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Subjective well-being and social media use: Do personality traits moderate the impact of social comparison on Facebook?

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Abstract

The purpose of the study was to explore whether personality traits moderate the association between social comparison on Facebook and subjective well-being, measured as both life satisfaction and eudaimonic well-being. Data were collected via an online questionnaire which measured Facebook use, social comparison behavior and personality traits for 337 respondents. The results showed positive associations between Facebook intensity and both measures of subjective well-being, and negative associations between Facebook social comparison and both measures of subjective well-being. Personality traits were assessed by the Reinforcement Sensitivity Theory personality questionnaire, which revealed that Reward Interest was positively associated with eudaimonic well-being, and Goal-Drive Persistence was positively associated with both measures of subjective well-being. Impulsivity was negatively associated with eudaimonic well-being and the Behavioral Inhibition System was negatively associated with both measures of subjective well-being. Interactions between personality traits and social comparison on Facebook indicated that for respondents with high Goal-Drive Persistence, Facebook social comparison had a positive association with eudaimonic well-being, thus confirming that some personality traits moderate the association between Facebook social comparison and subjective well-being. The results of this study highlight how individual differences in personality may impact how social comparison on Facebook affects individuals' subjective well-being.

Keywords: Facebook; subjective well-being; social comparison; personality; life satisfaction; eudaimonic well-being

Highlights

- Analysis of the association between social comparison on Facebook and well-being
- The potential moderating role of personality traits was explored
- Subjective well-being was assessed as life satisfaction and eudaimonic well-being
- Facebook social comparison was negatively associated with subjective well-being
- Goal-Drive Persistence moderates this relationship

1. Introduction

Since its inception in 2004, Facebook and similar social networking sites (SNS) have revolutionized modern communication. SNS platforms have become rapidly integrated into daily life, and have changed the way we communicate, with more of our social lives taking place online than ever before. As previous studies have shown that social relationships are an important determinant of subjective well-being (e.g. Myers & Diener, 1995) and with Facebook now boasting 1.65 billion active users (Facebook Newsroom, 2016), it is important to understand the effect SNS use has on subjective well-being.

Although research on SNS use and subjective well-being has increased in recent years, the results of these studies have been inconsistent. Some studies report positive associations between SNS use and subjective well-being (Ellison, Steinfield, & Lampe, 2007; Grieve, Indian, Witteveen, Anne Tolan, & Marrington, 2013; Oh, Ozkaya, & LaRose, 2014), while others report the opposite (Fox & Moreland, 2015; Kross et al., 2013; Sagioglou & Greitemeyer, 2014). It is possible that an additional variable mediates or moderates the complex relationship between SNS use and subjective well-being, thus explaining the inconsistencies in the literature. Since SNS are essentially tools for human interaction, it is necessary to understand what SNS users bring into the online environment in order to explore how SNS use affects their subjective well-being. Previous studies have found that personality is a key element to understanding users' motivations in online behavior (Amichai-Hamburger, 2002; Hamburger & Ben-Artzi, 2000). While past studies have looked at SNS use and personality traits, none to our knowledge have investigated how personality traits affect the relationship between SNS use and subjective well-being.

The present research aims to contribute to this growing literature by exploring how users' personality traits may moderate the association between social comparison on Facebook and subjective well-being. A unique feature of our study is that, with regards to subjective well-

being, we consider both life satisfaction and eudaimonic well-being, in contrast to previous studies of this nature which usually focus solely on life satisfaction. Our study first examines the direct relationships between subjective well-being and Facebook use, Facebook social comparison, and personality. Second, it explores whether personality moderates the association between Facebook social comparison and subjective well-being. We expect to contribute to a better understanding of how individual differences may impact the complex nature of the relationship between Facebook use and subjective well-being. If personality traits moderate the relationship between Facebook use and subjective well-being, it may explain the mixed findings in the current literature.

1.1 Social Networking Sites and Subjective Well-Being

Social networking sites are online environments which enable users to create a public profile and connect with other users (Ellison et al., 2007). This connection allows SNS users to quickly and easily share contact information, messages, pictures, life events and other content. Of the SNS available, Facebook is by far the most popular with 71% of all American adult internet users reporting that they have a Facebook account (Pew Research Center, 2014). While social connection is the main characteristic of all SNS, each SNS has its own additional features which can impact how the site is used, and therefore, each SNS may affect subjective well-being differently. Due to its overwhelming popularity, the present study will focus specifically on how Facebook use affects subjective well-being.

Subjective well-being is defined as "a broad category of phenomena that includes people's emotional responses, domain satisfactions, and global judgments of life satisfaction" (Diener, Suh, Lucas, & Smith, 1999, p. 277). A more recent definition describes that subjective well-being consists of three elements: life evaluation, affect, and eudaimonia (The Organisation for Economic Co-operation and Development, 2013). Life evaluation is

frequently measured with a single-item or multi-item life satisfaction scale, which assesses how satisfied a person is with his/her life (e.g. Diener, Emmons, Larsen, & Griffin, 1985). The concept of eudaimonia emphasizes achieving well-being through "the development of a person's best potentials and their application in the fulfillment of personally expressive, self-concordant goals" (Waterman et al., 2010, p. 41), and thus focuses on having a sense of meaning or purpose in life. Although life satisfaction is frequently used as the only measure to assess well-being in studies of SNS use, research has found that measuring both life satisfaction and eudaimonic well-being concurrently creates a more complete picture of an individual's well-being (Keyes, 2007; Seligman, Parks, & Steen, 2004; Seligman, 2011) and we therefore include both measures here to address this gap in the literature (the few studies that measure both types of well-being simultaneously include Liu & Yu, 2013; Satici & Uysal, 2015).

Previous studies which have investigated life satisfaction and SNS use tend to yield conflicting results, which may be due to the studies' focus on particular covariates. For example, previous studies on social capital, perceived social support or social connectedness have found that Facebook use is positively associated with life satisfaction (Ellison et al., 2007; Grieve et al., 2013; Oh et al., 2014; Valenzuela, Park, & Kee, 2009) while studies examining envy or problematic use have found that Facebook use is negatively associated with life satisfaction (Chou & Edge, 2012; Krasnova, Wenninger, Widjaja, & Buxmann, 2013; Satici & Uysal, 2015). These studies typically measure Facebook use with the Facebook Intensity Scale, which assesses how engaged an individual is when using Facebook (Ellison et al., 2007). A recent study investigated the impact of Facebook use on life satisfaction directly, and found that the more participants used Facebook, the more their life satisfaction declined over time (Kross et al., 2013). We therefore hypothesize that the intensity of Facebook use will be negatively associated with life satisfaction. While few

studies have investigated SNS use and eudaimonic well-being, Satici & Uysal found that problematic Facebook use was associated with lower eudaimonic well-being (2015). In light of these findings, we hypothesize that:

H1. Respondents who are intensive Facebook users will have lower life satisfaction and lower eudaimonic well-being than those who use Facebook less intensively.

1.2 Social Comparison and Facebook Use

One of the main features of Facebook is that it allows users to control how they are presented in the online environment. Many users practice image management and present an idealized version of themselves in the form of flattering pictures and status updates about their successes (Chou & Edge, 2012; Qiu, Lin, Leung, & Tov, 2012). At the same time Facebook allows users to gain insights into their Facebook friends' lives which they would normally not have, thus making this SNS the ideal platform for social comparison. Social comparison is the process by which individuals compare themselves to others in order to obtain an external guideline against which to assess their opinions, skills, abilities, personality traits and emotions (Festinger, 1954; White, Langer, Yariv, & Welch, 2006). Although social comparison can take place between any two individuals, it most commonly takes place when an individual believes another shares similar opinions, beliefs and abilities to their own (Festinger, 1954; Gibbons & Buunk, 1999). Additionally, individuals compare themselves to others when they are confronted with information about others, such as how others are doing, others' abilities and what others have achieved (Mussweiler, Rueter, & Epstude, 2006). Features such as Facebook's newsfeed provide a steady stream of information about peers' lives, achievements, abilities, emotions and personalities, creating a perfect breeding ground for social comparison to take place.

Previous studies which focused on social comparison on Facebook have investigated how it relates to correlates of subjective well-being, such as depressive symptoms (Feinstein et al., 2013; Steers, Wickham, & Acitelli, 2014), body image (Haferkamp & Krämer, 2011), and envy (Chou & Edge, 2012; Krasnova et al., 2013). These studies find that social comparison affects the user negatively. Social comparison has also been found to mediate the relationship between time spent on Facebook and depressive symptoms (Steers et al., 2014). Therefore, we hypothesize that users who compare themselves to their peers on Facebook in a negative light will have lower subjective well-being than users who compare themselves in a positive light. In the following, we refer to both life satisfaction and eudaimonic well-being when we mention subjective well-being in our hypotheses.

H2. Respondents who compare themselves negatively to their peers on Facebook will have lower subjective well-being than those who mostly compare themselves in a positive way (Facebook social comparison).

1.3 Social Networking Sites and Personality

While past studies have investigated Facebook social comparison, none to our knowledge have examined the role personality traits play in its association with subjective well-being. Past studies on Facebook use and personality commonly focus on feature use (posting photos, joining public groups, etc.), frequency of use, and number of Facebook friends, in conjunction with the Five-Factor Model of personality (Amichai-Hamburger & Vinitzky, 2010; Correa, Hinsley, & de Zúñiga, 2010; Costa & McCrae, 1992; Ljepava, Orr, Locke, & Ross, 2013). In contrast, the present study extends previous research on social comparison on Facebook and subjective well-being by investigating whether certain

personality traits make Facebook users more likely to compare themselves to others in a negative way, and therefore experience decreased well-being.

The Five-Factor Model (FFM) of personality theorizes that personality can be quantified by measuring five dimensional traits: Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness (Costa & McCrae, 1992). Although the FFM of personality is widely used, it fails to offer an explanation for the causal source of personality traits (Corr, DeYoung, & McNaughton, 2013). To understand how personality interacts with Facebook use and subjective well-being, we need to understand the underlying processes driving those traits. The Reinforcement Sensitivity Theory (RST) of personality is theoretically based on the biological and psychological processes which drive personality (Corr, 2008). RST proposes that there are three neurophysiological systems which drive behavior, and that individual differences in these systems are reflected as personality. These three systems are the behavioral approach system (BAS), the behavioral inhibition system (BIS), and the fight-flight-freeze system (FFFS). As the model is based on evolutionary theory, the core of these systems is primarily concerned with success and survival. The majority of Facebook and subjective well-being research has been conducted using the FFM of personality, therefore we compare FFM traits to RST traits as a theoretical base for our personality hypotheses.

The BAS is activated by positive stimuli such as food or sexual partners. It is sensitive to reward and generates approach behavior when activated. It is responsible for emotional states such as eagerness, excitement, hope and desire (Corr et al., 2013). On a more contemporary level, the BAS can also be activated for social rewards such as making friends and gaining social status or affiliation. RST theorists therefore believe that the BAS may be the central quality of Extraversion in the FFM of personality (Depue & Collins, 1999; Lucas & Baird, 2004). Individuals with a high BAS tend to be optimistic, reward-oriented

and impulsive (Corr & Cooper, 2016; Corr, 2016). Although the BAS was originally conceptualized as one measure, research has indicated that the BAS is multidimensional (Carver & White, 1994; Corr & Cooper, 2016). The BAS has therefore been recently re-conceptualized to reflect these findings, splitting it into four sub-processes: Reward Interest, Reward Reactivity, Impulsivity, and Goal-Drive Persistence (Corr & Cooper, 2016).

Reward Interest is associated with seeking behavior and is responsible for the motivation to find rewarding places, activities and people. Individuals with high Reward Interest are likely to enjoy exploring new places, approaching new people and participating in new activities. It therefore is most similar to Openness to Experience in the FFM of personality (Corr & Cooper, 2016). Studies on the FFM of personality and Facebook use found that people high in Openness to Experience use social media more frequently (Correa et al., 2010). As Facebook creates opportunities to seek out friends, events and new experiences, we hypothesize that respondents who have high Reward Interest will be more active Facebook users. Studies which have investigated the FFM of personality and subjective well-being have found that Openness to Experience is positively related to multiple facets of subjective well-being (Steel, Schmidt, & Shultz, 2008). We therefore predict that respondents high in Reward Interest will have higher subjective well-being.

H3a: Respondents with high Reward Interest will use Facebook more intensively.
H3b: Respondents with high Reward Interest will have higher subjective well-being than respondents with low Reward Interest.

Reward Reactivity is associated with the pleasure of receiving a reward or the excitement of winning. It is responsible for feelings of hope and the anticipation of reward, whether it be an unconditional reward or a small achievement which is part of a larger goal (Corr &

Cooper, 2016). Reward Reactivity is often conceptualized as the core component to the BAS (Corr & Cooper, 2016). As the BAS may be the central quality of Extraversion (Depue & Collins, 1999; Lucas & Baird, 2004) and extraverts are more likely to be attentive to rewards (Steel et al., 2008), we propose that Reward Reactivity would be closest to the FFM trait of Extraversion. Studies on Facebook and FFM of personality have found that people high in Extraversion use social media more than people who are low in Extraversion (Caci, Cardaci, Tabacchi, & Scrima, 2014; Correa et al., 2010). As such, we predict that respondents high in Reward Reactivity will use Facebook more intensively than respondents low in Reward Reactivity. FFM studies which have investigated subjective well-being found that higher scores on a variety of subjective well-being measures were associated with higher Extraversion (Hayes & Joseph, 2003; Steel et al., 2008). Therefore, we hypothesize that respondents with high Reward Reactivity will have higher subjective well-being than respondents with low Reward Reactivity.

H4a: Respondents with high Reward Reactivity will use Facebook more intensively than respondents low in Reward Reactivity.

H4b: Respondents with high Reward Reactivity will have higher subjective well-being than respondents with low Reward Reactivity.

Impulsivity measures an individual's proneness to impulsive behavior, which can be beneficial when caution and planning are not appropriate and the reward needs to be seized quickly (Corr & Cooper, 2016). A past study linking BIS/BAS traits to the FFM of personality found that Impulsivity was the most similar to low Conscientiousness (Steel et al., 2008). Conscientiousness reflects organization and goal-planning, which requires the delay of gratification. Therefore, it is plausible that individuals low on Conscientiousness would

display impulsive traits. Previous research on Facebook use has found that people who are high on Conscientiousness used Facebook less than those who are low on Conscientiousness (Caci et al., 2014; Ryan & Xenos, 2011). We therefore surmise that respondents who have high Impulsivity will use Facebook more intensively than those with low Impulsivity. In regards to subjective well-being, research has found that impulsive individuals are more susceptible to negative behaviors such as procrastination (Steel, 2007). Additionally, research shows that choosing short-term gain over rewards which require the delay of gratification is sometimes associated with poor health (Bogg & Roberts, 2004) and financial deficit (Angeletos, Laibson, Repetto, Tobacman, & Weinberg, 2001). As such, we hypothesize that respondents with high Impulsivity will have lower subjective well-being.

H5a: Respondents with high Impulsivity will use Facebook more intensively than those with low Impulsivity.

H5b: Respondents with high Impulsivity will have lower subjective well-being than those with low Impulsivity.

Goal-Drive Persistence comes into play when a reward is possible but not immediately available. It is responsible for restraint and goal-planning, as well as the motivation to establish goals and sub-goals to in order to maintain the necessary drive to achieve a long-term reward (Corr & Cooper, 2016). As Goal-Drive Persistence is characterized by a high level of organization and goal-planning, it is the most similar to the FFM trait of high Conscientiousness. Studies which have investigated the FFM of personality and Facebook use have found that people with high Conscientiousness spend less time on Facebook than people who are low in Conscientiousness (Caci et al., 2014; Ryan & Xenos, 2011). However, Goal-Drive Persistence is also characterized by a high level of persistence

in general which is not accounted for in the FFM concept of high Conscientiousness. This high level of persistence may result in people with high Goal-Drive Persistence spending more time on Facebook than people with low Goal-Drive Persistence. Due to the divergence between the FFM concept of high Conscientiousness and the RST concept of Goal-Drive Persistence, we predict that there will be a significant relationship between Goal-Drive Persistence and Facebook intensity, but do not predict the direction of this relationship. Also, as personal development and the achievement of goals are important components of eudaimonic well-being (Sheldon, 2002; Waterman, 2008), and previous studies have found positive associations between high Conscientiousness and facets of subjective well-being (Hayes & Joseph, 2003), we hypothesize that respondents with high Goal-Drive Persistence will have higher subjective well-being than those with low Goal-Drive Persistence.

H6a: There will be a significant association between Goal-Drive Persistence and Facebook intensity.

H6b: Respondents with high Goal-Drive Persistence will have higher subjective well-being than those with low Goal-Drive Persistence.

The fight-flight-freeze system (FFFS) is triggered by threatening stimuli (such as predators) and elicits avoidance behavior accompanied by fear and panic based on the severity of the threat. An FFFS reaction prompts behavior to remove the individual from the perceived danger. Individuals with high FFFS have a tendency to be fear-prone and avoidant. In extreme cases, they may suffer from panic or phobias (Corr, 2008). The FFFS differs from the BIS as the FFFS operates in the present, whereas the BIS is mainly concerned with the future. We do not have any predictions for FFFS but include it in our model as all RST personality traits should be assessed together.

The behavioral inhibition system (BIS) is activated when there is a conflict within or between systems. It can be activated when a system is in conflict with itself (for example, if the FFFS is activated and an individual must decide whether to fight or flee a threatening situation) or when two systems are in conflict with each other (in social situations, the BAS may be motivating an individual to speak to a potential mate, while the FFFS is motivating the individual to flee). It is responsible for risk assessment, passive avoidance, and contributes to anxious behavior (Corr et al., 2013; Corr, 2008). Individuals with high BIS tend to worry often and are prone to anxious rumination (Corr, 2008). Both the BIS and the FFFS are associated with the FFM concept of Neuroticism (Corr et al., 2013). As research has found an association between frequent social comparison and Neuroticism (Gibbons & Buunk, 1999), and individuals who are high in BIS tend to be worry-prone, we hypothesize that respondents who have a high BIS will be more likely to make negative comparisons between themselves and their Facebook friends than those with low BIS. Several studies have established a link between high Neuroticism and lower subjective well-being (DeNeve & Cooper, 1998; Hayes & Joseph, 2003; Steel et al., 2008), and we therefore further hypothesize that high BIS is associated with lower subjective well-being.

H7a: Respondents with high BIS will be more likely to compare themselves negatively to their friends on Facebook than those with low BIS.

H7b: Respondents with high BIS will have lower subjective well-being than those with low BIS.

Although there is a wealth of literature on social comparison, there are few studies which have investigated the role that personality plays in social comparison behavior. However, personality has been found to moderate other social processes, such as the

relationship between mood and social approach (Brown, Diekman, Tennial, & Solomon, 2011), and the interaction between daily events and stress (Longua, DeHart, Tennen, & Armeli, 2009). We therefore believe that it may also moderate the relationship between social comparison and subjective well-being. Facebook is an ideal environment to investigate this theory, as Facebook provides ample opportunity for social comparison to take place. We therefore further conduct exploratory analysis to investigate whether personality traits moderate the relationship between Facebook social comparison and subjective well-being.

2. Methods

2.1 Sample and Procedure

Respondents were recruited online via Amazon Mechanical Turk (MTurk) and social media sites (Facebook, Twitter and Reddit) over a 4-month period from February to May 2015. To access the study, respondents clicked a link which directed them to a secure online survey website (Qualtrics). Upon giving consent, respondents were directed to complete a questionnaire. Respondents who were recruited through MTurk were paid $2 in exchange for their participation, while those recruited through social media sites were compensated with personality results upon completion of the questionnaire. Only those over the age of 18 with a Facebook account were eligible for participation. Data were collected from 495 individuals, however, respondents who failed the attention checks (such as "Please select slightly agree for this question") or who did not complete the survey were not included in the final sample. The final sample (N = 337) consisted of 136 males and 201 females between the ages of 18 and 70, with a mean age of 36.5 (Table 1) and a median age of 34 (114 respondents between the ages of 18-29; 121 respondents between the ages of 30-39; 48 respondents between the ages of 40-49; 37 respondents between the ages of 50-59; and 17 respondents between the ages of 60-70). Respondents were asked which employment status best reflected their current

situation, and were told to select as many as applied to allow for overlap (such as student and part-time employment). Employment status categories included: full-time employment, part-time employment, student, homemaker, retired, and unemployed.

Table 1
Sample characteristics

Variable	N	*M*	*SD*	Min	Max
Male	337	0.4	0.5	0	1
Age	337	36.5	11.3	18	70
University education or higher	337	0.6	0.5	0	1
Employment Status:					
Student	337	0.1	0.3	0	1
Full-time employment	337	0.6	0.5	0	1
Part-time employment	337	0.2	0.4	0	1
Homemaker	337	0.1	0.3	0	1
Retired	337	0.03	0.2	0	1
Unemployed	337	0.1	0.3	0	1

Note: Respondents were allowed to indicate more than one employment status (e.g., part-time and student). Education was coded as a binary variable with 0 denoting that the participant did not attend university and 1 denoting that the participate obtained at least a university education.

2.2 Measures

2.2.1 Subjective Well-being

Life satisfaction was assessed using the 5-item Satisfaction with Life Scale (SWLS), an instrument developed by Diener et al (1985) to measure overall judgments of one's life. Respondents were asked to indicate their responses to each of the five questions on a 7-point scale ranging from (1) strongly disagree to (7) strongly agree. These scores were summed,

with a low score indicating a low level of life satisfaction and a high score indicating a high level of life satisfaction (range = 5-35, α = .93, see Table 2).

Eudaimonic well-being was assessed with a 21-item measure developed by Waterman and colleagues (2010). Respondents were asked to indicate their responses on a 5-point scale ranging from (0) strongly disagree to (4) strongly agree. These scores were summed, with a low score indicating a low level of eudaimonic well-being and a high score indicating a high level of eudaimonic well-being (range = 0-84, α = .89, see Table 2).

2.2.2 Facebook Use

Facebook use was measured with the Facebook Use Intensity Scale, an 8-item scale that was developed by Ellison, Steinfield and Lampe (2007). Respondents were asked to indicate how many friends they have on Facebook (8-point scale ranging from 0 friends to 400 friends or more), and approximately how many minutes per day they spend on the site (5-point scale ranging from less than 10 minutes a day to more than 3 hours per day), followed by six questions exploring how they feel about Facebook (5-point scale ranging from (1) strongly disagree to (5) strongly agree). These 8-items were averaged to produce a Facebook intensity score, with low scores representing less intense Facebook use and high scores representing more intense Facebook use (range = .85-5.4, α = .83, see Table 2).

2.2.3 Facebook Social Comparison

We used the 11-item Social Comparison Rating Scale to assess how respondents compare themselves to others on Facebook. The scale was originally developed by Allan and Gilbert (1995), but was recently adapted for use in Facebook research (Feinstein et al., 2013). The original scale began using the stem, "In relationship to others I generally feel…". Following the adaptation used by Feinstein et al, this study used the stem "When I compare

myself to others on Facebook, I feel…". Respondents then responded by selecting a number from 0 to 10 that best illustrated their perceived position between two poles. Some of the poles included items such as "When I compare myself to others on Facebook I feel: 0 = inferior to 10 = superior, 0 = different to 10 = same, and 0 = an outsider to 10 = an insider. Following Feinstein et al (2013) these scores were summed and then reversed, with a low score indicating positive self-perceptions compared to others and a high score indicating negative self-perceptions compared to others (range = 0-110, α = .92, see Table 2). It should be noted that the original Social Comparison Rating Scale is on a scale from 1-10. We adapted this scale to 0 to 10, so 5 would reflect the true half-way point of the scale and give respondents a neutral response option.

2.2.4 Personality Traits

We used the Corr-Cooper Reinforcement Sensitivity Personality Questionnaire (RST-PQ, Corr & Cooper, 2016) to measure personality traits. This 73-item instrument measures the behavioral inhibition system (BIS), the fight-flight-freeze system (FFFS) and the subscales of the behavioral approach system (Reward Interest, Reward Reactivity, Goal-Drive Persistence and Impulsivity). This instrument also has questions which measure Defensive Fight, which were included in the questionnaire, but not used in our analysis. Respondents were asked to evaluate to what extent each statement described them in general on a 4-point scale ranging from (1) not at all to (4) highly. Low scores indicate that the individual does not have many traits which match the traits measured by the subscale, while high scores indicate that the respondent has many traits which match the traits measured by the subscale.

Table 2
Descriptive statistics

Variable	N	Mean	St. Dev.	Min	Max	Reliability (α)
Life Satisfaction	337	21.2	8.0	5	35	.93
Eudaimonic Well-being	337	55.7	11.5	19	82	.89
Facebook Intensity	337	3.4	1.0	1.0	5.4	.83
Facebook Social Comparison	337	54.6	17.0	8	110	.92
Personality Traits						
Reward Interest	337	17.1	4.6	7	28	.83
Reward Reactivity	337	26.5	5.5	11	40	.82
Impulsivity	337	16.6	4.6	8	29	.76
Goal-Drive Persistence	337	20.2	4.7	9	28	.88
BIS	337	52.9	16.1	24	88	.95
FFFS	337	23.7	6.9	10	40	.85

Note: Reliability measured by Cronbach's alpha

2.2.5 Control Variables

Previous studies have established significant associations between subjective well-being and socio-demographic characteristics including education, gender and age (Deeming, 2013; Portela, Neira, & Salinas-Jiménez, 2013; Vera-Villarroel et al., 2012). We include a quadratic age term in our models in order to investigate if age has a curvilinear relationship with any of the dependent variables. Additionally, we control for student status, as previous research has established that student populations are more susceptible to social comparison and peer influence (Maxwell, 2002; Stipek & Tannatt, 1984). Descriptive statistics for these control variables can be found in Table 1.

2.3 Analytical Methods

We ran Pearson correlations and multiple ordinary least squares regressions (OLS) to test our hypotheses. As our study employs two measures of subjective well-being, we ran each regression model for each of the two outcome variables, namely life satisfaction and

eudaimonic well-being. The potential moderating effect of personality traits on the association between Facebook social comparison (FBSC) and subjective well-being was estimated by including interaction terms between the z-scores for FBSC and each personality trait.

3. Results

3.1 Facebook Intensity

The OLS regressions showed a significant positive association between life satisfaction and Facebook intensity (β = 1.37, $p < .01$; Table 3, column 1), as well as eudaimonic well-being and Facebook intensity (β = 2.34, $p < .001$; Table 4, column 1). H1 is therefore rejected, as Facebook intensity was positively associated with higher well-being contrary to our predictions that there would be a negative association between Facebook intensity and both measures of subjective well-being. The first regression model explained 6% of the variance in life satisfaction and 8% of the variance in eudaimonic well-being.

3.2 Facebook Social Comparison

We found significant negative associations between Facebook social comparison and both life satisfaction (β = -0.22, $p < .001$, Table 3, column 2) and eudaimonic well-being (β = -0.26, $p < .001$, Table 4, column 2), suggesting that respondents who compare themselves negatively to their friends on Facebook have lower subjective well-being thus confirming hypothesis H2. Adding Facebook social comparison to model 2 significantly improved the fit of the model to the data compared to Model 1 for both life satisfaction ($F(1, 329) = 97.35$, $p < .001$) and eudaimonic well-being ($F(1, 329)= 106.94$, $p < .001$), with the explained variance increasing to 25% of the variance in life satisfaction and 21% of the variance in eudaimonic well-being.

3.3 RST Personality

Adding personality traits in Model 3 significantly improved the fit of the model to the data compared to Model 2 for both life satisfaction ($F(6, 323) = 9.12$, $p < .001$) and eudaimonic well-being ($F(6, 323) = 51.50$, $p < .001$). However, adding the personality and FBSC interactions in Model 4 did not improve the fit of the model to the data compared to Models 3 for life satisfaction nor eudaimonic well-being. The final regression models explained 38% of the variance in life satisfaction and 61% of the variance in eudaimonic well-being. We discuss the results for each personality trait below.

3.3.1 Reward Interest

We found a significant positive correlation between Reward Interest and Facebook intensity ($r = 0.17$, $p < .01$, Table 5), suggesting that people high in Reward Interest are more likely to be intense Facebook users, thus supporting H3a.

We did not find an association between Reward Interest and life satisfaction, however, there was a positive significant association between Reward Interest and eudaimonic well-being ($\beta = 0.54$, $p < .001$, Table 4, column 3), thereby partially supporting H3b which predicted that Reward Interest would be positively associated with both measures of subjective well-being.

3.3.2 Reward Reactivity

We found a significant positive correlation between Reward Reactivity and Facebook intensity ($r = 0.36$, $p < .001$, Table 5), thereby supporting hypothesis H4a. Contrary to our hypothesis (H4b) Reward Reactivity was not significantly associated with life satisfaction.

However, Reward Reactivity was positively associated with eudaimonic well-being (β = 0.22, $p < .05$, Table 4, column 3), therefore partially supporting H4b.

3.3.3 Impulsivity

We found a significant positive correlation between Impulsivity and Facebook intensity ($r = 0.17$, $p < .01$, Table 5), thus supporting H5a. Our regression model did not find any evidence of a significant association between Impulsivity and life satisfaction; however, there was a significant negative relationship between Impulsivity and eudaimonic well-being (β = -0.35, $p < .01$, Table 4, column 3). Therefore, H5b is partially supported, as Impulsivity is associated with lower eudaimonic well-being, but shows no evidence of an association with life satisfaction.

3.3.4 Goal-Drive Persistence

We found a significant positive correlation between Goal-Drive Persistence and Facebook intensity ($r = 0.23$, $p < .001$, Table 5), thus supporting H6a. Goal-Drive Persistence further shows a positive association with both life satisfaction (β = 0.21, $p < .05$, Table 3, column 3) and eudaimonic well-being (β = 1.22, $p < .001$, Table 4, column 3). Therefore, H6b is fully supported.

In the eudaimonic well-being model, we found a significant interaction between Goal-Drive Persistence and Facebook social comparison (β =1.49, $p < .01$, Table 4, column 4), but the main effect of Facebook social comparison is no longer significant (β = -0.03, *ns*). The positive Goal-Drive Persistence-FBSC interaction coefficient therefore suggests that for people high in Goal-Drive Persistence negative social comparison on Facebook can have a positive association with eudaimonic well-being.

3.3.5 BIS

We found a significant positive correlation between BIS and Facebook social comparison ($r = 0.47$, $p < .001$, Table 5), thus confirming H7a which predicted that individuals who are high in BIS would be more likely to compare themselves negatively to their friends on Facebook.

The regressions revealed significant negative relationships between BIS and both life satisfaction ($\beta = -0.15$, $p < .001$, Table 3, column 3) and eudaimonic well-being ($\beta = -0.13$, $p < .001$, Table 4, column 3), thereby fully supporting H7b.

3.4 Summary of Results

In summary, we found that Facebook intensity was positively associated with both measures of subjective well-being, and Facebook social comparison was negatively associated with both measures of subjective well-being. Reward Interest and Reward Reactivity were positively associated with eudaimonic well-being, while Impulsivity was negatively associated with eudaimonic well-being. Goal-Drive Persistence was positively associated with both measures of subjective well-being and BIS was negatively associated with both measures of subjective well-being. We also found a significant positive interaction between Goal-Drive Persistence and Facebook social comparison in the final eudaimonic well-being regression model. We therefore conclude that some personality traits moderate the association between Facebook social comparison and subjective well-being.

Table 3
OLS regressions for Life Satisfaction

	Life Satisfaction			
	Facebook use	Social comparison	Personality	Personality interactions
	(1)	(2)	(3)	(4)
Male	2.60**	2.34**	1.94*	2.10**
	(0.89)	(0.79)	(0.76)	(0.77)
Age	-0.99	-2.02*	-2.34**	-2.19**
	(0.89)	(0.80)	(0.80)	(0.81)
Age squared	-0.40	-0.27	-0.45*	-0.48*
	(0.26)	(0.23)	(0.22)	(0.23)
University education or higher	0.005	0.003	0.004	0.005
	(0.003)	(0.003)	(0.003)	(0.003)
Student	-1.02	0.24	-0.06	-0.51
	(1.51)	(1.36)	(1.29)	(1.32)
Facebook intensity	1.37**	0.22	0.27	0.26
	(0.45)	(0.42)	(0.41)	(0.41)
Facebook social comparison		-0.22***	-0.10***	-0.10***
		(0.02)	(0.03)	(0.03)
Reward Interest			0.21	0.20
			(0.11)	(0.12)
Reward Reactivity			0.09	0.08
			(0.09)	(0.09)
Impulsivity			-0.07	-0.07
			(0.10)	(0.10)
Goal-Drive Persistence			0.21*	0.19
			(0.10)	(0.10)
BIS			-0.15***	-0.14***
			(0.03)	(0.03)
FFFS			-0.02	-0.02
			(0.06)	(0.06)
Reward Interest x FBSC				-0.28
				(0.50)
Reward Reactivity x FBSC				-0.04
				(0.53)
Impulsivity x FBSC				-0.10
				(0.51)
Goal-Drive Persistence x FBSC				0.79
				(0.50)
BIS x FBSC				-0.40
				(0.44)

FFFS x FBSC				-0.13
				(0.38)
Constant	23.26***	37.52***	35.26***	36.23***
	(5.34)	(5.01)	(5.76)	(5.79)
Observations	337	337	337	337
R^2	0.06	0.25	0.36	0.38
F Statistic	3.74** (df = 6; 330)	16.08*** (df = 7; 329)	14.12*** (df = 13; 323)	10.11*** (df = 19; 317)

*Note: *p < .05, **p < 0.01, ***p < 0.001*
To compute interactions, z-scores were calculated for each personality trait and Facebook social comparison. These z-scores were then interacted and entered into the regression model.

Table 4
OLS regressions for Eudaimonic Well-being

	Eudaimonic Well-being			
	Facebook use	Social comparison	Personality	Personality interactions
	(1)	(2)	(3)	(4)
Male	0.74	0.43	-1.09	-0.82
	(1.26)	(1.17)	(0.86)	(0.87)
Age	-1.23	-2.45*	-1.03	-1.09
	(1.26)	(1.18)	(0.92)	(0.93)
Age squared	0.11	0.27	0.01	0.01
	(0.37)	(0.34)	(0.26)	(0.26)
University education or higher	0.001	-0.001	0.001	0.001
	(0.004)	(0.004)	(0.003)	(0.003)
Student	0.70	2.20	-0.82	-0.71
	(2.14)	(2.00)	(1.47)	(1.50)
Facebook intensity	2.34***	0.96	0.18	0.09
	(0.63)	(0.61)	(0.47)	(0.47)
Facebook social comparison		-0.26***	-0.02	-0.03
		(0.04)	(0.03)	(0.03)
Reward Interest			0.54***	0.55***
			(0.13)	(0.13)
Reward Reactivity			0.22*	0.20
			(0.11)	(0.11)
Impulsivity			-0.35**	-0.29
			(0.11)	(0.42)
Goal-Drive Persistence			1.22***	1.21***
			(0.12)	(0.12)
BIS			-0.13***	-0.13***
			(0.03)	(0.04)

FFFS			0.10	0.10
			(0.07)	(0.07)
Reward Interest x FBSC				-0.74
				(0.56)
Reward Reactivity x FBSC				-0.39
				(0.61)
Impulsivity x FBSC				-0.003
				(0.03)
Goal-Drive Persistence x FBSC				1.49**
				(0.57)
BIS x FBSC				0.48
				(0.50)
FFFS x FBSC				-0.02
				(0.43)
Constant	42.34***	59.32***	25.84***	25.97**
	(7.57)	(7.37)	(6.56)	(9.11)
Observations	337	337	337	337
R^2	0.08	0.21	0.60	0.61
F Statistic	4.87*** (df = 6; 330)	12.78*** (df = 7; 329)	36.69*** (df = 13; 323)	25.84*** (df = 19; 317)

*Note: *p < .05, **p < 0.01, ***p < 0.001*
To compute interactions, z-scores were calculated for each personality trait and Facebook social comparison. These z-scores were then interacted and entered into the regression model.

Table 5
Correlations between Facebook intensity, Facebook social comparison and personality traits

	1	2	3	4	5	6	7
1. Facebook intensity							
2. Facebook social comparison	-0.28***						
3. Reward Interest	0.17**	-0.42***					
4. Reward Reactivity	0.36***	-0.30***	0.50***				
5. Impulsivity	0.17**	-0.16**	0.45***	0.46***			
6. Goal-Drive Persistence	0.23***	-0.40***	0.51***	0.44***	0.04		
7. BIS	0.00	0.47***	-0.24***	0.15**	0.15**	-0.19***	
8. FFFS	0.10	0.21***	-0.10	0.19***	0.05	0.01	0.38***

4. Discussion

The aim of the current study was to examine how Facebook use, social comparison on Facebook, and users' personality traits affect life satisfaction and eudaimonic well-being. We further investigated whether the association between Facebook social comparison and

subjective well-being is moderated by users' personality traits, an analysis which, to the best of our knowledge, has not been previously conducted. We used the RST of personality because it focuses on the biological explanation behind the emotional and motivational processes which drive behavior, instead of simply describing the characteristics of each personality trait (Corr et al., 2013; Corr, 2008).

Our results revealed that Goal-Drive Persistence moderates the relationship between Facebook social comparison and eudaimonic well-being, suggesting that people who have high Goal-Drive Persistence and who compare themselves negatively on Facebook have higher eudaimonic well-being. While this may sound counter-intuitive, research has demonstrated a link between social comparison and motivation for self-improvement (Mumm & Mutlu, 2011; Taylor & Lobel, 1989). As such, it is possible that for people high in Goal-Drive Persistence, negative social comparison on Facebook acts as a source of motivation for improvement.

We found that high Facebook intensity was associated with higher life satisfaction and eudaimonic well-being, which while contrary to our predictions, confirms previous findings for life satisfaction (Ellison et al., 2007; Grieve et al., 2013; Oh et al., 2014; Valenzuela et al., 2009). To our knowledge, our study is the first study to investigate Facebook use and eudaimonic well-being directly in a non-student population, as the few previous studies which have investigated Facebook use and eudaimonic well-being have investigated eudaimonic well-being through social support (Liu & Yu, 2013) or in relation to problematic Facebook use (Satici & Uysal, 2015). We also found a significant negative association between Facebook social comparison and both measures of subjective well-being, which was significant in two out of the three models in which Facebook social comparison was included for life satisfaction but only in the first model for eudaimonic well-being. Although this was contrary to our prediction, it is not surprising that social comparison

showed little impact on eudaimonic well-being, as life satisfaction is more influenced by affect, while eudaimonic well-being tends to be more stable (Huta & Ryan, 2010), and thus may be more resilient against social comparison behavior.

The positive correlations we found between Facebook intensity, Reward Interest, Reward Reactivity and Impulsivity were in line with our hypotheses and concur with findings from previous research on the FFM personality traits and frequency of Facebook use for individuals high in Openness to Experience, Extraversion, and low in Conscientiousness (Andreassen, Torsheim, Brunborg, & Pallesen, 2012; Caci et al., 2014; Correa et al., 2010; Ryan & Xenos, 2011). Research has found that people on both sides of the Extraversion scale demonstrate elevated SNS use; as those high in Extraversion use SNS for social enhancement, while those low in Extraversion use SNS for social compensation (Kuss & Griffiths, 2011). A previous study established a link between people who score low on Conscientiousness and heightened SNS use, and suggested that people with low Conscientiousness spend time on SNS as a way of procrastinating (Wilson, Fornasier, & White, 2010). Our results also revealed a positive relationship between Goal-Drive Persistence and Facebook intensity. This finding is particularly interesting when considered in the context of the significant interaction effect for Goal-Drive Persistence and FBSC. Perhaps people high in Goal-Drive Persistence use Facebook more intensively because it allows them to share their own accomplishments, as well as compare their goals and successes to the goals and successes of others, which may inspire goal persistence and motivation. This result may also highlight the difference between the concepts of Goal-Drive Persistence and Conscientiousness. While both high Conscientiousness and Goal-Drive Persistence reflect a high level of organization and goal-planning, Goal-Drive Persistence also reflects a level of persistence in tasks which may not be present in the concept of

Conscientiousness. This task persistence may also explain why people with high Goal-Drive Persistence use Facebook more intensively.

4.1 Benefits and Drawbacks of Intensive Facebook Use

The present study found positive associations between several personality traits and and Facebook use (Facebook intensity: Reward Interest, Reward Reactivity, Impulsivity and Goal-Drive Persistence; Facebook social comparison: BIS). While under some circumstances Facebook use can increase subjective well-being, users should practice moderation when using Facebook, as Facebook overuse has been linked to lower subjective well-being (Kross et al., 2013; Satici & Uysal, 2015). Facebook users should also make an effort to use Facebook to engage in social activities rather than solitary activities or browsing the newsfeed, as previous studies have found positive associations between Facebook use and subjective well-being when it is used to build relationships (Ellison et al., 2007; Oh et al., 2014) and negative associations between Facebook use and subjective well-being when users consume content, but do not create it (Burke, Marlow, & Lento, 2010; Qiu, Lin, & Leung, 2010; Verduyn et al., 2015).

In regards to specific personality traits, individuals high in Reward Interest may spend more time on Facebook to seek out new friends and social groups. Individuals who are high in Reward Reactivity may use Facebook to seek rewarding feedback from their peers, and may be especially sensitive to "likes" and comments. In this case, using Facebook intensively may be rewarding for those who are high in Reward Interest and Reward Reactivity by helping these individuals to gain social capital (Steinfield, Ellison, & Lampe, 2008), social support (Nabi, Prestin, & So, 2013) and maintain friendships which would be otherwise geographically difficult (Burke & Kraut, 2014). Research which has found negative associations between intensive Facebook use and correlates of subjective well-being usually

focus on topics such as envy (Krasnova et al., 2013) and social comparison (Steers et al., 2014). Therefore, intensive Facebook use could contribute to the subjective well-being of individuals who are high in Reward Interest and/or Reward Reactivity as long as they do not frequently compare their lives to the lives of their friends in a negative way.

Individuals high in Impulsivity may use Facebook to alleviate boredom or as a form of procrastination. However, individuals high in Impulsivity should be cautious of the amount of time they spend using Facebook in this manner, as Facebook use as a method of procrastination has been linked to declines in academic success (Kirschner & Karpinski, 2010). This relationship may also be relevant to individuals who are not students, but have access to Facebook at work.

Individuals high in Goal-Drive Persistence may also benefit from social rewards by using Facebook intensively. Research on Goal-Drive Persistence has found that the trait is related to the motivation for social exchange (Krupić, Gračanin, & Corr, 2016). Facebook creates many opportunities to exchange social resources, which may be of a particular interest to those high in Goal-Drive Persistence. As highlighted by the results of this study, individuals who are high in Goal-Drive Persistence may also benefit in terms of subjective well-being by using Facebook social comparison as a source of motivation. However, such individuals should be cautious of how frequently they employ this method, as research has suggested that frequent social comparison negatively impacts subjective well-being by inducing negative emotions such as guilt, envy, defensiveness and regret (White et al., 2006).

This study found a significant association between BIS and negative social comparison on Facebook. As individuals who are high in BIS are prone to rumination (Corr, 2008), these individuals should try to be mindful of how frequently they compare themselves to others when using Facebook, as previous research has found that rumination moderates the relationship between social comparison on Facebook and depressive symptoms (Feinstein et

al., 2013). Individuals who are high in BIS should also keep in mind that people present an idealized version of themselves on the site, volunteering information which casts themselves in a socially desirable light (Chou & Edge, 2012). The posts of Facebook friends are not usually a good representation of their day-to-day life, and are often instead, a highlight reel of their celebrations and successes.

4.2 Validity, Limitations and Future Research

This research is cross-sectional and correlational in nature and as such, does not allow causal inferences. Experimental manipulation is needed to establish if the relationships between Facebook use, Facebook social comparison and subjective well-being found in this study are causal in nature. To account for construct validity, we used only well-known and established scales in our questionnaire, which should make our results easier to replicate. In regards to external validity, the sample was drawn from the general population, included a similar gender balance to the Facebook population, and comprised a variety of age groups. This makes our sample more representative of the population of Facebook users than studies which rely on student samples (Henrich, Heine, & Norenzayan, 2010). However, although our respondents were paid (either monetary or with personality results), they volunteered to take part in the study and therefore, the sample may therefore suffer from self-selection bias. Also, the respondents for this study were all drawn from a western sample (USA and UK), and results therefore may not generalize to other cultures. Future research could include a more cross-cultural sample to verify whether these results are specific to individualistic-analytic cultures or whether they also apply to collectivistic-holistic cultures.

Finally, due to the absence of literature on Facebook use and RST of personality, this study compared FFM personality traits to RST personality traits to create theory driven hypotheses. Some of these hypotheses were rejected, demonstrating the potential differences

between the two personality models. Future studies on Facebook use and personality could investigate the RST of personality in greater detail.

5. Conclusions

With more of our social lives taking place online than ever before, it is important to understand the impact the use of SNS has on subjective well-being. While SNS can be an excellent tool to create and maintain social networks, they also allow unprecedented access to the lives and achievements of others, creating the perfect breeding ground for social comparison. The results of this study highlight how individual differences in personality may impact how social comparison on Facebook affects individuals' subjective well-being. Our results can therefore be used to inform Facebook users how to best manage their time on Facebook in order to reap the benefits of social networking instead of engaging in usage which may be a detriment to their subjective well-being.

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