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Review of the effects of Five Factor Model personality traits on network structures and perceptions of structure

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ABSTRACT

We review recent research on Five Factor Model personality and social network analysis to assess how structures develop and are perceived. Extraversion and agreeableness relate consistently to personal but not workplace networks. Extraverts are more likely to seek connections, whereas agreeable individuals receive connections from others. Openness predicts network diversity and is marginally related to position when groups pursue collective goals. Conscientiousness is associated with maintaining certain personal relationships, but is strongly related to central positions in workplace networks. Neuroticism has no consistent relationship with network size or composition, and is differentially related to network positions, depending on the context.

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Introduction

Social network analysis (SNA) has been used to study entities (people, businesses, etc.) and the relationships between those entities (giving advice, trade, disease spread, etc.) in a variety of disciplines (Scott, 2000; Wasserman and Faust, 1994). The structure and properties of the network depend on the study design, network type, and types of relationships that are being represented. While SNA has been used extensively in fields like sociology, its increased popularity in psychology has led to a surge of studies merging the traditional structural approaches of SNA with the individual differences literature. One topic that has been only recently explored is how individual differences in personality affect network structures and perceptions. There have been few attempts (e.g., Burt et al., 2013; Fang et al., 2015; Kilduff and Tsai, 2003) to synthesize the existing research related to personality and SNA. Here we review both consistencies and inconsistencies in the literature that uses the Five Factor Model (FFM) of personality.

Incorporating personality traits into the social network paradigm

At the extreme, traditional structuralists tout that network structure is the major determinant of human interaction, and reject the suggestion that individuals have agency over their social environments (e.g., Mayhew, 1980). Kilduff and Tsai (2003) provide a detailed outline of the controversy regarding this perspective. Adherents to this “anti-categorical imperative” (Kilduff and Tsai, 2003, p. 68) doubt the efficacy of predicting human behavior using only the characteristics of individuals—of claiming dispositions drive dyadic and group behavior (Wellman, 1983). They highlight the role that networks play in creating or hindering opportunities for social interaction and resources (Kilduff and Tsai, 2003; Wellman, 1983). However, these views discount the fact that humans are active agents, and their social relationships and environments are affected by their motivations, behaviors, and personalities. The traditional structuralists’ strong anti-individualist stance is not shared by all; some social network researchers have attempted to look at individual motivations and predispositions to assess how these characteristics help shape network structure (e.g., Kadushin, 2002) and explain changes in network patterns (like intransitivity; Hallinan and Kubitschek, 1988). Kilduff and Tsai (2003) describe the work of “pioneering” structuralists (p. 80; see also Burt et al., 2013). Recently, a literature has emerged to link individual differences and social networks. These authors contend, and we concur, that individual differences in personality are related to both perceptions of the network itself (e.g., Casciaro, 1998; Clifton

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and Kuper, 2011; Clifton, 2014; Lamkin et al., 2014) as well as the structure of the networks (e.g., Emery, 2012; Flynn et al., 2010; Kalish and Robins, 2006; Kalish, 2008; Selfhout et al., 2010).

While the literature suggests that personality traits may influence some social network structures, there is only one study that has meta-analytically assessed the effects of self-monitoring and the FFM personality traits on network properties (Fang et al., 2015). Fang et al. (2015) were particularly interested in how these traits influence workplace (organizational) networks, and how those structural positions then predicted job performance and career success. Their work provided new insights into how personality directly and indirectly influences work outcomes in organizational networks through advantageous network positions. However, Fang et al. (2015) only assessed the effect of traits on two types of network positions (in-degree centrality and brokerage), and limited their analysis to adult, working samples. We included studies that used a variety of samples spanning across work-related and personal networks to better evaluate the effects of personality on a variety of social relationships.

In this review paper, we catalogue and critique research that has assessed the relationships that personality traits (specifically those of the FFM) have with network structure and perceptions of the network structure across a variety of network properties. As such, we account for the potential effects of personality on other structural properties within networks, such as alternative conceptualizations of centrality (e.g., betweenness and closeness) or more complex structural formations such as transitivity. We draw conclusions about how personality contributes to understanding a variety of structural positions theoretically and practically, with special consideration to the implications of how patterns may differ between network designs (egocentric or sociocentric), types of networks (workplace or personal), and types of relationships (ties). Finally, we offer some additional suggestions for future research.

Scope and approach

Social network analysis (SNA) is a method to describe social structure in terms of networks (Marsden, 1990; Wasserman and Faust, 1994). Because SNA can be used to characterize any set of entities and the connections between those entities, it is applicable to a wide range of disciplines (Scott, 2000; Wasserman and Faust, 1994). Because the purpose of this review is to assess the effects that personality has on network perceptions and structures, we are limiting the scope to humans embedded in social contexts with other humans. The network members (“actors”) are associated with others in a network based on some shared social interaction (e.g., friendship, leadership). Accordingly, articles that solely used simulated data were excluded.

Studies utilizing either sociocentric (complete network) or egocentric (networks enumerated from the perspective of one individual) designs were eligible for inclusion (Butts, 2008; Marsden, 1990; Wasserman and Faust, 1994). However, studies assessing online social networking websites (e.g., Facebook, Twitter, FourSquare) were excluded due to boundary definition issues. That is, people use social networking sites for many different reasons (Subrahmanyam et al., 2008), and can be connected to others on those sites without ever engaging in direct interactions with the individuals in their online social networks. Furthermore, the types of interactions and constraints on the nature of the interactions vary widely depending on the type of networking site (e.g., Twitter’s character restrictions on tweets, FourSquare’s limited purpose in providing only location-based information), which limit the comparisons that can be made with other forms of social interaction assessed here. Though personality has been linked to online social network usage (e.g., Chorley et al., 2015; Lönnqvist and Itkonen, 2014), these studies will not be discussed.

Articles must have evaluated some social network property, like size, composition, and/or structure (through the use of social network metrics) and those properties and metrics must have been related to personality in some regard (e.g., reported correlations or path coefficients). Furthermore, to be included in the review, the study must have included at least one of the traits defined by the FFM (extraversion, neuroticism, agreeableness, openness to experience, and conscientiousness), though we placed no restrictions on the instrument used to measure each trait. For example, extraversion as measured by personality scales such as the Eysenck’s Personality Questionnaire – Revised (EPQ-R; Eysenck and Eysenck, 1985), International Personality Item Pool (IPIP; Goldberg et al., 2006), various versions of the NEO-PI-R (e.g., Costa and McCrae, 1992; McCrae et al., 2005), or short scales like the Ten Item Personality Inventory (TIPI; Gosling et al., 2003) were all acceptable. We excluded articles that only measured non-FFM traits (e.g., abnormal personality traits; Lamkin et al., 2014), and articles that simply used network procedures to visualize or analyze personality as a network (e.g., Costantini et al., 2015; Goekoop et al., 2012).

To find relevant literature, we used multiple search strategies. These included (a) conducting searches using the University of Georgia Multi-search Tool, which is a collection of approximately 130 databases and the UGA Library Catalog including PsycINFO, MEDLINE with Full Text, Social Sciences Citation Index, SocINDEX with Full Text, Business Source Complete, and ScienceDirect¹; (b) consulting with a subject matter expert (SME) for recommended articles on the topic of personality and social network analysis; and (c) assessing literature listed in the reference sections of articles found using the databases and recommendations from the SME. In our database searches, we used various combinations of the following search terms: “social network;” “social network analysis;” “network analysis;” personality; “Five Factor Model;” “Big Five;” extraversion; extroversion; neuroticism; emotional stability; “openness to experience;” openness; agreeableness; conscientiousness; “NOT Facebook;” and “NOT Twitter.” We also applied restrictions to include human subjects only, and sources that were peer-reviewed and published in English. Our broadest searches yielded approximately 748 articles.

After reviewing the articles based on the inclusionary and exclusionary criteria described above, our final list consisted of 30 articles. The final list is summarized in Table 1, and includes brief descriptions of the design, sample, type of relationship(s) measured, network property assessed, and traits measured in each article. In the table, we distinguish between sociocentric and egocentric designs. The data used in sociocentric designs (i.e., socionetworks or whole networks) were gathered from most or all individuals within a predefined set of boundaries, and assessments of network structures tend to reflect actual² positions within the network (Butts, 2008; Wasserman and Faust, 1994). Traditionally, egonetworks, as defined by Wasserman and Faust (1994), are networks whereby a focal actor (“ego”) enumerates their network members (“alters”) based on some predefined criteria (e.g., “important others” or “family, friends, and significant others”), and then reports the relationships (perceived ties) between each pair of alters. Reports from the ego are based on perceptions of the ego’s immediate social spheres. However, in some egonetworks included

¹ A full list of databases is available at <http://www.libs.uga.edu/multisearch.html>.

² By ‘actual’, we mean that the networks were created using data from more than a single individual in the network. We acknowledge, however, that sociocentric design may not reflect ‘objective reality’, but they do rely on combining (always) or corroborating (usually) the perceptions of multiple people. As such, socionetworks are likely to be more objective than egonetworks. The primary purpose of this distinction is to differentiate how a single individual’s viewpoint of their network’s structure is influenced by their personality in egonetworks, and how individuals’ personality influences their positions in socionetworks.

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