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Personality, Motivation, and the War Between Facebook and Twitter

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PERSONALITY, MOTIVATION, AND THE WAR BETWEEN FACEBOOK AND TWITTER

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ABSTRACT

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by Elizabeth Shallal

Social networking sites (SNSs) have recently become integrated in modern lives as entertainment, communication, and even careers have become more reliant on them. The current study explored the relationship between Facebook and Twitter attachment and demographic, motivation, and personality traits. Differing psychological relationships may explain why people become more attached to specific SNSs as well as explain their continuance of use. Using online self-report measures, this study measured motivations to use Facebook and Twitter, the Big Five personality traits, and Facebook/Twitter attachment of 109 participants who have been users of both Facebook and Twitter. Results of hierarchical multiple regressions showed that conscientiousness, extraversion, neuroticism, and openness to experience were unable to explain a significant amount of attachment to Facebook or Twitter. Facebook attachment was explained by the motivation to pass time and interact socially whereas Twitter attachment was explained by the motivation to pass time and share information. These findings can help media researchers, as well as companies, understand why people become attached to various SNSs.

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Introduction

Social networking sites (SNSs) can be used to express entertainment preferences, follow worldly happenings, and socialize with friends; what makes a site popular is a topic currently being studied by psychologists, marketers, and computer scientists (Papachrissi & Mandelson, 2011). Social networking sites are defined by the ability to have a unique user profile with daily updates and the ability to connect with others, either through one-sided "following" or mutual "friending." The main question of the current study was whether or not psychological variables, such as personality traits and motivation, differentially predict a preference for Facebook or Twitter. This question is relevant because SNSs are a large source of revenue and jobs, entire careers revolve around utilizing them, and it is important to know more about the users. Attachment to a site reflects the likelihood of a user to continue using the site due to a sense of belonging and reliance on it. If this SNS attachment is related to motivation, personality traits, or a specific combination of the two, then researchers will have psychological explanations for why different people are attracted to and continue to use different SNS platforms.

The Psychology of Social Networking Sites

A constant connection to the internet is a daily part of modern living, as 77% of American adults now own a smartphone (Pew Research Center, 2017). Many innovators are tapping into this market by creating new SNSs that are either entirely focused within smartphone apps (e.g., Instagram, WhatsApp, Snapchat) or primarily web-based and ported to smartphones (e.g., Facebook, Twitter, Tumblr). The success of these companies relies largely on continuation of use on the end user's side. If no one uses the

SNS, then it falls out of popular media and ceases to be. Looking at a user's motivation to be active on a particular SNS would help guarantee the success of a company because motivational factors to use the site would explain the continued use of the product (Liu, Chung, & Lee, 2010).

Previous SNS research focused primarily on Facebook because it has been consistently favored by users, with two billion monthly active users (Company Info, 2017; Hall & Pennington, 2013; Moore & McElroy, 2012; Ross et al., 2009; Ryan & Xenos, 2011). Research that compares two different SNSs would serve academia and corporations with more information on user behaviors and preferences because it can show psychological differences between users. A recent study looking at motivating factors for different SNSs found significantly different motivating relationships between users of Facebook, Twitter, Snapchat, and Instagram (Alhabash & Ma, 2017). Alhabash and Ma adopted a uses and gratifications (U & G) approach to motivation for this study. U & G approaches use factor analysis to identify the reasons why people use popular media items to gratify their needs (Papachrissi & Mandelson, 2011). Alhabash and Ma developed their motivation measures from a previous study on Twitter usage (Liu et al., 2010). The measured cross-SNS variables included self-documentation, social interaction, entertainment, passing time, self-expression, medium appeal, and convenience.

Alhabash and Ma (2017) found significant differences in all of the motivational aspects of SNS use. They, however, did not perform post hoc tests so it is unknown which sites differed from the others in end-user motivation. This finding further supports

a need for a motivation component in SNS research. Additionally, it may also be possible that personality traits account for more individual differences in SNS preference compared to motivation; or, personality trait variables may simply add additional explanation to SNS preference. Individual differences in personality traits may also play an important part in continuance of use, especially in the interaction between website design and personality. For example, some users may be motivated to use SNSs to socialize with others, but if they are introverted they may lean towards a site that focuses more on interpersonal communication that is not visible to a wide audience. If personality traits and motivation to use an SNS are related to SNS attachment, creators can use this information to design more intuitive websites that result in greater user enjoyment and continuance of use.

Personality and Social Networking Sites

Research on SNSs originally focused on individual differences and thus the research is largely made up of studies looking at the personality traits of users. Previous studies on SNSs and personality have frequently looked at the Big Five personality traits and intensity of Facebook use, but these studies together reveal contradictory results (Liu & Baumeister, 2016; Ross et al., 2009; Ryan & Xenos, 2011). For example, one study found that extraversion had no relationship to Facebook use (Ross et al., 2009), whereas another study found a significant relationship between extraversion and Facebook use (Ryan & Xenos, 2011). Several studies found a negative relationship between conscientiousness and Facebook use (Moore & McElroy, 2012; Ryan & Xenos, 2011), whereas Ross (2009) found no significant relationship. These inconclusive results may be

attributed to varying definitions of Facebook use such as number of friends, number of posts, and number of groups the participants belonged to.

The indefinite nature of these results also led to discussions that the Big Five traits are too broad to explain individual differences among Facebook users (Ross et al., 2009). This is not to say that the traits themselves are too broad, but that Facebook use is too widespread for it to be explained by the Big Five traits. Following these suggestions, Moore and McElroy (2012) chose to focus on the Big Five traits in relation to feelings of regret over Facebook use. They found that individuals high in conscientiousness, introversion, and emotional stability felt more regret over how often they used Facebook (Moore & McElroy, 2012). Though informative, these studies identify and describe only Facebook behaviors and personality traits. These studies do not give information about whether or not SNS users differ from each other, which can explain a user's continued use of a SNS.

Facebook is the most commonly studied SNS due to its overall popularity; however, the comparison of personality traits and user behaviors on Twitter and Facebook has become a growing topic of discussion in the field of SNS research. Comparing users of the two sites has shown significant differences between the end users in the Big Five traits as well as other psychological measures (Alhabash & Ma, 2017; Alhabash & McAlister, 2015; Hughes, Rowe, Batey, & Lee, 2012; Panek, Nardis, & Konrath, 2013). Looking at these studies in-depth, researchers have found that the superiority aspect of narcissism was related to Twitter use, while the exhibitionism aspect was related to Facebook use (Panek, Nardis, & Konrath, 2013). This means that Twitter use was more

common in participants who felt that they are better than others and that Facebook use was more common in those who wanted to show off. The mass communicative style of Twitter essentially serves as a megaphone for a user's every thought, which may be why it was related to superiority. Greater attachment to a specific SNS may be the result of motivated need fulfillment and psychological traits. These differences in components of narcissism serve as evidence that personality traits may be a strong predictor in what attracts users to different sites and should be included in models that examine users.

Hughes and colleagues (2012) compared Facebook and Twitter users in regard to social and informational uses of the sites. They found that when using SNSs for informational purposes, the personality traits of those using Facebook and Twitter had complete opposite relationships (Hughes, et al., 2012). For example, Facebook for informational uses was positively related to sociability, while Twitter was negatively related to it. This may be because sharing information on Facebook allows for commenting and discussion, whereas responding to a shared article on Twitter is uncommon due to the 140-character limit, though this has been recently upgraded to 280-characters (Rosen & Ihara, 2017). In-depth discussions on Twitter tend to take place in the Direct Message portion of the site, which is much more interpersonal than the Newsfeed. Hughes' study found evidence for a distinction between the personality traits of Twitter and Facebook users. They found that individuals who are more social and extraverted use Facebook, this is most likely due to its features that encourage interactions.

Motivation and the Online Self

Liu and Baumeister's (2016) meta-analysis showed that the Big Five traits are too broad to accurately predict SNS use because of weak effect sizes that are significant due to large sample sizes. Including several motivational factors along with the Big Five traits may strengthen the relationship between SNS use and psychological attributes. SNS studies have recently begun to look into motivational factors for using various SNSs (Alhabash, Park, Kononova, Chiang, & Wise, 2012; Ross et al., 2009; Ryan & Xenos, 2011). In the first motivation and SNS study, Ross and colleagues (2009) looked at how motivation to use computer mediated communication (CMC) was related to Facebook use activities. They found that the individuals with the highest motivation to use CMC checked their Facebook wall more often and reported spending more time on Facebook. This makes sense, as people who were most comfortable with CMC would be more likely to utilize Facebook's various features.

Papachrissi and Mandelson (2011) sought to create a U & G model for Facebook. U & G models are utilized in research that seeks to identify why people begin and continue to use various items of media. First, a model for internet use was developed, and from there blogging models evolved that resulted in the current SNS models (Papachrissi & Mandelson, 2011). Papachrissi and Mandelson's U & G factor analysis reported eight motivations to use Facebook: expressive information sharing, habitual pass time, relaxing entertainment, cool and new trend, companionship, professional advancement, escape, and social interaction. This initial research on a U & G

motivational model for Facebook created a foundation on which other SNS researchers could expand.

Researchers have been able to further refine motivational scales for SNS use from Papachrissi and Mandelson's (2011) work. Using a Taiwanese population, Alhabash et al. (2012) found that posting and viewing status updates was the strongest motivating predictor of Facebook intensity. Facebook content generation was most related to the motivation to post and view photographs (Alhabash et al., 2012). Knowing this, Facebook acquired Instagram, a purchase being referred to as "the smartest acquisition ever" (Luckerson, 2016). In 2015, Alhabash and McAlister studied viral behavior intentions on Twitter using these motivational scales. They found that the motivation for social interaction was most related to liking, sharing, and commenting on the provided viral Tweet.

Expanding SNS research, Alhabash and Ma (2017) studied motivation for the main four SNSs (Facebook, Twitter, Snapchat, and Instagram), rather than just Facebook and Twitter. They reported significant differences between motivational factors for the SNSs and these motivational factors accounted for 58% of explained variance in Facebook intensity, 66% in Twitter intensity, 64% in Instagram, and 65% in Snapchat (Alhabash & Ma, 2017). There may be a significant increase in the amount of explained variability by using the Big Five traits in addition to motivational factors. The motivational factors may help specify how personality traits are related to SNS use, with differing increases in unique variance for each of the SNSs. The intensity scale used for the three of these motivation studies (Alhabash et al., 2012; Alhabash & Ma, 2017; Alhabash & McAlister,

2015) was the Ellison (2007) scale, which provides for strong consistency between studies and results that can be easily understood in relation to one another.

Moving away from the U & G developed motivation scales, Hughes and colleagues (2012) looked at the informational and social uses of Twitter and Facebook based on a scale of their own devising. Their psychometrics were relatively weak with factor loading values as low as .51 for the social uses of the sites and alpha values below .70 (Facebook social = .63; Twitter social = .63; Hughes et al., 2012, pp. 564). These poorly supported psychometrics may have been a contributing factor for the non-significant correlations between personality traits and social uses of the sites. This is one of the few studies in current literature that looked at both motivations to use a SNS and personality traits in the same study. Although their informational results were enlightening in regard to the different personality traits of Facebook and Twitter, the weak psychometrics suggest using a more thoroughly developed metric for motivation constructs.

Deficiencies in the Literature

One problem with the reviewed research was SNS dependent or criterion variables were measured and defined in several different ways. In short, some studies focused on the number of hours that participants spend on the site (Moore & McElroy, 2012; Ryan & Xenos, 2011) and others focus on intensity. A user may spend many hours on a SNS but this may not mean he or she enjoys it, resulting in a higher likelihood of the individual abandoning the site for a newer SNS. Ellison, Steinfield, and Lampe (2007) developed a scale referred to as a Facebook Intensity scale, which has been reliably adapted for Twitter, Instagram, and Snapchat (Alhabash & Ma, 2017). This scale measures how

integrated the SNS is in an individual's life using phrases such as "I would be disappointed if [SNS] shut down" and "I am proud to tell people I am on [SNS]". These items measure attitudes towards SNSs, in addition to the amount of friends and the amount of time spent on the sites.

Another deficiency found was the most likely inaccuracy of time reported on SNSs. These measures could have been altered by participants because of social desirability biases; participants may have been embarrassed if they spent a large amount of time on a SNS and lied to make it appear to be less time. Because SNSs are easily accessible on smartphones it is also a difficult task to accurately measure how much time is spent on them. iPhones have a setting to measure how long applications are open on the screen, however, this does not measure the time spent on a computer. An accurate measure of SNS use in which participants track the time they have them open on a computer as well as giving researchers their phone use times would be a time-consuming request of participants and may still come out inaccurate.

Confusing variable names were also a problem found in reviewed research. The label of "SNS intensity of use" was assigned by the researchers and has been described as a variable that measures the cognitive and affective use of a SNS (Ellison et al., 2007). The current study used the label "SNS attachment" because there was little to no psychometric evidence that the items were really measuring cognition or affect. Moreover, the items look at relationships to the SNS more so than intensity of SNS use, especially without the use of time spent on SNS.

An additional problem found in the methods of past studies was the unreliability of the self-reported total number of friends (Moore & McElroy, 2012; Ross et al., 2009). Self-report numbers of friends may be influenced by several factors. These include how integrated the SNS is in the participants' own lives, how private they are with their SNSs, or the amount of people they know who use the particular SNS. Although Moore and McElroy (2012) performed a reliability check on the friend counts that were provided by participants and found that they generally did not inflate the number, this evidence is anecdotal to their study. One study that includes a validity check to ensure participants are not lying cannot be generalized to all studies and social desirability biases may still exist in other studies measuring friend and follower counts.

In addition, social desirability biases may be a problem in the self-reporting one's number of Twitter followers because Twitter use has a relationship with the superiority dimension of narcissism (Panek, Nardis, & Konrath, 2013). These users may inflate the number of followers they report in order to fuel their desire for superiority. In fact, a greater number of Twitter followers is so desirable that it is estimated that 9-15% of Twitter users are bots that can be used to artificially inflate followers (Varol, Ferrara, Davis, Menczer, & Flammini, 2017). It is also an active practice to buy likes and followers on Facebook and Instagram (Confessore, Dance, Harris, & Hansen, 2018). Using friend and follower counts to measure the use of SNS is unattractive for these reasons and the measure has been dropped from Ellison et al.'s (2007) intensity of use scale in the adapted version that extends the scale's generalizability to Twitter, Instagram, and Snapchat (Alhabash & Ma, 2017).

Another recurring deficiency in most of the reviewed study designs is a skewed gender proportion with the majority of participants being women. Current research has found minimal differences in the percentage of men and women on SNSs (Pew Research Center, 2016); therefore, studies should attempt to get the most representative samples as possible when it comes to the gender of participants. However, it is difficult to achieve such a sample while avoiding collection bias or unethical behavior, especially when one relies on university participant pools. In order to avoid the effects of a skewed gender pool, if gender is significantly related to the dependent variable, it may be ideal to include gender as a covariate in multivariate regression models (Alhabash & Ma, 2017).

A final problem stems from the fact that many studies looking at personality traits and SNSs focus on the extreme ends of personality traits using median splits; this method discards variance and cuts the sample size down, which can result in a false finding of non-significance. Regression models should be used rather than ANOVAs in order to present the most accurate results because the variables in personality scales are typically continuous. These regression models can also be used to separate motivation and personality trait variables to explore the idea that one may account for more explained variance above the other.

Significance and Purpose

A study looking at personality traits and motivation with Twitter and Facebook attachment would contribute to the growing body of SNS research in the field of media psychology. In regard to measures, the use of a scale that measures the attachment an individual has towards a SNS will help researchers understand why people use specific

SNSs. This makes more sense than using time spent on the website which can only provide the answer to how long an individual spends on it. There are several potential intervening factors to the number of hours an individual spends online, which is the most frequently used index of SNS use. An average of two hours of use a day may be considered low for some but high for others. Items that measure an individual's relationship with a specific site may better capture his or her attachment and continuance of use because it shows that the use of the site is deliberate and the person is not likely to abandon it for the next big website trend.

Knowing the personality traits of users across different SNSs will help researchers understand why users are attracted to different sites. User experience researchers at companies can use the SNS relationships with personality and motivation to tailor their user surveys. For example, if SNS developers know their users are largely extraverted they can use big data – which has been found to be accurate at personality predictions (Youyou, Kosinski, & Stillwell, 2015) – to locate more introverted users. From these specific users they can find out what to improve to make the user experience better, thus attracting more potential introverted users or simply adding functions to increase the attachment level of introverted users.

Comparing the Facebook and Twitter populations' motivational and personality traits can provide crucial information to psychological SNS research. It is possible that motivational factors may account for the majority of individual differences in SNS attachment, whereas personality traits do not. It could also be possible that an unmeasured psychological attribute explains individual differences in users of one site

but not the other. This would explain why some SNSs are more popular than others. If the explained variance in the Twitter and Facebook attachment models differ, researchers and SNS developers will have a clearer vision of why people spend time on their sites. It will also give each site an idea of why people enjoy their competitors. Such results would also offer further support to the previous research of Alhabash and Ma (2017) and Hughes and colleagues. (2012).

It is expensive and time-intensive to program and debug new features, while refining old features or acquiring other companies may be more cost effective. When developers know exactly which features their users are more attached to, they can implement more successful site changes or acquisitions. Evidence that Facebook made the correct decision to purchase Instagram is shown in the strong relationship found between content generation and the motivation to share and view photographs (Alhabash et al., 2012). If website developers see that their users are not motivated by social interaction they may focus more on updates that do not involve interpersonal interaction. Or companies may use this information in the opposite way and try to reach more users who are motivated by social interactions by refining the site's private message system to make it more attractive.

The purpose of this non-experimental study was to identify the relationships between motivation to use SNS, individual personality, and attachment to Facebook and Twitter. The sites studied (Facebook and Twitter) are the two most popular SNSs and appear to be similar in the mechanisms of how people utilize them. There is, however, one major difference between them, which is privacy settings. Facebook allows users to add friends

mutually, one-sidedly follow fan accounts, and also gives users the option to change the privacy settings of every post. Twitter is more similar to the fan pages of Facebook; the feeds of users can only be completely public or only public to approved followers. Website design and its ability to attract different people with different features may by evident by differing personality and motivational profiles of the Facebook and Twitter users. The results of this study can offer insight as to why Facebook has double the users that Twitter has (PEW, 2016).

Using both personality and motivation in one multivariate model would allow one to uncover more information on how personality traits and motivation work together in understanding SNS attachment. The predictor variable of motivation was defined as information sharing, self-documentation, social interaction, and passing time (Alhabash & Ma, 2017). The predictor variable of personality was defined as the participant's level of openness, conscientiousness, extraversion, and neuroticism (John & Srivastava, 1999). The main criterion variable was the participant's level of attachment for the SNS (Facebook, Twitter), as measured by phrases such as "[SNS] is part of my everyday activity." and "I feel I am part of the [SNS] community." (Ellison et al., 2007). Hierarchical multiple regression models can best reveal the relationship between all of these variables because they consider the continuous nature of the variables. A hierarchical multiple regression model allows one to hold demographic variation constant if the variables are proven to be significantly related to the model. Hierarchical multiple regressions also have the advantage of comparing relative strength of prediction by reversing steps in separate analyses. For instance, one can identify whether personality

or motivation explains more variance in SNS attachment by putting each one first in separate analyses.

Hypotheses

The following hypotheses were tested:

H1: Motivation (information sharing, self-documentation, social interaction, and passing time) will explain variance in Facebook attachment over and above demographics (gender and age).

H2: Personality (openness, extraversion, neuroticism, conscientiousness) will explain an increase in variance in Facebook attachment over and above motivation and demographics.

Q1: In order to determine whether personality or motivation is a better predictor in Facebook attachment, we will reverse the steps in H1 and H2.

H3: Motivation (information sharing, self-documentation, social interaction, and passing time) will explain variance in Twitter attachment over and above demographics (gender and age).

H4: Personality (openness, extraversion, neuroticism, conscientiousness) will explain an increase in variance in Twitter attachment over and above motivation and demographics.

Q2: In order to determine whether personality or motivation is a better predictor in Twitter attachment, we will reverse the steps in H3 and H4.

Method

Participants

Participants were recruited via the San José State University (SJSU) Introductory Psychology research pool as well as by sharing a link to the study across SNSs, via snowball sampling, in order to acquire a sample that expands beyond a typical college student pool. The study required participants to consent to being participants of the study (see Appendix A) and they also had to be users of both Facebook and Twitter. In order to make sure all of the participants were users of both sites they were asked if they had ever used Facebook and then asked the same about Twitter. If either question was answered with a 'no' the participant was not allowed to continue with the study (see Appendix B). The questionnaire was created on Qualtrics, hosted by SJSU. Personal or identifying information about participants' SNS accounts was not obtained.

A power analysis for the multiple correlation of H1, H2, H3, and H4 was run using a conservative estimated effect size of 0.14, as based on the findings of Alhabash and Ma (2017), alpha of .05, and power level of .85; the power analysis suggested a total sample size of 76 participants. The final participant pool after the data were cleaned was 109. The participants included in the analyses were 28.4% (n = 31) male and 71.6% (n = 78) female. Despite hoping for equal gender distributions, the study was unable to achieve a close to equal ratio. To account for this, gender will be included in the first step of the hierarchical multiple regression if it is found to be significantly related to the criterion attachment variable. The age range of the participants was 18 to 62 years old with a mean age of 22.94 (SD = 7.9).

The combined sample was 46.7% White/European American, 31.1% Asian/Asian American, 28.4% Hispanx/Latinx, 1.8% American Indian/Alaska Native, and 1% Black/African American. No participants selected Native Hawaiian/Other Pacific Islander or Middle Eastern/North African. This sample is quite ethnically diverse, with less than half of the participants identifying as White/European American. The education levels of the sample were also quite diverse. Participants who only had a high school diploma or equivalent accounted for 19.3% of the sample and those with some college education represented 49.5%. The rest of the participants had various college degrees: 1% had an Associate's degree, 25.7% had a Bachelor's degree, 3.7% had a Master's degree, and 1% had a Doctoral or other professional degree. This sample contained more participants without degrees than with college degrees.

Measures

Facebook and Twitter attachment. Facebook and Twitter attachment were defined by SNS scales tested by Alhabash and Ma (2017) that were altered from original research by Ellison et al. (2007; alpha = .83). These scales focus their definition on the attachment to Facebook or Twitter (see Appendix C) and this study did not include time spent online or number of friends. The six SNS items measured attachment to the sites on a seven-point Likert scale. The lowest possible total score was 6, reflecting low SNS attachment, and the highest possible score was 42, reflecting high SNS attachment.

After calculating the Cronbach's alpha for the current sample, the revised scale was shown to be internally consistent for all of the SNS sites it tested for (Facebook = .89; Twitter = .93). This scale was used by several other researchers (Alhabash & Ma, 2017;

Alhabash & McAlister, 2015; Ross et al., 2009) including a revision for cross-cultural samples that also had acceptable Cronbach's alphas over .80 (Lee et al., 2016).

Facebook and Twitter motivation. Facebook and Twitter motivation were defined by four motivation-to-use traits that were defined by Alhabash and Ma (2017). Each motivational category used a seven-point Likert scale on the items contained by the category. The scales of "information sharing," "self-documentation," "social interaction," and "passing time" had three items, with a minimum total score of 3 and a maximum total score of 21 (Alhabash & Ma, 2017). Items on information sharing include statements such as "I use [SNS] to share information" and "I use [SNS] to present information on my interest." An example of an item in self-documentation was "I use [SNS] to record what I do in life." An example of social interaction was "I use [SNS] to connect with people who are similar to me." The passing time scale was comprised of questions similar to "I use [SNS] because it helps pass the time." and "I use [SNS] because I have nothing better to do." (See Appendix D). Out of the four scales, Facebook information sharing, Facebook self-documentation, Twitter information sharing, Twitter self-documentation, Twitter social interaction, and Twitter passing time had adequate internal reliability (Cronbach's alphas greater than .80). Motivation to use Facebook for social interaction and passing time had Cronbach's alphas of .73 and .71, respectively.

Personality. Personality was defined by four of the Big Five traits: openness to experience, extraversion, conscientiousness, and neuroticism. These traits were measured with the Big Five Inventory (BFI; John & Srivastava, 1999; see Appendix E). Openness to experience measured how curious and imaginative a person is. Extraversion

measured how sociable, energetic, and forceful an individual is. Both openness to experience and extraversion have been previously found to be related to SNS use (Hughes et al., 2011; Ross et al., 2009). Conscientiousness measured how efficient and thorough a person is and has been previously found to be negatively related to SNS use (Hughes et al., 2011; Moore & McElroy, 2012). Neuroticism measured traits such as moodiness and self-consciousness, and has been a common measure used in SNS research (Hughes et al., 2011; Moore & McElroy, 2012; Seidman, 2013). Although agreeableness is one of the Big Five traits, it was not included because very few studies found relationships between it and SNS use; agreeableness is largely unrelated to SNS use (Chua & Chua, 2017; Hughes et al., 2011; Ross et al., 2009).

Careless response test. Considering that this research was survey-focused, the study contained two questions to detect whether or not the participants were answering the questions thoughtfully. This required the participants to read a few sentences of instructions in which they were thanked for participating and to answer the first question with five and then to subtract two from that number for their response to the second question (see Appendix G). If participants were carelessly answering, they would not have read the instruction to answer questions with "5" and then "5 minus 2," and would instead answer the question freely. If they did so, it indicated they were not paying attention to the task and hence were dropped from the data analysis.

During data collection, we noted that over half of the participants scored incorrectly on the Careless Response Test (CRT). Because of this, in retrospect we see that the CRT was flawed. Participants may have not been reading the instruction paragraph after

answering so many questions that appeared in the same format. At that point in data collection, the survey was therefore modified to appear without "I do not mind when I leave my phone at home to run errands" and "I try to read everything on my social networking newsfeeds." The remaining participants answered the questions accurately. For these reasons, the careless response test was not taken into account when analyzing the results. The final percentage of participants who passed the careless response test, including those who took it after it was altered, was 35.8% (n = 39).

Procedure

Participants who were recruited via the snowball sampling method saw a Facebook post that stated that the user's friend was completing her Master's thesis and if he or she had ten to twenty minutes to spare it would be appreciated if he or she assisted in the data collection. The post then contained the recruitment message approved by the IRB. Undergraduate participants recruited through the SONA SJSU system saw the recruitment message approved by the IRB. After this, all participants followed a link to the Qualtrics survey where they signed their consent to participate by selecting the date and then they had to pass the exclusion criteria (see Appendix A and Appendix B). They then completed surveys for demographics, Big Five Inventory, Facebook attachment, Twitter attachment, careless response test, Facebook motivation, Twitter motivation, and an additional self-monitoring survey. Participants recruited via snowball sampling were thanked for their time and told to close the window. Participants who were SJSU students used the click-through link to receive their credit from SONA.

Statistical Analysis

Our study design was correlational and looked at relationships between variables. The participants' Facebook attachment and Twitter attachment scores were the two criterion/outcome variables. The predictor variables were demographics (age and gender), the Big Five Inventory personality trait measures, and each model's respective motivation variables. The Facebook model contained the motivation scales for Facebook and the Twitter model contained the motivation scales for Twitter. Descriptive statistics were calculated to understand the make-up of the participants, correlations were conducted to understand the relationships between the variables, and four hierarchical multiple regressions were run to test the hypotheses. The first two hierarchical models were run with the motivation step before the personality step. The third and fourth hierarchical models were run with personality before motivation in order to answer Q1 and Q2. All of the tests were run using IBM SPSS software for statistical analysis.

Results

Data Cleaning

In total, 127 participants were initially collected using the San Jose State University student pool and a snowballing tactic of sharing the study on Facebook. A minimum time parameter for completing the survey was set to 300 seconds (5 minutes). None of the participants spent less than this amount of time on the survey, therefore, no one was dropped for this reason. Participants who omitted their age, gender, or any of the survey items for the criterion and predictor variables were removed from the sample. The final sample size was 109 participants.

Descriptive Statistics

Descriptive statistics are reported in Table 1.

Table 1

Descriptive Statistics (N = 109)

Variable	*n*	*M/Pct*	*SD*
Age	109	22.94	8
Gender	109		
Male	31	28%	
Female	78	72%	
Facebook Attachment	109	16.55	6.57
Twitter Attachment	109	16.58	7.74
Big Five Variables			
Extraversion	109	23.3	5.88
Conscientiousness	109	32.36	4.75
Neuroticism	109	26.88	5.92
Openness to Experience	109	35.57	6.36
Facebook Motivation to Use Variables			
Info Sharing	109	12.37	5.18
Self-Documentation	109	10.52	4.96
Social Interaction	109	11.62	4.54
Passing Time	109	13.28	4.31
Twitter Motivation to Use Variables			
Info Sharing	109	12.56	5.42
Self-Documentation	109	10.01	5.04
Social Interaction	109	12.73	5.18
Passing Time	109	13.93	5.29

Demographic variables. Participants were given three gender options to select: male, female, and gender non-conforming. Four participants identified as gender non-conforming and were not used in the analyses because of unequal category sizes and gender being included as a covariate. Age was also included in the first step of the regression if it was found to have a significant relationship with the criterion attachment variable.

Motivation predictors. The predictor category of motivation to use Facebook had four variables. Motivation to use Facebook for information sharing averaged around a 'somewhat agree' result (M = 12.37, SD = 5.18). This sample used Facebook for information sharing purposes at times, but not extensively. Participants on average disagreed somewhat about using Facebook for self-documentation (M = 10.52, SD = 4.96). This sample did not tend to record what they do in everyday life on Facebook. The sample was also somewhat motivated to use Facebook for social interaction (M = 11.62, SD = 4.54). Using Facebook to pass the time was the highest motivating factor for using the site among this sample (M = 13.28, SD = 4.31). This sample likely opened Facebook when they were bored and had nothing better to do.

The category for motivation to use Twitter had the same four variables as did Facebook. Motivation to use Twitter to share information had an average score that was around 'somewhat agree', similar to Facebook (M = 12.56, SD = 5.42). This sample was motivated to share information at times on Twitter. Self-documentation on Twitter was around a 'somewhat disagree' for this sample (M = 10.01, SD = 5.04). Similar to the Facebook results, these participants were also not likely record their daily happenings on Twitter. Unlike Facebook, the sample was not neutral on socializing on Twitter and on average had scores that were closer to agreeing slightly (M = 12.73, SD = 5.18). This sample was likely to use Twitter to connect with similar others. Finally, participants agreed on average in their motivation to use Twitter when looking to pass the time (M = 13.93, SD = 5.29). This sample, on average used Twitter because they had nothing better

to do. The Facebook and Twitter averages were relatively similar for the four motivating categories.

Personality predictors. The current sample had the highest mean in personality traits for openness to experience (M = 35.57, SD = 6.36) with no significant skewness (0.13). This may be due to the sampling restrictions of participants needing to be both Twitter and Facebook users. Being users of both may be an indication of the higher openness average. Conscientiousness had a mean score of 32.36 (SD = 4.75) with no significant skewness (-0.13). This sample was more likely to be efficient workers. The sample's average neuroticism score was a mean of 26.88 (SD = 5.92) with no significant skew ratio (-1.95). The sample's extraversion score had a mean of 23.3 (SD = 5.88) with no significant skew (1.57).

Criterion variables. Facebook attachment scores, after each scale item was totaled, had a mean score of 16.55 (SD = 6.57). This sample was not particularly attached or detached to Facebook. Twitter attachment scores, after each scale item was totaled, had a mean of 16.58 (SD = 7.74). This sample was also not extremely attached to Twitter. Skewness ratios for both Facebook (-.19) and Twitter (.92) are not significant enough to affect the normality of the sample.

Zero-order correlations. Zero-order correlations were calculated between the predictors and two criterion variables to better understand the individual relationships. In identifying the relationships between predictors and the criterion variable of Facebook attachment, the strongest relationships were with the four motivation variables. The higher the Facebook attachment, the more motivation a person had to use Facebook for

information sharing, $r(107) = .52$, $p < .001$, self-documentation, $r(107) = .52$, $p < .001$, passing time, $r(107) = .52$, $p < .001$, and social interaction, $r(107) = .50$, $p < .001$. These motivational-attachment relationships were all very strong. Facebook attachment was also weakly related to age, $r(107) = .24$, $p < .01$, in which the older the person was the higher the attachment. There was a weak relationship with gender, $r(107) = .19$, $p < .05$, in which female participants had slightly stronger Facebook attachment scores than male participants. Between the four motivation to use Facebook variables there were moderate to strong correlations, all with a significance of $p < .001$ (see Table 2).

Table 2

Pearson Correlations, Predictors and Facebook Criterion Variable (N = 109)

Variable	1.	2	3	4	5	6	7	8	9	10.	11.
1. Facebook Attachment Total	--										
2. Age	.24 **	--									
3. Gender	.19 *	-.13	--								
4. Big Five Extraversion	.13	.03	.14	--							
5. Big Five Conscientiousness	-.14	.08	-.03	.23 **	--						
6. Big Five Neuroticism	.06	-.18 *	.33 ***	-.11	-.21 *	--					
7. Big Five Openness to Experience	.08	.23 **	.02	.06	.05	.06	--				
8. Motivation - Information Sharing	.52 ***	.23 **	.12	.14	-.01	.12	.28 **	--			
9. Motivation - Self-Documentation	.52 ***	.21 *	.16	.23 **	-.03	.15	.24 **	.81 ***	--		
10. Motivation - Social Interaction	.50 ***	.19 *	.12	.19	-.03	.11	.28 **	.64 ***	.55 ***	--	
11. Motivation - Passing Time	.52 ***	.09	.19 *	-.04	-.18 *	.05	-.08	.40 ***	.32 ***	.34 ***	--

* p < .05 ** p < .01 *** p < .001

The Twitter attachment criterion had a weak correlation with age, $r(107) = -.17$, $p < .05$, in which younger participants had higher Twitter attachment. The motivational variables all had strong significant correlations. Twitter attachment was positively related to the motivation to use Twitter for information sharing, $r(107) = .59$, $p < .001$, social interaction, $r(107) = .59$, $p < .001$, passing time, $r(107) = .55$, $p < .001$, and self-documentation, $r(107) = .53$, $p < .001$. There were moderate to strong correlations between all of the motivation to use Twitter variables with a significance value below .001 (see Table 3).

Table 3

Pearson Correlations, Predictors and Twitter Criterion Variable (N = 109)

Variable	1.	2	3	4	5	6	7	8	9	10.	11.
1. Twitter Attachment Total	--										
2. Age	-.17 *	--									
3. Gender	.07	-.13	--								
4. Big Five Extraversion	.03	.03	.14	--							
5. Big Five Conscientiousness	-.08	.08	-.03	.23 **	--						
6. Big Five Neuroticism	.08	-.18 *	.33 ***	-.11	-.21 *	--					
7. Big Five Openness to Experience	.01	.23 **	.02	.06	.05	.06	--				
8. Motivation - Information Sharing	.59 ***	.07	.04	.01	-.01	.09	.20 *	--			
9. Motivation - Self-Documentation	.53 ***	-.05	.17 *	.10	.03	.14	.14	.75 ***	--		
10. Motivation - Social Interaction	.59 ***	.02	.10	-.07	-.15	.23 **	.25 **	.76 ***	.68 ***	--	
11. Motivation - Passing Time	.55 ***	-.25 **	.19 *	-.20 *	-.21 *	.17	-.12	.44 ***	.43 ***	.54 ***	--

* p < .05 ** p < .01 *** p < .001

There were few significant relationships between the Big Five variables and the two demographic variables. A weak relationship was found between openness and age, $r(107) = .23$, $p < .01$, in which older participants were more likely to be open to new experiences. A negative relationship between age and neuroticism was also found, $r(107) = -.18$, $p < .05$, being young was weakly related to scoring higher on the neuroticism scale. Gender and neuroticism also had a moderate relationship, $r(107) = .33$, $p < .001$, with female participants being more likely to score high on the neuroticism scale.

Only two significant inter-correlations were found between the personality trait variables. Conscientiousness was weakly related to extraversion, $r(107) = .23$, $p < .01$, in which those high in conscientiousness were also high in extraversion. Neuroticism and conscientiousness had a weak relationship, $r(107) = -.21$, $p < .05$, the higher the level of conscientiousness the lower the neuroticism score.

Openness to experience was significantly related to three of the Facebook use motivation measures. Information sharing, $r(107) = .28$, $p < .01$, self-documentation, $r(107) = .24$, $p < .01$, and social interaction, $r(107) = .24$, $p < .01$, were all weakly related to openness to experience. The more open individuals were to new experiences, the more they were motivated to use Facebook for sharing information, self-documentation, and social interaction. Openness was also significantly related to two Twitter motivation scales. Information sharing, $r(107) = .20$, $p < .05$, and social interaction, $r(107) = .25$, $p < .01$, were both weakly related to openness to experience. Individuals motivated to use Twitter for information sharing and social interaction were likely to score higher for being open to new experiences. Neuroticism was also weakly related to the motivation to

use Twitter for social interaction, $r(107) = .23$, $p < .01$; individuals who were motivated to use Twitter for communication likely score higher in neuroticism.

Hypothesis Testing

In total, four hierarchical multiple regressions were performed to answer the four hypotheses questions and the two research questions. Facebook attachment was the first criterion variable tested for H1, H2, and Q1. For the first three-step hierarchical regression, the two demographic variables were entered in block 1, with motivation in block 2, and personality in block 3. To answer the research question of whether motivation or personality is a better predictor of Facebook attachment another hierarchical regression was run with the demographic variables in the first block, personality as the second block, and motivation as the third block. The above process was repeated for Twitter attachment to answer H3, H4, and Q2; however, the demographics block was not significantly related to Twitter attachment so the model was run again without the demographic block. Multicollinearity for all of the variables in the tested models was above .8 and the variance inflation factor was below 4. As a result, multicollinearity was not an issue in any of the models and no variables were removed.

Hierarchical Multiple Regression Analysis – Facebook

To test the first and second hypotheses, a hierarchical regression model was conducted. In the first block, as seen in Table 4, age and gender were included because they were significantly related to Facebook attachment, $R^2 = .11$, $R^2_{adj} = .09$, $F(2, 106) = 6.31$, $p < .01$. Gender and age together accounted for 11% of the explained variance in Facebook attachment. In the demographic block, age had a significant unique

contribution, $\beta = .27$, $t = 2.89$, $p < .01$, and gender had a significant unique contribution, $\beta = .23$, $t = 2.43$, $p < .05$. The results suggest that there was a positive relationship between gender and age with Facebook attachment, whereas older and female users of Facebook were more likely to be attached to it.

Table 4

Hierarchical Multiple Correlation, Predictor and Facebook Criterion Variables (N = 109)

Variable	r	sr^2	β	R^2	ΔR^2
Step 1: Demographics				.11 **	--
Age	.24 **	.27	.27 **		
Gender	.19 *	.22	.23 *		
Step 2: Motivation				.46 ***	.36 ***
Information Sharing	.52 ***	.01	.03		
Self-Documentation	.52 ***	.14	.24		
Social Interaction	.50 ***	.16	.21 *		
Passing Time	.52 ***	.31	.34 ***		
Step 3: Personality				.47 ***	.01
Extraversion	.13	.06	.07		
Conscientiousness	-.14	-.09	-.10		
Neuroticism	.06	-.03	-.03		
Openness to Experience	.08	-.05	-.06		

* p < .05 ** p < .01 *** p < .001

To test the first hypothesis, the second block of the hierarchical model involved the four motivation to use Facebook variables. Results showed that the motivation scales along with demographic variables were significantly related to Facebook attachment, R^2

= .46, R^2_{adj} = .43, $F(6, 102) = 6.31$, $p < .001$. The demographic variables and the motivation variables together accounted for 46% of individual differences in Facebook attachment. When taking demographic variables into account, the motivation scales made a significant change, $\Delta R^2 = .36$, $F(4, 102) = 16.81$, $p < .001$. Motivation to use Facebook for information sharing, self-documentation, social interaction, and passing time accounted for 36% of the variance in Facebook attachment above and beyond age and gender. Within the second block, social interaction, $\beta = .21$, $t = 2.17$, $p < .05$, and passing time, $\beta = .34$, $t = 4.19$, $p < .001$, had significant unique relationships to Facebook attachment. The results suggest that the more people want to use Facebook for passing time and social interaction, the more likely they are to be attached to Facebook as a website.

The third block of the hierarchical model, labeled personality, contained the Big Five Inventory traits for extraversion, conscientiousness, neuroticism, and openness to experience. This block was created to answer the second hypothesis, whether or not personality accounted for variance above and beyond motivation in Facebook attachment. Together, the demographic, motivation, and personality traits explained 47% of the individual differences in Facebook attachment ($R^2 = .47$, $R^2_{adj} = .42$, $F(10, 98) = 8.87$, $p < .001$). When taking demographic and motivation variables into account, the personality traits did not make a significant change to the explained variance, $\Delta R^2 = .01$, $F(4, 98) = .64$, $p > .05$. Personality traits did not make a significant contribution to the model, above and beyond that of age, gender, and motivation to use Facebook.

To determine whether personality or motivation was a better predictor in Facebook attachment, as stated by the first research question, the motivation and personality blocks were reversed, as seen in Table 5. The first block for demographics had the same results as the first model. The second block contained the personality scales. Together, the personality and demographic variables were significantly related to Facebook attachment, $R^2 = .15$, $R^2_{adj} = .10$, $F(6, 102) = 2.91$, $p < .05$. Extraversion, conscientiousness, neuroticism, openness to experience, age, and gender accounted for 15% of the explained variance in Facebook attachment.

Table 5

Hierarchical Multiple Correlation, Predictor and Facebook Criterion Variables Reversed (N = 109)

Variable	*r*	sr^2	β	R^2	ΔR^2
Step 1: Demographics				.11 **	--
Age	.24 **	.27	.27 **		
Gender	.19 *	.22	.23 *		
Step 2: Big Five Inventory				.15	.04
Extraversion	.13	.13	.13		
Conscientiousness	-.14	-.17	-.18		
Neuroticism	.06	.02	.02		
Openness to Experience	.08	.01	.01		

* p < .05 ** p < .01 *** p < .001

When taking the demographic variables into account, the personality variables did not make a significant change, $\Delta R^2 = .04$, $F(4, 108) = 1.18$, $p > .05$. Because of these non-significant results, this analysis will not be discussed further. The first two hypotheses and the first research question were answered. Motivation to use Facebook was a unique

contributor to Facebook attachment while personality traits are not. This result stayed constant when personality was entered before and after the motivation variables.

Hierarchical Multiple Regression Analysis – Twitter

To test the third and fourth hypotheses, a hierarchical regression model was conducted. In the initial analysis, age and gender variables were entered to examine their contribution to the model. It was found that age and gender were not significantly relevant to the model, $R^2 = .03$, $R^2_{adj} = .01$, $F(2, 106) = 1.64$, $p > .05$. Age and gender had no combined significant relationship to Twitter attachment and did not need to be statistically accounted for; therefore, this block was left out of the Twitter analyses.

To test Hypothesis 3, whether or not the motivation to use Twitter variables explain variance in Twitter attachment, the four motivation items were entered in the first block. As seen in Table 6, results showed that the motivation variables significantly explained variance in Twitter attachment, $R^2 = .47$, $R^2_{adj} = .45$, $F(4, 104) = 22.84$, $p < .001$. The motivation to use Twitter for information sharing, self-documentation, social interaction, and passing time accounted for 47% of the variance in Twitter attachment. Within this block, passing time, $\beta = .31$, $t = 3.65$, $p < .001$, had a significant unique relationship to Twitter attachment. Although it did not have a significant unique relationship, $\beta = .25$, $t = 1.95$, $p = .053$, information sharing showed a trend for accounting for a large amount of unique variance to the model. Information sharing was significant when age and gender were initially in the model ($\beta = .27$, $t = 2.11$, $p = .04$), suggesting that there simply was not enough statistical power for it to be significant, for these reasons it will be referred to as a significant unique contributor. These results suggest that the more a person wants to

use Twitter for passing the time and information sharing, the more attached he or she will be to Twitter.

Table 6

Hierarchical Multiple Correlation, Predictor and Twitter Criterion Variables (N = 109)

Variable	r	sr^2	β	R^2	ΔR^2
Step 1: Motivation				.47 ***	--
Information Sharing	.59 ***	.14	.25 º		
Self-Documentation	.53 ***	.05	.08		
Social Interaction	.59 ***	.11	.18		
Passing Time	.55 ***	.26	.31 ***		
Step 2: Personality				.48 ***	.02
Extraversion	.03	.09	.10		
Conscientiousness	-.08	.00	.00		
Neuroticism	.08	-.04	-.04		
Openness to Experience	.01	-.07	-.05		

º p = .053 * p < .05 ** p < .01 *** p < .001

The second block of the hierarchical model, labeled personality, contained the Big Five Inventory traits for extraversion, conscientiousness, neuroticism, and openness to experience. This block was run to answer Hypothesis Four, whether or not personality accounts for variance above and beyond motivation in Twitter attachment. Results showed that the personality traits were significantly related to Twitter attachment, R^2 = .48, R^2_{adj} = .44, $F(8, 100) = 11.64$, $p < .001$. The motivation and personality variables together explained 48% of the individual differences in Twitter attachment. When taking

motivation variables into account, the personality scales did not make a significant change, $\Delta R^2 = .02$, $F(4, 100) = .59$, $p > .05$. Personality did not make a significant contribution to the model, above and beyond that of motivation to use Twitter.

To determine whether personality traits or motivation was a stronger predictor in Twitter attachment, as stated by the second research question, the motivation and personality blocks were reversed, as seen in Table 7. A hierarchical model was run with extraversion, conscientiousness, neuroticism, and openness to experience in the first block. These variables were not significantly related to Twitter attachment, $R^2 = .01$, $R^2_{adj} = -.03$, $F(4, 104) = .35$, $p > .05$. Because this block was not significant, the analysis will not be discussed further. Similar to the first Twitter attachment hierarchical multiple regression, personality variables did not account for a significant amount of explained variance in Twitter attachment. In response to the second research question, these results suggest that the variables for the personality traits of extraversion, conscientiousness, neuroticism, and openness are not a significant indicator of an individual's attachment to Twitter, regardless of the order it is entered in the model.

Table 7

Hierarchical Multiple Correlation, Predictor and Twitter Criterion Variables Reversed (N = 109)

Variable	*r*	sr^2	β	R^2	ΔR^2
Step 1: Big Five Inventory				.01	--
Extraversion	.03	.05	.05		
Conscientiousness	-.08	-.07	-.08		
Neuroticism	.08	.07	.07		
Openness to Experience	.01	.01	.01		

* p < .05 ** p < .01 *** p < .001

Discussion

The Facebook results suggest that an individual's motivation to use Facebook for passing time and social interaction account for individual differences in Facebook attachment beyond those contributed by age and gender. Although all of the individual motivation variables had significant zero-order correlations with Facebook attachment, when accounting for the other motivation variables, only passing time and social interaction were significant on their own. This may be due to moderate inter-correlations between the four variables. Passing time had correlations of moderate and weak strength with the other variables and this may be why it was uniquely significant. Information sharing and self-documentation had a significant zero order correlation, with a very strong effect size and most likely led to too much shared variance to make either scale uniquely significant in the total model. The personality block's inability to significantly add to the explained variance in Facebook attachment makes sense after analyzing the zero-order correlations, in which none of the four personality traits included in the model had a significant relationship with Facebook attachment.

The Twitter results suggest that an individual's motivation to use Twitter for passing time and information sharing account for individual differences in Twitter attachment beyond those contributed by age and gender. Though all of the individual motivation variables had significant one-way correlations with Twitter attachment, when accounting for the other motivation variables, only passing time and information sharing were significant on their own. The personality block's inability to significantly add to the explained variance in Twitter attachment makes sense after analyzing the zero-order

correlations in which none of the traits had a significant relationship with Twitter attachment. Similar to the Facebook results, the demographic variables not being significant in the Twitter model also makes sense as there was no zero-order correlation between gender and Twitter attachment, and the relationship with age was also very weak.

Personality and Motivation in SNS Attachment

The current study offers evidence that personality traits are not significantly related to one's attachment to specific SNSs. Our results also provide additional confirmation of the research previously performed by Alhabash and Ma (2017), showing that U & G measures of motivation for SNS use are related to attachment to said SNS. Additionally, our results confirm that users who are attached to Facebook and Twitter have different motivations to use each site. When looking solely at zero-order correlations, all of the motivation variables had significant relationships with SNS attachment. By using a hierarchical model, we were able to investigate these relationships in regard to one another. Both sites had significant unique relationships with passing time. The difference was that Facebook had a significant unique relationship with social interaction while Twitter had a nearly significant unique relationship with information sharing. According to the U & G theory, these unique relationships may signal a user's intention to continue to use the site. Twitter users choose to use the site as their source of information sharing and Facebook users choose to use the site for social interaction, while both users go to the sites for passing time.

In looking at the overall model, the above findings held when the blocks of the models were reversed. We chose to reverse the motivation and personality blocks in the models because personality traits have never to our knowledge been included with the U & G motivation variables in previous research. By doing this we were able to see whether personality traits made a unique additional contribution to explained variance in SNS attachment or whether personality was a suppressor or moderating variable. Personality was neither of these things; it simply did not account for a statistically significant amount of explained variance in the Facebook or Twitter models. The data from this study suggest personality traits have no relationship with continuance of SNS use.

This study provided a more in-depth and statistically sound look at motivation and its relationship to SNS attachment compared to those previously offered in research. For this study's motivational measures, the psychometrically solid portions of Alhabash and Ma's hierarchical regression model (2017) were replicated. Their model included a time spent daily measure, which is flawed because it is nearly impossible to get a reliable measure due to repetitive SNS checking behaviors. The time spent measure explained the most unique variance in their model. Alhabash and Ma's model also contained variables that were only measured by two questions or were a more specific version of other measures, specifically, self-expression as a more specific version of self-documentation and entertainment as a more specific version of passing time. Convenience was also a factor that was left out due to the large percentage of people who own smartphones and can check their apps freely during the day. For these reasons, this

study utilized Alhabash and Ma's U & G scale items that had the best internal validity as well as making sure that they were not repetitive of another.

Limitations

This study was limited in the demographic block's representativeness. Men who use Twitter and Facebook were not represented well in our study due to a gender ratio of almost 2.5 times more females than males. Not only this, but age became skewed with half of the sample being undergraduate participants (age range from 18 to 20 years old) and the other half being snowballed participants (age range from 21 to 62 years old). Future studies should try to solely rely on snowballing through SNSs or use professional data collection platforms such as Amazon's Mechanical Turk service. In this method, gender and age would be better represented.

These limitations may be why the demographics block for Twitter was not significant while the Facebook model did have a significant demographic block. It could also be that there is no relationship between Twitter attachment, age, and gender. This question cannot be answered by this study due to the skewed demographics. Future studies that have a more generalizable sample and does not rely on student participant pools may be able to determine the answer to this.

Another limitation that resulted from Twitter's non-significant demographic block was the alteration of information sharing's p-value. When the demographic variables were in the model, information sharing had a significant unique contribution, and when it was removed that significance value rose to the reported value. This variable is most likely significant, but this study may not have been powered enough with a sample size of

109, or the skewed age and gender may have dampened information sharing's unique contribution to the model.

Another limitation of the current investigation was the U & G psychometrics. A stronger model with more items per motivation variable may need to be developed; however, this goes beyond the scope of this study. Interestingly enough, the measure for passing time had the most varied psychometrics but accounted for the most unique explained variance in both the Facebook and Twitter models. Future researchers who want to look into U & G for SNS may need to examine the combination of the variables for self-documentation and self-expression as well as entertainment and passing time.

Recently, Facebook has been scrutinized for poor management of the data of their users (Facebook Scandal, 2018). As a result, new qualitative U & G factor analyses have been looking at ways Facebook does not gratify the needs of its users. Three trends appeared in a study by Alakklouk and Mokhtar (2017) on Palestinian college students. The interviewed students commonly stated that Facebook needed to improve privacy, lessen their advertisements, and improve freedom of expression on the site. Future SNS models that focus on U & G variables may want to include items such as "privacy" and "trustworthiness" to identify where SNSs are not gratifying needs.

Implications and Future Directions

The findings from this study offer evidence that there is a difference in a user's desire to use Facebook and Twitter. Individuals who are more attached to Twitter are going to the site to pass time and share information. This is valuable information for the developers of Twitter, who likely already know that their end-users' main use of their site

is to share information. There is evidence of this in the recent changes to the length of Tweets as well as new sharing options. In February of 2018, Twitter added a new feature, called bookmarking, that makes sharing Tweets easier than ever (Shah, 2018). Bookmarks simplifies the process of saving content from Twitter to view later via the 'Bookmarks' tab on users' profiles. These are probably articles that the user would like to view later when he or she has more free time. After the user finds the time to read the article, he or she may decide to retweet it, resulting in greater information sharing behaviors.

Individuals who are attached to Facebook are using the site to pass time and also interact socially. Their continued use most likely heavily relies on the use of the Facebook Messenger app. This app allows users to converse textually, over an audio call, or a video call. It also has no restrictions on where the users live, unlike the restrictions found in other teleconferencing services. The ease of this Facebook product has most likely developed a sense of attachment in its users.

Personality traits had no significant relationships with either Facebook or Twitter attachment, both on its own and in the model. Previous studies that found varying results used a measure of time spent on the site, which may explain their significant relationships (Moore & McElroy, 2012; Ross et al., 2009; Ryan & Xenos, 2011). Some researchers have suggested using a more specific personality measure, because perhaps the Big Five traits are too broad to explain SNS usage (Liu & Baumeister, 2016). It is most likely the case that uses and gratifications explain SNS attachment more accurately compared to personality.

Self-documentation was not a unique significant predictor for the Facebook or Twitter models. It may be that high correlations with other motivation variables take away from its unique explaining power. However, both Facebook and Twitter users had sample means of about 10 out of a possible score of 21 for self-documentation, which is fairly low. It is possible that Snapchat and Instagram are used to gratify a user's needs for self-documentation due to the simplicity of posting photos and videos that last 24 hours. This style of posting may be a more desirable way to self-document compared to Facebook and Twitter's permanent posting style. A future study would be wise to include Instagram and Snapchat measures.

The uses and gratifications model of SNS explains a large amount of individual differences in Facebook and Twitter attachment. The U & G model used in this study was well-rounded, and yet it could still use improvement. This improvement would especially be needed for the inclusion of Snapchat and Instagram. Combining and narrowing down the self-documentation and self-expression scales may be an ideal way to start. The phrasing in self-expression, like "to tell others about myself," uses more relatable language compared to "…to record what I have learned" in self-documentation (Alhabash & Ma, 2017). It may even be wise to split the U & G model up into "passive" and "active" categories. Users may be more likely to continue using sites when their purposes to use it are more active, such as sharing information and talking with others. Passive uses, such as finding it entertaining and using it to pass the time, may not lead to as resilient of a connection with the SNS as the more active uses.

The future of SNS research should focus more on U & G models that outline users' motivations for using the sites, rather than personality. Motivation, it appears, will provide most insight into how they use the sites. Studies that look into cyberbullying should focus on these scales, since adolescents may be more at risk for cyberbullying behaviors if they are solely using SNS for passing the time. Motivation to use a SNS has consistently explained nearly half of the individual differences in attachment to the SNS, both in this study and prior research by Alhabash and Ma (2017) and Alhabash et al. (2012). For this reason, motivation should be acknowledged and utilized in future SNS studies.

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APPENDIX A
The Consent Form/Introduction

Request for your participation in research.
Personality, Motivation, and the War Between Facebook and Twitter

Elizabeth Shallal
San Jose State University
Graduate Student

Faculty Supervisor: Dr. Gregory Feist

The purpose of this study is to look at social networking behaviors in accordance with various psychological variables. You will answer a series of surveys covering demographics, personality traits, Facebook and Twitter behaviors, and motivation to use Facebook and Twitter. This should take between 10 and 25 minutes. There are no physical, psychological, social, or legal risks in taking part in this study. There are also no direct benefits to you, though results of the study will benefit the field of research on social networking sites. If you are a San Jose State University student, there will be course credit compensation through the SONA system. If you are not a San Jose State University student, there is no compensation for participation. No identifying information will be collected, therefore responses will not be connected to individuals in any way.

Your participation in this study is completely voluntary. You can refuse to participate in the entire study or any part of the study without any negative effect on your relations with San Jose State University. You also have the right to skip any question you do not wish to answer. This consent form is not a contract. It is a written explanation of what will happen during the study if you decide to participate. You will not waive any rights if you choose not to participate, and there is no penalty for stopping your participation in the study.

You are encouraged to ask questions at any time during this study.

● For further information about the study, please contact Elizabeth Shallal: Elizabeth.Shallal@sjsu.edu
● Complaints about the research may be presented to Dr. Lynda Heiden: Lynda.Heiden@sjsu.edu
● For questions about participants' rights or if you feel you have been harmed in any way by your participation in this study, please contact Dr. Pamela Stacks, Associate Vice President of the Office of Research, San Jose State University, at 408-924-2479.

By entering today's date and checking the box saying you are over the age of 18 it indicates that you voluntarily agree to be a part of the study, that the details of the study have been explained to you, that you have been given time to read this document, and

that your questions have been answered. You may print a copy of this consent form for your records.

Please check a box indicating if you are over 18.

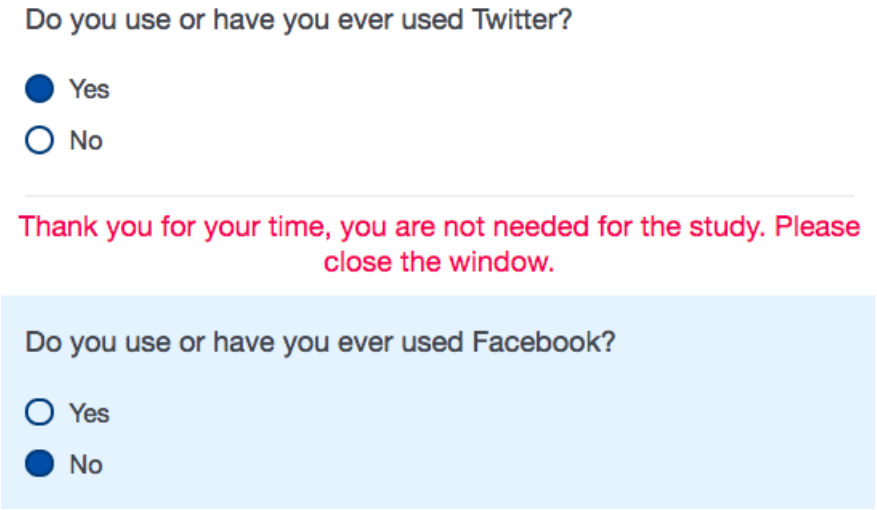
- ○ I am above the age of 18
- ○ I am not above the age of 18

Please select today's date to confirm your agreement to participate in this study.

- ○ 2/17/2018

APPENDIX B
Exclusion Criteria

What participants were shown if they did not pass the exclusion criteria:



APPENDIX C
SNS Attachment Questionnaire

Facebook

Here are a number of characteristics that may or may not apply to you. Please select a choice for each statement to indicate the extent to which you agree or disagree with that statement.

Facebook is part of my everyday activity

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

I am proud to tell people I'm on Facebook

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

Facebook has become part of my daily routine

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

I feel out of touch when I haven’t logged onto Facebook for a while

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

I feel I am a part of the Facebook community

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

I would be sorry if Facebook shuts down

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

Twitter

Here are a number of characteristics that may or may not apply to you. Please select a choice for each statement to indicate the extent to which you agree or disagree with that statement.

Twitter is part of my everyday activity

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

I am proud to tell people I'm on Twitter

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

Twitter has become part of my daily routine

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

I feel out of touch when I haven't logged onto Twitter for a while

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

I feel I am a part of the Twitter community

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

I would be sorry if Twitter shuts down

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

APPENDIX D
SNS Motivation Questionnaire

Facebook

Here are a number of characteristics that may or may not apply to you. Please select a choice for each statement to indicate the extent to which you agree or disagree with that statement. Each statement begins with "I use Facebook..."

…to share information

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to record what I do in life

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to connect with people who share some of my values

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…because it helps pass the time

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to share information useful to people

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to record what I have learned

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to connect with people who are similar to me

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…because I have nothing better to do

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to present information on my interest

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to record where I have been

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to meet new people

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…because it relaxes me

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

Twitter

Here are a number of characteristics that may or may not apply to you. Please select a choice for each statement to indicate the extent to which you agree or disagree with that statement. Each statement begins with "I use Twitter..."

…to share information

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to record what I do in life

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to connect with people who share some of my values

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…because it helps pass the time

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to share information useful to people

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to record what I have learned

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to connect with people who are similar to me

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…because I have nothing better to do

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to present information on my interest

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to record where I have been

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…to meet new people

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

…because it relaxes me

Strongly disagree	Disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree	Strongly agree

APPENDIX E
Big Five Inventory

Here are a number of characteristics that may or may not apply to you. Please select a choice for each statement to indicate the extent to which you agree or disagree with that statement. Each statement begins with "I see myself as someone who..."

…is talkative

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…does a thorough job

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is depressed, blue

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is original, comes up with new ideas

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is reserved

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…can be somewhat careless

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is relaxed, handles stress well

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is curious about many different things

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is full of energy

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is a reliable worker

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…can be tense

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is ingenious, a deep thinker

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…generates a lot of enthusiasm

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…tends to be disorganized

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…worries a lot

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…has an active imagination

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…tends to be quiet

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…tends to be lazy

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is emotionally stable, not easily upset

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is inventive

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…has an assertive personality

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…perseveres until the task is finished

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…can be moody

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…values artistic, aesthetic experiences

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is sometimes shy, inhibited

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…does things efficiently

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…remains calm in tense situations

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…prefers work that is routine

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is outgoing, sociable

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…makes plans and follows through with them

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…gets nervous easily

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…likes to reflect, play with ideas

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…has few artistic interests

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is easily distracted

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

…is sophisticated in art, music, or literature

Disagree strongly	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Agree strongly

APPENDIX F
Demographic Questionnaire

What is your age?

What is your gender?

- ○ Male
- ○ Female
- ○ Gender non-conforming

What is your ethnicity?

- ☐ American Indian/Alaska Native
- ☐ Asian or Asian American
- ☐ Black or African American
- ☐ Hispanic or Latinx
- ☐ Native Hawaiian or Other Pacific Islander
- ☐ Middle Eastern or North African
- ☐ White/European American

What is your highest level of education?

- ○ No formal educational credential
- ○ High school diploma or equivalent
- ○ Some college, no degree
- ○ Associate's degree
- ○ Bachelor's degree
- ○ Master's degree
- ○ Doctoral or professional degree

What is your occupation?

- ○ Student
- ○ Other:

APPENDIX G
Careless Response Test

This study requires you to answer questions about social networking sites and your behavior online. It is important for you to take your time in reading all instructions and questions thoughtfully. The questions below serve to test whether or not you are taking the time to read all questions in the survey. Please answer 'five' on the first question. To answer the second question please subtract two from that answer. Thank you for participating.

1. I do not mind when I leave my phone at home to run errands.

[Strongly disagree (1) (2) (3) (4) (5) (6) (7) Strongly agree]

2. I try to read everything on my social networking newsfeeds.

[Strongly disagree (1) (2) (3) (4) (5) (6) (7) Strongly agree]