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Narcissism and Social Media Use: A Meta-Analytic Review

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The relationship between narcissism and social media use has been a topic of study since the advent of the first social media websites. In the present manuscript, the authors review the literature published to date on the topic and outline 2 potential models to explain the pattern of findings. Data from 62 samples of published and unpublished research (N = 13,430) are meta-analyzed with respect to the relationships between grandiose and vulnerable narcissism and (a) time spent on social media, (b) frequency of status updates/tweets on social media, (c) number of friends/followers on social media, and (d) frequency of posting pictures of self or selfies on social media. Findings suggest that grandiose narcissism is positively related to all 4 indices (rs = .11–.20), although culture and social media platform significantly moderated the results. Vulnerable narcissism was not significantly related to social media use (rs = .05–.42), although smaller samples make these effects less certain. Limitations of the current literature and recommendations for future research are discussed.

Keywords: narcissism, social media, meta-analysis, selfies, Facebook

Does narcissism relate to social media use? Or is the power to selectively present oneself to an online audience appealing to everyone, regardless of their level of narcissism? Social media websites such as Facebook, Twitter, or Instagram can sound like a narcissistic dream. In seconds, one can share self-enhancing content—flattering pictures, boastful statuses—with a potential audience of millions and receive immediate feedback in the form of "likes" and comments from followers. One can share as little or as much as one wants to present exactly the self-image one desires. To date, >60 studies have endeavored to answer this question, but with mixed results. In this meta-analytic review, we try to more precisely quantify and characterize how narcissistic individuals interact with social media.

We focus on answering the following questions: (a) Do those high in grandiose (a more callous, extraverted form of narcissism; Miller et al., 2011) and vulnerable (a more neurotic, introverted form) narcissism spend more time on social media than those low in narcissism? (b) Do those high in grandiose and vulnerable narcissism use the features of social media (i.e., adding friends, status updates, and posting pictures of oneself) differently from those low in narcissism? And (c) Do those high in vulnerable narcissism use the features of social media differently from those high in grandiose narcissism? To better answer these questions, we describe major theoretical models of the relationship between narcissism and social media behavior.

Review of Narcissism and Social Media

Defining Narcissism

We define narcissism as a dimensional personality trait that consists of a grandiose self-concept as well as behaviors intended to maintain this self-concept in the face of reality (Emmons, 1984; Morf & Rhodewalt, 2001). Separate from narcissistic personality disorder (American Psychiatric Association, 2013), trait narcissism exists across the normal (nonpathological) population and is associated with both positive (e.g., leadership, Rosenthal & Pittinsky, 2006; and subjective well-being, Sedikides, Rudich, Gregg, Kumashiro, & Rusbult, 2004) and negative (e.g., aggression,

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Bushman & Baumeister, 1998; and low commitment in relationships, Campbell & Foster, 2002) outcomes. Narcissists—a term we use as a shorthand for those as scoring higher on inventories of narcissistic personality—are known to seek out attention and praise, and because their larger-than-life self-views are often in conflict with reality, narcissists employ interpersonal strategies such as bragging (Buss & Chiodo, 1991), affiliating with high-status others (Campbell, 1999; Horton & Sedikides, 2009), and other self-promotional behaviors as well as intrapersonal strategies such as downward social comparison (Campbell, Reeder, Sedikides, & Elliot, 2000) and self-serving attributions (Rhodewalt & Morf, 1998) to maintain high self-esteem. The origins of narcissism are unknown, but some theorists suggest it may be an outgrowth of personal trauma (Pinsky & Young, 2009; Young & Pinsky, 2006).

Narcissism has two forms that have been studied in the literature, grandiose and vulnerable (Cain, Pincus, & Ansell, 2008). *Grandiose narcissism* is the extraverted, grandiose and callous form of narcissism. It also is the form that has garnered the most research attention. *Vulnerable narcissism* is the more introverted, neurotic form that is less well studied (Miller et al., 2011). This distinction in the literature between grandiose and vulnerable narcissism shares some parallels with Freud's (1914/1957) distinction between primary and secondary narcissism. In Freud's model, primary narcissism was the basic self-love experienced by the typical child. With development, much of this primary narcissism was then projected onto the representation of another person ("an object"), an image of the self, or it withdrawn back into the self, such as in the case of delusions of grandeur coupled with psychological withdrawal. Each of these are "secondary" narcissism because they follow from the primary narcissism. Given this, grandiose narcissism conceptually suggests some residual primary narcissism but also can reflect some secondary narcissism as psychic energy is attached or "cathected" to the self-image. Vulnerable narcissism, however, conceptually linked to secondary narcissism, as it is also characterized by low self-esteem and withdrawal in the form of social introversion (Hendin & Cheek, 1997). Although this link between grandiose and vulnerable narcissism and primary and secondary narcissism has not been tested directly in the literature (there are no existing measures of primary and secondary narcissism), there are measures of primary and secondary psychopathy and these do correlate more with grandiose and vulnerable narcissism, respectively (Miller et al., 2010). In the present meta-analysis, we differentiate between grandiose and vulnerable narcissism, rather than primary and secondary narcissism, as is done in the literature.

Narcissism is increasingly considered a feature of modern society (Twenge & Campbell, 2009) and of recent generations (Twenge, 2007). Narcissism scores have been shown to be increasing over time (Twenge, Campbell, & Gentile, 2012; Twenge, Konrath, Foster, Campbell, & Bushman, 2008; cf. Grijalva et al., 2015), and popular media often credits this trend for the popularity of social media websites such as Facebook, Twitter, and Instagram (Diller, 2015; NPR Staff, 2015), although there is not solid empirical evidence for the latter. These media platforms allow individuals to broadcast information about themselves to a wide audience at any given time—ostensibly appealing to people's growing desire for attention and praise—but they also can provide opportunities for other needs such as belongingness, which is believed to be a universal need (Baumeister & Leary, 1995) and to be increasingly lacking in our modern society (Putnam, 2001). Narcissism can operate at a cultural as well as individual level, resulting not only in the increase in individual traits such as narcissism and contingent self-worth but also in the social acceptability of related behaviors (e.g., contingent self-esteem leading to posting more pictures on social media; Stefanone, Lackaff, & Rosen, 2011). However, the data in this review do not speak to narcissism as a cultural variable, and thus our focus will be on the relationship between individual narcissism and social media use.

Theoretical Models Relating Elevated Social Media Use Among Those High in Narcissism

There are three general classes of theoretical models that predict elevated social media use on the part of narcissistic individuals. We refer to these as: s*elf-enhancement*, *fit*, and *trait* models. According to the *self-enhancement model* (Buffardi, 2011; Campbell, 1999; Morf & Rhodewalt, 2001), social media can be a useful platform for promoting and enhancing the self (Buffardi & Campbell, 2008), so narcissistic individuals will be drawn to social media to

fulfill self-enhancement needs. For example, the dynamic self-regulatory processing model of narcissism (Morf & Rhodewalt, 2001) conceptualizes narcissism as having a goal of self-esteem regulation or self-enhancement. In order to maintain an unrealistically grandiose sense of self, narcissists must engage in interpersonal strategies to obtain self-affirming feedback from their environment. Similarly, the agency model of narcissism (Campbell, Brunell, & Finkel, 2006; Campbell & Foster, 2007) describes narcissism as a system of mutually reinforcing traits, skills, and behaviors that is self-sustaining but has no overarching goal. This conceptualization suggests that the narcissistic patterns of behavior seen on social media come about because of favorable conditions that trigger and are conducive to narcissism. Social media will be "sticky" for narcissistic individuals because once involved the narcissistic individual will find a reasonably favorable environment for gaining admiration and esteem and generally reinforcing the narcissistic self.

A second model is a *fit model*. Essentially, social media encourages wide but shallow social networks that are a good fit for narcissistic skills and abilities. For example, individuals high in grandiose narcissism are known to prefer emotionally shallow social relationships and like to publicly associate themselves with high status others (Campbell, 1999). They make good first impressions (Back, Schmukle, & Egloff, 2010; Paulhus, 1998) and are often seen as more attractive (Holtzman & Strube, 2010; Vazire, Naumann, Rentfrow, & Gosling, 2008). Likewise, because narcissists enjoy having social influence, they tend to occupy more central positions in their social networks (Clifton, Turkheimer, & Oltmanns, 2009). Given this along with the finding that having more attractive friends on your Facebook page gives observers a positive impression (Tong, Van Der Heide, Langwell, & Walther, 2008), it is reasonable that grandiose narcissism is consistently associated with having more friends on social media sites (Davenport, Bergman, Bergman, & Fearrington, 2014; Garcia & Sikström, 2014).

Finally, the basic personality traits associated with narcissism suggest a *trait model* of narcissism. In Big Five terms, grandiose narcissism is composed of high extraversion and openness and low agreeableness (Miller et al., 2011), and extraverts have been shown to have larger social networks in general (Pollet, Roberts, & Dunbar, 2011; Roberts, Wilson, Fedurek, & Dunbar, 2008) and spend more time and generate more content on social media sites (Gosling, Augustine, Vazire, Holtzman, & Gaddis, 2011). Thus, narcissists' tendency to have more friends and generate more content on social media may, in part, be linked their extraversion. In contrast, vulnerable narcissism is associated with low agreeableness and neuroticism, which suggests more anxiety or discomfort associated with social media use. In basic motivational terms, we see a similar pattern. For example, the Unmitigated Approach Model (Campbell et al., 2006; Foster & Trimm, 2008) describes grandiose narcissists as much more sensitive to and motivated by potential reward than by potential punishment. This creates a tendency toward approach-oriented social behavior (Foster, Misra, & Reidy, 2009), which may explain why those high in grandiose narcissism generate more content (Buffardi & Campbell, 2008; Mehdizadeh, 2010; Poon & Leung, 2011)—especially self-promoting content (Buffardi & Campbell, 2008; Mehdizadeh, 2010)—with relatively little concern for privacy (Smith, Mendez, & White, 2014; Utz & Kramer, 2009) on social media sites. In contrast, vulnerable narcissists, who are high in both approach and avoidance motivation (Foster & Trimm, 2008), are more cautious about obtaining praise, showing more concern for privacy (Ahn, Kwolek, & Bowman, 2015) and putting more effort into impression management (i.e., taking multiple selfies before picking one and cropping and editing pictures) than grandiose narcissists (McCain et al., 2016). This suggests that traits associated with grandiose narcissism are perhaps a better fit for social media than those associated with vulnerable narcissism.

Findings and Potential Moderators

Does narcissism truly lead to more social media use, and do those high in narcissism use social media differently than those low in narcissism? Despite the theoretical reasons to expect such differences, findings have been mixed with regards to whether narcissists do (Fox & Rooney, 2015; Vieth & Kommers, 2014) or do not (Bergman, Fearrington, Davenport, & Bergman, 2011; Buffardi & Campbell, 2008) spend

significantly more time on social media websites than nonnarcissists. This variability suggests that the effect size is small, or that there are moderators of the effects that have not been uncovered. Thus, our review looks at several potential theoretical moderators: birth cohort (i.e., the generation a participant belongs to, which presumably shares a particular set of sociocultural experiences; see Caspi, 1987), culture, and platform. These are discussed below. We also examined other potential moderators such as age and gender composition of the sample.

Birth cohort. Age differences in the relationship between narcissism and social media use could reflect either generational or developmental effects (we do not have sufficient cross-lagged data to tease these two apart). In terms of generations, the research on narcissism and social media in the United States focuses primarily on two different generations. Gen Xers, who would correspond to the MTurk samples in this review, are primarily in their 30s and 40s. In Gen Xers narcissism has been shown to be associated with Facebook use (Davenport et al., 2014), particularly the superiority (Panek, Nardis, & Konrath, 2013), vanity, exhibitionism, and exploitativeness (Leung, 2013) facets of narcissism. Millennials, or Generation Y, are primarily in their 20s and have lived an Internet-saturated existence for most of their lives (Tapscott, 1998; Twenge, 2007). Studies often find no relationship between narcissism and social media use in this generation (Bergman et al., 2011; Davenport et al., 2014; Leung, 2013), although Panek et al. (2013) found a relationship between the superiority facet of narcissism and Twitter use as well as between the exhibitionism facet and Facebook use in college students. These differences, however, could also be the result of development. It is plausible that self-enhancing type behaviors on social media (e.g., selfies) are more a product of social norms in younger samples but become more strongly associated with personality in older individuals.

Culture. Narcissism's inconsistent relationship to social media usage may also be due to cultural differences. First, there is ample evidence that narcissism differs in both prevalence and presentation across cultures. Cultures that are high in individualism (Hofstede, 1980), such as the United States, value individual autonomy more highly than cultures high in collectivism, such as cultures in Asia (see Oyserman, Coon, & Kemmelmeier, 2002 for a review of individualism/collectivism across countries). Individualistic countries show higher levels of narcissism than collectivistic countries (Foster, Keith Campbell, & Twenge, 2003), with China as a possible exception (Miller et al., 2015), and narcissistic behaviors such as self-enhancement manifest differently in collectivistic cultures than in individualistic ones (i.e., individuals in collectivistic cultures self-enhance on communal rather than agentic traits; Sedikides, Gaertner, & Toguchi, 2003). Some researchers even suggest that narcissism itself may manifest in a communal rather than agentic form in collectivistic countries (Gebauer, Sedikides, Verplanken, & Maio, 2012). Second, social media usage has been shown to differ between collectivistic and individualistic cultures. For example, United States samples have been found to differ from Asian samples (e.g., Korean, Taiwanese, and Chinese) on the number of friends listed (Alhabash, Park, Kononova, Chiang, & Wise, 2012), topics discussed (Fong & Burton, 2008), and motivations reported (Kim, Sohn, & Choi, 2011) for using social media. In addition, Long and Zhang (2014) found independent self-construal (which is prevalent in individualistic cultures; Markus & Kitayama, 1991) to relate to differences between British (individualistic) and Japanese samples in motivations for social media use. Third, structural and political differences across countries such as technological advancement, access to the Internet, wealth, and censorship and/or control of Internet content can also produce differences in media usage across countries (see Bolton et al., 2013 for a review).

Platform. Although many studies focus on social media use as a whole, meaningful differences have been found between platforms. The vast majority of studies in this review used Facebook for data collection. However, Facebook may differ from other sites in important ways. For example, Facebook is considered a nonymous (as opposed to anonymous) site because users are required to use their real names and subscribe to networks which are regionally or institutionally bound (Zhao, Grasmuck, & Martin, 2008), and Facebook censors content that is potentially offensive. Twitter provides slightly more anonymity, allowing users to post under a pseudonym or handle, while forums

such as 4chan and Reddit make anonymity and freedom of content posting a priority. These differences may translate to differing relationships between narcissism and social media usage. For example, Facebook and Twitter have been found to differ in the facets of narcissism that drive use (Davenport et al., 2014; Panek et al., 2013). More specifically, college students high in the superiority facet preferred Twitter, whereas those high in exhibitionism preferred Facebook. However, adults (or Gen Xer's) high in superiority preferred Facebook.

The Present Research

Our goal in the present research is to estimate the association between narcissism (both grandiose and vulnerable) and social media use. We looked at four key markers of social media use, including *time spent on social media*, *frequency of status updates*, *number of friends*, and *number of pictures of self and/or selfies uploaded*.

The outcome variables used in the present research, including network size, communication (e.g., photo sharing, status updates), and time spent online, were examined for both practical and theoretical reasons. From a practical perspective, this work was a meta-analysis, so we were limited to outcome variables which were in the published literature and in sufficient numbers. The variables we studied were thus the ones that were available.

From a more theoretical perspective of social network sites activity, these variables also tap into important constructs in the literature. Research on social networks can come from two primary directions. In more formal/mathematical network analysis, variables like size, centrality, edges, structure, clustering, and so forth are key to understanding the network (Eubank, Kumar, Marathe, Srinivasan, & Wang, 2004; Handcock, Raftery, & Tantrum, 2007; Kumar, Novak, & Tomkins, 2010). In specific terms of social relationships in social networks, these can be divided into "similarities" (e.g., gender, group membership), "social relations" (e.g., friendships, likes), "interactions" (e.g., helping, harming), and "flows" (e.g., information; Borgatti, Mehra, Brass, & Labianca, 2009).

The work on social networks sites examined in the present research is more limited because it does not include statistical social network analysis of the social networks involved. Instead, it relies on individual level-data, typically individuals reporting their own experiences in social networks. Thus, the literature has developed to capture items important to network behaviors from an individual rather than network perspective. Along these lines, network size is crucial to how broad a network an individual has which is linked to social capital (Ellison, Steinfield, & Lampe, 2007). Communication such as sharing selfies and status updates is an important marker of information flow on networks. Time spent of the network is one measure of engagement. Of course, there are other measures that could be used in research on social media. In our meta-analytic review, we were limited to items that were used multiple times in the literature.

A second theoretical point is worth making. In the case of research examining narcissism, there is interest in variables that are theoretically linked to self-enhancement. On social network sites, these include breadth of network (breadth = a larger audience for self-promotion), image and photo sharing (again, in the interest of self-promotion), and time on the network (more time = more opportunity to self-promote; Buffardi & Campbell, 2008; McCain et al., 2016). In sum, the variables chosen involve a practical consideration of what is in the literature, a theoretical consideration of what social network properties and activities are important, and an additional theoretical consideration of what social network properties and activities are plausible linked to narcissism.

In addition to the above indicators, we also looked at theoretically relevant moderators when possible, such as age, world region, and social media platform. We also test standard moderators such as gender, nature of the data (self-report vs. objective), type of sample (i.e., student, Mturk, or Internet), and type of narcissism measure used. Given the evidence for potential moderators reviewed above, we predict that a random effects model will best represent the data—that is, that the effect sizes are not sampled from a uniform distribution of effects. Our basic prediction is that grandiose narcissism will be positively associated with the spectrum of social media use with small to moderate effect sizes. We do not expect a similar effect for vulnerable narcissism although the literature is scarce, so our prediction is not well justified.

We do not have specific predictions for the various moderators.

Method

In order to quantify and test the link between narcissism and social media, we meta-analytically combined effect sizes from 62 samples from 29 papers ($N = 13{,}430$) for which effect size information for select indices was available. These studies are indicated in the reference section with an asterisk (*) and include 23 published works, four dissertations, one conference paper, and one set of unpublished data. Articles were searched on both the Google Scholar and EBSCO PsycINFO databases using the search terms "narcissism," "social media," and "Facebook." Any articles published before or during 2015 with reported effect sizes for the relevant indices were retained. In addition, unpublished data were solicited via a post on the Society for Personality and Social Psychology forums. Unpublished data sets were obtained either through this posting or through word of mouth. The large majority of these studies focused exclusively on grandiose narcissism and Facebook. Thus, the present paper speaks most strongly toward the relationship between grandiose narcissism (as measured by the Narcissistic Personality Inventory [NPI]) and Facebook use.

The use of unpublished data is an important topic of debate. On one hand, peer review limits null findings, so using only peer reviewed data can artificially inflate findings (McAuley, Pham, Tugwell, & Moher, 2000). On the other hand, including non-peer-reviewed findings can potentially reduce quality. In the medical literature (we are not aware of a similar survey in the social sciences), the majority of meta-analysts appear to recommend including unpublished data when possible (Cook et al., 1993). We chose to include unpublished work because obtaining accurate effect size estimates was of primary importance. The social sciences are riddled with inflated and even nonexistent effects and we wanted mitigate this risk as much as possible (Nosek, Spies, & Motyl, 2012).

We examined four outcome measures (i.e., time spent on social media, frequency of status updates, number of friends, number of pictures of self and/or selfies uploaded), each of which was measured by at least 10 studies. We also tested for moderation when possible. The majority of the samples measured grandiose narcissism using some version of the NPI, with 33% using the 40-item version (Raskin & Terry, 1988), 35% using the NPI-16 (Ames, Rose, & Anderson, 2006), and two studies using the NPI-13 (Gentile et al., 2013), and two using 15-item versions (i.e., Qiu, Lin, & Leung, 2010; Schütz, Marcus, & Sellin, 2004). Although three of these measures (excluding the NPI-15) have been shown to provide generally equivalent measurement of narcissism (Gentile et al., 2013), differences in the reliability of scores produced by these measures may add to the inconsistency of the relationship between narcissism and social media use. One study used the NARQ (Back et al., 2013) in lieu of the NPI to measure grandiose narcissism. In addition, two studies measured narcissism as part of the Dark Triad (i.e., the trio of "dark" personality traits identified by researchers: narcissism, psychopathy, and Machiavellianism; Paulhus & Williams, 2002), one using the Short Dark Triad (a short measure of the Dark Triad; Jones & Paulhus, 2014) and one using the Dirty Dozen (A 12-item measure of the Dark Triad; Jonason & Webster, 2010). Although Dark Triad narcissism is usually conceptualized as grandiose narcissism (Paulhus & Williams, 2002), measuring narcissism in the context of the Dark Triad may also result in differing relationships between narcissism and social media use. Finally, Ong et al. (2011) used the revised Narcissistic Personality Questionnaire for Children (NPQC-R; Ang & Raine, 2009) for a sample of adolescents that may differ slightly in their measurement of narcissism. Vulnerable narcissism in this review was measured mostly with the Hypersensitive Narcissism Scale (Hendin & Cheek, 1997), although Brailovskaia and Bierhoff (2016) used the revised Narcissistic Inventory (Neumann & Bierhoff, 2004) and Barry and colleagues (2015) used the Pathological Narcissism Inventory (Pincus et al., 2009). We report the results for grandiose and vulnerable narcissism separately.

All relationships were reported in or converted to Pearson's r correlation coefficients, which was used as our effect size statistic. All meta-analyses were conducted using the metafor package (Viechtbauer, 2010) in R statistical software (R Core Team, 2014).

Social Media Measures

Time spent on social media. Eighteen samples measured time spent on social media. This was usually in the form of self-reported hours spent per day browsing, posting, and reading content. This is separate from self-reported number of logins per day, which we did not include in this analysis.

Frequency of status updates. Twenty-four samples measured frequency of status updates. This was usually in the form of self-reported number of times one typically updates their status in a given period of time. For the majority of studies this refers specifically to Facebook status updates, although for two studies focusing on Twitter, this index refers to frequency of "tweeting."

Number of friends or followers. Twenty-eight samples measured number of friends on social media. This was usually in the form of self-reported number of friends, although three samples retrieved objective friend counts from participants' social media profiles.

Pictures of self/selfies uploaded. Eleven samples measured the frequency with which participants uploaded pictures of themselves including selfies to social media. Usually this was in the form of the self-reported number of pictures typically posted in a period of time. Because only three studies focused specifically on selfies, we did not differentiate between these and pictures of oneself in general.

Moderators

Average age. The average ages of samples in this study ranged from 14 to 35. As discussed above, important differences could exist between ages and these could reflect generational or developmental effects.

World region. The majority (67%) of samples in this meta-analysis came from Western (i.e., United States or Canada samples), whereas eight (17%) came from Europe, three (7%) came from Asia (i.e., China and Japan), two came from Russia, and one (2%) came from Australia. As seen in our review above, both structural and cultural differences across countries can and have been linked to both narcissism and social media use. Given the above research, it is feasible that the relationship between narcissism and social media usage may differ based on world region.

Social media platform. The majority of samples in this analysis focused exclusively on Facebook (65%), although six samples (13%) focused on Twitter, six (11%) on Instagram, and four (9%) surveyed participants about social media websites in general. This tendency to generalize from Facebook to other social media sites is potentially misleading, as platforms differ in important ways that may affect narcissism (see review above). In addition to testing platform as a moderator in this study, we caution against generalizing the results of this meta-analysis to social media sites other than Facebook and Twitter.

Percentage of males in sample. The gender diversity of the samples in this study ranged from 35% male to 100% male. Although rarely studied with regards to social media, gender differences in narcissism have been well documented (Grijalva et al., 2015). More specifically, men tend to be more narcissistic than women. According to Grijalva and colleagues, narcissism is more consistent with the male gender role, and may be transmitted to each generation of men through observation and culture, consistent with the biosocial model (Wood & Eagly, 2012) of gender.

Type of data. The vast majority (78%) of samples in this review were based on self-report (e.g., participants were asked about their social media usage), while the remainder included an objective source for their data (i.e., the participants' actual social media profiles). Although Burke and colleagues (2010) found self-reports of such indices as number of friends and hours of use to be equivalent to objective reports, the widespread use of self-report still brings the possibility of biased reporting or common method variance (Podsakoff, 1986), especially since narcissism was also universally measured via self-report. Testing for data type as a moderator can indicate whether this reliance on self-report is problematic in social media research.

Type of sample. Roughly 59% of the samples used undergraduate student samples, whereas 17% used Amazon MTurk, 7% used adolescent samples collected from high schools, and the remainder recruited random samples online. Although several studies suggest that MTurk samples do not appreciably differ from conventional samples or student samples in terms of demographic diversity or quality of data produced (Buhrmester, Kwang, & Gosling,

2011; Casler, Bickel, & Hackett, 2013), MTurkers are already self-selected in that they already have access to the web and are engaged in some sort of Internet activity. On the other hand, undergraduate samples have classically been criticized as having WEIRD (White Educated Industrialized Rich and Democratic; Henrich, Heine, & Norenzayan, 2010) participants, especially in the United States. This is similar to the YAVIS (Young Attractive Verbal Intelligent and Successful; Jennings & Davis, 1977) criticism of individuals most likely to take part in clinical studies, and it implies that these two types of sampling have the potential to produce differing outcomes.

Results

Results of the meta-analysis can be seen in Table 1. Q-Tests for heterogeneity were significant for all tests excluding that of vulnerable narcissism and selfie-taking. Forest plots for each index can be seen in Figures 1–4. Specific relationships between narcissism and social media use as well as moderators are discussed below.

Primary Associations

Grandiose narcissism was positively related to time spent on social media ($r = .11$), frequency of status updates ($r = .18$), number of friends ($r = .20$), and number of selfies ($r = .14$), although moderation analyses suggest the majority of these findings is qualified (there were no moderators tested that explained the variability in the relationship between grandiose narcissism and time spent on social media). We found no statistically significant effect for vulnerable narcissism.

Moderation Analyses

Grandiose narcissism was most strongly related to status updates in Internet samples ($r = .66$), followed by MTurk ($r = .16$) and undergraduate ($r = .12$) samples, but was unrelated in adolescent ($r = .11$) samples ($Q_M = 128.55$, $df = 3$, $p < .0001$). This relationship was also substantially stronger for samples from Russia ($r = .73$) than for samples from Asia ($r = .20$), Europe ($r = .25$), or the United States ($r = .12$), $Q_M = 30.12$, $df = 5$, $p < .0001$. Finally, the NPI-40 detected the strongest relationship between grandiose narcissism and status updates ($r = .24$), followed by the NARQ ($r = .21$), the NPQC-R ($r = .19$), the German translation of the NPI ($r = .10$), and the NPI-16 ($r = .08$), $Q_M = 15.87$, $df = 6$, $p < .05$.

Grandiose narcissism was positively related to number of friends, although moderation analyses ($Q_M = 30.12$, $df = 5$, $p < .0001$) suggest that Russian samples ($r = 56$) significantly differed in this relationship from US ($r = .19$), Asian ($r = .21$), and European ($r = .29$) and that Internet samples ($r = .38$) differed significantly from undergraduate ($r = .15$), MTurk ($r = .18$), and adolescent ($r = .17$) samples, $Q_M = 15.54$, $df = 3$, $p < .01$.

Finally, grandiose narcissism was positively related to posting pictures of oneself on social media although moderation analyses ($Q_M = 12.67$, $df = 2$, $p < .05$) suggest that

Table 1
Meta-Analytic Results for all Four Indices for Grandiose and Vulnerable Narcissism

Marker of social media use	Number of samples (k)	Number of participants (*N*)	Effect size (*r*)	95% CI	*P*-value	*SE* of *P*	Z	Q	DF	*P*	τ^2
Grandiose											
Time spent	18	6,132	.11	[.04, .18]	.001	.03	3.23	96.33	17	<.0001	.017
Frequency of status updates	21	7,371	.18	[.11, .26]	<.0001	.04	4.67	113.6	19	<.0001	.029
Friends/followers	24	10,079	.20	[.14, .26]	<.0001	.03	6.49	156.94	23	<.0001	.019
Selfies	8	3,853	.14	[.06, .21]	<.0001	.04	3.60	50.31	11	<.0001	.009
Vulnerable											
Time spent	0	—	—	—	—	—	—	—	—	—	—
Frequency of status updates	3	575	.42	[−.01, .85]	.06	.22	1.91	97.52	2	<.0001	.14
Friends/followers	4	1,033	.21	[−.06, .49]	.12	.14	1.53	53.09	3	<.0001	.073
Selfies	3	967	.05	[−.02, .11]	.16	.03	1.40	1.17	2	.56	.003

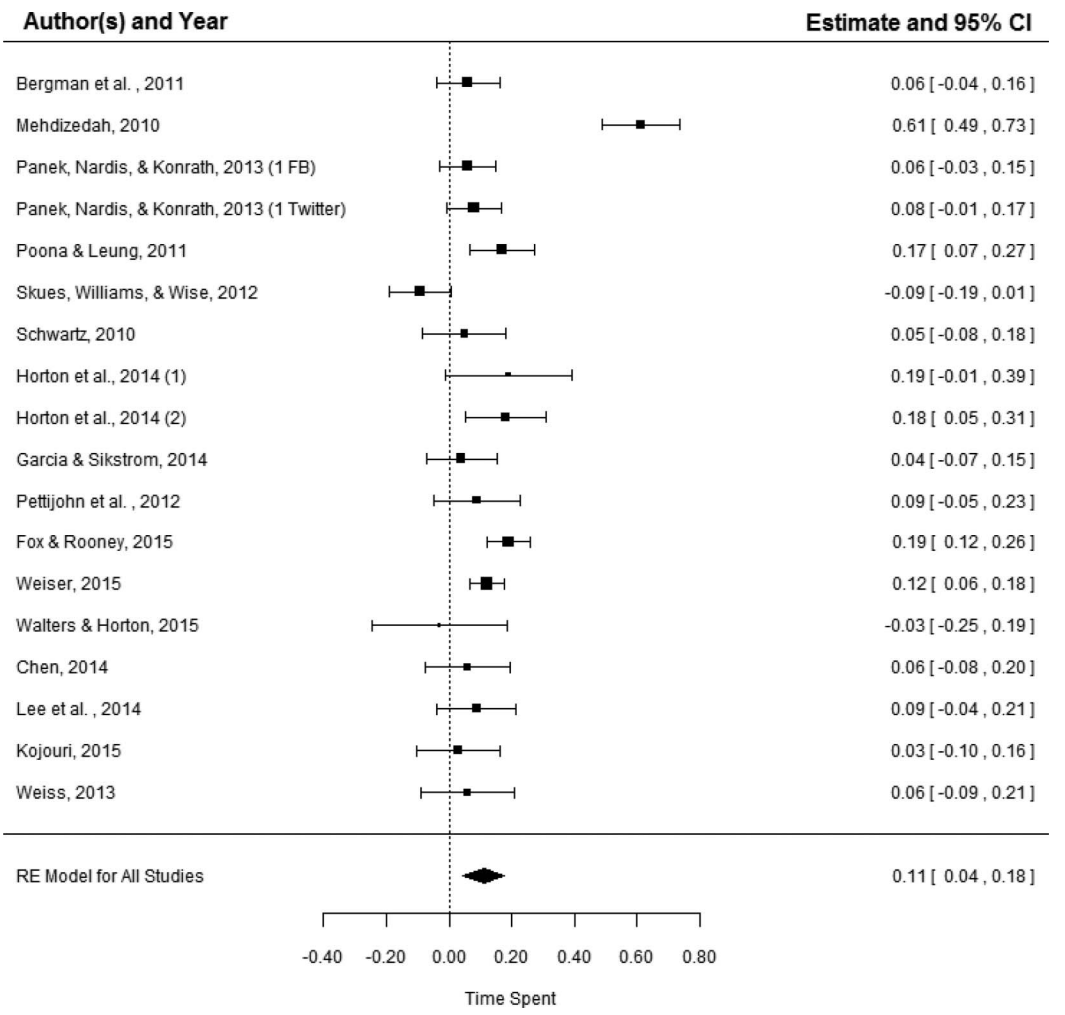

Figure 1. Forest plot of grandiose narcissism and time spent on social media.

this relationship may be nonsignificant for Instagram ($r = .06$), and stronger for studies that measured social media use broadly ($r = .22$) than for those focusing specifically on Facebook ($r = .10$).

Because of the small sample size, we were unable to examine moderators for vulnerable narcissism.

Assessing Publication Bias and P-Hacking

P-curve analyses. P-hacking, or the selective publication of statistically significant results while suppressing null findings, is a significant problem in contemporary social psychology. In light of this fact, we conducted P-curve analyses (Simonsohn, Nelson, & Simmons, 2014) on the four meta-analyses concerning grandiose narcissism to confirm that the above findings have evidential value and are not a result of p-hacking or publication bias. These analyses were conducted in R using syntax from www.p-curve.com. P-Curves for all four indices can be seen in Figure 5, whereas the relevant statistics for each p-curve can be found in Table 2. All four showed a shape that is right skewed and not flatter than 33%, suggesting that the data for all four indices have evidential value and that p-hacking is unlikely to have occurred.

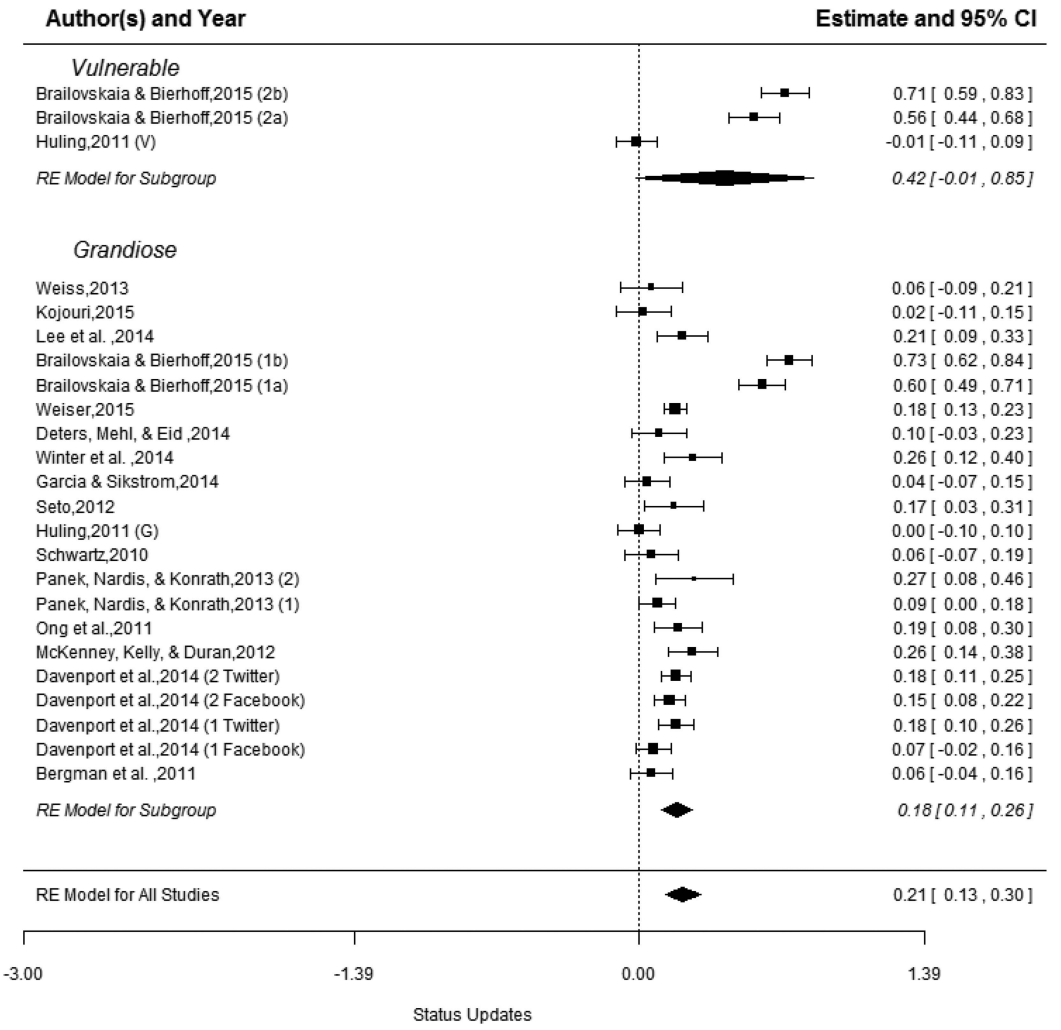

Figure 2. Forest plot of grandiose and vulnerable narcissism and frequency of status updates.

Funnel plots. Also to detect bias introduced by selective publication and heterogeneity, funnel plots (Egger, Smith, Schneider, & Minder, 1997) were generated for all four indices as related to grandiose narcissism. Although all four showed considerable horizontal scatter (see Figure 6), this is consistent with heterogeneity (Sterne et al., 2011) and consistent with world region as a moderator. In particular, certain studies taking place in Russia and Europe (i.e., Brailovskaia & Bierhoff, 2016, Samples 1 and 2), and Australia (Skues et al., 2012) fell outside of the funnel on all indices except selfies posted. Status updates showed heterogeneity from an unknown source, as a considerable number of studies with lower standard error had lower effect sizes than predicted. Only the plot for selfies shows the potential effects of reporting bias; however, given the small number of studies and the fact that selfie research is still in its early stages, we interpret this plot with caution.

Discussion

Based on a sample of over 12,000 participants, meta-analytic results revealed a small to

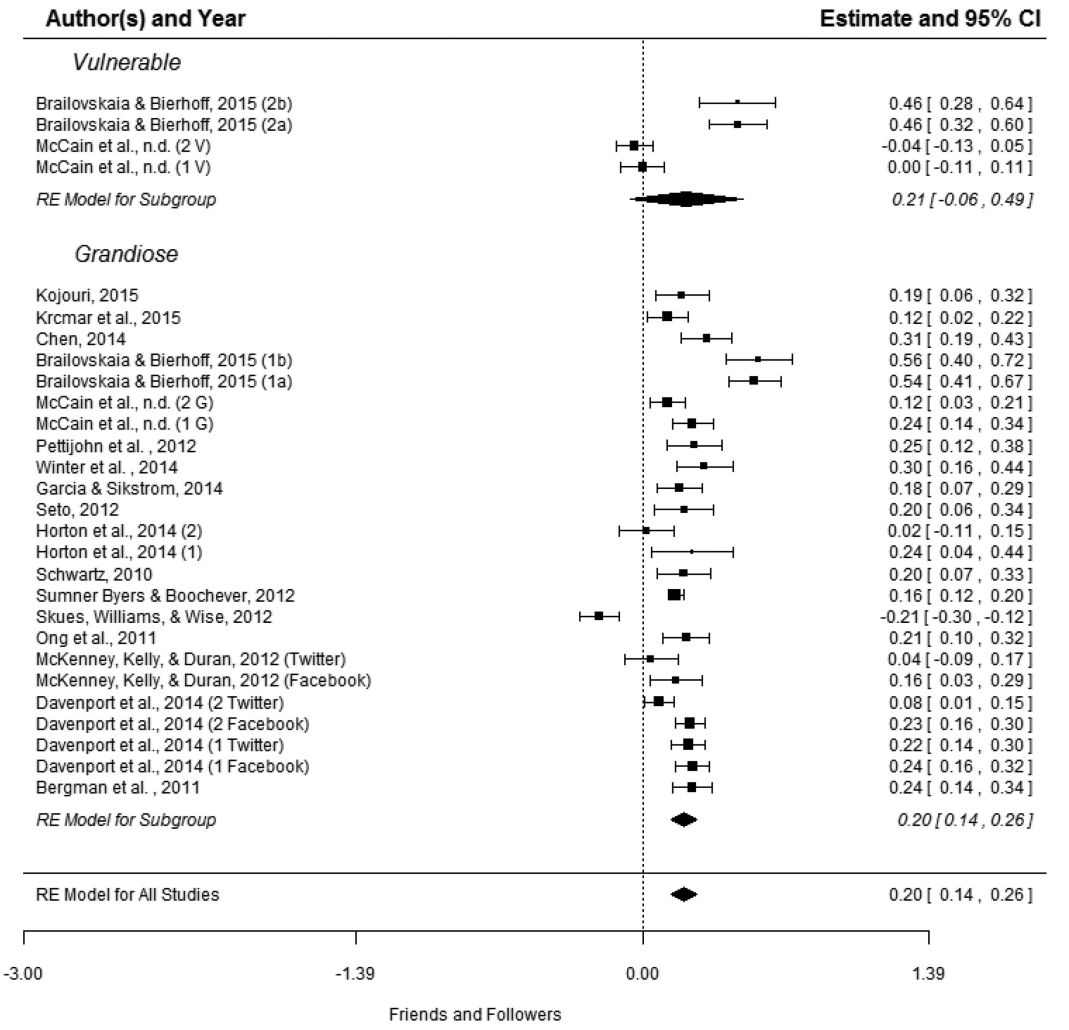

Figure 3. Forest plot of grandiose and vulnerable narcissism and number of friends on social media.

moderate positive association between grandiose (but not necessarily vulnerable) narcissism and social media use. This effect, however, differed somewhat depending on the aspect of social media use measured and the level of certain moderating variables.

Specific Findings

Grandiose narcissism appears to positively relate to time spent on social media websites. This effect is small, which may explain why it has not been found consistently throughout the literature. Although this relationship tested significant for heterogeneity, none of our proposed moderators could explain the data. Although narcissism appears to relate to time spent on social media in our sample of mostly Facebook-based, Millennial, and United States studies, given the differences seen in social media use across cohorts (Bergman et al., 2011; Leung, 2013; Panek et al., 2013) and cultures (Alhabash et al., 2012; Brailovskaia & Bierhoff, 2016; Kim et al., 2011; Long & Zhang, 2014; Markus & Kitayama, 1991), more diverse research is required to confirm its robustness across contexts.

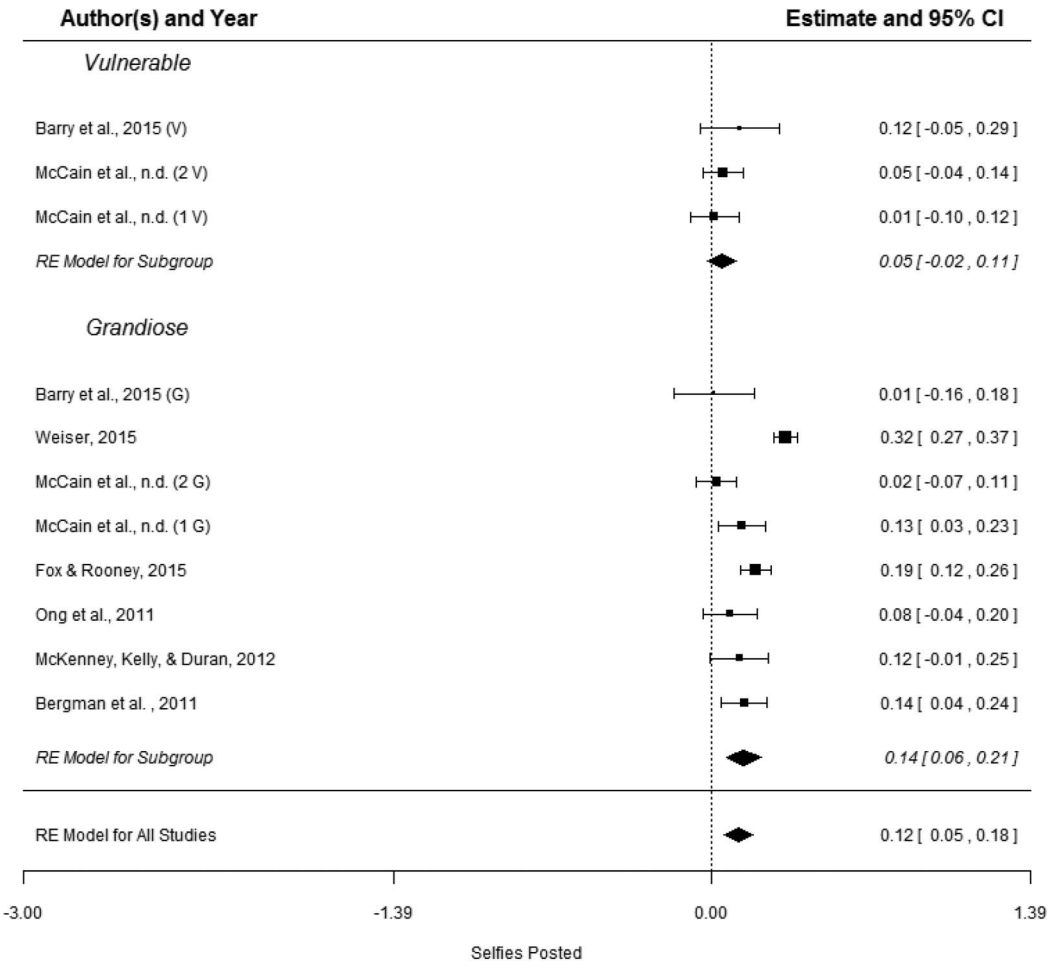

Figure 4. Forest plot of grandiose and vulnerable narcissism and selfies posted on social media.

Our meta-analysis also supports past findings on how narcissists use social media. Individuals high in grandiose narcissism appear to have more friends, post more frequent status updates, and post more pictures of themselves on social media than do nonnarcissists. However, two of these relationships—between narcissism and number of friends and frequency of status updates—appear to be moderated by culture in that they are significantly higher in Russian samples. Asian samples failed to differ significantly from United States or European samples, which is inconsistent with past research showing that Asian countries, which tend to have collectivistic cultures (Hofstede, 1980) and interdependent self-construals (Markus & Kitayama, 1991), have differing relationships between narcissism and social media use. However, Russia is considered to have an attenuated collectivistic culture (Latova & Latov, 2009) that has both individualistic and collectivistic elements and which may have a unique effect on the relationship between narcissism and social media use. Given that little research is available on social media usage in Russia at this time, and the current findings are based on a single multistudy paper, we interpret this finding with caution.

The finding that individuals high in grandiose narcissism more frequently update their statuses

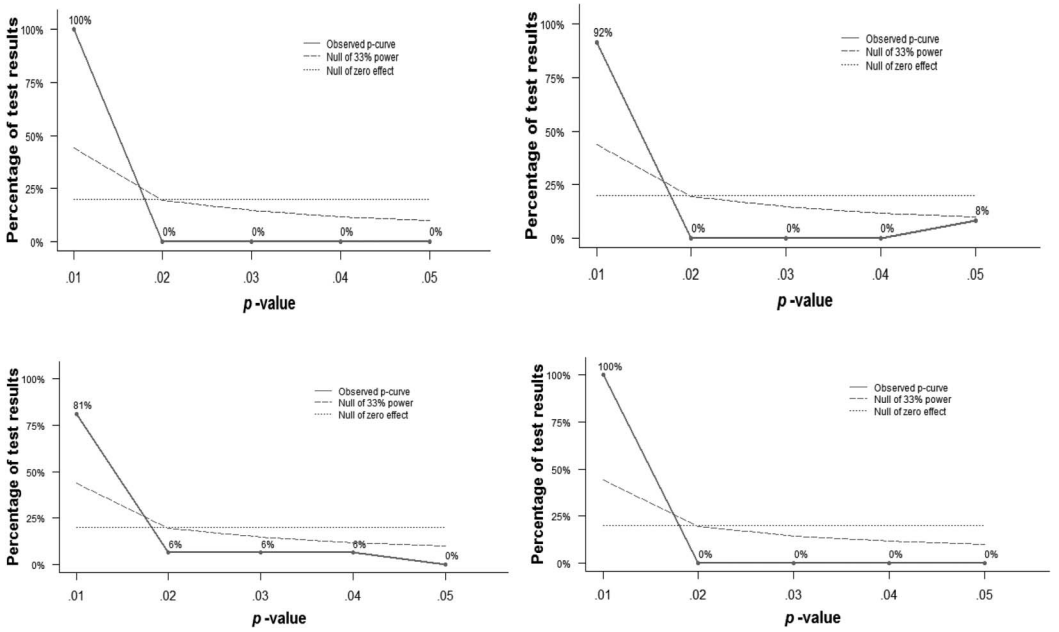

Figure 5. P-Curves for meta-analyses of time spent on social media (top left), frequency of status updates (top right), friends/followers on social media (bottom left), and frequency of posting pictures of self (bottom right).

also appears to be moderated by sample type. Specifically, the relationship was strongest for Internet samples, which were not specific to any particular age group or location, and was nonsignificant for adolescent samples. MTurk samples showed only a slightly stronger relationship overall than did undergraduate samples, inconsistent with past findings that narcissism relates more strongly to social media usage in Generation Xers (Leung, 2013; Panek et al., 2013). The average age of the Internet samples ($M = 24.43$) largely reflects a Millennial sample, and was not linked to any specific location or culture. However, this lack of contextual boundaries may leave these samples more vulnerable to self-selection than undergraduate, adolescent, or MTurk samples. It may be that individuals who have a stronger relationship between narcissism and status updates were more likely to sign up for these studies.

Table 2
P-Curve Significance Values for all Four Indices of Social Media Usage

Index	Right skew	Flatter than 33%	Left skew
Time spent	$p < .0001$	$p = 1.00$	$p = 1.00$
Frequency of status updates	$p < .0001$	$p = .98$	$p = .99$
Friends/followers	$p < .0001$	$p = 1.00$	$p = 1.00$
Selfies	$p < .0001$	$p = 1.00$	$p = 1.00$

The finding that individuals high in grandiose narcissism post pictures of themselves more frequently on social media also appears to be moderated by platform. This finding was nonsignificant for Instagram only studies, but was stronger in studies that did not specify a platform. This makes any interpretation difficult.

Finally, vulnerable narcissism has yet to be studied in depth in relation to social media usage. In the few studies conducted to date, vulnerable narcissism appears to show no relationship to social media usage, with the possible exception of frequency of status updates. These results should be viewed very cautiously, however.

From a theoretical perspective, these results fit with both the self-enhancement and fit models on narcissism and social media. In terms of self-enhancement, each of the behaviors we examined (use, posting, selfies) were potentially

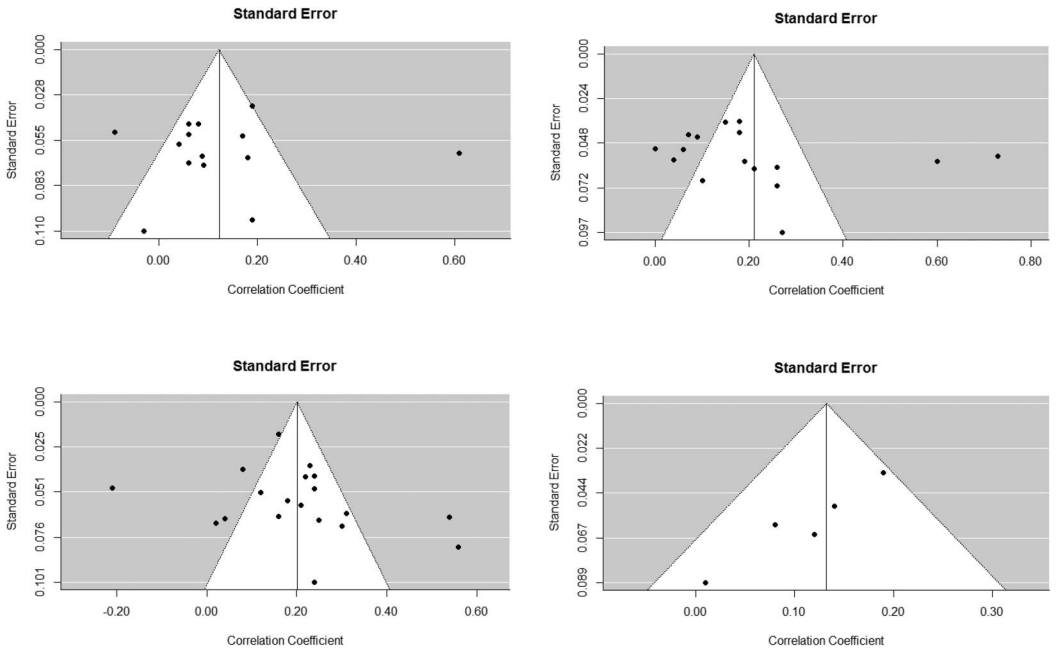

Figure 6. Funnel plots for meta-analyses of time spent on social media (top left), frequency of status updates (top right), friends/followers on social media (bottom left), and frequency of posting pictures of self (bottom right).

routes to self-enhancement. That said, there was no consistent pattern of moderation that could be used to fully support this model. Likewise, in terms of fit, the number of friends in particular was a good marker of fit and it was reliably linked to grandiose narcissism. Again, however, there was no pattern of moderators that allowed us to fully embrace the fit model. Ideally, future research will use more detailed approaches that allow for a precise understanding of why narcissism is linked to social media use.

Limitations and Future Research

Like all meta-analyses, this one is limited by the existing data. Our findings regarding moderation are somewhat inconsistent with past research, which may be due to the inclusion of unpublished data in our analyses. However, the results of the p-curve analysis and funnel plots suggest that the data are not clearly biased in a systematic way. We hope future research continues this apparent willingness to publish null results so as to provide the best effect size estimates possible. There was a lack of findings involving hypersensitive narcissism. We would encourage researchers interested in narcissism and social media to include a Hypersensitive Narcissism Scale in studies where there is an interest in narcissism. All the effect sizes in this meta-analysis were cross-sectional. There is a major need for experimental or longitudinal data in order to better illuminate the mechanisms by which narcissism affects, or is affected by, social media behavior. Finally, 11 years after the advent of Facebook, the relationship between grandiose (NPI) narcissism and self-reported Facebook usage alone has been well established with at least 22 studies. Researchers should now focus their resources on studying this relationship in the variety of other social media platforms available (e.g., Instagram, Reddit, Tumblr, Snapchat) as well as examining vulnerable narcissism alongside grandiose narcissism. Comparing these relationships among different platforms will provide a better understanding of how the features of social media sites influence behavior. More attention should also be paid to cross-cultural work, as the present analysis shows that at least some differences in social media use between cultures exist. Fi-

nally, researchers should strive to use more objective measures (i.e., using metrics from actual social media profiles) rather than relying on self-reports to measure social media behavior.

Conclusion

As social media sites have blossomed so too has the interest in social media and narcissism. Still, this field of research is only seven years as measured from publication of the first paper (Buffardi & Campbell, 2008). We now have relatively robust evidence that grandiose narcissism is associated with social networking behavior across many—but not all—conditions. And we know the size of the association ranges from small to moderate. We will hopefully continue to see the expansion of this research into current and emerging social media platforms.

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