Do computer-mediated communication skill, knowledge and motivation mediate the relationships between personality traits and attitude toward Facebook?

Yan Piaw Chua a,*, Yee Pei Chua b

a University of Malaya, Institute of Educational Leadership, Level 11, Wisma R & D, UM, Jalan Pantai Baru, 59000, Kuala Lumpur, Malaysia
b Universiti Putra Malaysia, Faculty of Computer Science and Information Technology, Universiti Putra Malaysia, 43400, Serdang, Selangor, Malaysia

ABSTRACT

Social networking sites (SNSs) are observed to have both positive and negative effects on users' social, emotional, and cognitive development, which would further influence their self-esteem and well-being. Hence, understanding the behavior of users in online social networking is important. The present study investigates the causal relationships between Facebook users' personal factors and attitude toward Facebook. The study hypothesizes that personality traits would be significantly associated with attitude toward Facebook and that the association would be mediated by computer-mediated communication (CMC) skill, CMC knowledge and CMC motivation. The participants in this study are 327 school teenagers. The results indicate that participants who are extraverted and open to experience possess a positive attitude toward Facebook. Conscientious participants possess a negative attitude toward Facebook; however, for participants who are neurotics or who are agreeable, their attitude toward Facebook is not influenced by their personalities. An important finding of this study is that the three CMC competence components are mediators that either enhance or reduce the strengths of the causal relationships between four personality traits – neuroticism, extraversion, conscientiousness and openness to experience – and participants' attitude toward Facebook.

© 2016 Elsevier Ltd. All rights reserved.

1. Introduction

Social networking sites (SNSs) such as Facebook, WhatsApp, Twitter and Instagram, are created for social networking among people who share interests and activities. SNSs have attracted billions of users, many of whom have integrated these sites into their daily practices, and the number of SNS users is increasing. For example, the number of monthly active Facebook users has increased from 1.00 billion in 2012 to 1.65 billion in the first quarter of 2016 (The Statistics Portal, 2016).

SNSs, including Facebook, are found to have both positive and negative effects on users, especially teenagers’ social, emotional, cognitive and academic development, which would further influence their self-esteem and well-being (Aida, Behrang, & Behrooz, 2014; Vural, 2015). Hence research has been conducted to understand the attitude of SNS users (e.g., Andreassen, Torsheim, & Pallesen, 2014; Hughes, Rowe, Batey, & Lee, 2011; Moore & McElroy, 2012; Ryan & Xenos, 2011; Smock, Ellison, Lampe, & Wohn, 2011; Wang, Jackson, Wang, & Gaskin, 2015; Wang, Jackson, Zhang, & Su, 2012). Most of the studies focus on the causal relationship between personality and attitude of SNS users. Research on the influence of computer-mediated communication (CMC) competencies of Facebook users and their attitude is scarce. There is currently a dearth of evidence of the influences of CMC competencies, such as CMC skills, on the relationship between personality and attitude of Facebook users.

The present study focuses on the direct and indirect effects of the relationship between five main personality traits and attitudes toward Facebook. The indirect effects are the mediating effects of the three computer-mediated communication competence components: CMC knowledge, skill and motivation. Previous research has not been carried out on the indirect effects of CMC components. Studying these indirect effects is important because the relationship between personality traits and attitude toward Facebook (as a whole) as reported in previous studies is the total of the direct and
indirect effects. Without studying the indirect effect of CMC competencies, we can only identify the relationship between personality and attitude without knowing how much of the relationship is caused by personality and how much of it is caused by the indirect mediating effect of CMC competencies. The uniqueness of the present study is that it sets out primarily to explore the causal relationship between personality and attitude toward Facebook and to investigate whether the relationship would be indirectly mediated by computer-mediated communication skill, knowledge and motivation. We believe that the findings of this study will contribute to the body of knowledge regarding social networks, as well as increasing our understanding of the relationship between personality and attitude toward Facebook.

2. Literature review

2.1. Causal relationships between five main personality traits and attitude toward SNS

In Five Factors Model of Personality, Costa and McCrae (1992) defined personality as a series of five dimensional traits: Neuroticism, Extraversion, Conscientiousness, Openness to experience and Agreeableness. Most research on personality and attitude toward SNS focused on these five personality traits (e.g., Amichai-Hamburger & Vinitzky, 2010; Hughes et al., 2011; Ryan & Xenos, 2011; Ross et al., 2009; Wang et al., 2012). This is because the literature on personality and individual differences indicate that the core aspects of personality are best described by the so-called ‘Big Five’ personality traits (Teh, Yong, Chong, & Yew, 2011).

2.1.1. Neuroticism and attitude toward SNS

Neurotic people tend to experience psychological distress (such as anger, anxiety, depression and vulnerability) and high levels of that trait are associated with sensitivity to threat (Costa & McCrae, 1992). Neurotic people are found to have a positive attitude toward SNS. For example, individuals with a high neurotic personality demonstrated a strong interest in using SNS for personal purposes (Andreassen et al., 2014) and communication (Wolfred & Doll, 2001). They used SNS to decrease feelings of loneliness and to create a sense of belonging (Butt & Phillips, 2008) due to their low levels of social support (Swickert, Hittner, Harris, & Herring, 2002).

Several studies found that neuroticism was negatively correlated with the amount of time spent on SNS (Amichai-Hamburger, Wainapel, & Fox, 2002; Amiel & Sargent, 2004; Tuten & Bosnjak, 2001), and a high level of neuroticism was not associated with increased levels of SNS use or addictive tendencies (Wilson, Fornasier, & White, 2010). Although there is no clear and consistent conclusion on whether the relationship is positive or negative, the present study hypothesizes that there would be a significant causal relationship between neuroticism personality traits and attitude toward Facebook.

2.1.2. Extraversion and attitude toward SNS

Extraverts tend to be enthusiastic, action-oriented individuals. They are sociable and able to experience positive emotions (Costa & McCrae, 1992). Most of the previous research on SNS found that extraversion personality was positively correlated with SNS use. For example, extraversion was positively related to attitudes toward SNS for personal purposes during working hours (Andreassen et al., 2014), have more Facebook friends (Amichai-Hamburger & Vinitzky, 2010), engage in more frequent use of Facebook (Ross et al., 2009; Ryan & Xenos, 2011; Wilson et al., 2010), broadcast their events on Facebook (Bibby, 2008), have larger social networks on SNS (Tong, Van Der Heide, Langwell, & Walther, 2008) and belong to more Facebook groups than introverted individuals (Ross et al., 2009). Extraversion was also significantly correlated with the communicative features of Facebook (Ryan & Xenos, 2011; Correa, Hinsley, & de Zuniga, 2010).

Conversely, Ross et al. (2009) reported that extraversion was not significantly related to number of Facebook friends, time spent online or using communicative Facebook features. In addition, two studies found a negative relationship (Goby, 2006; Hughes et al., 2011). Ong et al. (2011) explained the negative relationship by referring to the Social Compensation Model, which proposes that extraverts gain more from offline communication due to their strong interpersonal and social skills, while introverts gain more from SNS usage as SNS platforms compensate for their relatively weaker social skills.

Nevertheless, since more previous studies found a significant positive relationship between extraversion and Facebook use, the present study hypothesizes that there would be a significant positive causal relationship between extraversion personality traits and attitude toward Facebook.

2.1.3. Conscientiousness attitude toward SNS

Conscientiousness reflects the degree to which an individual is diligent, self-disciplined, organized, and scrupulous. Conscientiousness people tend to control, regulate, and direct their impulses rather than exhibit spontaneous reactions (Costa & McCrae, 1992). Several research studies have been conducted on the relationship between conscientiousness and attitude toward SNS. Wang et al. (2012) found that there was no significant relationship between conscientiousness and SNS use. However, other studies reported that conscientiousness is negatively related to attitude toward SNS. Andreassen et al. (2014) found that conscientiousness is negatively associated with SNS use for personal purposes during working hours. Ryan and Xenos (2011) reported that conscientiousness is negatively related time spent on SNS. and Wilson et al. (2010) found that conscientious individuals upload significantly fewer pictures to SNS. Butt and Phillips (2008) and Ross et al. (2009) explained the negative relationship by conscientious people tending to avoid SNSs because these sites promote procrastination and serve as a distraction from more important tasks. Hence, the present study hypothesizes that there would be a significant causal relationship between conscientious personality traits and attitude toward Facebook.

2.1.4. Openness to experience and attitude toward SNS

Openness to experience reflects the degree to which an individual opens his or her mind to unusual ideas and a variety of experiences. People who are open to experience tend to be intellectually curious, open to emotion, sensitive to the beauty of the arts and willing to try new things (Costa & McCrae, 1992). Some studies reported a significant positive relationship between openness to experience with the use of instant messaging (Correa et al., 2010) and Facebook features (Amichai-Hamburger & Vinitzky, 2010; Butt & Phillips, 2008; Tuten & Bosnjak, 2001). The reason can be found in John and Srivastava (1999) and Costa and McCrae (1992), who note that openness to experience is related to a willingness to consider alternative approaches, to being intellectually curious and to enjoy the artistic pursuits of Facebook features. However, three recent studies found that openness to experience was not related to SNS use (Hughes et al., 2011; Wang et al., 2012; Wilson et al., 2010). In the present study, we hypothesize that there would be a significant causal relationship between openness to experience personality traits and attitude toward Facebook.

2.1.5. Agreeableness and attitude toward SNS

Costa and McCrae (1992) defined agreeableness as the tendency of a person to be trusting, sympathetic and cooperative, rather than...
suspicious and antagonistic toward others. Agreeableness reflects the extent to which people are friendly, and individuals with high agreeableness are inclined to be warm and sympathetic. A few studies reported that agreeableness is related neither to overall Internet use nor to any form of social media use (Correa et al., 2010; Hughes et al., 2011; Ross et al., 2009). However, a weak but positive relationship between agreeableness and time spent on communication (Ryan & Xenos, 2011; Wilson et al., 2010) and making comments on SNS (Wang et al., 2012) was reported. In the present study, we hypothesize that there would be a significant causal relationship between agreeableness personality traits and attitude toward Facebook.

Based on the literature reviewed above, the present study hypothesizes that there will be significant causal relationships between the Big Five personality traits and attitude toward Facebook [Hypothesis H1].

2.2. Causal relationships between personality traits, CMC competencies and attitude toward Facebook

Spitzberg (2006) and Lewis and Fabos (2005) stated that personality is not the only factor likely to impact a user’s attitude toward SNS use. The major determinants of using SNS technology are CMC skill, CMC knowledge and CMC motivation. Spitzberg (2006) stated that the skill, knowledge and motivation of computer-mediated communication are three main indicators of CMC competencies of SNS users because their background skill, prior knowledge and their willingness to use SNS determine how frequently they use the SNS. In general, it seems reasonable to expect that the more knowledgeable about the better skill a person has with CMC, the more motivated the person will be to use SNS (Spitzberg, 2006). Therefore, it is expected that there would be inter-correlations among the three components of CMC.

According to Ross et al. (2009), studying these CMC factors is as crucial as studying other personal factors in understanding Facebook use. The Model of Computer-Mediated Communication Competency defines CMC as any human symbolic text-based interaction conducted or facilitated through digitally based technologies (Spitzberg, 2006). According to Spitzberg (2006), CMC competence is represented by its three dimensions, i.e., CMC skill, CMC knowledge and CMC motivation. The three aspects are the basis of effectiveness, appropriateness, understanding and satisfaction of SNS use which indirectly influence users’ attitude toward SNS (Bubas, 2006, pp. 1–38). CMC skill is closely aligned with computer-web-networking fluency (Bunz, 2004) and is similar to many of the process effects attributed to the interactivity of media, such as navigation control, pace control, rapidity, and responsiveness (Burgoon et al., 2000; Sohn & Lee, 2005). CMC Knowledge consists of both content and procedural knowledge (Spitzberg, 2006). Content knowledge is an understanding of the “what” of communication, such as topics, rules, and concepts, while procedural knowledge is comprehension of the “how” of communication: how the content knowledge of CMC can be applied (Spitzberg, 2006). Furthermore, CMC Motivation is a proactive CMC attitude which is reflected by the antitheses of constructs such as confidence, comfort, and communicator involvement (Bubas, 2006, pp. 1–38; Richter, Naumann, & Groeben, 2000).

Studies of the relationship between personality traits and CMC competence are scarce. Two research studies reported that the Big Five personality traits, in part, predict SNS users’ attitude in online communication (Guadagno, Oldke, & Eno, 2008; Orchard & Fulwood, 2010), and CMC knowledge (β = 0.41), CMC skill (β = 0.23) and CMC motivation (β = 0.11) of the computer-mediated communication medium are significant predictors of the attitude (Sherblom, Withers & Leonard, 2013). In other words, the three CMC competence components are assumed capable of mediating the relationship between personality traits of users and their attitude in online communication. In another study, Ross et al. (2009) found that openness to experience significantly predicted CMC knowledge with a negative regression weight (β = −0.24). The researchers suggested a possible explanation for this finding might be that because of broad interests, people high in openness to experience have greater difficulty in trying to communicate with others through forms of CMC, as their interests do not translate well. Rouse and Haas (2003) found that CMC competence was significantly correlated with extraversion, openness to experience, neuroticism and conscientiousness. Based on their findings, Ross et al. (2009) suggested that there is a need to further examine personal characteristics that may have a strong relationship to SNS use. This approach is warranted because continuing research needs to disentangle many of the motivational factors that lead people to engage in SNS. Correa et al. (2010) also suggested that this type of investigation is especially relevant where active participation of SNS users may become crucial to advancing in social spheres. The present study hypothesizes that there will be significant causal relationships between the Big Five personality traits and CMC skill, CMC knowledge and CMC motivation [Hypothesis H2].

Furthermore, Seguin-Levesque, Laliberte, Pelletier, Blanchard, and Vallerand (2003) found that high CMC motivation participants significantly spent more time per day on Facebook, although the relationship was weak (r = 0.30, p < 0.05). The findings of Ross et al. (2009) are similar. They found that the high CMC motivation group typically spent 31–60 min per day on Facebook, while those in the low CMC motivation group typically spent 10 min per day or less on Facebook. Theory and model have been used to explain the relationship. Lee and Kim (2014) referred to the Social Enhancement Model, which proposes that an individual’s need — i.e., who is more or less eager (CMC motivation) to engage in social interactions — and the Social Compensation Model, which proposes that individual’s ability — i.e., who is better or worse at performing social interactions smoothly (CMC skill) — as major determinants of SNS use. Therefore, the present study hypothesizes that there will be significant causal relationships between CMC skill, CMC knowledge and CMC motivation and attitude toward Facebook [Hypothesis H3].

In addition, Chang and Wang (2008) employed the Technology Acceptance Model, which states that attitude toward the use of technology is linked to intentions centered around use of and decisions to use CMC. Since the models have highlighted that intention, need, knowledge and skills of technology are expressions of attitude toward use of technology, the present study hypothesizes that the causal relationships between the Big Five personality traits and attitude toward Facebook, as stated in hypothesis H1, would be mediated by CMC skill, CMC knowledge and CMC motivation [Hypothesis H4].

2.3. Summary of hypotheses

The four main hypotheses of this study are:

H1. There will be significant causal relationships between the Big Five personality traits and attitude toward Facebook.

H2. There will be significant causal relationships between the Big Five personality traits and CMC skill, CMC knowledge and CMC motivation.

H3. There will be significant causal relationships between CMC skill, CMC knowledge and CMC motivation and attitude toward Facebook.

H4. The causal relationships between the Big Five personality traits and attitude toward Facebook are mediated by CMC skill, CMC knowledge and CMC motivation.
traits and attitude toward Facebook will be mediated by CMC skill, CMC knowledge and CMC motivation.

3. Method

3.1. Participants

Participants consist of 327 school teenagers, aged 15 (n = 152, 46.5%) and 16 (n = 175, 53.5%). All of them are Malaysian Chinese. Among them, 145 are males (44.3%) and 182 are females (55.7%). The reason for using teenagers as participants in the study is that more than 90% of teenagers are Facebook users (Mary et al., 2013), and most of the previous studies are only mainly focused on adults (e.g., Aida et al., 2014). The majority of the respondents have had Facebook accounts for at least 2 years (85.0%), and 64.8% of them use Facebook at least an hour per day. Most of them are either satisfied or very satisfied with Facebook (70.0%). Based on the percentage of cases, 90.2% of them use Facebook to communicate with friends, 87.2% use Facebook to view information about people in which they are interested, 87.5% communicate with a group of people who share the same interests, 80.1% share photos with friends, and 67.6% discuss schoolwork with their friends. Only 17.4% communicate with teachers about schoolwork using Facebook.

3.2. Materials

The instrument of the study consists of four sections. Section 1 is the personality details, while Sections 2, 3 and 4 are measurement items for attitude towards Facebook, personality traits and CMC competence.

3.2.1. Demographic details

Section 1 includes six items for collecting details of participants’ age, gender and their background of using Facebook. The items are adapted from the Facebook Questionnaire of Ross et al. (2009).

3.2.2. Attitude towards Facebook

The Facebook Attitude Scale (FAS) is adapted from the Facebook Questionnaire developed by Ross et al. (2009, p. 580). The scale has seven items. Item 1 “On average, approximately how many minutes per day do you spend on Facebook?” has five ordinal scales ranging from 1 = less than 10 min to 5 = more than 3 h. Item 2 to item 7 are being answered on a 5-point Likert scale, ranging from “strongly disagree” (1) to “strongly agree” (5). For example, the statement of item 2 is “Facebook is part of my everyday activity”. In the present study, internal consistency reliability of the items is high with Cronbach’s alpha = 0.91. Atabek and Yildirim (2014) employed the FAS in a recent study and they reported that the scale is unidimensional. Therefore in the present study, total score of attitude is used as a single measurement variable for attitude towards Facebook.

3.2.3. Personality traits

The Big Five Personality Inventory BFPI (John, Donahue, & Kentle, 1991) is employed for measuring personality traits of the participants. It has 44 items for measuring five personality traits: neuroticism (e.g., “I am someone who is emotionally unstable”); extraversion (e.g., “I am someone who is outgoing, sociable”); conscientiousness (e.g., “I am someone who makes plans and follows through with them”); openness to experience (e.g., “I am someone who is curious about many different things”); and agreeableness (e.g., “I am someone who likes to cooperate with others”). The BFPI have been used in a numbers of personality studies and has been reported to have satisfactory reliability and validity (e.g. Wang et al., 2012; Srivastava, John, Gosling, & Potter, 2003). In terms of reliability, items of a variable are reliable to measure its construct if internal consistency reliability for the items is larger than 0.70 (Chua, 2014; Kline, 2016). In this study, Cronbach’s alpha internal consistency reliabilities of the five personality traits (neuroticism = 0.78, extraversion = 0.84; openness to experience = 0.81; conscientiousness = 0.78; Agreeableness = 0.89) are above the minimum reliability benchmark.

3.2.4. CMC competence components

The Computer Mediated Communication Competence Measure of Spitzberg (2006) is employed for measuring CMC skill, CMC knowledge and CMC motivation of the participants. It has 13 items with three dimensions of competence: CMC skill (e.g., “I manage the give and take of CMC interactions skillfully”), CMC knowledge (e.g., “I am very knowledgeable about how to communicate through computers”), and CMC motivation (e.g., “I am very motivated to use computers to communicate with others”). In the present study, the three CMC competence components (CMC skill = 0.87; CMC knowledge = 0.86; CMC motivation = 0.90) are above the minimum reliability benchmark of a > 0.70.

3.3. Procedure

Participants were asked to complete the instrument individually, in classroom setting and in the presence of the researcher. No time constraint is placed on the participants. A session lasted approximately 30 min.

3.4. Preliminary analysis: validity and reliability of research instrument

The data collected from the participants are analysed using the structural equation modeling (SEM) with AMOS. According to Kline (2016), there are two requirements for variables of SEM analysis with AMOS, (1) univariate normality of an item of a variable is achieved if skewness and kurtosis values of the item are in the range of ±1.96, and (2) multivariate normality is achieved if critical ratio of multivariate kurtosis for all the items in the proposed model is smaller than 8.0.

Results of preliminary analysis indicated that all of the items of the measures of attitude (FAS); personality traits (BFPI) and CMC competence components achieved univariate normality (skewness and kurtosis values are in the range of −0.47 to 0.82) and multivariate normality [critical ratio of multivariate kurtosis: attitude = 4.39; personality traits (neuroticism = 3.50, extraversion = 3.91, conscientiousness = 5.56, openness to experience = 6.30, agreeableness = 4.10) and CMC competence components (CMC skill = 4.24, CMC knowledge = 5.87, CMC motivation = 5.17].

In terms of validity, discriminant validity of the items is achieved if inter-correlations among the items are smaller than 0.85 (Brown, 2006). Inter-correlations among the five personality traits are in the range of 0.18−0.72 and Inter-correlations of the CMC skill, CMC knowledge and CMC motivation are in the range of 0.20−0.58 (see Table 1). The results indicate that the data of personality traits, CMC competence components and attitude are free of multi-collinearity problem, and thus the discriminant validities of the variables are achieved. Results of the preliminary analysis show that the BFPI, CMCC and FAS have achieved the benchmarks of validity.

4. Results

The results of hypotheses testing are presented in the sequence of the four research hypotheses.
4.1. Causal relationships between the Big Five personality traits and attitude toward Facebook

Table 2 depicts the values of all regression paths in the hypothesized model. Three of the five causal relationships between personality traits and attitude toward Facebook are significant. The signiﬁcant personality traits are extraversion ($\beta = 0.13$, $p < 0.05$), conscientiousness ($\beta = -0.33$, $p < 0.001$) and openness to experience ($\beta = 0.13$, $p < 0.01$). However, no causal relationship of neuroticism and agreeableness with attitude toward Facebook are found. Hence hypothesis H1 is supported for extraversion, conscientiousness and openness to experience, but not supported for neuroticism and agreeableness.

The results indicate that participants who are extraverted and open to experience have a positive attitude toward Facebook. Conscientious participants have a negative attitude toward Facebook; however, for participants who are neurotic and agreeable, their attitude toward Facebook are not directly influenced by their personalities.

4.2. Causal relationships between personality traits and CMC skill, knowledge and motivation

Table 3 indicates that hypothesis H2 is supported for nine of the fifteen causal relationships between the five personality traits and the three CMC competence components. There are significant causal relationships between neuroticism and CMC skill ($\beta = -0.17$, $p < 0.05$) and CMC motivation ($\beta = 0.27$, $p < 0.001$). Partial mediating effects of CMC skill (mediating effect = 0.11) and CMC motivation (mediating effect = 0.13) occur in the causal relationship between extraversion and the three CMC competence components, i.e., CMC skill ($\beta = 0.68$, $p < 0.001$), CMC knowledge ($\beta = 0.25$, $p < 0.001$) and CMC motivation ($\beta = 0.44$, $p < 0.001$) are also found. This means that participants with high extraversion are motivated, knowledgeable and skilled in using Facebook. In addition, significant causal relationships between conscientiousness and CMC skill and CMC knowledge are found to be identical with a positive and large effect ($\beta = 0.34$, $p < 0.001$). For openness to experience, significant causal relationships for CMC skill ($\beta = -0.16$, $p < 0.05$) and CMC motivation ($\beta = 0.25$, $p < 0.001$) are found. However, there is no significant causal relationship between openness to experience and CMC knowledge.

The results indicate that neurotic participants are highly CMC-motivated but have low CMC skill in using Facebook. Extraverted participants are highly motivated, knowledgeable about Facebook use and have good skill in using Facebook. Conscientious participants are found to have high knowledge and skill in using Facebook. Open to experience participants are motivated to use Facebook although they have low CMC skill (a negative effect was found). No significant causal relationship between agreeableness and the three CMC competence components was found. To summarize, hypothesis H2 is supported for four personality traits, i.e., neuroticism, extraversion, conscientiousness and openness to experience. However, H2 is rejected for agreeableness.

4.3. Causal relationships between the CMC competence components and attitude toward Facebook

Table 4 indicates signiﬁcant and positive causal relationships between all of the three CMC competence components and attitude toward Facebook. Therefore, hypothesis H3 is fully supported. For CMC knowledge and CMC motivation, the effects are large (CMC motivation: $\beta = 0.47$, $p < 0.001$; CMC knowledge: $\beta = 0.42$, $p < 0.001$), while for CMC skill, the effect is small (Skill: $\beta = 0.15$, $p < 0.01$). The results indicate that participants who are highly motivated, knowledgeable and possess good CMC skill have a positive attitude toward Facebook.

4.4. Mediating effects of the three CMC competence components on the causal relationships between personality traits and attitude toward Facebook

A mediating effect occurs when (1) the causal relationship (or direct effect) between a personality trait (the causal variable) and a CMC competence component (the mediator variable) is signiﬁcant, and (2) the causal relationship between a CMC competence component (the mediator variable) and attitude toward Facebook (the outcome variable) is signiﬁcant.

Full mediating effect occurs when there is no signiﬁcant causal relationship or direct effect between the causal variable and the outcome variable (Baron & Kenny, 1986). Table 5 presents the output of mediating effect analysis using AMOS software. The output indicates that a positive full mediating effect of CMC motivation (mediating effect = 0.13) and a negative full mediating effect of CMC skill (mediating effect = -0.03) occur in the causal relationship of neuroticism → attitude (direct effect = 0.00).

Partial mediating effect occurs when there is a direct effect between the causal variable and the outcome variable. Positive partial mediating effects of CMC skill (mediating effect = 0.10), CMC knowledge (mediating effect = 0.11) and CMC motivation (mediating effect = 0.21) occur in the relationship of extraversion → attitude (direct effect = 0.13), while partial mediating effects of CMC skill (mediating effect = 0.05) and CMC knowledge (mediating effect = 0.15) occur in the relationship of conscientiousness → attitude (direct effect = -0.33). In addition, partial mediating effects of CMC skill (mediating effect = 0.06) and CMC knowledge (mediating effect = 0.07) occur in the relationship of neuroticism → attitude (direct effect = 0.00).
effects of CMC skill (mediating effect = −0.03) and CMC motivation (mediating effect = 0.12) occur in the relationship of openness → attitude toward Facebook (direct effect = 0.13).

Partial mediating effect of CMC knowledge occurs for the causal relationship of extraversion → attitude (direct effect = 0.13; mediating effect = 0.01) and conscientiousness → attitude (direct effect = −0.33; mediating effect = 0.15). No mediating effect of CMC knowledge is found for neuroticism, openness to experience and agreeableness.

Furthermore, CMC motivation is a positive and significant full mediator for the relationship of neuroticism → attitude (direct effect = 0.00; mediating effect = 0.13) and a positive partial mediator for the relationship of extraversion → attitude (direct effect = 0.13; mediating effect = 0.21) and openness → attitude (direct effect = 0.13; mediating effect = 0.12). However, CMC motivation is not a significant mediator for the causal relationships of conscientiousness → attitude and agreeableness → attitude because no mediating effect is found for the two personality traits (conscientiousness: direct effect = −0.33; mediating effect = 0.00; agreeableness: direct effect = 0.00; mediating effect = 0.00).

Spitzberg (2006) stated that the three components of the CMC in humans naturally cannot be separated because human behavior is comprehensive. Table 3 indicates that extraversion has the largest total mediating effect (0.42), followed by conscientiousness (0.20), neuroticism (0.10) and openness to experience (0.09). Based on the results, hypothesis H4 is supported for neuroticism, extraversion, conscientiousness and openness to experience, and not supported for agreeableness.

4.5. The final mediation model

In structural equation modeling analysis, model fit testing establishes whether the model is acceptable and applicable. A hypothesized model is acceptable and applicable if the model fits its data. Five main model fit indexes recommended by most research reports are the Chi-square (χ²), the Root Mean Square Error of Approximation (RMSEA), the Goodness-of-fit Index (GFI), the Comparative Fit Index (CFI), and the χ²/df ratio. The model fits the data when the p-value of χ² is larger than 0.05; the value of RMSEA is smaller than 0.08; the value of CFI is larger than 0.90; and the value of Ratio is smaller than 3.0 (Schumacker & Lomax, 2010). However, there is a limitation to the Chi-square. It is highly sensitive to sample size, especially when the sample size is larger than 200, the p-value tends to be 0.000 (Joreskog & Sorbom, 1993). Therefore, in the present study (n = 327), the value of Chi-square is ignored in interpreting the results of model fit testing.

Model fit testing is important because it shows how well a model predicts the relationship among the variables, and how well...
the model can be applied or generalized to the population of the study (Kline, 2016). A model is unacceptable or inapplicable if the model does not fit the data (Schumacker & Lomax, 2010).

In model fit testing procedure, insignificant causal relationships or regression paths are removed from the hypothesized model because the paths do not exist in the model. The output of the AMOS shows that among the twenty-three paths in the hypothesized model of the present study, eight are insignificant. The paths are neuroticism → attitude toward Facebook, neuroticism → CMC knowledge, conscientiousness → CMC motivation, openness to experience → CMC motivation, agreeableness → CMC skill, agreeableness → CMC knowledge, agreeableness → CMC motivation and agreeableness → attitude toward Facebook. The model fits the data of the study [RMSEA = 0.074; CFI = 0.978; CFI = 0.988; Ratio = 2.381] after the eight insignificant paths were removed from the hypothesized model. The final mediation model is presented in Fig. 1.

5. Discussion

In the present study, no significant direct relationship between neuroticism and attitude toward Facebook is observed. However, with the presence of CMC skill and CMC motivation as mediators, there is a significant indirect effect (mediating effect) of neuroticism on attitude toward Facebook. The results show that a neurotic user with high CMC motivation would probably possess a positive attitude toward Facebook, while a neurotic user with high CMC skill would probably possess a negative attitude toward Facebook. In other words, CMC competence of the participants is a factor that determines whether the relationship between neuroticism and attitude toward Facebook is positive or negative. This is because the indirect effect could be positive or negative, depending on the CMC skills and CMC motivation of the participants. This is a new finding that can be used as one of the reasons for the inconsistent findings of previous studies, which found either a positive (e.g., Andreassen et al., 2014; Correa et al., 2010; Ehrenberg, Juckes, White, & Walsh, 2008; Ross et al., 2009) or a negative (e.g., Amichai-Hamburger et al., 2002; Amiel & Sargent, 2004; Tuten & Bosnjak, 2001) relationship between neuroticism and attitude toward Facebook.

The present study also shows that there is a significant direct causal relationship between extraversion and attitude toward Facebook. The positive relationship is consistent with findings of previous studies (e.g., Amichai-Hamburger & Vinitzky, 2010; Ross et al., 2009; Ryan & Xenos, 2011; Wilson et al., 2010). This can be explained by the Rich-Get-Richer Model (Kraut et al., 2002), in which extraverted people are socially competent and are more likely to use SNS to keep in contact with others. In addition, we found that the three CMC competence components are positive partial mediators that enhance the causal relationship between extraversion and attitude toward Facebook. In the presence of the mediating effects of three CMC components, the causal relationship increases from a small effect to a large effect. This finding implies that previous studies, which only reported the causal relationship between extraversion and attitude toward Facebook without studying CMC of participants, are insufficient. The results of this study suggest that in examining the relationship between extraverted personality traits and attitude toward SNS, future research should include the three CMC competence components as mediators. This is because the strengths of the relationship for a group of participants with high level of CMC competences and another group of participants with low level of CMC competences are different.

The conscientiousness trait reflects how organized and persistent a person is in pursuing his or her goals, and conscientious people are characterized as being industrious, systematic, dutiful, high on achievement striving, and hardworking (Trautwein, Ludtke, Roberts, Schnyder, & Niggli, 2009). Therefore, a negative relationship between conscientiousness and attitude toward Facebook is expected. This finding is consistent with two previous studies (Ryan & Xenos, 2011; Wilson et al., 2010). The reason for the negative relationship is that conscientious people tend to avoid SNSs because these sites promote procrastination and serve as a distraction from doing more important tasks (Butt & Phillips, 2008). Our further analysis found that the presence of mediating effects of CMC skill and CMC knowledge reduces the negative direct effect to a smaller effect. The positive mediating effects mean conscientiousness participants with high CMC skill and CMC knowledge tend to have a less negative attitude toward Facebook compared to their low CMC competence counterparts. This finding is new. It addresses the positive role of CMC skill and CMC knowledge in reducing the negative causal relationship between conscientiousness and attitude toward Facebook.

The findings of the present study are consistent with several previous studies (Amichai-Hamburger & Vinitzky, 2010; Butt & Phillips, 2008; Correa et al., 2010; McCrae & Costa, 1987) that there is a significant and positive causal relationship between openness to experience personality trait and attitude toward Facebook (e.g., Amichai-Hamburger & Vinitzky, 2010; Butt & Phillips, 2008; Tuten & Bosnjak, 2001). The reason for this causal relationship is that openness to experience people like to use alternative approaches, be intellectually curious and enjoy artistic features of SNSs (Costa & McCrae, 1992; John & Srivastava, 1999).

People with high agreeableness personality traits are friendly, trusting, cooperative, and inclined to be warm and sympathetic (Costa & McCrae, 1992) and are expected to have a positive attitude to SNS (Wang et al., 2012). However, in the present study neither a significant direct effect nor a mediating effect of agreeableness on attitude toward Facebook is found. This result is not surprising, as several recent studies have also reported that agreeableness is related neither to overall Internet use nor to any form of social media use (Correa et al., 2010; Hughes et al., 2011; Ross et al., 2009). However, the reason for the non-existential relationship is unknown, and it will require further attention in future research.

6. Conclusions and suggestions

The results of the present study have indicated that mediating effects of the three CMC components occur in the relationships between four of the five personality traits and attitude toward Facebook. Without CMC skill, CMC knowledge and CMC motivation, there is no significant relationship between the neuroticism personality trait and attitude toward Facebook. In other words, the three CMC components are significant mediators which establish the relationship between neuroticism and attitude toward Facebook; increase the positive causal relationship between extraversion and openness to experience with attitude toward Facebook; and reduce the negative causal relationship between conscientiousness and attitude toward Facebook. The final model (see Fig. 1) derived from the present study can be used as an alternative in explaining the previous findings on the relationships between personality traits and attitude toward Facebook.

The present study indicates that a total of 76% of variance of attitude toward Facebook is predicted by the four personality traits and the three CMC components (Fig. 1). Another 24% of variance is unpredicted. Therefore, future studies can include other personal characteristics, such as self-efficacy, shyness, individualism, loneliness, anxiety and narcissism. As suggested by some scholars (Clayton, Osborne, Miller, & Oberle, 2013; Morahan-Martin & Schumacher, 2003; Ong et al., 2011; Whitty & McLaughlin, 2007), these personality characteristics influence Facebook use. Studying
the influence of these personality characteristics could further contribute to the body of knowledge in this field and provide a bigger picture of the relationship between personality factors and attitude toward Facebook.

Finally, future studies can include multiple types of SNSs which cuts across multiple platforms and ultimately makes a stronger contribution to our understandings of the relationship between personality and attitude toward SNSs.

7. Limitations

Our study has several limitations. First, only one type of social networking site (Facebook) was assessed. Hence, the findings should not be generalized to SNSs such as WhatsApp and WeChat, which have different functions and aims. Second, the findings are based on associations from the cross-sectional study. There was no manipulation or random selection in this study. Third, this study assessed a group of school teenagers. These participants’ SNS skill, knowledge, motivation and experience are expected to differ from those of other SNS users, such as college students and adults; therefore, the findings should be generalized with caution. Due to these limitations, we encourage future studies to be conducted on other age and culture groups.

Declaration of conflicting interests

The authors declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

This work was supported by the University of Malaya Research Grant, Institute of Research Management & Monitoring, University of Malaya, Malaysia [Grant no: UMRG - RC345-15AFR].

References


Burgoon, J. K., Bonito, J. A., Bengtsson, B., Cederberg, C., Lundeberg, M., & Alspach, L.

Fig. 1. Final model of the study.