Facebook use and depressive symptomatology: Investigating the role of neuroticism and extraversion in youth ☆

Teague E. Simoncic, Kate R. Kuhlman, Ivan Vargas, Sean Houchins, Nestor L. Lopez-Duran *

Department of Psychology, University of Michigan, Ann Arbor, MI, USA

ARTICLE INFO

ABSTRACT

The popularity of social networking sites, such as Facebook, has increased rapidly over the past decade, especially among youth. Consequently, the impact of Facebook use on mental health problems (e.g., depressive symptomatology) has become a recent area of concern. Yet, evidence for such a link has been mixed and factors that contribute to heterogeneity of findings have not been identified. In this study, we examined whether the association between Facebook use and depressive symptoms is moderated by individual factors (i.e., personality and sex). To this end, we measured Facebook use, depressive symptoms, and personality domains (i.e., extroversion and neuroticism) among 237 young adults. No direct association was found between Facebook use and depressive symptoms. However, for females with high neuroticism, more frequent Facebook use was associated with lower depressive symptoms. Our findings suggest a complex relationship between Facebook use and depressive symptomatology that appears to vary by sex and personality. Facebook use may be protective against depressive symptoms for female users with high levels of neuroticism, while Facebook use may be unrelated to depressive symptoms among males.

© 2014 Elsevier Ltd. All rights reserved.

1. Introduction

The use of social networking sites has grown exponentially during the last decade. For example, Facebook, the largest social networking site, increased its membership from 1 million in 2004 to 1 billion in 2012 (Smith, Segall, & Cowley, 2012), with over forty percent of its users under the age of twenty-five (Smith, 2010). The popularity of these sites has raised concerns about their potential role in mental health (O'Keeffe & Clarke-Pearson, 2011), given that risk for mental health problems during this developmental phase is high (¾ of all lifetime psychiatric illnesses begin before age 24; Kessler et al., 2005). However, evidence linking Facebook and mental health disorders, such as depression is sparse and mixed (Datu, Valdez, & Datu, 2012; Jelenchick, Eickhoff, & Moreno, 2013; Kross et al., 2013; Rosen, Whaling, Rab, Carrier, & Cheever, 2013). In addition, there is growing evidence suggesting the association between Facebook use and depressive symptomatology may vary as a function of other factors, such as, personality

(Ryan & Xenos, 2011) and type of use (Rosen et al., 2013). Yet, it is unclear if these factors explain prior inconsistencies in previous examinations of the Facebook-depression link. Therefore, we aim to clarify previous inconsistencies by examining whether the association between Facebook use and depressive symptoms in youth is moderated by personality factors and sex.

In 2011 the American Academy of Pediatrics (AAP) popularized the term "Facebook depression" to describe the potential phenomenon in which teens spend a significant amount of time on social networking sites and could subsequently exhibit symptoms of depression (O'Keeffe & Clarke-Pearson, 2011). The AAP was concerned that excessive exposure to negative peer interactions (e.g., online bullying, premature sexual experimentation) combined with youth's limited regulatory skills, would place youth at higher risk for mental health problems (O'Keeffe & Clarke-Pearson, 2011). Although at the time there was no empirical evidence of this effect, the studies that followed suggest a much more complex relationship. For example, while Facebook use has been linked with lower subjective well-being and life satisfaction among young adults (Kross et al., 2013), only a sub-category of Facebook behaviors, Facebook impression management, has been positively associated with greater depressive symptoms (Rosen et al., 2013). In contrast, other studies have failed to link Facebook use and depression in both older adolescents and young adults (Datu et al., 2012; Jelenchick et al., 2013; Kross et al., 2013). In fact, having more

---

Facebook friends has been linked to lower symptoms of dysthymia (Rosen et al., 2013). It is possible however, that Facebook has a putative effect on depression only among vulnerable individuals, which could explain previously conflicting findings. Among factors associated with increased risk for depression we focused on personality and sex given that both are associated with social networking site usage (Kiser, 2011; Lynn & Martin, 1997) and risk for mental health problems (Goodwin & Gotlib, 2004; Hankin & Abramson, 1999).

Extraversion, characterized by positive emotionality, sociability, and energetic behavior (McCrae & John, 1992), is often associated with increased feelings of happiness and fewer depressive symptoms (Cheng & Furnham, 2003). Specifically, high extraversion may be protective against the development of depression (Farmer et al., 2002), as it may promote the use of social support (Pai & Carr, 2010). Extraversion also predicts greater *direct* social engagement compared to non-direct (e.g., online) social engagement (Muscanell & Guadagno, 2012). For example, when given the choice between Internet interaction and traditional (i.e., face-to-face) social interaction, highly extraverted people prefer traditional interaction (Amichai-Hamburger, Wainapel, & Fox, 2002). Therefore, it is possible that extraversion serves as a protective factor to the potential negative impact of excessive Facebook use by facilitating potentially less harmful use patterns.

In contrast, neuroticism, a personality construct characterized by emotional reactivity, anxiety, and negative emotionality (Lahey, 2009), has been extensively linked to higher risk for depression (Jylhä, Melartin, Rytsälä, & Isometsä, 2009; Klein, Kotov, & Bufferd, 2011), especially among adolescents (Kercher, Rapee, & Schniering, 2009), and young adults (Cheng & Furnham, 2003). Individuals high in neuroticism are more likely to engage in social media (Correa, Hinsley, & De Zuniga, 2010; Guadagno, Okdie, & Eno, 2008), and prefer online interactions to face-to-face interactions (Amichai-Hamburger et al., 2002) than their low neuroticism peers. This is a significant concern given that neuroticism is linked to poor use of traditional social support systems when distressed (Wang & Gan, 2011), which may further increase risk for developing depressive symptoms if individuals high in neuroticism forgo face-to-face interactions for online exchanges. For example, greater online social networking use by women high in neuroticism has been associated with greater loneliness, a common correlate of depression (Amichai-Hamburger & Ben-Artzi, 2003).

In addition, there are robust sex differences in social networking behavior, personality profiles, and prevalence of depression. Traditionally, females have higher rates and more chronic cases of depression (Essau, Lewinsohn, Seeley, & Sasagawa, 2010). Females also compose around 60% of all Facebook users (Kiser, 2011), and are more likely than their male counterparts to update their Facebook profiles, post pictures, and comment on material shared by others ("College Students' Social Networking", 2008). Furthermore, females typically report higher neuroticism than males (Lynn & Martin, 1997). Sex differences in neuroticism may play a role in the type of social support females and males receive (i.e., online vs. traditional social interactions), and thus differentially contribute to risk for depression.

Therefore, the objective of this study was to examine whether the association between Facebook use and depressive symptoms was moderated by personality traits and sex. We hypothesized that Facebook use was associated with higher reported depressive symptoms but only among participants low in extraversion or high in neuroticism. Finally, given previous evidence that males and females differ in their Internet behavior (Muscanell & Guadagno, 2012), and depressive symptoms (Essau et al., 2010), we examined whether these associations were stronger among, or even unique to, females. If these hypotheses are confirmed, these findings would contribute to our understanding of how dimensions of personality influence social behavior in a highly influential, novel, and growing social environment while potentially conferring mental health risk.

2. Methods

2.1. Participants

Participants included 237 young adults (112 females) ages 18–23 (M_{age} = 18.81 years; SD_{age} = 0.98). Participants were students at a large research university in the United States and were recruited from a research participant pool. Ethnic distribution of our sample was consistent with that of the larger undergraduate population at the university, and included: African American (5%), Asian American (11%), Caucasian (77%), and Other (7%).

2.2. Procedure

All questionnaires were administered online using web-based Qualtrics software. Participants were able to complete the survey on any computer with Internet access, 24 h per day, during the fall 2011 and winter 2012 terms. Before beginning the survey, participants read and indicated their consent to participate. The survey took an average of 29 min to complete and participants did not have the option of returning to the survey once finished. This study was approved by the University's Institutional Review Board and was conducted in concordance with the guidelines for ethical research with human subjects.

2.3. Measures

2.3.1. Depressive symptoms

Depressive symptoms were assessed via the Center for Epidemiologic Studies Depression Scale (CES-D; Radloff, 1977). The CES-D is a 20-question, self-report instrument with excellent reliability and validity (Radloff, 1977). This measure also demonstrated good internal consistency in the current sample (α = .87).

2.3.2. Personality

Ninety-six items of the Revised NEO Personality Inventory (NEO PI-R; Costa & McCrae, 2008) that measure extraversion and neuroticism were used in this study. Raw totals for both Extraversion and Neuroticism were converted to *t*-scores before being centered for regression analyses. The NEO PI-R is a commonly used measure for assessing personality factors in the general population. The measure has been shown to have high reliability and validity (Young & Schinka, 2001). In our sample, this measure demonstrated good reliability for both extraversion (α = .88) and neuroticism (α = .91).

2.3.3. Facebook use

The Facebook Questionnaire (Ross et al., 2009) is a 35-item self-report questionnaire that was used to assess Facebook activity and daily Facebook use. Facebook activity consisted of the average score on 6-items that assessed how frequently (e.g., "more than once daily", "once weekly", "twice monthly") users commented on photos, posted on Walls, checked their own Wall, sent messages, "poked" others, and changed their status. Facebook activity is a measure of active behaviors, as compared with scrolling through pages passively. In our sample, the Facebook activity sub-scale demonstrated good reliability, α = .83. We focused on the association between Facebook activity, or *active* Facebook use, and depressive symptoms as this construct has not been previously tested independently. Previous research has typically