



Brief Report

The Five-Factor Model of personality and Degree and Transitivity of Facebook social networks

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ABSTRACT

The present study examined the associations of the Five-Factor Model personality dimensions with Degree (number of friends) and Transitivity (the likelihood that two of a person's friends are friends with each other) of a person's network on the social networking site Facebook. A Facebook application administered a personality questionnaire and objectively recorded properties of the participants' ($N = 5031$; 65% female, mean age 33 years) social networks. As expected, Extraversion predicted Degree, whereas Openness to Experience and, among men, Agreeableness predicted more cross-sex friendships. Also as expected, Extraversion and, among men, Openness to Experience predicted lower Transitivity, but the former association was rendered insignificant when Degree was controlled for.

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1. Introduction

Human social networks are characterized by rich variation at the individual level. Some people have few friends whereas others have many. Some people are embedded in tightly-knit groups where everyone knows each other, whereas others belong to many different groups where there is little overlap between friends. However, the effects of individual characteristics have largely been ignored in social networks research (Fowler, Dawes, & Christakis, 2009). The present research seeks to fill this gap in the literature by linking egocentric social network characteristics to individual differences in personality. Within personality psychology, the Five-Factor Model (FFM; Costa & McCrae, 1992) is commonly accepted as a comprehensive representation of personality based on five broad dimensions: Emotional Stability, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness. Within the context offered by the social network site (SNS) Facebook, our purpose was to connect these personality dimensions to individual differences in Degree and Transitivity. Degree refers to the number of a person's friends, or social ties. Transitivity, also called the clustering coefficient, refers to the likelihood that two of a person's friends are connected to each other. We also investigated possible gender differences, and whether different personality

dimensions may be relevant in the prediction of cross-sex and same-sex friendships.

SNSs allow their users to create a network of people with whom they wish to share e.g., profile information, photos, comments, status updates, news, etc. Most popular among SNSs is Facebook, which, as of December 2012, had over a billion monthly users (Key Facts – Facebook Newsroom). Facebook offers a highly attractive context in which to study social ties. Besides being much more popular than other SNSs, Facebook is distinguished from most other SNSs by displaying an offline-to-online tendency. The primary use of most SNSs is that they allow people to find others who share their interests. By contrast, Facebook is used to maintain and strengthen relationships that have already developed offline (Ross et al., 2009).

There is some prior research on personality and Degree on SNSs. For instance, Gosling, Augustine, Vazire, Holtzman, and Gaddis (2011) collected personality self-ratings from a sample of students who allowed researchers to analyze and record several features of their Facebook profiles, such as total number of friends. Degree was in that study correlated with Extraversion, and there were no other personality effects (for similar results, see e.g., Stopfer, Egloff, Nestler, & Back, 2013). Although previous research consistently suggests that Extraversion should be positively associated with Degree, no research has focused on whether personality is similarly associated with number of same-sex and cross-sex friendships. Generally, we expect high extraverts to have more same-sex and cross-sex friendships (e.g., Ciarrochi & Heaven,

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2009). However, some traits not relevant in same-sex friendships may be relevant in cross-sex friendships. A prejudiced or sexist attitude towards the opposite sex could be expected to be associated with a lower number of cross-sex friendships. In terms of the FFM, low Openness to Experience predicts sexism (e.g., Ekehammar & Akrami, 2007), suggesting that participants scoring low on this dimension will have fewer cross-sex friends. In adolescence, girls rate boys scoring high in Agreeableness as better adjusted (Ciarrochi & Heaven, 2009), and some results suggest that high Agreeableness predicts more cross-sex friendships among university students (Asendorpf & Wilpers, 1998). Based on the above research, we expected those who score high on Extraversion or Openness to Experience, and those men who score high on Agreeableness, to have more cross-sex friendships. One of the reasons that possible sex differences have previously not been investigated could be that such moderator analyses require very large sample sizes (Chaplin, 1991). This was not an issue in the present research design, as we expected thousands of participants.

We know of no previous research that would, in an on-line context, have sought to predict individual differences in Transitivity using personality traits. However, some of the industrial and organizational psychology literature may be relevant in developing hypotheses for Transitivity. In this literature, brokerage positions in social networks refer to positions that connect people who are themselves not connected; i.e., being in a brokerage position means having low Transitivity. Despite substantial research on the many beneficial consequences of occupying a brokerage position – i.e., being at the intersection of heterogeneous social groups – there is almost no research on individual difference variables that would predispose persons to occupy such positions (Burt, 2005). However, two recent studies have addressed this issue. Both a study by Oh and Kilduff (2008) on Korean expatriate entrepreneurs in a Canadian urban area, and a study by Sasovova, Mehra, Borgatti, and Schippers (2010) on friendship relations in a radiology department, showed that those high in self-monitoring – i.e., people manage their self-presentation in order to make a good public impression, and are therefore sensitive to social cues regarding appropriate behavior (Snyder, 1979) – tended to occupy brokerage roles. However, one of the limitations of these studies was that they did not include a measure of personality factors. This could be considered especially awkward because the credence of the self-monitoring construct has been under debate ever since it was created. The most pertinent criticism is that the construct incorporates several distinct and uncorrelated personality dimensions, with the most robust and important of them being highly similar or identical to the Extraversion factor (see e.g., John, Cheek, & Klohnen, 1996). Another trait that could be relevant in the prediction of Transitivity is Openness to Experience. Those scoring high on this dimension – characterized by their need to seek out new and varied experiences (Costa & McCrae, 1992) – could, by definition, seek exposure to others who are different from themselves and also different from each other. We thus expected high Extraversion and high Openness to Experience to be correlated with low Transitivity.

2. Method

2.1. Participants and procedure

Data on social networks was collected using a Facebook application programmed for purposes of the present research project. Potential participants were directed to our survey web-page, which explained the research and allowed Facebook users to install our application after authentication. Before the application could be installed, the user had to agree to share specified personal

information (i.e., a full list of their friends and some background or control variables, such as gender and hometown) with the researchers. As an incentive to participate, everyone who completed the questionnaire, which took on average 16 min, was given feedback on his or her personal values profile. As additional incentives, consecutive raffles for an iPad and for a 500€ Amazon gift card were added at later stages of data collection. Participants received one raffle ticket for participating in the survey, and an additional ticket for each friend that participated.

The application had three functions: (i) it retrieved data on the Facebook user's contact network and some background or control variables, (ii) it administered a questionnaire survey including measures of personality, attitudes, and personal values, and (iii) it allowed the user to share the application in his or her contact network, either by posting the link to the application along with comments on the user's own Facebook page (for a contact to see), or by sending a private invitation to selected friends. Individuals in the retrieved contact network were represented by Facebook's unique ID numbers; no names were stored. During data collection, the Facebook ID numbers were automatically associated with new ID numbers, referring to the order in which they were added to the database, and these ID numbers were used in the analysis. The identity of respondents was thus not revealed in the database used by the researchers.

Participants were primarily recruited via invitations sent to e-mail lists. Several invitations to the University of Helsinki (Finland) and Aalto University (Finland) student and staff email lists were sent between June 2012 and September 2013. The number of participants was 5031 (65% women; mean age 32.7 ($SD = 11.2$)), of whom 91% responded to the personality measure. Each participant had on average 250 ($SD = 173$) friends, of whom 8.9 had completed the survey.

2.2. Measures

2.2.1. Personality

Personality was measured by having participants complete, in self-report format, the National Character Survey (NCS; Terracciano et al., 2005; for the Finnish translation, see Realo et al. 2009). This measure – designed to mimic the original 240 item NEO PI-R (Costa & McCrae, 1992) – consists of 30 bipolar items, of which each measures a facet of the FFM (Costa & McCrae, 1992). Cross-instrument correlations between the NCS personality factors and longer measures of the FFM personality factors tend to vary between .70 and .80 (Konstabel, Lönnqvist, Walkowitz, Konstabel, & Verkasalo, 2012). Participants were instructed to rate themselves on a five-point scale using the 30 NCS items and at the top of the questionnaire was printed 'I am...'. For instance, the two poles of the Neuroticism facet Anxiety were 'Anxious, nervous, worrying' and 'At ease, calm, relaxed'. Scores on the five factors were calculated as the means of the six relevant facets. The means were 3.57 ($SD = 0.48$), 3.47 ($SD = 0.65$), 3.89 ($SD = 0.65$), 3.70 ($SD = 0.56$), and 3.67 ($SD = 0.63$) for Emotional Stability, Extraversion, Openness to Experiences, Agreeableness, and Conscientiousness, respectively. Internal consistency reliabilities were mostly acceptable, with all except one exceeding .69, the exception being Openness to Experience, which had an alpha of .56.

2.2.2. Degree and Transitivity

Degree (number of friends) was obtained from the contact network retrieved by the application, and was therefore available for all 5031 participants. When possible, the application also obtained the sex distribution of the contact network (i.e., how many women and how many men did the participant have as friends). This was possible for 96% of the people included in the participants' contact networks (the remaining 4% had not made this information

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