative (sad, angry) reactions. One explanation for this could again be established Facebook norms: users may be more comfortable providing positive than negative feedback to shared content as they are more confident about how this will be received. A major motivation for Facebook use is relationship maintenance and positivity likely facilitates this (Tosun, 2012). Alternatively, positive reactions could commonly be the appropriate response as the majority of shared content is positive (Lee-Won, Shim, & Joo, 2014). Finally, users try to engage in positive self-presentation online (Chou & Edge, 2012; Scott & Ravenscroft, 2017), and may feel that responding positively rather than negatively is an effective presentation strategy.

Of the two negative reactions, users were more likely to react using sad than angry, possibly due to a desire by users to positively self-present. When reacting sadly this may be viewed as sympathetic, whereas reacting angrily may be viewed as being more confrontational, decreasing the likelihood of future online interaction. Having established that users are most likely to respond to content using the like reaction, and that they are more likely to react by expressing a positive than a negative emotion, we were also interested in whether type of content influenced how reactions were employed.

Reactions in response to content

There was a clear difference in the type of online content users were likely to react to. Pictures and status updates were most likely to elicit reactions, followed by external links and timehops, while events were least likely to be reacted to. Photos and status updates have been available to users for the longest time, are the most basic type of text and picture content. (Ryan & Xenos, 2011). Participants may have indicated they would be most likely to respond to them as they encounter them more frequently. Similarly, Events may generate fewer reactions because they occur less frequently (Ryan & Xenos, 2011). Alternatively, more salient content (larger, picture based) may be more likely to be

noticed, attended to, and thus generate reactions. Some types of Facebook content may be less likely than others to be reacted to because they offer alternative ways of presenting feedback. An example of this is an event, which users can indicate they will ‘attend’, ‘maybe attend’, or ‘not attend’. It is possible that providing this feedback on attendance negates the need for users to provide further feedback via reactions.

There was a significant interaction between Reaction and Content. When responding to status updates and timehops, users were equally likely to react using love as haha. Such categories may be more commonly used to share humorous content (e.g., old photos generated by the timehop feature) and so this increases the likelihood of reacting using haha. Another feature of this interaction is wow being utilized less often than the other positive reactions, and no more often than sad in response to status updates, links, and timehops. Users may view this reaction as more ambiguous and less clearly positive than like, love, or haha, and so are less likely to select this option if their desire is to clearly indicate positive feedback on content.

One possible explanation for this pattern of findings is that the specified categories of content are confounded in the minds of participants. For example, users often share a link to external content but accompany this with a comment. In such cases, some reactions might be in response to the content of the link, while other might be in response to the accompanying comment. Future research should endeavour to disambiguate these aspects of Facebook content.

Personality factors

Four personality factors emerged as predictors of online behaviour: those higher in neuroticism, extraversion and openness, but lower in narcissism, were more likely utilize a number of the new emotional reactions, and to respond to specific types of content. Individual high in neuroticism were more likely to use the love, sad, and angry reactions while users high in extraversion were more likely to use the love response, and those high in openness were more likely to use the angry reaction.

Both neuroticism and extraversion been associated with above average Facebook use: extraversion with time spent online (Wilson et al., 2010), neuroticism with checking the site more frequently (Correa et al., 2010). Simply by spending longer on the site individuals high in these personality factors may be exposed to more content and therefore

be more likely to utilize the reactions. Users higher in extraversion show a preference for the majority of Facebook features (e.g., chat, messages, comments, the wall: Ryan & Xenos, 2010). The Rich get richer hypothesis (Ong et al., 2010), which states that extraverts are more likely to react and be outgoing online, translates here to diversity of reactions. Neuroticism is associated with more cautious online self-representation, and those higher in the trait are more likely to present characteristics related to their ideal selves than more emotionally stable users (Leary & Allen, 2011). Love may be viewed as the strongest of the positive reactions. Users high in extraversion, and therefore more likely to utilize the available Facebook features to express themselves, or high in neuroticism, who have an increased desire to positively self-present online, may be most likely to ‘upgrade’ their reactions to friends’ content from like to love because of these features of their personality.

Users higher in neuroticism are also more likely to use negative reactions. These could simply reflect users’ moods, as neuroticism is associated with likelihood of experiencing negative emotions (Judge & Bono, 2000). By showing more likelihood to use the relatively unutilized angry reaction, users high in openness demonstrate a readiness to engage with a feature unpopular with other users and inconsistent with established norms (Ross et al., 2009).

Users high in extraversion and neuroticism are more likely to respond to timehops. This may be because of the personal nature of their content (Facebook users post a wide variety of photos not always related to themselves: Scott, Boyle, Czerniawska, & Courtney, 2017). Users high in extraversion or neuroticism, for reasons explained above, may be more likely to react to content specifically related to their online friends.

Neuroticism, extraversion, and openness were all positively associated with reacting to pictures and links. Users high in extroversion and neuroticism are more likely to engage with Facebook content (Ross et al., 2009; Ryan & Xenos) and users higher in openness are more likely to engage with novel features (Ross et al., 2009). A possible explanation for this is the highly salient, picture-based presentation of these types of content on Facebook (Mullins, 2016). They are typically represented on timelines and newsfeeds as headline and accompanying picture, highly salient SNS components possibly more likely to be responded to by those users already predisposed to interacting with content.

Users higher in narcissism were less likely to use the love reaction, or to react to timehops or links. Narcissism has been positively associated with online behaviour related to positive self-presentation (Buffardi & Campbell, 2008), likely in an attempt to harvest ego-boosting positive feedback in the form of comments and BBC (Andreassen et al., 2017). As this is involved broadcasting information to others, individuals high in narcissism may concentrate on this type of communication online at the expense of providing feedback to others.

Conclusions

While this study provided valuable insight into how Facebook users utilize the new reactions feature, what type of content they react to, and which personality factors motivate this behaviour, several questions require further investigation. This study investigated users' reactions to five broad categories of content commonly shared on Facebook. This could be expanded in the future by including additional types of shared content (such as different categories of images), by taking into account the substance of that content (e.g., its emotional valence, or whether or not it contains humour), and by disambiguating different categories of content (e.g., links or pictures posted with comments).

The current study investigated Facebook users' utilization of the reactions feature, the first update to many-to-one communication, and in particular BBC communication, offered by the site since liking was introduced in 2009. This offers a low cost method for users to provide much more detailed feedback than before on shared content. We demonstrated that users do use these features: while like remains the most likely to be used, users are more likely to use the positive than the negative reactions, possibly because of the specific affordances of the feature, established online norms and concerns with positive self-presentation. They are also more likely to react to status updates and pictures, and least likely to react to events. Reaction use is predicted by high neuroticism, extraversion, and openness, and low narcissism, with these factors driving use of the strong love reaction, the negative sad and angry reactions, and on the specifically personal timehop content, possibly motivated by a desire for complex social interaction and to positively manage online interactions, and on the and pictorially salient picture and link content types.

References

- Abutaleb, Y. & Nair, A.S. (2016). ‘Wow’: Facebook launches reactions worldwide. Reuters.com. Retrieved from: <http://www.reuters.com/article/us-facebook-reactions-idUSKCN0VX1L7>
- Albanesius, C. (2014). 10 Years Later: Facebook’s Design Revolution. Retrieved from: <http://www.pcmag.com/feature/320360/10-years-later-facebook-s-design-evolution/13>
- Ambady, N. & Skowronski, J. (2008). *First impressions*. New York: Guilford.
- Ames, D.R., Rose, P., & Anderson, C.P. (2006). The NPI-16 as a short measure of narcissism. *Journal of Research in Personality, 40*, 440-450. doi: 10.1016/j.jrp.2005.03.002
- Amichai-Hamburger, Y. & Vinitzky, G. (2010). Social network use and personality. *Computers in Human Behavior, 26*, 1289-1295. doi: 10.1016/j.chb.2010.03.018
- Amichai-Hamburger, Y., Wainapel, G., & Fox, S. (2002). “On the internet no one knows I’m an introvert”: Extraversion, neuroticism, and internet interaction. *Cyberpsychology & Behavior, 5*(2): 125–128. doi: [10.1089/109493102753770507](https://doi.org/10.1089/109493102753770507)
- Andreassen, C.S., Pallesen, S., & Griffiths, M.D. (2017). The relationship between addictive use of social media, narcissism, and self-esteem: Findings from a large national survey. *Addictive Behaviors, 64*, 287–293. doi: [10.1016/j.addbeh.2016.03.006](https://doi.org/10.1016/j.addbeh.2016.03.006)
- Bachrach, Y., Kosinski, M., Graepel, T., Kohli, P., & Stillwell, D. (2012). Personality and patterns of Facebook usage. Proceedings from ACM Web Sciences 2012, *ACM Conference on Web Sciences*, Evanston, IL, USA.
- Bergman, S.M., Fearington, M.E., Davenport, S.W., & Bergman, J. (2011). Millennials, narcissism, and social networking: What narcissists do on social networking sites and why. *Personality and Individual Differences, 50*, 706–711. doi: 10.1016/j.paid.2010.12.022
- Bohnert, D. & Ross, W.H. (2010). The influence of social networking web sites on the evaluation of job candidates. *Cyberpsychology, Behavior, & Social Networking, 13*(3), 341-347. doi: [10.1089/cyber.2009.0193](https://doi.org/10.1089/cyber.2009.0193)
- Boyd, D.M. & Ellison, N.B. (2007). Social networking sites: Definition, history, and scholarship. *Journal of Computer-Mediated Communication, 13*, 210–230. Doi: 10.1111/j.1083-6101.2007.00393.x
- Buffardi, L.E. & Campbell, W.K. (2008). Narcissism and social networking web sites. *Personality and Social Psychology Bulletin, 34*, 1303-1314. doi: [10.1177/0146167208320061](https://doi.org/10.1177/0146167208320061)
- Carpenter, J.M., Green, M.C., & LaFlam, J. (2011). People or profiles: Individual differences in online social networking use. *Personality & Individual Differences, 50*, 538-541. doi: 10.1016/j.paid.2010.11.006
- Chiou, W-B., Chen, S-W., & Liao, D-C. (2014). Does Facebook promote self-interest? Enactment of indiscriminate one-to-many communication on online social networking sites decreases prosocial behaviour. *Cyberpsychology, Behavior, & Social Networking, 17*(2), 68-73. doi: 10.1089/cyber.2013.0035
- Chou, H-TG. & Edge, N. (2012). “They are happier and having better lives than I am”: the impact of using Facebook on perceptions of others’ lives. *Cyberpsychology, Behavior and Social Networking, 15*, 17–121. doi: 10.1089/cyber.2011.0324

- Chou H-T.G. & Lee, C-C. (2013). Enactment of one-to-many communication may induce self-focused attention that leads to diminished perspective taking: The case of Facebook. *Judgment and Decision Making*, 8(3), 372-380.
- Collins T (May, 2017) Emoji lovers rejoice! Facebook expands its reactions feature to comments. Retrieved from: <http://www.dailymail.co.uk/sciencetech/article-4472518/Facebook-expands-reactions-feature-comments.html>
- Correa, T., Bachmann, I., Willard Hensley, A., & Gil de Zúñiga, H. (2013). Personality and social media use. In E.Y. Li & C. Evans (Eds.) *Organizations and social networking: Utilizing social media to engage consumers*. Hershey: IGI Global.
- Costa, P.T. & McCrae, R.R. (1985). *The NEO personality inventory manual*. Odessa, FL: Psychological Assessment Resources.
- Digman, J.M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology*, 41, 417-440.
- Eftekhar, A., Fullwood, C., & Morris, N. (2014). Capturing personality from Facebook photos and photo-related activities: How much exposure do you need? *Computers in Human Behavior*, 37, 162-170. doi: [10.1016/j.chb.2014.04.048](https://doi.org/10.1016/j.chb.2014.04.048)
- Ehrenberg, A., Juckes, S., White, K.M., & Walsh, S.P. (2008). Personality and self-esteem as predictors of young people's technology use. *Cyberpsychology & Behavior*, 11(6), 739-741. doi: [10.1089/cpb.2008.0030](https://doi.org/10.1089/cpb.2008.0030)
- Facebook Newsroom (2019). Retrieved from: <https://newsroom.fb.com/news/2017/06/two-billion-people-coming-together-on-facebook/>
- Fay, N., Garrod, S., & Carletta, J. (2000). Group discussion as interactive dialogue or as serial monologue: the influence of group size. *Psychological Science*, 11, 481-486. doi: [10.1111/1467-9280.00292](https://doi.org/10.1111/1467-9280.00292)
- Goldberg, L.R. (1992). The development of markers for the Big-Five factor structure. *Psychological Assessment*, 4, 26-42.
- Gosling, S.D., Augustine, A.A., Vazire, S., Holtzan, N., & Gaddis, S. (2011). Manifestation of personality in Online Social Networks: Self-reported Facebook-related behaviors and observable profile information. *Cyberpsychology Behavior and Social Networking*, 14, 483-488. doi: [10.1089/cyber.2010.0087](https://doi.org/10.1089/cyber.2010.0087)
- Haythornthwaite, C. (2005). Social networks and Internet connectivity effects. *Information Communication & Society*, 8(2), 125-147. doi: [10.1080/13691180500146185](https://doi.org/10.1080/13691180500146185)
- John, O.P. & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In LA Pervin and OP John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102-138). New York: Guilford.
- Judge, T.A. & Bono, J.E. (2000). Five-factor model of personality and transformational leadership. *Journal of Applied Psychology*, 85, 751-765. Doi: [10.1037/0021-9010.85.5.751](https://doi.org/10.1037/0021-9010.85.5.751).
- Kashdan, T.B. (2002). Social anxiety dimensions, neuroticism, and the contours of positive psychological functioning. *Cognitive Therapy and Research*, 26, 789-810.
- Kraut, R., Kiesler, S., Boneva, B., Cummings, J., Helgeson, V., & Crawford, A. (2002). Internet paradox revisited. *Journal of Social Issues*, 58(1), 49-74. doi: [10.1111/1540-4560.00248](https://doi.org/10.1111/1540-4560.00248)
- Leary, M.R. & Allen, A.B. (2011). Personality & persona: Personality processes in self-presentation. *Journal of Personality*, 79(6), 1191-1218. doi: [10.1111/j.1467-6494.2010.00704.x](https://doi.org/10.1111/j.1467-6494.2010.00704.x)

- Lee, S., Hansen, S.S., & Lee, J.K. (2016). What makes us click “like” on Facebook? Examining psychological, technological, and motivational factors on virtual endorsement, *Computer Communications*, *73*(1), 332 - 341. doi: [10.1016/j.comcom.2015.08.002](https://doi.org/10.1016/j.comcom.2015.08.002)
- Lee-Won, R.J., Shim, M., & Joo, Y.K. (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. doi: 10.1016/j.chb.2014.08.007
- Loomer, J. (2012) Detailed history of Facebook changes 2004-2012. Retrieved from: <http://www.jonloomer.com/2012/05/06/history-of-facebook-changes/>
- McCrae, R.R. & Costa, P.T. (1990). *Personality in adulthood*. New York: Guilford.
- McCrae, R.R. & Costa, P.T. (2003). *Personality in adulthood: A five-factor theory perspective*. New York: The Guilford Press.
- McCrae, R.R. & John, O.P. (1992). An introduction to the five-factor model and its applications. *Journal of Personality*, *60*, 175-215.
- Moore, K. & McElroy, J.C. (2012). The influence of personality on Facebook usage, wall postings, and regret. *Computers in Human Behavior*, *28*, 267–274. Doi: [10.1016/j.chb.2011.09.009](https://doi.org/10.1016/j.chb.2011.09.009).
- Mor, N. & Winquist, J. (2002). Self-focused attention and negative affect: a meta-analysis. *Psychological Bulletin*, *128*, 638–662. doi: 10.1037/0033-2909.128.4.638
- Mullins J. (2016) This is how Facebook has changed over the past 12 years. Retrieved from: <http://www.eonline.com/uk/news/736977/this-is-how-facebook-has-changed-over-the-past-12-years>
- Norman, W.T. (1963). Toward an adequate taxonomy of personality attributes: Replicated factor structure in peer nomination personality ratings. *The Journal of Abnormal and Social Psychology*, *66*, 574-583.
- Peckham, J. (2016) History of Facebook: All the major updates and changes from 2004-2016. Retrieved from: <http://www.knowyourmobile.com/apps/facebook/21807/history-facebook-all-major-updates-changes-2004-2016>
- Raskin, R. & Terry, H. (1988). A principal-components analysis of the Narcissistic Personality Inventory and further evidence of its construct validity. *Journal of Personality and Social Psychology*, *54*, 890–902. Doi: [10.1037/0022-3514.54.5.890](https://doi.org/10.1037/0022-3514.54.5.890).
- Riggo, H.R. & Riggo, R.E. (2002). Emotional expressiveness, extraversion, and neuroticism: A meta-analysis. *Journal of Nonverbal Behaviour*, *26*(4), 195-218.
- Ross, C., Orr, E.S., Susic, M., Arseneault, J.M., Simmering, M.G., & Orr, R. (2009). Personality and motivations associated with Facebook use. *Computers in Human Behavior*, *25*, 578–586. doi: 10.1016/j.chb.2008.12.024
- Ryan, T. & Xenos, S. (2011). Who uses Facebook? An investigation into the relationship between the Big Five, shyness, narcissism, loneliness, and Facebook usage. *Computers in Human Behaviors*, *27*, 1658–1664. doi: [10.1016/j.chb.2011.02.004](https://doi.org/10.1016/j.chb.2011.02.004)
- Scott, G.G., Boyle, E., Czerniawska, K., & Courtney, A. (2018). Posting photos on Facebook: The impact of narcissism, social anxiety, loneliness, and shyness. *Personality and Individual Differences*, *133*, 67-72. Doi: [10.1016/j.paid.2016.12.039](https://doi.org/10.1016/j.paid.2016.12.039)
- Scott, G.G. & Hand, C.J. (2016). Motivation determined Facebook viewing strategy: An eye movement analysis. *Computers in Human Behaviour*, *56*, 267-280. doi: [10.1016/j.chb.2015.11.029](https://doi.org/10.1016/j.chb.2015.11.029)

- Scott, G.G. & Ravenscroft, K. (2017). Bragging on Facebook: The interaction of content source and focus in online impression formation. *Cyberpsychology, Behavior, & Social Networking*, 20(1), 58-63. doi: 10.1089/cyber.2016.0311
- Scott, G.G., Sinclair, J., Short, E., & Bruce, G. (2014). It's not what you say, it's how you say it: Language use on Facebook impacts employability but not attractiveness. *Cyberpsychology, Behavior, & Social Networking*, 17(8), 562-566. Doi: [10.1089/cyber.2013.0584](https://doi.org/10.1089/cyber.2013.0584)
- Seidman, G. (2013). Self-presentation and belonging on Facebook: How personality influences social media use and motivations. *Personality and Individual Differences*, 54, 402-407. doi: 10.1016/j.paid.2012.10.009
- Tosun, L.P. (2012). Motives for Facebook use and expressing “true self” on the internet. *Computers in Human Behavior*, 28, 1510-1517. doi: 10.1016/j.chb.2012.03.018
- Vazire, S., Naumann, L.P., Rentfrow, P.J., & Gosling, S.D. (2008). Portrait of a narcissist: Manifestations of narcissism in physical appearance. *Journal of Research in Personality*, 42, 1439-1447. doi: 10.1016/j.jrp.2008.06.007
- Wilson, K., Fornasier, S., & White, K.M. (2010). Psychological predictors of young adults' use of social networking sites. *Cyberpsychology, Behavior, & Social Networking*, 13(2): 173-177. doi: [10.1089/cyber.2009.0094](https://doi.org/10.1089/cyber.2009.0094)
- Xia, M., Huang, Y., Duan, W., & Whinston, A.B. (2007). Implicit many-to-one communication in online communities. *Communities and Technologies 2007: Proceedings of the Third Communities and Technologies Conference, Michigan State University 2007*. 265-174.
- Youyou, W., Kosiski, K., & Stillwell, D. (2005). Computer-based personality judgments are more accurate than those made by humans. *Proceedings of the National Academy of Sciences*, 112(4), 1036-1040. <https://doi.org/10.1073/pnas.1418680112>

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