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The dark side of Facebook: Semantic representations of status updates predict the Dark Triad of personality

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ABSTRACT

Using Latent Semantic Analysis, we quantified the semantic representations of Facebook status updates of 304 individuals in order to predict self-reported personality. We focused on, besides Neuroticism and Extraversion, the Dark Triad of personality: Psychopathy, Narcissism, and Machiavellianism. The semantic content of Facebook updates predicted Psychopathy and Narcissism. These updates had a more "odd" and negatively valanced content. Furthermore, Neuroticism, number of Facebook friends, and frequency of status updates were predictable from the status updates. Given that Facebook allows individuals to have major control in how they present themselves and draw benefits from these interactions, we conclude that the Dark Triad, involving socially malevolent behavior such as self-promotion, emotional coldness, duplicity, and aggressiveness, is manifested in Facebook status updates.

"Evelyn, I'm sorry. I just, uh... you're not terribly important to me"
[*American Psycho*]

"...there is only one thing in the world worse than being talked about, and that is not being talked about"
[*The Picture of Dorian Gray by Oscar Wilde*]

"It is double pleasure to deceive the deceiver"
[*Niccolò Machiavelli*]

"By giving people the power to share, we're making the world more transparent"
[*Mark Zuckerberg*]

1. Introduction

The recent years have seen a major revolution in how people interact with each other through the Internet. The social network Facebook is not only part of this revolution but also presents a unique opportunity for psychological research (for a review see Wilson, Gosling, & Graham, 2012). In Facebook, as in other social networks, individuals' activities (e.g., connecting to others, expressing preferences, status updates) provide observable data for studying human behavior (Wilson et al., 2012). Status updates, for example, are generally used to broadcast current states or make statements with own written words. Although these texts might be informative for investigating how people present themselves in Facebook, or other social interactions in the network, there are no quantitative studies focusing on status updates. In the present article we direct our attention to the question if the semantic representation of status updates predicts personality traits. Facebook is in fact a compelling forum to test this relationship because unlike other social networks (e.g., Badoo, Habbo), individuals in Facebook typically become friends online after being friends offline (Ross et al., 2009). Moreover, although some self-enhancement might be present in Facebook, individuals are generally presenting themselves fairly accurately to their offline selves (e.g., Back et al., 2010; see also Wilson et al., 2012).

Nevertheless, Buffardi and Campbell (2008) found that, by subjective coding of Facebook pages, narcissists engage in self-promotion on Facebook. Narcissism involves a grandiose yet fragile sense of the self (Ames, Rose, & Anderson, 2006) as well as an obsession with success and demands for admiration (for a review see Morf & Rhodewalt, 2001). The trait of Narcissism has been associated with the frequency of using Facebook (Buffardi & Campbell, 2008; Mehdizadeh, 2010; Ong et al., 2011) and with the number of friends on Facebook (Bergman, Fearrington, Davenport, & Bergman,

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2011; Carpenter, 2012). Narcissism has been suggested as a socially aversive personality (Kowalski, 2001), which shares features with two specific "malevolent" personality traits: Psychopathy and Machiavellianism (Paulhus & Williams, 2002). Psychopathy involves high impulsivity and thrill-seeking along with low empathy and anxiety (Hare, 1985) and shows similar neurological activations to the personality trait of Psychoticism (Corr, 2010; see also Hare, 1981). For instance, Psychoticism as measured by the three-factor hierarchical model proposed by Eysenck (Eysenck & Eysenck, 1985) is better labeled "Psychopathy or "Impulsive Unsocialized Sensation Seeking" (Zuckerman, Kuhlman, Thornquist, & Kiers, 1991. See also Zuckerman, 1989, 1991). Machiavellianism is the cold manipulative personality and was originally derived from Machiavelli's original books (see Christie & Geis, 1970).

This "Dark Triad" involves socially malevolent behavior such as self-promotion, emotional coldness, duplicity, and aggressiveness (Paulhus & Williams, 2002). As detailed by Holtzman (2011), psychopaths, narcissists, and Machiavellians, are usually successful in brief interactions by taking advantage of people, successfully extracting resources, and committing crimes. For instance, two of the common internal motivations for using Facebook are increasing social capital (i.e., benefits from interaction with others) and fulfilling social-grooming needs such as gossip and monitoring members of one's social group (Wilson et al., 2012).

As in earlier studies investigating the relationship between personality and Facebook behavior (Amichai-Hamburger & Vinitzky, 2010; Ross et al., 2009) we also include Extraversion and Neuroticism in our analysis. Studies using behavior genetic approaches, however, show that the Dark Triad expands the current personality models (Veselka, Schermer, & Vernon, 2012). We suggest that focusing on the Dark Triad might offer new insights into how people are presenting themselves on Facebook and help to examine positive and negative impacts on society as suggested by Wilson and colleagues (2012). Moreover, in the present study, we quantify the semantic content in Facebook users' status updates to objectively investigate whether this semantic representation predicts self-reported personality traits. Giving the nature of Facebook, allowing individuals to have major control in how they present themselves and draw benefits from these interactions (i.e., increasing social capital and fulfilling social-grooming needs), we expected that the Dark Triad is manifested in the status updates.

2. Method

2.1. Participants and overview of the procedure

The participants ($N = 304$, age mean = 26.40 sd. = 7.52, 132 males and 172 females) were recruited through Amazons' Mechanical Turk (MTurk). MTurk allows data collectors to recruit participants (workers) online for completing different tasks in exchange for wages (see other demographics of the whole sample in the Supplementary Material online, Table S1). This method for data collection online has become more common during recent years and it is an empirical tested valid tool for conducting research in the social sciences (see Buhrmester, Kwang, & Gosling, 2011). Participants were recruited by the following criteria: resident of the USA and have a minimum of 15 own written status updates in her/his Facebook profile. Participants were paid a wage of two American dollars for completing the task and informed that the study was confidential and voluntary. First, the participants were presented with a battery of self-reports comprising the personality measures, demographics (e.g., age, gender, marital status), questions about their own Facebook profile (number of Facebook friends, how often the status was updated, and to estimate how much time they spend on Facebook on a daily basis) and then to provide the latest 15 status updates from their own Facebook profile.

2.2. Semantic representation of status updates

The status update provided by the participants were not sufficiently large to construct a high quality representation, therefore, the semantic content of the status updates was quantified by using a semantic representation generated from Latent Semantic Analysis (LSA) applied on an English news corpus (for a detailed description of the English semantic space used here see Arvidsson, Sikström, and Werbart (2011). The semantic representation captures similarities in meaning, but tends to ignore other information related to the words. For example, semantic representation of plural and singular nouns tends to be similar (e.g., car – cars), as well as different tense of the same verb (e.g., go – went – gone), etc. Ambiguous words (e.g., the word *bank* in the context of "a bank on a river" versus a "bank that gives loan") tend to have semantic representation that is a mix between the different meanings of the word. Words with similar spellings, but different meanings (e.g., *mammon* and *mammoth*) tend to have unrelated semantic representations.

In order to create a semantic representation of the status updates, we simply added the semantic vectors representing all words in each participant's own status updates. The resulting vector was normalized to a length of one. We investigated whether the semantic representation of the status updates predicted personality measures by applying multiple linear regressions. A one-leave out procedure was used, so that the-to-be predicted semantic representation data-point was removed from the training set and only used for testing. Thus, a new training and testing was made for each subject. To avoid over fitting, only the most important/first dimensions in a semantic representation were used. The number of dimensions was set to the number that showed the highest correlation to the outcome variable in the training set, and these dimensions were applied in the test set.

We also calculated the valence of the status updates based on the semantic representation. This was done by first training one set of English words ranked for valence (ANEW, Bradley & Lang, 1999), and then applying the obtained regression coefficients on the semantic representation of the status updates. Finally, we measured the prototypical of the status updates, by measuring the semantic distance between the mean value of all status updates and a particular update, where the semantic distance is measured by the dot product between two semantic representations. All analysis of the semantic space was conducted using the Semantic program, which is a software specially designed for analyzing semantic representations that run in the Matlab environment (Sikström, n.d.).

2.3. Personality

The short version of the Eysenck Personality Questionnaire Revised (EPQR-S) was used to measure Extraversion (e.g., "Do you usually take the initiative in making new friends?"), Neuroticism (e.g., "Do you ever feel 'just miserable' for no reason?"), and Psychoticism (e.g., "Would you like other people to be afraid of you?") (Eysenck, Eysenck, & Barrett, 1985). The EPQR-S consists of 12 items for each trait (forced binary answers: *Yes* or *No*). The score for each of the personality traits was computed as the sum of the 12 items, with *yes* responses coded as 1 and *no* responses coded as 0. Thus, a high score represents high degree in each of the three personality traits. As stated in the Introduction section, Eysenck's Psychoticism scale is better labeled as Psychopathy (Zuckerman, 1989; Zuckerman, 1991). Hence, for the rest of the paper we refer to the Psychoticism scale as Psychopathy.