University of Groningen

The moderating influence of personality on individual outcomes of social networks

Regts, Gerdien; Molleman, Eric

Published in:
Journal of Occupational and Organizational Psychology

DOI:
[10.1111/joop.12147](https://doi.org/10.1111/joop.12147)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2016

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):

Regts, G., & Molleman, E. (2016). The moderating influence of personality on individual outcomes of social networks. *Journal of Occupational and Organizational Psychology*, 89(3), 656-682.
<https://doi.org/10.1111/joop.12147>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

The moderating influence of personality on individual outcomes of social networks

Gerdien Regts and Eric Molleman*

Faculty of Economics and Business, University of Groningen, The Netherlands

Advantageous structural positions in a social network provide opportunities for employees. In this study, we examined whether the interaction between the personality traits neuroticism and extraversion affects the extent to which employees benefit from network centrality. Data from a sample of 299 nurses from four Dutch hospitals revealed that affect-based network centrality was associated with higher job satisfaction and that in-degree advice network centrality was associated with higher ratings by supervisors with respect to job performance, but only for extraverts low in neuroticism and introverts high in neuroticism. The results show that the existence and magnitude of the positive relationship between affect-based network centrality and job satisfaction, and the positive relationship between advice network centrality and supervisor ratings of job performance, may crucially depend on the specific interactional combination of personality traits. These findings provide an explanation for the variation in results regarding the network centrality–job satisfaction link and extend empirical evidence for the network centrality–job performance link. The current findings offer team managers insight into how a combination of personality traits influences the effect of network centrality on individual work outcomes. Implications for social networks and selection of employees are discussed.

Practitioner points

- The positive relationship between affect-based network centrality and job satisfaction and the positive relationship between advice network centrality and job performance depend on the specific interactional combination of neuroticism and extraversion.
- Employees benefit most from network centrality when they are high on extraversion and low on neuroticism, or when they are low on extraversion and high on neuroticism.
- For jobs that require much social interaction, extraverts low in neuroticism are preferred.

Research into the effects of social networks in organizations has established that being embedded in social networks at work gives employees access to resources that provide them with opportunities to enhance individual outcomes such as influence and performance (e.g., Brass, 1984; Brass, Galaskiewicz, Greve, & Tsai, 2004; Sparrowe & Liden, 2005). A well-known indicator for being embedded in a social network is *network centrality*, defined by Sparrowe, Liden, Wayne, and Kraimer (2001, p. 316) as ‘the extent to which a given individual is connected to others in a network’ (Mehra, Kilduff, & Brass, 2001). In terms of social capital theory, being central in a network provides social

*Correspondence should be addressed to Eric Molleman, Faculty of Economics and Business, University of Groningen, PO Box 800, Groningen, The Netherlands (email: h.b.m.molleman@rug.nl).

resources that help individuals to obtain desirable outcomes (Agneessens & Wittek, 2012; Flap & Völker, 2001; Zhang, Zheng, & Wei, 2009).

Previous research has shown that in work settings it is important to distinguish two types of social networks, because different types of resources are exchanged in these networks, enhancing different individual work outcomes. Affect-based networks are primarily related to the exchange of affect and social support, while instrumental ties provide mainly resources such as information and advice that are necessary to accomplish a task (e.g., Flap & Völker, 2001; Gibbons, 2004; Liden, Sparrowe, & Wayne, 1997; Roberson & Williamson, 2012; Umphress, Labianca, Brass, Kass, & Scholten, 2003). The affect-based network is derived 'from mutual liking, similarity of attitudes, or personal choice' (Mehra *et al.*, 2001, p. 130). The instrumental network has been defined as being 'comprised of relations through which individuals share resources, such as information, assistance, and guidance' (Sparrowe *et al.*, 2001, p. 317). Affect-based networks are also referred to as friendship, expressive, or informal networks (Lincoln & Miller, 1979; Mehra *et al.*, 2001). We stick to the term affect-based, because this resembles best our focus on the social-emotional side of interpersonal relations. With respect to the instrumental network, in this study, we focus on the advice network, which indicates that employees are sought after for their work-related advice (Klein, Lim, Saltz, & Mayer, 2004). We propose that affect-based network centrality should primarily relate to job satisfaction, an affect-based individual outcome, whereas advice network centrality should mainly relate to individual job performance, a task-related outcome.

Recognizing that network centrality offers *potential* benefits, Anderson (2008) notes that researchers are becoming more and more concerned with the question of how social structure relates to action. Several scholars have criticized the typical assumption that individuals will respond suitably to their advantageous network position, and stated that researchers have neglected to explore how individual differences might affect *actual* network usage and benefits (Kilduff & Krackhardt, 1994; Kilduff & Tsai, 2003; Mehra *et al.*, 2001; Zhou, Shin, Brass, Choi, & Zhang, 2009). Although individual characteristics as antecedents of social networks have been investigated extensively (e.g., Daly, Liou, Tran, Cornelissen, & Park, 2014; Fang *et al.*, 2015; Klein *et al.*, 2004; Zell, McGrath, & Vance, 2014), attention to individual differences related to the use of social networks has been much more limited (e.g., Anderson, 2008; Burt, Jannotta, & Mahoney, 1998). Using a person-situation interactionist perspective (e.g., Abuhamdeh & Csikszentmihalyi, 2009; Funder, 2006; Mischel & Shoda, 1995; Orvis & Leffler, 2011), we will argue that in particular, neuroticism (or its reverse 'emotional stability') and extraversion will be relevant if we consider the consequences of being central in a social network for individual work outcomes. Whether these individual differences influence the realization of social capital benefits is as yet unknown. Investigation of the combined influence of network centrality and the personality traits neuroticism and extraversion on individual work outcomes therefore provides an opportunity to increase our understanding of employees' responses to social structures in organizations (Kilduff & Tsai, 2003). Specifically, it enables us to deal with the research question posed by Shalley, Zhou, and Oldham (2004): 'Do individuals with different personalities (. . .) respond differently to network positions?' (p. 949).

Because personality traits coexist within individuals (Penney, David, & Witt, 2011), and potentially operate together (King, George, & Hebl, 2005), from a person-situation interactionist perspective they provide the opportunity to examine trait combinations that may be more precisely mapped with respect to specific situations (Judge & Erez, 2007; Penney *et al.*, 2011). Including a combination of traits would provide a more

holistic view of an individual and a tighter conceptual meaning of personality (Jensen & Patel, 2011). Several researchers have found evidence of the combined influence of extraversion and neuroticism (or its reverse, 'emotional stability') in predicting subjective well-being (e.g., Hotard, McFatter, McWhirter, & Stegall, 1989; Pavot, Diener, & Fujita, 1990) and job performance (Judge & Erez, 2007). These researchers have shown that the interaction between these personality traits accounts for significant incremental variance (Penney *et al.*, 2011). The effect of neuroticism seems to modify the impact of extraversion and vice versa (Penney *et al.*, 2011); therefore, the specific combination of extraversion and neuroticism may explain why individuals respond differently to a specific social network position. We argue that especially the combination of these two traits, more than their direct effects, explains these different responses. Our main argument is that those who score high on neuroticism will experience negative affect, but that those who are simultaneously high on extraversion direct these negative feelings primarily towards others, while those low in extraversion (i.e., introverts) project them mainly inwards, leading to completely different responses to their social environment (e.g., Eysenck & Eysenck, 1985; Hotard *et al.*, 1989). Thus, we expect that in particular, the combination of neuroticism and extraversion will influence the relationship between an individual's network position and individual work outcomes.

We contribute to the social network literature by investigating the impact of network centrality in two different types of social networks, the affect-based network and the advice network, matching them in specificity with individual work outcomes. Second, we contribute to social capital and social network theory in organizational settings by showing that the combination of extraversion and neuroticism influences the extent to which opportunities provided by network centrality are exploited by an employee, providing further evidence of how social network structure is linked with individual action (Anderson, 2008). Third, we contribute to the person-situation interactionist perspective (Mischel & Shoda, 1995; Orvis & Leffler, 2011) by showing that when it is about realizing positive individual work outcomes of being central in a social network, a combination of two personality traits will be relevant. Recently, on the basis of a meta-analysis, Fang *et al.* (2015) concluded that it is important to integrate network structure and personality theory in predicting work outcomes.

Theory and hypotheses

Network centrality and individual work outcomes

Important determinants of job satisfaction are the social relationships that employees maintain with coworkers (Baron & Pfeffer, 1994). Laboratory network studies dating back to the 1950s found that central actors were more satisfied than peripheral actors (Shaw, 1964). The affect-based network involves ties that provide interpersonal affect, and these are important sources of social support (Balkundi & Harrison, 2006; Lamertz & Aquino, 2004; Umphress *et al.*, 2003). Consequently, as mentioned by Brass (1981), holding a central position in a social network provides an employee with a strong sense of inclusion in the organization that may lead to a positive relationship between affect-based network centrality and job satisfaction. Nevertheless, the few social network studies focusing on job satisfaction that have been conducted in the field show somewhat mixed outcomes (Brass *et al.*, 2004). It has been found that actors with many links have higher job satisfaction than peripheral actors (Roberts & O'Reilly, 1979), but also that the relationship between network centrality and job satisfaction is not a direct but an

indirect relationship through job characteristics (Brass, 1981). Although most studies indicate a positive relationship, there is even one study that indicates that network centrality can be negatively related to job satisfaction (Kilduff & Krackhardt, 1994; as cited in Krackhardt & Brass, 1994). A possible explanation for the mixed results is that social interactions at work are not equally important to all employees (e.g., Barrick, Stewart, & Piotrowski, 2002); there are clear indications that certain personality traits can clarify why individuals respond differently to social relationships (Molleman & Broekhuis, 2012; White, Hendrick, & Hendrick, 2004).

With respect to position in the advice network, in the current study we focus on in-degree advice network centrality, which 'refers to the extent to which others seek help or advice about work-related matters from a focal person' (Kilduff & Krackhardt, 1994, p. 95). So far, evidence from prior studies suggests that a positive relationship exists between in-degree advice network centrality and individual job performance (e.g., Sparrowe *et al.*, 2001). When an employee is asked for his or her advice through advice ties, it is an indication that coworkers believe that the employee has the competence to provide guidance (Zagenczyk, Gibney, Murrell, & Boss, 2008). We therefore suggest that advice ties increase the visibility of employee competence levels (Brass & Burkhardt, 1993), which is likely to lead to higher supervisor ratings of individual job performance. Furthermore, when a central individual in the advice network assists other group members, group performance is likely to improve (Sparrowe *et al.*, 2001). Supervisors recognize and reward individuals who develop a reputation for assisting group members for the benefit of group performance (Chiaburu, Stoverink, Li, & Zhang, 2015); therefore, in-degree advice network centrality is likely to lead to higher supervisor ratings for the central individual's job performance (see, e.g., Sparrowe *et al.*, 2001). Below we will argue that the strength of the positive relationship between in-degree advice network centrality and job performance evaluation will depend on specific personality traits.

The role of personality traits: A person–situation interactionist perspective

A person–situation interactionist perspective presumes that individuals may respond differently to social situations dependent on their personality (Mischel & Shoda, 1995; Orvis & Leffler, 2011). The situational signals we focus on in the current study are the positions of individuals in their affect-based and advice networks. In this study, we focus on two personality traits that explain why individuals may respond differently to their network position: neuroticism (or its reverse, 'emotional stability') and extraversion. There are no clear-cut definitions for extraversion and neuroticism, but in the literature each is described using a series of adjectives which give a clear indication of its meaning and content (e.g., Hofstee, De Raad, & Goldberg, 1992; McCrae & Costa, 1989; Mount & Barrick, 1995). Neurotic persons are described as envious, nervous, and having negative thoughts (Hofstee *et al.*, 1992; John & Srivastava, 1999; Mount & Barrick, 1995). Extraversion is associated with being socially active, talkative, assertive, and gregarious (Hofstee *et al.*, 1992; Mount & Barrick, 1995). Research has revealed that especially individual differences with respect to these two traits are strongly related to social interactions (see, e.g., Barry & Stewart, 1997; Casciaro, Carley, & Krackhardt, 1999; Judge & Erez, 2007; Neuman & Wright, 1999; Ozer & Benet-Martínez, 2006; Watson & Clark, 1992) and mould the way a person responds to social relationships (see, e.g., LePine, Buckman, Crawford, & Methot, 2011; Molleman & Broekhuis, 2012; Ozer & Benet-Martínez, 2006; Roberts, Wilson, Fedurek, & Dunbar, 2008; Swickert, Hittner, & Foster, 2010; White *et al.*, 2004). Although these traits have been investigated extensively as

antecedents of social networks (e.g., Battistoni & Colladon, 2014; Daly *et al.*, 2014; Fang *et al.*, 2015; Roberts *et al.*, 2008), they have not been examined from a person–situation interactionist perspective to answer the question, ‘To what extent can these traits explain how individuals differently profit from their social network position for realizing individual work outcomes?’

The two traits are part of the widely accepted Big Five model of personality (e.g., Goldberg, 1990; Judge, Heller, & Mount, 2002), the other three traits being agreeableness, conscientiousness, and openness to experience. These three personality traits might also appear to be relevant to investigating individuals’ use of their social network position. However, we believe that they are less relevant than the two traits we included. We briefly illuminate this below.

It seems rather obvious that those high on agreeableness are focused on interpersonal relations. Agreeable persons are depicted as being altruistic, unselfish, modest, compliant, good-natured, likable, and considerate (Hofstee *et al.*, 1992; Mount & Barrick, 1995). They do not draw attention to themselves; rather, they wish to accommodate others and make them feel comfortable, and are primarily focused on satisfying others (Kristof-Brown, Barrick, & Franke, 2002). If they are central in an affect-based network, it is likely that they contribute in particular to the job satisfaction of others. Agreeableness might be directly related to the person’s own job satisfaction (e.g., Judge & Ilies, 2002), because agreeable people experience more positive moods, but it is not reasonable that being central in an affect-based network will strengthen this relationship. With respect to performance, agreeable persons may improve performance at the team level in an indirect way, because of their contribution to a positive work climate and group cohesion. But agreeable persons are probably less likely to set high-performance goals for themselves, because they are primarily focused on warm interpersonal relationships (Judge & Ilies, 2002). Therefore, there is no reason to believe that advice network centrality will contribute greatly to their own performance and that advice network centrality and agreeableness will interact.

Highly conscientious people are described as disciplined, hardworking, high in achievement motivation, and believing in their own capabilities (Hofstee *et al.*, 1992; Mount & Barrick, 1995; Penney *et al.*, 2011). Past research has shown that conscientiousness is related to performance rather independently of the work context (Barrick & Mount, 1991; Organ & Ryan, 1995; Ziegler *et al.*, 2014). Persons high in conscientiousness wish to perform well, but generally believe that they are themselves responsible for realizing this, and also believe in their own abilities to do so (Fang *et al.*, 2015; Judge & Ilies, 2002; Monzani, Ripoll, & Peiro, 2015). They are also seen as competent by coworkers; for that reason, coworkers are likely to ask the highly conscientious person for advice (Battistoni & Colladon, 2014; Liu & Ipe, 2010). Therefore, while a conscientious person who is central in the advice network may be asked for advice, it is unlikely that this centrality stimulates the person to improve his or her own performance further. It also has been found that conscientiousness is positively related to job satisfaction, and it is supposed that this is mainly due to achievements (Judge *et al.*, 2002). However, on the basis of the characteristics of conscientiousness, there is no reason to believe that this trait strengthens the relationship between affect-based network centrality and job satisfaction.

Those high in openness are described as creative, artistic, analytical, intellectual, and individualistic (Hofstee *et al.*, 1992; Mount & Barrick, 1995). They are inclined to go their own way and operate rather independently of their social environment (Klein *et al.*, 2004). They are triggered in particular by creative tasks and a non-routine work setting (Barrick *et al.*, 2002; Major, Turner, & Fletcher, 2006; Penney *et al.*, 2011), but probably

not so much by their social network position. Therefore, openness seems not to be a very good candidate for moderating the relationship between network centrality and individual work outcomes.

In sum, we do not wish to conclude that agreeableness, conscientiousness, and openness are irrelevant to investigations of the relationship between network centrality and individual work outcomes, but we consider neuroticism and extraversion to be the most significant traits that influence this relationship. In the following section, we argue that especially the combination of these two traits explains variation in the relationship between network centrality and individual work outcomes.

The combined moderating role of extraversion and neuroticism

As mentioned above, those high in neuroticism experience a high level of negative affect. However, highly extravert persons will project these negative feelings primarily upon others, while introverts will mainly project these negative feelings inwards, which is less visible to the outer world. Therefore, neurotic extraverts will respond differently to their social network position than neurotic introverts, and, consequently, with different individual work outcomes. We explain this in more detail below.

Extraverted, emotionally stable individuals tend to be hearty, buoyant, confident, indefatigable, vigorous, carefree, and easygoing (Eysenck & Eysenck, 1985; Hofstee *et al.*, 1992). As a result, they are not only socially active and visible, but they also view themselves and their social world in a positive manner. When they are central in the affect-based network, they have the opportunity to interact with coworkers, which facilitates social exchange and interaction, likely satisfying the extraverts' needs for social interaction (Chiaburu *et al.*, 2015; Panaccio & Vandenberghe, 2012). We therefore expect that especially highly extraverted stable individuals will be able to benefit from and exploit a central position in the affect-based network, likely strengthening the link between affect-based network centrality and job satisfaction.

Further, because extraverted, emotionally stable people approach their social environment in a constructive way and are interpersonally active, they are willing to share their vision and ideas, and, when asked for advice, they are able and eager to effectively and efficiently give it. This clearly makes them and their competences visible in a positive way, leading to better performance evaluations, and thus strengthening the link between in-degree advice network centrality and supervisor ratings of individual job performance.

Extraverted neurotic individuals have been described as volatile, impulsive, wordy, changeable, explosive, meddlesome, moody, and restless (Eysenck & Eysenck, 1985; Hofstee *et al.*, 1992; Klein *et al.*, 2004). Although this description suggests that these persons are socially active and visible, they are inclined to approach their social environment in a negative way (Bono & Judge, 2004; Duffy, Shaw, Scott, & Tepper, 2006). It is likely that neurotic extraverts will make strong appeals to their colleagues, but they probably lack important interpersonal skills, such as being a good listener, therefore inhibiting their ability to exploit positive social relationships at work, and their appeals to colleagues may be intrusive and impulsive. We therefore expect that, for extraverts who are also highly neurotic, the positive relationship between being central in the affect-based network and job satisfaction will be weaker than for extraverts who are low in neuroticism.

With respect to performance, individuals who are high in neuroticism and extraversion are inclined to actively approach their social environment in a negative way, and may

respond to requests for advice with disrespect, annoyance, or criticism (Klein *et al.*, 2004). Moreover, because they are talkative, they may easily be distracted from their work, and for longer periods, when asked for advice; therefore, there is less time available to perform well, and their attention, energy, and other resources are partly consumed by worry, negative sentiment and gossip, or other unproductive interpersonal activities (Penney *et al.*, 2011). Such individuals are likely to be noticeable in a more negative sense, and their ability to effectively act upon their in-degree advice network centrality may be compromised to a certain extent, thus weakening the positive link between in-degree advice network centrality and supervisor ratings of individual job performance (Smillie, Yeo, Furnham, & Jackson, 2006).

Neurotic introverts have been described as shy, weak, inhibited, guarded, self-critical, insecure, self-pitying, fearful, and melancholic (Hofstee *et al.*, 1992). These adjectives suggest that they have a negative attitude, but this negative attitude pertains mainly to the self or to how they think that others see them. While introverts may derive less energy from their social environment and respond less openly to it, they are not immune for it. It has been shown, for example, that particularly for neurotic introverts, social disapproval is a threat (Bendersky & Shah, 2013); a more central position in the affect-based network could therefore strengthen their confidence and self-esteem and provide neurotic introverts with relevant social support that leads to higher job satisfaction.

Further, the experience of centrality in the advice network is likely to increase their self-reliance and self-confidence, which will motivate them to perform well. In addition, it is likely that neurotic introverts will engage in group task-oriented behaviours such as giving advice upon request, because these provide an opportunity to inhibit their negative self-view and to avoid the threat of being seen as incompetent by others (Bendersky & Shah, 2013). Meanwhile, this is likely to contribute to team and individual performances, and so lead to higher supervisor ratings. We therefore expect that for neurotic introverts, the link between in-degree advice network centrality and supervisor ratings of job performance will be relatively strong.

Emotionally stable introverts can be described as unexcitable, sedate, tranquil, modest, acquiescent, unassuming, and placid (Hofstee *et al.*, 1992). This depiction suggests that emotionally stable introverts are triggered less by their affect-based relations to experience a high level of job satisfaction. Thus, for introverts who are low in neuroticism (i.e., high in emotional stability), we expect that the positive relationship between affect-based network centrality and job satisfaction will be weaker than for introverts who are high in neuroticism.

Further, introverts low in neuroticism are not easily distracted from their own work for a significant period when asked for advice, which is likely to reduce their detectable role in realizing a good team performance. Moreover, it is reasonable to believe that being central in a network creates less work motivation for unexcitable, emotionally stable introverts, because they are likely to persevere regardless of their structural position. Therefore, we expect that for them, the relationship between in-degree advice network centrality and job performance will be relatively weak.

In sum, we hypothesize the following:

Hypothesis 1: When extraversion is high, the positive relationship between affect-based network centrality and job satisfaction will be stronger among employees who are low in neuroticism than among employees who are high in neuroticism. When extraversion is low, the positive relationship between affect-based network

centrality and job satisfaction will be stronger among employees who are high in neuroticism than among employees who are low in neuroticism.

- Hypothesis 2:* When extraversion is high, the positive relationship between in-degree advice network centrality and supervisor ratings of individual job performance will be stronger among employees who are low in neuroticism than among employees who are high in neuroticism. When extraversion is low, the positive relationship between in-degree advice network centrality and individual supervisor ratings of job performance will be stronger among employees who are high in neuroticism than among employees who are low in neuroticism.

Method

Sample and procedure

With the consent of the boards of directors of four Dutch hospitals, we approached the managers of all internal medicine and orthopaedic units of these hospitals with the request to participate in the study. The first author gave a presentation at each unit to inform nurses and their managers about the content of the research, the procedure, and how confidentiality would be ensured. Thereafter, we administered questionnaires to 425 nurses working in 17 hospital units. An accompanying letter contained information about the research. After 2 weeks, a reminder was sent to all nurses. Of these nurses, 299 voluntarily completed questionnaires (response rate = 70%). There was an average of 23 nurses in each unit, ranging from 11 to 39 nurses per unit. The nurses were mostly women (93%), and the average age was 39 years ($SD = 10.90$). Their average organizational tenure was 13 years ($SD = 10.80$), and the nurses had held their current positions for an average of 11 years ($SD = 9.95$). Because the questionnaires included coworkers' names, we assured participants of the strict confidentiality of their responses.

Measures

We asked supervisors to rate the job performances of their followers. Furthermore, to acquire multisource data and to improve the reliability of network data, affect-based network centrality and in-degree advice network centrality were measured using a round-robin design in which each team member rated, and was rated by every other team member (Warner, Kenny, & Stoto, 1979) using the roster method (Marsden, 1990). Respondents were provided with a roster, which is a list containing the names of each coworker in their own unit. Supervisors were not included in the network rosters. We used single-item measures for network centrality; this is acceptable and usual in network studies, because answering multiple questions per measure about all other nurses in the unit would be extremely demanding (e.g., Marsden, 1990; Venkataramani, Green, & Schleicher, 2010). We limited the current research to *direct* connections between employees by examining the impact of *degree centrality* (Wasserman & Faust, 1994) on job satisfaction and job performance. For measuring direct, asymmetric ties, such as advice ties, the use of in-degree centrality using coworker ratings is common in organizational research (Kilduff & Krackhardt, 1994). However, because affect-based ties resemble the extent of mutual liking (Mehra *et al.*, 2001), we used a combination of coworker and self-ratings (in-degree and out-degree centrality) to measure affect-based network centrality. Following Wasserman and Faust (1994), to compute centrality scores,

we averaged the values of all ties to the individual employee level for in-degree advice network centrality, and averaged the values of all ties to and from an employee for affect-based network centrality. Such a measure of centrality refers to the average connection of the employee with all other coworkers in the work team (Brass, 1984; Wasserman & Faust, 1994). Finally, employees provided self-reports of extraversion, neuroticism, and job satisfaction. Thus, data were provided from three sources (i.e., supervisors, coworkers, and individuals themselves), reducing common source concerns.

Affect-based network centrality

Because the affect-based network involves mutual liking among employees (Mehra *et al.*, 2001), we measured affect-based network centrality using a social network question that captures the degree of liking. On the basis of Umphress *et al.*'s (2003) measure of affective ties, we asked the participants to rate each of their coworkers on the item, 'How do you generally feel about this coworker?' The scale ranged from 1 (*dislike a lot*) to 7 (*like a lot*). To calculate mutual liking, for each dyad in which an employee was involved, we first averaged the employee's score indicating the extent to which he or she liked his or her coworker, and the coworker's score indicating the extent to which that coworker liked the employee. Next, we aggregated these dyadic scores to the individual level by averaging the mutual liking scores of the dyads in which the employee was involved to indicate the employee's affect-based network centrality.¹

In-degree advice network centrality

On the basis of Ibarra's (1993) measure of the advice network, respondents were asked to rate each of their coworkers on the item, 'To what extent is X an important source of professional advice, whom you approach if you have a work-related problem or when you want advice on a decision you have to make?' The scale ranged from 1 (*not at all*) to 7 (*to a great extent*). To calculate in-degree advice network centrality, scores on this item were averaged for each employee.

Extraversion

We used all six items from the extraversion subscale of the shortened version of the Five-Factor Personality Inventory (FFPI; Hendriks, Hofstee, & De Raad, 1999), each subscale of which contains the six highest loading items from its corresponding FFPI factor. The subscale for extraversion includes items such as 'loves to chat' on the positive pole and 'keeps apart from others' on the negative pole. The scale ranged from 1 (*not at all applicable*) to 5 (*entirely applicable*). Cronbach's alpha for this subscale was .65, which was in line with earlier studies (e.g., Bakker, Van Oudenhoven, & Van der Zee, 2004).

¹ One of the reviewers noticed that the way we constructed the variable 'affect-based network centrality' might also include dyadic relationships in which there actually was no mutual liking. Therefore, we also tested our first hypothesis with measures for affect-based network centrality in which dyads were excluded for which the scores of the focus person (A) liking another (B) and that other (B) liking the focus person (A) differed more than 1, 2, and 3. In all three occasions, the results had no effect on the outcomes for testing our hypotheses. In 28.42% of the cases, the score 'A likes B' and 'B likes A' differs 1 or more. In 9.82% of the cases, the score 'A likes B' and 'B likes A' differs 2 or more. In 2.98% of the cases, the score 'A likes B' and 'B likes A' differs 3 or more. The full results of these analyses can be obtained from the first author.

Neuroticism

We measured neuroticism using all six items of the neuroticism subscale of the shortened version of the FFPI. This subscale contains items such as 'is always in the same mood' on the positive pole and 'gets overwhelmed by emotions' on the negative pole. The scale ranged from 1 (*not at all applicable*) to 5 (*entirely applicable*). Cronbach's alpha for these six items was .79.

Job satisfaction

Job satisfaction was measured using the six items derived from Agho, Price, and Mueller's (1992) global measure of job satisfaction. A sample item is, 'I find real enjoyment in my job'. Responses were given on a 7-point scale ranging from 1 (*completely disagree*) to 7 (*completely agree*). Cronbach's alpha for these six items was .88.

Job performance

Molleman and Van der Vegt (2007) developed a scale to measure nurses' overall performance. They distinguished six criteria that define a high standard of nursing performance: 'dedication', 'communication', 'self-reliance', 'demonstrating accountability', 'administrative work', and 'planning of work'. After extensive discussion with an expert group consisting of head nurses and policy advisors, 10 items based on these six criteria were carefully chosen to measure job performance. For every follower, we then asked the supervisor to indicate how satisfied he or she was with the follower's performance with respect to the 10 items, on a 5-point scale ranging from 1 (*very dissatisfied*) to 5 (*very satisfied*). These items were 'nursing skills', 'knowledge concerning nursing skills', 'communication with the patient/family of the patient', 'communication about the patient', 'collaboration', 'administration', 'planning of tasks', 'improving care and coordination', 'job involvement', and 'improving the image/performance of the unit'. Cronbach's alpha for the 10 items was .83.

Control variables

We controlled for demographics (i.e., age, organizational tenure, and job tenure [all in years], and gender). In addition, we also controlled for the other three Big Five traits (i.e., agreeableness, conscientiousness, and openness to experience).

Discriminant and convergent validity

We conducted a confirmatory factor analysis (CFA) to assess the discriminant and convergent validities of the job satisfaction, job performance, neuroticism, and extraversion constructs using the maximum likelihood method of the LISREL 8.80 computer package. First, we tested our hypothesized model (Model 1), in which the job satisfaction, job performance, neuroticism, and extraversion items were grouped according to the four corresponding latent constructs. We then compared this model with (2) a model with a single underlying construct, and (3) a model with two underlying constructs in which job satisfaction and job performance were grouped as one factor and neuroticism and extraversion as another.

The first model, the hypothesized model, fitted our data well: The χ^2 was 846.11 (df = 344, $p < .001$, $n = 299$), the Non-Normed Fit Index (NNFI) was .90, the

comparative fit index (CFI) was .91, and the root-mean-square error of approximation (RMSEA) was .07. These values meet the cut-off values that are generally used for these indices (.90 for NNFI and CFI and .08 for RMSEA). In addition, the factor loading of each item onto the corresponding latent construct was significant at the .01 level or better. The fit indices of the other models were significantly worse than those of the hypothesized measurement model. For the second model: $\Delta\chi^2(6) = 3639.95$, $p < .001$, NNFI = .59, CFI = .62, RMSEA = .18; for the third model: $\Delta\chi^2(5) = 1879.13$, $p < .001$, NNFI = .71, CFI = .62, RMSEA = .15.

We also conducted a CFA without the job performance construct. First, we tested our hypothesized model (Model 1), in which job satisfaction, neuroticism, and extraversion items were grouped according to the three corresponding latent constructs. We then compared this model with (2) a model with a single underlying construct, and (3) a model with two underlying constructs in which neuroticism and extraversion were grouped as one factor.

The first model, the hypothesized model, fitted our data well: The χ^2 was 352.41 ($df = 132$, $p < .001$, $n = 299$), the NNFI was .93, the CFI was .94, and the root-mean-square error of approximation (RMSEA) was .08. In addition, the factor loading of each item onto the corresponding latent construct was significant at the .01 level or better. The fit indices of the other models were significantly worse than those of the hypothesized measurement model. For the second model: $\Delta\chi^2(3) = 1552.30$, $p < .001$, NNFI = .68, CFI = .71, RMSEA = .19; for the third model: $\Delta\chi^2(2) = 265.50$, $p < .001$, NNFI = .86, CFI = .88, RMSEA = .11.

Data analyses

Given that the individual-level data were nested within units, it is possible that the responses were not independent. For job satisfaction, the results of a one-way analysis based on the units, $F(16, 297) = 3.09$, $p < .001$, were significant, indicating that the nested structure might influence the results. For job performance, the results based on the units, $F(16, 390) = 8.19$, $p < .001$, were also significant. Consequently, we tested our hypotheses using multilevel analyses, analysing the nested data at the individual level while controlling for the unit level. For this, we used the Mixed Models command in SPSS (IBM SPSS Statistics, IBM, NY, USA). The number of hospitals (four) was so low that multilevel analyses including random effects for hospitals would be rather meaningless (Raudenbush & Bryk, 2002; Snijders & Bosker, 1999). Instead, we created three dummy variables to capture the hospitals ('Dummy 1', 'Dummy 2', and 'Dummy 3').

To test our hypotheses, we conducted moderated regression analyses following the procedures recommended by Aiken and West (1991): (1) Standardize the predictors to reduce multicollinearity between these variables and their interaction term; (2) multiply the standardized predictor variables to calculate their interaction term; (3) include the 'main' effects in the model to prevent a biased estimate of the interaction; and (4) to depict a significant interaction effect, compute regression equations using values of the predictors that lie ± 1 SD from their means. For the dependent variables, we will use only part of the scale in the figures. We think that statistics are there to show whether an interaction is significant or not. Figures should help the reader to understand a significant interaction, and by only using part of the scale this will be facilitated. Due to some missing data for the performance measure, the analyses including this variable relate to 293 observations. The other analyses pertain to 299 observations.

Results

The descriptive statistics and correlations among the study variables can be found in Table 1.

Job satisfaction

To test Hypothesis 1, we regressed job satisfaction on the independent variables in four steps (see Table 2). The results of Model 4 show a significant three-way interaction between affect-based network centrality, neuroticism, and extraversion on individual job satisfaction ($B = -0.14, p < .01$). To test whether the form of this three-way interaction corresponds with the hypothesized pattern, we plotted the interaction in Figure 1. Figure 1a shows a significant positive relationship between affect-based network centrality and job satisfaction for employees scoring high on neuroticism and low on extraversion (simple slope: $B = 0.43, p < .001$). There was no significant relationship between affect-based network centrality and job satisfaction for employees scoring low on neuroticism and low on extraversion (simple slope: $B = 0.14, p = \text{ns}$). Furthermore, Figure 1b shows a significant positive relationship between affect-based network centrality and job satisfaction for employees scoring low on neuroticism and high on extraversion (simple slope: $B = 0.32, p < .01$), but no significant relationship for employees scoring high on neuroticism and high on extraversion (simple slope: $B = 0.05, p = \text{ns}$). If we compare Figure 1a and 1b, we see that respondents who score high on neuroticism and low on extraversion score the lowest on job satisfaction if their centrality in the affect-based network is low, but profit relatively greatly in terms of higher job satisfaction if they are more central in this network (Figure 1a). Those who score low on neuroticism and high on extraversion report the highest level of job satisfaction if they are central in the affect-based network, and they also profit relatively greatly from such a structural position (Figure 1b). These patterns are in line with our expectations, supporting Hypothesis 1.²

Job performance

To test Hypothesis 2, we regressed job performance on the independent variables in four steps (see Table 3). The results show a significant three-way interaction between in-degree advice network centrality, neuroticism, and extraversion on individual job performance ($B = -0.04, p < .05$). To test whether the form of this three-way interaction corresponds with the hypothesized pattern, we plotted the interaction in Figure 2. Figure 2a shows a significant positive relationship between in-degree advice network centrality and job performance for employees scoring high on neuroticism and low on extraversion (simple slope: $B = 0.20, p < .001$). There was a weaker significant positive relationship between in-degree advice network centrality and job performance for employees scoring low on neuroticism and low on extraversion (simple slope: $B = 0.10$,

²We also explored asymptotic and curvilinear relationships. Neither was significant: for the asymptotic (log linear) term, $B = 4.35, SE = 7.77, t = 0.56, \text{ns}$; and for the curvilinear (quadratic) term, $B = 0.24, SE = 0.43, t = 0.56, \text{ns}$. In addition, we tested whether affect-based network centrality mediates the relationship between neuroticism and extraversion and job satisfaction. The indirect effect for neuroticism was $-.03, SE = 0.03, p = \text{ns}$, and for extraversion $.10, SE = 0.01, p < .05$. So, these results indicate only a significant mediation effect of affect-based network centrality mediating the relationship between extraversion and job satisfaction.

Table 1. Descriptive statistics and Pearson zero-order correlations among the study variables

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10	11	12
1. Age	38.58	10.90												
2. Gender (male = 0; female = 1)	0.93	0.26	-.07											
3. Organizational tenure	13.23	10.80	.72***	-.01										
4. Job tenure	10.87	9.95	.65***	.05	.70***									
5. Affect-based network centrality	5.46	0.50	-.08	.04	-.03	-.07								
6. In-degree advice network centrality	4.28	0.78	.15**	.03	.22**	.06	.33***							
7. Agreeableness	3.98	0.48	-.03	-.01	-.05	-.07	.25***	-.05						
8. Conscientiousness	3.88	0.55	.12*	.02	.07	.15**	.07	.00	.20***					
9. Openness to experience	3.81	0.45	.04	-.11	.00	-.09	-.01	.19**	-.01	.11				
10. Neuroticism	2.35	0.66	-.10	.08	-.06	-.02	-.15**	-.13*	-.11	.06	-.28***			
11. Extraversion	3.92	0.51	-.18**	.16**	-.18**	-.17**	.23**	.05	.16**	-.05	.16**	-.30**		
12. Job satisfaction	5.07	1.14	.10	.00	.03	.02	.31**	.08	.14*	.05	.06	-.19**	.19**	
13. Job performance	3.72	0.45	.15**	-.01	.12*	.12*	.11	.30**	.02	-.04	.12*	-.09	-.02	.13*

Note. $n = 299$ employees (for job performance, $n = 293$).

* $p < .05$; ** $p < .01$; *** $p < .001$.

Table 2. Results of multilevel regression analyses for job satisfaction (Hypothesis 1)^a

Step and variables	Job satisfaction							
	Model 1		Model 2		Model 3		Model 4	
	B	SE	B	SE	B	SE	B	SE
Intercept	5.27***	0.29	5.41***	0.28	5.42***	0.28	5.44***	0.27
Dummy 1	-1.08**	0.33	-0.95**	0.31	-0.92*	0.31	-0.98**	0.32
Dummy 2	-0.35	0.21	-0.38	0.20	-0.37	0.19	-0.40	0.20
Dummy 3	-0.64**	0.21	-0.53*	0.20	-0.53*	0.20	-0.58*	0.20
Age	0.11	0.10	0.15	0.09	0.16	0.09	0.18	0.09
Gender	0.21	0.25	0.05	0.24	0.07	0.24	0.07	0.24
Organizational tenure	-0.01	0.10	-0.04	0.09	-0.04	0.09	-0.05	0.09
Job tenure	-0.05	0.09	-0.03	0.08	-0.03	0.08	-0.03	0.08
Agreeableness	0.15*	0.07	0.06	0.06	0.05	0.06	0.05	0.06
Conscientiousness	0.01	0.07	0.03	0.06	0.04	0.06	0.02	0.06
Openness to experience	0.06	0.06	0.01	0.06	0.00	0.06	0.00	0.06
Affect-based network centrality (AFNC)			0.27***	0.07	0.28***	0.07	0.23**	0.07
Neuroticism (NE)			-0.10	0.07	-0.08	0.07	-0.05	0.07
Extraversion (EX)			0.12	0.07	0.12	0.07	0.09	0.07
AFNC × NE					0.03	0.07	0.01	0.07
AFNC × EX					-0.02	0.06	-0.05	0.06
NE × EX					0.06	0.05	0.00	0.06
AFNC × NE × EX							-0.14**	0.05
Deviance statistic (-2 log likelihood)	844.40		817.00		814.28		806.34	
Change in deviance statistic			27.40***	df = 3	2.72	df = 3	7.94**	df = 1
R ²	.11		.19		.20		.22	
Pseudo-R ²	.07		.10		.10		.11	

Note. AFNC = affect-based network centrality; NE = neuroticism; EX = extraversion.

^an = 299 employees. Non-standardized regression coefficients are reported.

*p < .05; **p < .01; ***p < .001.

Figure 1. Three-way interaction between affect-based network centrality, neuroticism, and extraversion on job satisfaction (a: top; b: bottom).

$p < .05$). The slope for low neuroticism and low extraversion is probably still significant due to a strong positive main effect of in-degree advice network centrality. Furthermore, Figure 2b shows a significant positive relationship between in-degree advice network centrality and job performance for employees scoring high on extraversion and low on neuroticism (simple slope: $B = 0.16$, $p < .01$), but no significant relationship for employees scoring high on neuroticism and high on extraversion (simple slope: $B = 0.08$, $p = ns$). Again, those high in neuroticism and low in extraversion (Figure 2a) and those low in neuroticism and high in extraversion (Figure 2b) seem to profit most in terms of positive performance evaluations from being central in the advice network. These patterns are in line with our expectations, supporting Hypothesis 2.³

Discussion

To our knowledge, this is the first study in which the conditional effects of interactions among personality traits on the relationship between network structure and individual outcomes were examined. We aimed to broaden our understanding of how social network structure relates to individual outcomes by examining how the combination of

³ We also explored asymptotic and curvilinear relationships. Neither was significant: for the asymptotic (log linear) term, $B = -0.20$, $SE = 1.09$, $t = -0.18$, ns ; and for the curvilinear (quadratic) term, $B = 0.06$, $SE = 0.12$, $t = 0.45$, ns . In addition, we tested whether advice network centrality mediates the relationship between neuroticism and extraversion and job performance. The indirect effect for neuroticism was -0.1 , $SE = 0.01$, $p = ns$, and for extraversion $.01$, $SE = 0.02$, $p = ns$. So, there was no support in our data for these path models.

Table 3. Results of multilevel regression analyses for job performance (Hypothesis 2)^a

Step and variables	Job performance							
	Model 1		Model 2		Model 3		Model 4	
	B	SE	B	SE	B	SE	B	SE
Intercept	3.80***	0.13	3.77***	0.13	3.77***	0.13	3.77***	0.13
Dummy 1	−0.31	0.22	−0.23	0.22	−0.22	0.21	−0.23	0.22
Dummy 2	−0.04	0.13	−0.04	0.12	−0.04	0.12	−0.04	0.12
Dummy 3	−0.16	0.13	−0.15	0.13	−0.14	0.13	−0.15	0.13
Age	0.08	0.04	0.07*	0.04	0.08*	0.04	0.08*	0.04
Gender	0.07	0.09	0.04	0.09	0.05	0.09	0.05	0.09
Organizational tenure	0.00	0.04	−0.04	0.04	−0.05	0.04	−0.05	0.04
Job tenure	0.00	0.03	0.02	0.03	0.02	0.03	0.02	0.03
Agreeableness	−0.01	0.03	0.00	0.02	0.00	0.02	0.00	0.02
Conscientiousness	−0.04	0.03	−0.04	0.02	−0.03	0.02	−0.04	0.02
Openness to experience	0.06*	0.02	0.03	0.02	0.03	0.02	0.03	0.02
Advice network centrality (ANC)			0.14***	0.03	0.14***	0.03	0.14***	0.03
Neuroticism (NE)			−0.04	0.02	−0.04	0.03	−0.04	0.03
Extraversion (EX)			−0.03	0.02	−0.02	0.02	−0.03	0.02
ANC × NE								
ANC × EX					0.01	0.03	0.00	0.03
NE × EX					−0.02	0.02	−0.02	0.02
ANC × NE × EX					−0.00	0.02	−0.04*	0.02
Deviance statistic (−2 log likelihood)	304.87		276.62		275.48		271.29	
Change in deviance statistic			28.25***				4.19*	
R ²	.08		.15		.14		.17	
Pseudo-R ²	.07		.16		.16		.18	
				df = 3		df = 3		df = 1

Note. ANC = in-degree advice network centrality; NE = neuroticism; EX = extraversion.

^an = 293 employees. Non-standardized regression coefficients are reported.

*p < .05; **p < .01; ***p < .001.

Figure 2. Three-way interaction between in-degree advice network centrality, neuroticism, and extraversion on job performance (a: top; b: bottom).

an individual's neuroticism and extraversion might affect actual network benefits. We built on previous social network and social capital research, and extended the literature by examining the moderating influence of a particular combination of personality traits on the association between network centrality, on the one hand, and job satisfaction and job performance, on the other. Our results show that although degree centrality in the affect-based network and in-degree centrality in the advice network provided a structural opportunity for, respectively, higher job satisfaction and higher supervisor ratings of job performance, the particular combination of an employee's level of neuroticism and extraversion affected the extent to which the employee benefitted from network centrality. The effects of the interactions between network centrality and the combinations of personality traits on the individual outcomes of job satisfaction and job performance indicated a similar pattern. Employees benefit most from network centrality when they are high on extraversion and low on neuroticism, or when they are low on extraversion and high on neuroticism.

Theoretical contribution

Our findings make several important contributions related to social capital and social network theory in organizational behaviour. First, they confirm the importance of distinguishing network types based on tie content (e.g., Gibbons, 2004) when linking them with different network consequences (e.g., Umphress *et al.*, 2003). The results

indicate that affect-based network ties are positively associated with job satisfaction, a more affect-based individual outcome, and that instrumental advice ties are positively associated with individual job performance, albeit especially for employees with certain personalities.

Second, we contribute to social capital and social network theory in organizational settings by showing that the combination of extraversion and neuroticism influences the extent to which opportunities provided by network centrality are exploited by an employee. More specifically, we were able to provide an explanation for the somewhat mixed field results that have been found in prior research regarding the relationship between network centrality and job satisfaction (Brass *et al.*, 2004) by including personality as a potential moderator in the research model. Depending on the specific combination of extraversion and neuroticism, we found a significant positive relationship between affect-based network centrality and job satisfaction, or no significant relationship.

Only for emotionally stable extraverts and for neurotic introverts was the above relationship significant and positive. *Emotionally stable extraverts* profit more from being central in an affect-based network, because they initiate social interaction and approach others in a positive way. *Introverts who are high in neuroticism* have a negative self-view and think that others also have a negative attitude towards them. If they are more central in an affect-based network this may enhance their confidence and self-esteem, leading to higher job satisfaction. Our results indicate that the highest level of job satisfaction is reported by extraverted, emotionally stable persons who score high on being central in the affect-based network and that the lowest level of job satisfaction is reported by introverted, neurotic persons who score low on being central in the affect-based network. This clarifies why the advantage of being central in the affect-based network is relatively large for emotionally stable extraverts and neurotic stable introverts. *Highly neurotic extraverts* are socially active, but mainly interact with others in a negative fashion (Bono & Judge, 2004; Duffy *et al.*, 2006), probably reducing their ability to use their social relationships in a positive way. For *emotionally stable introverts*, affect-based ties seem to be less important for realizing high job satisfaction; in that sense, they profit relatively less from being central in an affect-based network. The foregoing indicates that variations in results regarding the relationship between network centrality and job satisfaction might be explained by an employee's personality (see also Brass *et al.*, 2004; Burt, 2000).

Third, we have provided further empirical evidence for the link between network centrality and job performance. Similar to earlier findings (e.g., Sparrowe *et al.*, 2001), the current findings show that in-degree advice network centrality has a significant positive effect on job performance. However, this only applies to emotionally stable extraverts and neurotic introverts and, to a lesser extent, emotionally stable introverts. *Extraverted, emotionally stable* persons approach their social environment in a positive way, are socially active, are eager to advise others, and are evidently present in a helpful sense. This clearly leads to a better performance evaluation. *Extraverted, neurotic* individuals are also socially active, but they are inclined to access others primarily in a negative way, for example, by criticizing others (Klein *et al.*, 2004); this is likely to lead to lower supervisor ratings of individual job performance. *Neurotic introverts* have a negative self-view; for them, being central in the advice network and contributing to team performance can foster self-esteem, which motivates them to do so (Bendersky & Shah, 2013), likely leading to higher supervisor ratings of individual job performance. For *emotionally stable introverts*, the relationship between advice network centrality and job performance was

also positive, albeit weaker than for neurotic introverts. The relationship is probably weaker because being central in an advice network is less motivating for emotionally stable introverts, and their contribution to the team task may also be less noticeable, restraining high-performance evaluations. These results suggest that an employee's position in the social network and personality traits combine interactively in predicting supervisor ratings of job performance.

Finally, our study contributes to the person–situation interactionist perspective (Mischel & Shoda, 1995; Orvis & Leffler, 2011). While a number of researchers have already provided empirical evidence that the interaction among personality traits accounts for significant incremental variance in important individual work outcomes (e.g., Penney *et al.*, 2011), the current findings indicate that the interaction among personality traits also conditionally influences the link between social network position and individual work outcomes. More specifically, our results show that the interactive blend of extraversion and neuroticism determines to what extent an advantageous network position is exploited by an employee. A recent meta-analysis by Fang *et al.* (2015) emphasized the relevance of integrating network structure and personality theory in predicting work outcomes.

Practical implications

Aside from the theoretical contributions of this study, we believe that the current findings also provide insights that will be valuable to management practitioners, especially in work settings where employee personality traits are assessed. The results of the current study can be used during selection processes because they suggest that organizations may be better able to predict an employee's ability to benefit from degree centrality in social networks when personality is considered as an interaction of traits. Especially applicants who are high on extraversion and high on neuroticism seem less able to fully benefit from centrality in social networks. The opposite is true for emotionally stable extraverts, who benefit greatly from being central in a network. Those low on extraversion and high on neuroticism seem to profit relatively greatly from being central in a network; however, they scored the lowest on job satisfaction and job performance when their centrality was low. Besides, the functioning of those high in neuroticism may be problematic because neuroticism has, for example, been found to correlate negatively with work motivation and positively with work stress (Judge & Ilies, 2002; Judge, Klinger, Simon, & Yang, 2008). For these reasons, it might be unattractive to select neurotic introverts. Of course, it is important to determine to what extent the job actually requires social interaction in order to ensure a match between job requirements and the applicant's qualifications: that is, person–job fit (Sekiguchi & Huber, 2011). For jobs that require much social interaction, such as consultancy, nursing, policing, or teaching, personality traits such as extraversion and neuroticism probably matter more, while for jobs for which social interaction and teamwork are less important, such as a mail delivery, gardening, or working as a mechanic, these may be less important.

Additionally, because the results of this study indicate that affect-based network centrality and in-degree advice network centrality are associated with important individual work outcomes, managers should become more active in observing the affect-based and advice network (Feeley, Hwang, & Barnett, 2008; Zagenczyk & Murrell, 2009), paying special attention to socially isolated employees. Especially socially isolated neurotic introverts benefit greatly from more central positions in the social network, and managers can play an important role in giving these employees more interaction

opportunities (Uhl-Bien, Graen, & Scandura, 2000). However, strengthening the structural network position for neurotic introverts might be difficult and, therefore, costly. Emotionally stable extraverts also profit relatively greatly from being central in a network, but it is likely that managerial interventions are less needed to help such employees to become more central, because they are probably able to realize this themselves (Chiaburu *et al.*, 2015; Swickert *et al.*, 2010).

Strengths, limitations, and future directions

The ratings of the personality traits and one of the dependent variables were provided by the same source. Each participant rated his or her own extraversion and neuroticism, and the dependent variable of job satisfaction. Although another individual's perception of employee attitudes is most likely not as good a measure as the employee's own perception (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003), there is the possibility with this type of data that the observed effects are influenced by common source variance (Crampton & Wagner, 1994; Spector, 1987). However, our network measures and our measure of job performance constitute a stronger measure than self-reported data, and both of our hypotheses were tested using data from different sources, precluding the possibility of common source bias.

A weakness of this study is that we used a cross-sectional design, which restricts our ability to draw firm conclusions about the direction of causality between the constructs. Although the findings are consistent with our theoretical reasoning, and the impact of network centrality on individual job performance was established in earlier research (Sparrowe *et al.*, 2001), the actual causality might deviate from our hypotheses. For future research, we recommend a stronger design, such as a longitudinal design.

Some caution is advised in drawing generalizations from this study, because the sample is possibly only representative of hospitals and, specifically, of nurses. Nurses frequently have to help patients with life-threatening diseases, who have much pain and are confused or anxious. Therefore, nursing work can be seen as emotional labour. Having affective networks and support, as well as access to information, might therefore have a relatively large influence on individual work outcomes, because of the great importance of having those connections in a hospital setting. According to the person–situation interactionist perspective, some personality traits will be more important in such a setting. Communication skills (which are related to extraversion) and being emotionally stable might be especially relevant in such situations. Future research should expand our findings to other task environments, and more heterogeneous samples should be used to broaden the applicability of our findings.

Another potential limitation of our study is that it is plausible that individuals with certain personalities may have different positions in social networks; therefore, our independent and moderator variables may be interrelated. It seems likely, for example, that extraverts or emotionally stable individuals will have more central positions in social networks. Previous research, however, has shown mixed results (e.g., Bendersky & Shah, 2013; Cross, Nohria, & Parker, 2002; Klein *et al.*, 2004; Roberts *et al.*, 2008; Russell, Booth, Reed, & Laughlin, 1997). It is possible, for example, that extraverts have larger social networks, but that introverts have higher quality interpersonal relationships, and that emotionally stable persons go their own way more, while neurotic persons seek more social connections. In our study, three of the four correlations between the centrality measures and the personality traits were significant (see Table 1), but in an absolute sense these correlations were modest (ranging from .05 to .23). So the amount of variance our

independent and moderator variables have in common is rather small and, therefore, most likely not a serious threat to the validity of our study. Nevertheless, it might be worthwhile in future research to consider the relationship between personality and network structures in more depth.

Being central in social networks could have possible adverse effects, because it means that the central individual needs to provide support or advice to others. This may result in too many people asking for advice, so that one is constantly distracted from one's own job. According to the work design and emotional labour literature, this enhances the individual's job demands which may impair one's own performance (e.g., Bolino & Turnley, 2005). Therefore, we have also tested whether the relationships between network centrality and job satisfaction and job performance might be asymptotic or curvilinear in the inverted-U form, but the outcomes were insignificant (see footnotes ² and ³). However, this might be due to, for example, the relatively small sample size in this study. Therefore, we recommend to further test for possible adverse effects between network centrality and work outcomes in future research with larger samples.

The person–situation interactionist perspective helped us to select the two personality traits that seem most important when investigating the relationship between network position and individual work outcomes. Following this perspective, the other three traits of the Big Five seem to be less relevant in this context. Nevertheless, we do not mean to imply that they are not important at all. It would be worthwhile to investigate (combinations of) these other traits when considering individuals' use of their network position, for example, when investigating other work outcomes.

According to the person–situation interactionist perspective, individuals may respond differently to social situations depending on their personality (Mischel & Shoda, 1995; Orvis & Leffler, 2011). So this perspective clearly recommends looking beyond main effects. In addition to the significant interaction effects between network position and personality traits, we found significant positive relationships between network centrality and individual work outcomes. For performance, this finding confirms previous findings. For satisfaction, previous findings were somewhat mixed. Although we did not hypothesize main effects, we believe that such effects are still relevant when investigating work outcomes.

Further, the person–situation interactionist perspective helped us to develop hypotheses for three-way interactions. We did not expect, nor did we find, two-way interactions between network position, neuroticism, and extraversion. Nevertheless, it may be worthwhile to investigate such two-way interactions in future research: for example, when including other personality traits or other work outcomes. Perhaps, for example, agreeable persons contribute more to group cohesion if they are central in the affect-based network.

Finally, our use of a single-item measure for affect-based network centrality and advice network centrality may be a limitation. However, we employed a round-robin design that results in multiple measurements, because every team member rates and is rated by every other team member, thus reducing error (Denissen, Geenen, Selfhout, & Van Aken, 2008; Kenny, 1994). Furthermore, we framed the items for affect-based network centrality and advice network centrality as closely as possible to the definition of the underlying theoretical construct. We therefore have confidence in the validity and reliability of the measures for network centrality, and we believe that our conclusions are not invalidated by our use of a single-item measure. Nevertheless, we recommend that future researchers use a multi-item measure for network centrality, if feasible.

Conclusion

We suggest that individuals differ in the extent to which they benefit from advantageous social network positions, depending on their personality. The existence and magnitude of the positive effects of affect-based network centrality on job satisfaction and of in-degree advice network centrality on supervisor ratings of job performance may crucially depend on an employee's personality, and on the specific interactional combination of personality traits. We hope that the current findings will encourage organizations and researchers to pay greater attention to the way that social network position and interactions between personality traits combine in influencing employee work outcomes.

References

- Abuhamdeh, S., & Csikszentmihalyi, M. (2009). Intrinsic and extrinsic motivational orientations in the competitive context: An examination of person-situation interactions. *Journal of Personality*, 77, 1615–1635. doi:10.1111/j.1467-6494.2009.00594.x
- Agho, A., Price, J., & Mueller, C. (1992). Discriminant validity of measures of job satisfaction, positive affectivity and negative affectivity. *Journal of Occupational and Organizational Psychology*, 65, 185–196. doi:10.1111/j.2044-8325.1992.tb00496.x
- Agneessens, F., & Wittek, R. (2012). Where do intra-organizational advice relations come from? The role of informal status and social capital in social exchange. *Social Networks*, 34, 333–345. doi:10.1016/j.socnet.2011.04.002
- Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- Anderson, M. H. (2008). Social networks and the cognitive motivation to realize network opportunities: A study of managers' information gathering behaviors. *Journal of Organizational Behavior*, 29, 51–78. doi:10.1002/job.459
- Bakker, W., Van Oudenhoven, J. P., & Van der Zee, K. I. (2004). Attachment styles, personality, and Dutch emigrants' intercultural adjustment. *European Journal of Personality*, 18, 387–404. doi:10.1002/per.515
- Balkundi, P., & Harrison, D. A. (2006). Ties, leaders, and time in teams: Strong inference about network structure's effects on team viability and performance. *Academy of Management Journal*, 49, 49–68. doi:10.5465/amj.2006.20785500
- Baron, J. N., & Pfeffer, J. (1994). The social psychology of organizations and inequality. *Social Psychology Quarterly*, 57, 190–209. doi:10.2307/2786876
- Barrick, M. R., & Mount, M. K. (1991). The Big Five personality dimensions and job performance: A meta-analysis. *Personnel Psychology*, 44, 1–26. doi:10.1111/j.1744-6570.1991.tb00688.x
- Barrick, M. R., Stewart, G. L., & Piotrowski, M. (2002). Personality and job performance: Test of the mediating effects of motivation among sales representatives. *Journal of Applied Psychology*, 87, 43–51. doi:10.1037/0021-9010.87.1.43
- Barry, B., & Stewart, G. L. (1997). Composition, process, and performance in self-managed groups: The role of personality. *Journal of Applied Psychology*, 82, 62–78. doi:10.1037/0021-9010.82
- Battistoni, E., & Colladon, A. F. (2014). Personality correlates of key roles in informal advice networks. *Learning and Individual Differences*, 34, 63–69. doi:10.1016/j.lindif.2014.05.007
- Bendersky, C., & Shah, N. P. (2013). The downfall of extraverts and rise of neurotics: The dynamic process of status allocation in task groups. *Academy of Management Journal*, 56, 387–406. doi:10.5465/amj.2011.0316
- Bolino, M. C., & Turnley, W. H. (2005). The personal costs of citizenship behavior: The relationship between individual initiative and role overload, job stress, and work-family conflict. *Journal of Applied Psychology*, 90, 740–748. doi:10.1037/0021-9010.90.4.740
- Bono, J., & Judge, T. (2004). Personality and transformational and transactional leadership: A meta-analysis. *Journal of Applied Psychology*, 89, 901–910. doi:10.1037/0021-9010.89.5.901

- Brass, D. J. (1981). Structural relationships, job characteristics, and worker satisfaction and performance. *Administrative Science Quarterly*, 26, 331–348. doi:10.2307/2392511
- Brass, D. J. (1984). Being in the right place: A structural analysis of individual influence in an organization. *Administrative Science Quarterly*, 29, 518–539. doi:10.2307/2392937
- Brass, D. J., & Burkhardt, M. E. (1993). Potential power and power use: An investigation of structure and behavior. *Academy of Management Journal*, 36, 441–470. doi:10.2307/256588
- Brass, D. J., Galaskiewicz, J., Greve, H. R., & Tsai, W. (2004). Taking stock of networks and organizations: A multilevel perspective. *Academy of Management Journal*, 47, 795–817. doi:10.2307/20159624
- Burt, R. S. (2000). The network structure of social capital. In B. M. Staw & R. I. Sutton (Eds.), *Research in Organizational Behavior*, 22, 345–431.
- Burt, R. S., Jannotta, J. E., & Mahoney, J. T. (1998). Personality correlates of structural holes. *Social Networks*, 20, 63–87. doi:10.1016/S0378-8733(97)00005-1
- Casciaro, T., Carley, K. M., & Krackhardt, D. (1999). Positive affectivity and accuracy in social network perception. *Motivation and Emotion*, 23, 285–306. doi:10.1023/A:1021390826308
- Chiaburu, D. S., Stoverink, A. C., Li, N., & Zhang, X. (2015). Extraverts engage in more interpersonal citizenship when motivated to impression manage: Getting along to get ahead? *Journal of Management*, 41, 2004–2031. doi:10.1177/0149206312471396
- Crampton, S. M., & Wagner, J. A. (1994). Percept-percept inflation in micro-organizational research: An investigation of prevalence and effect. *Journal of Applied Psychology*, 79, 67–76. doi:10.1037/0021-9010.79.1.67
- Cross, R., Nohria, N., & Parker, A. (2002). Six myths about informal networks – and how to overcome them. *Mit Sloan Management Review*, 43(3), 67–75.
- Daly, A. J., Liou, Y., Tran, N. A., Cornelissen, F., & Park, V. (2014). The rise of neurotics social networks, leadership, and efficacy in district reform. *Educational Administration Quarterly*, 50, 233–278. doi:10.1177/0013161X13492795
- Denissen, J. J. A., Geenen, R., Selfhout, M., & Van Aken, M. A. G. (2008). Single-item Big Five ratings in a social network design. *European Journal of Personality*, 22, 37–54. doi:10.1002/per.662
- Duffy, M. K., Shaw, J. D., Scott, K. L., & Tepper, B. J. (2006). The moderating roles of self-esteem and neuroticism in the relationship between group and individual undermining behavior. *Journal of Applied Psychology*, 91, 1066–1077. doi:10.1037/0021-9010.91.5.1066
- Eysenck, H. J., & Eysenck, M. W. (1985). *Personality and individual differences: A natural science approach*. New York, NY: Plenum Press.
- Fang, R., Landis, B., Zhang, Z., Anderson, M. H., Shaw, J. D., & Kilduff, M. (2015). Integrating personality and social networks: A meta-analysis of personality, network position, and work outcomes in organizations. *Organization Science*, 26, 1243–1260. doi:10.1287/orsc.2015.0972
- Feeley, T. H., Hwang, J., & Barnett, G. A. (2008). Predicting employee turnover from friendship networks. *Journal of Applied Communication Research*, 36(1), 56–73. doi:10.1080/00909880701799790
- Flap, H., & Völker, B. (2001). Goal specific social capital and job satisfaction. Effects of different types of networks on instrumental and social aspects of work. *Social Networks*, 23, 297–320. doi:10.1016/S0378-8733(01)00044-2
- Funder, D. C. (2006). Towards a resolution of the personality triad: Persons, situations, and behaviors. *Journal of Research in Personality*, 40(1), 21–34. doi:10.1016/j.jrp.2005.08.003
- Gibbons, D. E. (2004). Friendship and advice networks in the context of changing professional values. *Administrative Science Quarterly*, 49, 238–262. doi:10.2307/4131473
- Goldberg, L. R. (1990). An alternative description of personality: The Big-Five factor structure. *Journal of Personality and Social Psychology*, 59, 1216–1229. doi:10.1037/0022-3514.59.6.1216
- Hendriks, A. A. J., Hofstee, W. K. B., & De Raad, B. (1999). The five-factor personality inventory (FFPI). *Personality and Individual Differences*, 27, 307–325. doi:10.1016/S0191-8869(98)00245-1

- Hofstee, W. K. B., De Raad, B., & Goldberg, L. R. (1992). Integration of the big five and circumplex approaches to trait structure. *Journal of Personality and Social Psychology*, 63, 146–163. doi:10.1037/0022-3514.63.1.146
- Hotard, S. R., McFatter, R. M., McWhirter, R. M., & Stegall, M. E. (1989). Interactive effects of extraversion, neuroticism, and social relationships on subjective well-being. *Journal of Personality and Social Psychology*, 57, 321–331. doi:10.1037/0022-3514.57.2.321
- Ibarra, H. (1993). Network centrality, power, and innovation involvement: Determinants of technical and administrative roles. *Academy of Management Journal*, 36, 471–501. doi:10.2307/256589
- Jensen, J. M., & Patel, P. C. (2011). Predicting counterproductive work behavior from the interaction of personality traits. *Personality and Individual Differences*, 51, 466–471. doi:10.1016/j.paid.2011.04.016
- John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (2nd ed., pp. 102–138). New York, NY: Guilford Press.
- Judge, T. A., & Erez, A. (2007). Interaction and intersection: The constellation of emotional stability and extraversion in predicting performance. *Personnel Psychology*, 60, 573–596. doi:10.1111/j.1744-6570.2007.00084.x
- Judge, T. A., Heller, D., & Mount, M. K. (2002). Five-factor model of personality and job satisfaction: A meta-analysis. *Journal of Applied Psychology*, 87, 530–541. doi:10.1037/0021-9010.87.3.530
- Judge, T. A., & Ilies, R. (2002). Relationship of personality to performance motivation: A meta-analytic review. *Journal of Applied Psychology*, 87, 797–807. doi:10.1037/0021-9010.87.4.797
- Judge, T. A., Klinger, R., Simon, L. S., & Yang, I. W. F. (2008). The contributions of personality to organizational behavior and psychology: Findings, criticisms, and future research directions. *Social and Personality Psychology Compass*, 2, 1982–2000. doi:10.1111/j.1751-9004.2008.00136.x
- Kenny, D. A. (1994). *Interpersonal perception: A social relations analysis*. New York, NY: Guilford.
- Kilduff, M., & Krackhardt, D. (1994). Bringing the individual back in: A structural analysis of the internal market for reputation in organizations. *Academy of Management Journal*, 37, 87–108. doi:10.2307/256771
- Kilduff, M., & Tsai, W. (2003). *Social networks and organizations*. London, UK: Sage.
- King, E. B., George, J. M., & Hebl, M. R. (2005). Linking personality to helping behaviors at work: An interactional perspective. *Journal of Personality*, 73, 585–608. doi:10.1111/j.1467-6494.2005.00322.x
- Klein, K. J., Lim, B., Saltz, J. L., & Mayer, D. M. (2004). How do they get there? An examination of the antecedents of centrality in team networks. *Academy of Management Journal*, 47, 952–963. doi:10.2307/20159634
- Krackhardt, D., & Brass, D. (1994). Intra-organizational networks: The micro side. In S. Wasserman & J. Galaskiewicz (Eds.), *Advances in the social and behavioral sciences from social network analysis* (pp. 209–230). Beverly Hills, CA: Sage.
- Kristof-Brown, A., Barrick, M. R., & Franke, M. (2002). Applicant impression management: Dispositional influences and consequences for recruiter perceptions of fit and similarity. *Journal of Management*, 28(1), 27–46. doi:10.1177/014920630202800103
- Lamertz, K., & Aquino, K. (2004). Social power, social status and perceptual similarity of workplace victimization: A social network analysis of stratification. *Human Relations*, 57, 795–822. doi:10.1177/0018726704045766
- LePine, J. A., Buckman, B. R., Crawford, E. R., & Methot, J. R. (2011). A review of research on personality in teams: Accounting for pathways spanning levels of theory and analysis. *Human Resource Management Review*, 21, 311–330. doi:10.1016/j.hrmr.2010.10.004
- Liden, R. C., Sparrowe, R. T., & Wayne, S. J. (1997). Leader-member exchange theory: The past and potential for the future. *Research in Personnel and Human Resources Management*, 15, 47–119.

- Lincoln, J., & Miller, J. (1979). Work and friendship ties in organizations – comparative analysis of relational networks. *Administrative Science Quarterly*, 24, 181–199. doi:10.2307/2392493
- Liu, Y., & Ipe, M. (2010). How do they become nodes? Revisiting team member network centrality. *Journal of Psychology*, 144, 243–258. doi:10.1080/00223981003648260
- Major, D. A., Turner, J. E., & Fletcher, T. D. (2006). Linking proactive personality and the Big Five to motivation to learn and development activity. *Journal of Applied Psychology*, 91, 927–935. doi:10.1037/0021-9010.91.4.927
- Marsden, P. V. (1990). Network data and measurement. *Annual Review of Sociology*, 16, 435–463. doi:10.1146/annurev.so.16.080190.002251
- McCrae, R. R., & Costa, P. T. (1989). The structure of interpersonal traits: Wiggin's circumplex and the five-factor model. *Journal of Personality and Social Psychology*, 56, 586–595. doi:10.1037/0022-3514.56.4.586
- Mehra, A., Kilduff, M., & Brass, D. J. (2001). The social networks of high and low self-monitors: Implications for workplace performance. *Administrative Science Quarterly*, 46, 121–146. doi:10.2307/2667127
- Mischel, W., & Shoda, Y. (1995). A cognitive-affective system-theory of personality – reconceptualizing situations, dispositions, dynamics, and invariance in personality structure. *Psychological Review*, 102, 246–268. doi:10.1037/0033-295X.102.2.246
- Molleman, E., & Broekhuis, M. (2012). How working in cross-functional teams relates to core attributes of professional occupations and the moderating role of personality. *Group Dynamics: Theory, Research, and Practice*, 16, 50–67. doi:10.1037/a0026408
- Molleman, E., & Van der Vegt, G. S. (2007). The performance evaluation of novices: The importance of competence in specific work activity clusters. *Journal of Occupational and Organizational Psychology*, 80, 459–478. doi:10.1348/096317906X154469
- Monzani, L., Ripoll, P., & Peiro, J. (2015). The moderator role of followers' personality traits in the relations between leadership styles, two types of task performance and work result satisfaction. *European Journal of Work and Organizational Psychology*, 24, 444–461. doi:10.1080/1359432X.2014.911173
- Mount, M. K., & Barrick, M. R. (1995). The Big Five personality dimensions: Implications for research and practice in human resources management. *Research in Personnel and Human Resources Management*, 13, 153–200.
- Neuman, G. A., & Wright, J. (1999). Team effectiveness: Beyond skills and cognitive ability. *Journal of Applied Psychology*, 84, 376–389. doi:10.1037/0021-9010.84.3.376
- Organ, D. W., & Ryan, K. (1995). A meta-analytic review of attitudinal and dispositional predictors of organizational citizenship behavior. *Personnel Psychology*, 48, 775–802. doi:10.1111/j.1744-6570.1995.tb01781.x
- Orvis, K. A., & Leffler, G. P. (2011). Individual and contextual factors: An interactionist approach to understanding employee self-development. *Personality and Individual Differences*, 51, 172–177. doi:10.1016/j.paid.2011.03.038
- Ozer, D. J., & Benet-Martínez, V. (2006). Personality and the prediction of consequential outcomes. *Annual Review of Psychology*, 57, 401–421. doi:10.1146/annurev.psych.57.102904.190127
- Panaccio, A., & Vandenberghe, C. (2012). Five-factor model of personality and organizational commitment: The mediating role of positive and negative affective states. *Journal of Vocational Behavior*, 80, 647–658. doi:10.1016/j.jvb.2012.03.002
- Pavot, W., Diener, E., & Fujita, F. (1990). Extraversion and happiness. *Personality and Individual Differences*, 11, 1299–1306. doi:10.1016/0191-8869(90)90157-M
- Penney, L. M., David, E., & Witt, L. A. (2011). A review of personality and performance: Identifying boundaries, contingencies, and future research directions. *Human Resource Management Review*, 21, 297–310. doi:10.1016/j.hrmr.2010.10.005
- Podsakoff, P. M., MacKenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology*, 88, 879–903. doi:10.1037/0021-9101.88.5.879

- Raudenbush, S. W., & Bryk, A. S. (2002). *Hierarchical linear models: Applications and data analysis methods* (2nd ed.). Thousand Oaks, CA: Sage.
- Roberson, Q. M., & Williamson, I. O. (2012). Justice in self-managing teams: The role of social networks in the emergence of procedural justice climates. *Academy of Management Journal*, 55, 685–701. doi:10.5465/amj.2009.0491
- Roberts, K. H., & O'Reilly, C. A. III (1979). Some correlations of communication roles in organizations. *Academy of Management Journal*, 22, 42–57. doi:10.2307/255477
- Roberts, S. G. B., Wilson, R., Fedurek, P., & Dunbar, R. I. M. (2008). Individual differences and personal social network size and structure. *Personality and Individual Differences*, 44, 954–964. doi:10.1016/j.paid.2007.10.033
- Russell, D., Booth, B., Reed, D., & Laughlin, P. (1997). Personality, social networks, and perceived social support among alcoholics: A structural equation analysis. *Journal of Personality*, 65, 649–692. doi:10.1111/j.1467-6494.1997.tb00330.x
- Sekiguchi, T., & Huber, V. L. (2011). The use of person-organization fit and person-job fit information in making selection decisions. *Organizational Behavior and Human Decision Processes*, 116, 203–216. doi:10.1016/j.obhdp.2011.04.001
- Shalley, C. E., Zhou, J., & Oldham, G. R. (2004). The effects of personal and contextual characteristics on creativity: Where should we go from here? *Journal of Management*, 30, 933–958. doi:10.1016/j.jm.2004.06.007
- Shaw, M. E. (1964). Communication networks. In L. Berkowitz (Ed.), *Advances in experimental social psychology* (Vol. 1, pp. 111–147). New York, NY: Academic Press.
- Smillie, L. D., Yeo, G. B., Furnham, A. F., & Jackson, C. J. (2006). Benefits of all work and no play: The relationship between neuroticism and performance as a function of resource allocation. *Journal of Applied Psychology*, 91, 139–155. doi:10.1037/0021-9010.91.1.139
- Snijders, T. A. B., & Bosker, R. J. (1999). *Multilevel analysis: An introduction to basic and advanced multilevel modeling*. London, UK: Sage.
- Sparrowe, R. T., & Liden, R. C. (2005). Two routes to influence: Integrating leader-member exchange and social network perspectives. *Administrative Science Quarterly*, 50, 505–535. doi:10.2189/asqu.50.4.505
- Sparrowe, R. T., Liden, R. C., Wayne, S. J., & Kraimer, M. L. (2001). Social networks and the performance of individuals and groups. *Academy of Management Journal*, 44, 316–325. doi:10.2307/3069458
- Spector, P. E. (1987). Method variance as an artifact in self-reported affect and perception at work: Myth or significant problem? *Journal of Applied Psychology*, 72, 438–443. doi:10.1037/0021-9010.72.3.438
- Swickert, R. J., Hittner, J. B., & Foster, A. (2010). Big Five traits interact to predict perceived social support. *Personality and Individual Differences*, 48, 736–741. doi:10.1016/j.paid.2010.01.018
- Uhl-Bien, M., Graen, G. B., & Scandura, T. (2000). Implications of leader-member exchange (LMX) for strategic human resource management systems: Relationships as social capital for competitive advantage. In G. Ferris (Ed.), *Research in personnel and human resource management* (Vol. 18, pp. 137–185). Greenwich, CT: JAI Press.
- Umphress, E. E., Labianca, G., Brass, D. J., Kass, E., & Scholten, L. (2003). The role of instrumental and expressive social ties in employees' perceptions of organizational justice. *Organization Science*, 14, 738–753. doi:10.1287/orsc.14.6.738.24865
- Venkataramani, V., Green, S. G., & Schleicher, D. J. (2010). Well-connected leaders: The impact of leaders' social network ties on LMX and members' work attitudes. *Journal of Applied Psychology*, 95, 1071–1084. doi:10.1037/a0020214
- Warner, R., Kenny, D. A., & Stoto, M. (1979). A new round robin analysis of variance for social interaction. *Journal of Personality and Social Psychology*, 37, 1742–1757. doi:10.1037/0022-3514.37.10.1742
- Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. Cambridge, UK: Cambridge University Press.

- Watson, D., & Clark, L. A. (1992). On traits and temperament: General and specific factors of emotional experience and their relation to the five-factor model. *Journal of Personality*, 60, 441–476. doi:10.1111/j.1467-6494.1992.tb00980.x
- White, J. K., Hendrick, S. S., & Hendrick, C. (2004). Big five personality variables and relationship constructs. *Personality and Individual Differences*, 37, 1519–1530. doi:10.1016/j.paid.2004.02.019
- Zagenczyk, T. J., Gibney, R., Murrell, A. J., & Boss, S. R. (2008). Friends don't make friends good citizens, but advisors do. *Group & Organization Management*, 33, 760–780. doi:10.1177/1059601108326806
- Zagenczyk, T. J., & Murrell, A. J. (2009). It is better to receive than to give: Advice network effects on job and work-unit attachment. *Journal of Business and Psychology*, 24, 139–152. doi:10.1007/s10869-009-9095-3
- Zell, D., McGrath, C., & Vance, C. M. (2014). Examining the interaction of extroversion and network structure in the formation of effective informal support networks. *Journal of Behavioral and Applied Management*, 15(2), 59–81.
- Zhang, M., Zheng, W., & Wei, J. (2009). Sources of social capital: Effects of altruistic citizenship behavior and job involvement on advice network centrality. *Human Resource Development Quarterly*, 20, 195–217. doi:10.1002/hrdq.20015
- Zhou, J., Shin, S. J., Brass, D. J., Choi, J., & Zhang, Z. (2009). Social networks, personal values, and creativity: Evidence for curvilinear and interaction effects. *Journal of Applied Psychology*, 94, 1544–1552. doi:10.1037/a0016285
- Ziegler, M., Bensch, D., Maass, U., Schult, V., Vogel, M., & Buehner, M. (2014). Big Five facets as predictor of job training performance: The role of specific job demands. *Learning and Individual Differences*, 29, 1–7. doi:10.1016/j.lindif.2013.10.008

Received 4 December 2014; revised version received 22 February 2016