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How Do Instrumental and Expressive Network Positions Relate to Turnover? A Meta-Analytic Investigation

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Although social network methods have proven valuable for predicting employee turnover, an informed use of network methods for turnover management requires an integration and extension of extant networks-turnover research. To that end, this article addresses two relatively neglected issues in the networks-turnover literature: the lack of integration of turnover process models into networks-turnover research and the differential influence of "network content" (i.e., instrumental vs. expressive network resources) on turnover processes. To address these issues, we draw from social capital and turnover theories as a basis for investigating how turnover antecedents (i.e., work attitudes, job alternatives, and job performance) mediate the associations between instrumental and expressive degree centrality and turnover. We test a theoretical model using meta-analytic path analysis based on the results of random-effects meta-analyses (64 independent samples of working adults) of instrumental and expressive degree centrality in relation to job satisfaction, organizational commitment, job alternatives, job performance, and employee turnover. We found that both instrumental and expressive degree centrality relate to employee turnover, but through different mediating processes; instrumental degree centrality decreased the likelihood of turnover via job performance and organizational commitment, whereas expressive degree centrality decreased the likelihood of turnover via job satisfaction and organizational commitment. Furthermore, expressive degree centrality (as compared to instrumental degree centrality) had a negative association with turnover after accounting for these prominent turnover antecedents. These findings illustrate the importance of distinguishing between instrumental and expressive network positions in the turnover process as well as the value of leveraging employee networks for employee retention.

Keywords: social network, turnover, meta-analysis

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Social network methods are a useful tool for investigating how employees' professional relationships influence valued organizational outcomes, such as employee retention (or conversely, turnover; e.g., Ballinger, Cross, & Holtom, 2016). Indeed, research investigating employees' intraorganizational networks in relation to turnover has revealed that employees' network connections encourage attachments to their jobs and organizations (e.g., Mossholder, Settoon, & Henagan, 2005). Although these findings attest to the utility of adopting social network approaches for human resource management activities (Hollenbeck & Jamieson, 2015), we suggest that a more nuanced and integrative account of how network positions relate to turnover is necessary to inform the effective implementation of network approaches for turnover management. In particular, two prominent issues have heretofore been neglected in extant networks-turnover research: the integration of networks with turnover process models and the study of how different types of network ties (i.e., instrumental and expressive) simultaneously influence turnover processes.

First, despite the long history of process models in the turnover literature (e.g., Hom, Caranikas-Walker, Prussia, & Griffeth, 1992; Hom & Kinicki, 2001; Jackofsky, 1984; Mobley, Griffeth, Hand, & Meglino, 1979; Price & Mueller, 1981; Steers & Mowday, 1981), networks research has typically investigated direct relation-

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ships between network positions and turnover, overlooking how network positions influence employees' attitudes, beliefs, and behaviors that precede turnover. There are a few exceptions (Feeley, 2000; Feeley, Moon, Kozey, & Slowe, 2010), but these studies either do not consider turnover antecedents that are pervasive across turnover process models (e.g., work attitudes) or do not empirically evaluate whether turnover antecedents mediate the relationship between network positions and turnover. On the whole, networks research has rarely drawn from turnover theory as a theoretical basis, ignoring useful explanations for how network positions relate to turnover. To offer a more firmly grounded theoretical foundation for network approaches to turnover management, this study offers an initial integration of network positions with a turnover process model, illustrating how existing turnover theories may inform networks-turnover research.

Second, extant networks-turnover research has primarily investigated how the structure of networks influence turnover (e.g., Ballinger et al., 2016; Krackhardt & Porter, 1986) and "neglected the implications of the diverse contents transmitted through informal ties at work" (p. 675, Podolny & Baron, 1997). These "diverse contents" reflect resources (e.g., advice, friendship) that are the means by which network ties influence employee outcomes (Adler & Kwon, 2002; Ibarra, 1993). Yet, networks-turnover research has rarely considered the distinct roles that different types of network content play in turnover processes. One exception is Feeley, Hwang, and Barnett (2008): They revealed that both "peer" ties (in which contacts discuss work and nonwork topics) and friendship ties (in which contacts discuss nonwork topics) are negatively associated with turnover, although they did not compare the influence of both types of ties simultaneously. Given that network contacts may offer multiple types of resources (e.g., both instrumental and expressive), research is needed to simultaneously evaluate the relative influence of different types of network content on turnover processes to ensure that the influence of one type of network content is not mistaken for the other (Ibarra, 1993). Indeed, more clarification is needed regarding what types of network relationships are primarily responsible for inhibiting employee turnover (and through which mechanisms), as workplace connections do not operate uniformly to reduce the likelihood of employee turnover (e.g., Felps, Mitchell, Hekman, Lee, Holtom, & Harman, 2009). By simultaneously comparing the influence of two broad categories of network content, instrumental and expressive, we delineate the unique influence of each type of network content on turnover processes.

We address these two largely neglected issues by adopting meta-analytic methods to summarize the relationships of degree centrality in instrumental and expressive networks with turnover and turnover antecedents. We focus on degree centrality as the principal network position because it offers a more direct assessment of the amount of resources (i.e., instrumental and expressive network content) available to employees compared to other network positions (e.g., structural holes), and therefore allows us to more clearly delineate how employees' access to different types of network content (i.e., resources) influences turnover. Furthermore, drawing from classic turnover process models as a basis, we use meta-analytic path analysis to investigate three major turnover antecedents—work attitudes (job satisfaction and organizational commitment), job alternatives, and job performance—as mediators of the relationships between degree centrality and turnover. Whereas work attitudes and job alternatives have been central to turnover theory since their introduction in March and Simon's (1958) seminal turnover theory, job performance was included to represent employees' expected utility of staying at their employing organizations, which provides a complement to the expected utility of leaving tendered by job alternatives (Mobley et al., 1979). By considering different types of networks (instrumental and expressive) and drawing from long-standing turnover theories, this study offers a more nuanced and integrative perspective on how different types of employee networks influence turnover than has been considered in previous research.

We adopt meta-analytic methods for this investigation because they allow for a more precise estimate of the relationships between degree centrality in instrumental and expressive networks with turnover antecedents and outcomes. Thus, our meta-analysis not only clarifies how different types of network content relate to turnover antecedents and outcomes, but it also provides more generalizable estimates of these associations for researchers and practitioners seeking to apply study insights across organizational settings. Indeed, network scholars acknowledge that the research findings derived from one network study should be replicated because network information collected via the roster method is specific to the context and is not easily generalizable (Hanneman & Riddle, 2005). In addition, this meta-analysis extends previous meta-analytic summaries of the networks-turnover literature by including turnover antecedents (work attitudes, job alternatives, and job performance) and by providing a more direct assessment of the associations of degree centrality with turnover and turnover antecedents. For instance, Feeley et al.'s (2010) meta-analysis grouped different types of network centrality (degree, betweenness, and closeness) across network types (instrumental and expressive), which obfuscated how different types of network content and network positions relate to turnover. In contrast, we delineate between instrumental and expressive network content and focus on a single network position, that is, degree centrality.

Altogether, this article contributes to the networks and turnover literatures in two ways. First, this study extends prior research by integrating network perspectives—specifically, social capital—and turnover process models, which at present represent two seemingly separate lines of inquiry. Although there has been a shift in networks-turnover research from relying solely on network theories to integrating psychological and networks theories (e.g., Ballinger et al., 2016), there is scant research integrating network and turnover theories (cf. Hom & Xiao, 2011; Vardaman, Taylor, Allen, Gondo, & Amis, 2015) and hardly any research drawing from turnover process models to understand how network positions influence turnover (Feeley, 2000). Although it is useful to understand how network positions relate to turnover directly, additional knowledge of the role that networks play in retaining employees may be gained by clarifying how employees' networks influence turnover antecedents (i.e., work attitudes, job alternatives, job performance) that are considered fundamental to turnover decisions (March & Simon, 1958; Mobley et al., 1979). For instance, instrumental network content may decrease the likelihood of turnover through fostering job performance or increase the likelihood of turnover through improving job alternatives. Through this study, we recognize the sometimes-conflicting influence of workplace relationships on turnover processes, shedding light on

the nuanced ways in which workplace relationships shape turnover processes.

Second, this study investigates the relative influence of different types of network content (represented by instrumental and expressive degree centrality) on turnover and turnover antecedents, attending to an issue that has been acknowledged as important in the broader networks literature (Ibarra, 1993; Podolny & Baron, 1997) but that has received deficient attention in networks-turnover research. More specifically, this study clarifies which type of network content has a stronger influence on employee turnover by identifying the primary pathways through which each type of network influences turnover. In doing so, this study more formally illustrates that different types of network ties influence turnover differently (i.e., through different mediating mechanisms), suggesting that more attention should be paid to the content of the network, as it is not merely the number of professional network connections, but the content of the relationships that governs whether employees stay or leave.

Social Capital Perspectives on Turnover

Social networks research investigating employee turnover has been approached from multiple disciplinary (e.g., communications, management, psychology) and theoretical perspectives (e.g., structural equivalence, social influence, Simmelian tie; see Appendix A for an extended review of the networks-turnover literature). Among these, the social capital perspective is perhaps the most prominent and widely accepted. Broadly, *social capital* refers to access to resources through a network of relationships that may be mobilized to facilitate one's activities (Adler & Kwon, 2002; Burt, 1992; Coleman, 1988; Granovetter, 1973, 1985).

Social capital perspectives on the networks-turnover relationship assert that social capital "embeds" employees in their organizations by offering increased access to informational and solidarity benefits, which generate constituent attachments to employing organizations (Mossholder et al., 2005). That is, employees develop relationships that offer access to resources that one may mobilize for action (such as performance), and employees are hesitant to give up these relationships (and the resources they offer) by leaving their employing organizations (e.g., Ballinger et al., 2016; Vardaman et al., 2015). For instance, in the communications literature, Feeley and colleagues proposed the "erosion model" of employee turnover to explain this phenomenon; they argued that employees central in the organizational communication network are more likely to stay at their organizations because of increased access to informational resources, which generates organizational commitment (Feeley & Barnett, 1997). In support of their theorizing, they found that central network positions (degree, betweenness, and closeness centrality) were negatively associated with turnover across multiple studies (Feeley, 2000; Feeley & Barnett, 1997; Feeley et al., 2008). Extending preexisting social capital perspectives on turnover, Ballinger et al. (2016) suggested that social capital is a resource that takes different forms, which are represented by different positions in the network (i.e., in-degree centrality, network constraint, and in-degree eigenvector centrality). They identified specific types of social capital associated with each network position under investigation (e.g., brokerage affords information and influence that employees are unwilling to sacrifice by leaving), and they offered evidence that these different instantiations of social capital reduce the likelihood of turnover.

Whereas Ballinger et al. (2016) investigated how different forms of social capital—as represented by different network positions—relate to turnover, our investigation offers a complementary perspective; we focus on how different forms of social capital—as represented by different network content—influence turnover processes. Social capital research has recognized that network content is the means by which social capital influences individual outcomes (e.g., Adler & Kwon, 2002) and that the different types of network content may be useful for different work and personal outcomes (Ibarra, 1993; Podolny & Baron, 1997). Yet, how different types of network content influence turnover remains relatively unaddressed. Related research has compared centrality in peer networks (in which individuals discussed work and nonwork topics) to centrality in friendship networks (in which individuals discussed nonwork topics only; Feeley et al., 2008); they found that in-degree centrality in peer networks and out-degree centrality in friendship networks both reduced the likelihood of employee turnover, although they did not consider the effects of each type of network simultaneously. In addition, although not a primary focus of their study, Vardaman et al. (2015) found that expressive (friendship) in-degree centrality was negatively associated with turnover (after taking into account job satisfaction and turnover intentions), whereas instrumental (advice) centrality was unrelated. Based on these findings, they suggested that instrumental and expressive networks may have differential effects on turnover processes, and that additional research is needed to investigate this suggestion.

To clarify which type of network content is primarily responsible for employee turnover and through which mechanisms, we investigate two broad types of network ties that are common in networks research, instrumental and expressive network ties (Fombrun, 1982; Ibarra, 1993; Lincoln & Miller, 1979). Instrumental network contacts offer access to resources that are job-related, such as information, expertise, professional advice, political access, influence, or material resources. Expressive network contacts, on the other hand, offer access to resources like friendship, affect (liking), or social support (Ibarra, 1993). Given that some network contacts offer both instrumental and expressive resources, we compare the influence of each simultaneously to isolate and compare the relative influence of each type of network content on turnover processes. In the next section, we draw from turnover theory to identify an initial set of mediating mechanisms through which instrumental and expressive degree centrality may influence employee turnover.

Turnover Processes

Several turnover theories have been proposed to explain how employees arrive at the decision to leave their employer (e.g., Hom, Mitchell, Lee, & Griffeth, 2012; Jackofsky, 1984; Lee & Mitchell, 1994; Maertz & Campion, 2004; March & Simon, 1958; Mobley et al., 1979; Price & Mueller, 1981; Steers & Mowday, 1981). Although these theories come from different research traditions, they all attempt to specify the decision processes that precede an employee's act of leaving their organization (Steel & Lounsbury, 2009). Across these theories, work attitudes (job satisfaction and organizational commitment), job alternatives, and job

performance emerge as central to employees' decisions to leave. Although we recognize that not everyone follows the same "path" to leaving (Lee & Mitchell, 1994; Maertz & Campion, 2004), these key antecedents of turnover decisions capture a great deal of theoretical and empirical turnover research and can be traced back to "classic" turnover theories that have substantially influenced scholars' understanding of the turnover process (March & Simon, 1958; Mobley et al., 1979).

To elaborate, in their seminal turnover theory, March and Simon (1958) suggested that people leave their employers when they perceive a high desirability of movement (closely associated with job dissatisfaction) and a high ease of movement (often operationalized as job alternatives; Holtom, Mitchell, Lee, & Eberly, 2008). Contemporary turnover theories still acknowledge the importance of "preferences to leave/stay" (akin to desirability) and "control" over the decision, which is partially influenced by availability of job alternatives (Hom et al., 2012). The importance of these conceptual features of turnover theories has been supported by empirical research (Griffeth, Hom, & Gaertner, 2000). In addition, job performance positively influences employees' perceptions of job alternatives within their employing organization, or the expected utility of staying in the organization (Jackofsky, 1984; Landau & Hammer, 1986), also referred to as *calculative forces* (Maertz & Griffeth, 2004). With work attitudes and job alternatives being equal, employees with higher job performance are more likely to remain in their organizations because they anticipate future rewards (e.g., promotion, salary increase). Thus, job performance represents another key factor that influences employees' decisions to stay in their organizations, providing a counterpart to the expected utility of leaving captured by job alternatives (Mobley et al., 1979).

Study Hypotheses

This study seeks to formally synthesize insights from network and turnover theories to present a more nuanced and integrative perspective on how instrumental and expressive network centrality deter turnover through three turnover antecedents (i.e., work attitudes, job alternatives, and job performance) that represent key considerations to employees' decisions to leave their employing organizations (March & Simon, 1958; Mobley et al., 1979). Although both instrumental and expressive network positions are negatively associated with employee turnover (e.g., Feeley et al., 2008; Mossholder et al., 2005; Vardaman et al., 2015), we theorize that degree centrality in expressive networks has a stronger influence on turnover via work attitudes, whereas degree centrality in instrumental networks has a stronger influence on turnover via job alternatives and job performance; we also suggest that expressive degree centrality, as compared to instrumental degree centrality, has a stronger negative influence on turnover after accounting for prominent turnover antecedents (see Figure 1).

To begin, we propose that, compared to instrumental degree centrality, expressive degree centrality is more strongly (positively) related to work attitudes and therefore, is more likely to reduce the likelihood of turnover via work attitudes. *Work attitudes* refer to "evaluations of one's job that express one's feelings toward, beliefs about, and attachment to one's job" (Judge & Kammeyer-Mueller, 2012, p. 344) and are commonly represented

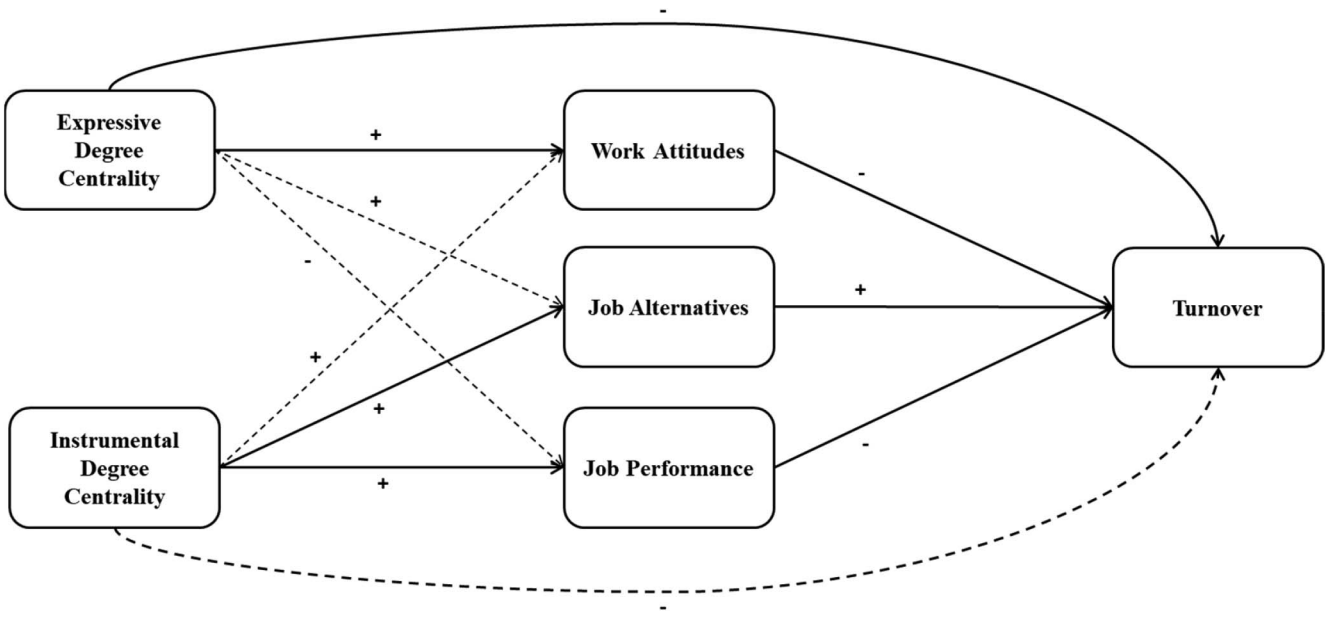

Figure 1. Hypothesized model of the relations of instrumental and expressive network positions to the turnover process. Bold (dashed) lines indicate stronger (weaker) associations between one form of degree centrality with turnover and turnover antecedents as compared to the other form of degree centrality. The work attitudes of job satisfaction and organizational commitment were analyzed in separate path models. Although not depicted here, work attitudes (job satisfaction and organizational commitment) were allowed to covary with job performance and job alternatives in the analyses.

by organizational commitment or job satisfaction. We suggest that having more expressive network contacts at work promotes positive evaluations of and attachments to one's job; expressive network contacts provide access to social support, coping resources, and heightened social exchange, which jointly promote positive evaluations of work that contribute to increased organizational commitment and job satisfaction (e.g., Chiaburu & Harrison, 2008; Kirmeyer & Lin, 1987). Consistent with this idea, Morrison (2002) found that network positions in friendship networks accounted for more variance in employees' organizational commitment than network positions in informational networks. Furthermore, Flap and Volker (2001) found that expressive network characteristics are positively associated with satisfaction with social aspects of a job (e.g., cooperation with colleagues, social climate).

However, as a whole, the empirical research on the associations between expressive versus instrumental degree centrality and work attitudes is mixed. Prior research has found stronger, positive bivariate associations between expressive degree centrality and organizational commitment compared to instrumental degree centrality (Cohen, 2007; Vardaman, Amis, Dyson, Wright, & van de GraaffRandolph, 2012), whereas other research has found the opposite (Graf, 1999; Harris, 2006; Kozey, 2008; Soltis, 2012) or that the associations are comparable (Betts, 2016; McAlpine, 2015). Similarly, prior research has found inconsistent associations between network positions and job satisfaction (as noted by Venkataramani, Labianca, & Grosser, 2013). These mixed findings may be due to the benefits derived from instrumental network positions, which likely indirectly promote work attitudes via job performance. For instance, access to information or advice through instrumental network contacts facilitates job performance, which may promote work attitudes (e.g., Judge, Thoresen, Bono, & Patton, 2001). However, we expect this indirect influence of instrumental degree centrality on work attitudes to be weaker than the direct relationship between expressive degree centrality and work attitudes.

Hypothesis 1: Compared to instrumental degree centrality, expressive degree centrality is more strongly, positively related to work attitudes.

Hypothesis 2: Compared to instrumental degree centrality, expressive degree centrality has a stronger, negative indirect relationship with turnover via work attitudes.

We further propose that, compared to expressive degree centrality, instrumental degree centrality is more strongly (positively) related to job alternatives and job performance, and therefore is more likely to influence the likelihood of turnover via job alternatives and job performance. With regard to job alternatives, instrumental degree centrality—as compared to expressive degree centrality—more strongly enhances employees' beliefs that they could find another acceptable job if they were searching. Access to information or advice via instrumental network contacts likely increases work-related knowledge and skills, which in turn, may enhance employees' beliefs that they could find a desirable alternative job (i.e., perceived ease of movement; Griffeth, Steel, Allen, & Bryan, 2005; March & Simon, 1958). Furthermore, instrumental network contacts are more likely to offer information about alternative employment opportunities. Instrumental network contacts—assumed to be more experienced and well-connected themselves—are likely to have a professional network that offers and shares job information and leads (Marin, 2013; McDonald, 2011), which they may pass along to their network contacts (depending upon the qualifications of the focal employee). Apart from job information and leads, instrumental network contacts may also offer advice on how to pursue alternative employment (e.g., who to contact at an alternative employer, how to prepare for an interview; Barbulescu, 2015), which promotes employees' beliefs that they could find high-quality employment elsewhere. Finally, using their influence, instrumental network contacts may sponsor a focal employee to others in their profession (Seibert, Kraimer, & Liden, 2001), increasing their visibility and therefore, their job alternatives (Allen & Griffeth, 2001). In comparison, the social support resources provided by expressive network contacts may be less valuable for identifying and obtaining alternative employment.

With regard to job performance, instrumental degree centrality, as compared to expressive degree centrality, more strongly promotes employees' effectiveness at work and therefore promotes retention via job performance. Employees who occupy central positions in instrumental networks have greater access to work-related resources necessary for accomplishing work activities, which leads to higher job performance. Central employees likely receive more information or advice about how to complete work-related tasks or how to handle sensitive political situations, which enables them to work more effectively (Cross & Sproull, 2004). Moreover, these employees likely have greater political access to individuals at more advanced hierarchical levels within the organization (Brass & Burkhardt, 1993), which they can leverage to accomplish work activities (e.g., stakeholder buy-in for a new initiative). In line with these arguments, prior research has illustrated the positive relations between central positions in instrumental networks and performance (e.g., Baldwin, Bedell, & Johnson, 1997; Sparrowe, Liden, Wayne, & Kraimer, 2001). Although expressive network contacts may facilitate job performance by providing social support and encouragement, such resources are less effective in facilitating job performance as compared to the advice and information more readily available from instrumental network contacts.

Hypothesis 3: Compared to expressive degree centrality, instrumental degree centrality is more strongly, positively related to (a) job alternatives and (b) job performance.

Hypothesis 4: Compared to expressive degree centrality, instrumental degree centrality has a stronger (a) positive indirect relationship with turnover via job alternatives, and (b) negative indirect relationship with turnover via job performance.

Finally, we propose that expressive degree centrality is more effective at promoting retention than instrumental degree centrality, after work attitudes, job alternatives, and job performance are taken into consideration. We argue that expressive degree centrality reflects strong friendship and social support resources that create constituent forces (Maertz & Campion, 2004), which discourage turnover decisions beyond other motivational forces represented by work attitudes, job alternatives, and job performance (i.e., affective, alternative, and calculative forces; Mossholder et al., 2005; Vardaman et al., 2015). The social support resources exchanged between expressive network contacts promote felt obligations to workplace friends (Eisenberger, Armeli, Rexwinkel,

Lynch, & Rhoades, 2001), and therefore create an additional impediment stymying employees' decisions to leave their workplaces (Moynihan & Pandey, 2007). Instrumental degree centrality and the resources offered by instrumental network contacts also create constituent forces by generating professional goodwill between network contacts (Adler & Kwon, 2002); however, we argue that the close affective bonds based on personal relationships have a stronger incremental impact on turnover decisions than the strategic bonds based on instrumental relationships. Thus, although both expressive and instrumental degree centrality are expected to reduce the likelihood of turnover beyond the key turnover antecedents, we expect that employees are more likely to stay at their jobs for expressive relationships rather than strategic or instrumental relationships, *ceteris paribus*.

Hypothesis 5: After accounting for work attitudes, job alternatives, and job performance, expressive degree centrality has a stronger negative relationship with turnover than instrumental degree centrality.

Method

We report the meta-analytic procedures that are the basis of this investigation. Then, we discuss how we use findings from previous and original meta-analyses to test study hypotheses.

Literature Search and Inclusion Criteria

To identify relevant articles for the current meta-analysis, we conducted an exhaustive literature search using PsycINFO, PsycARTICLES, Social Sciences Full Text, and Academic Search Premier databases to identify both published and unpublished studies conducted before or during 2016 by pairing the keyword *social network** with keywords for each of the outcome variables in this study: *job satisfaction*, *organizational commitment, perceived alternatives, job alternatives, ease of movement, task performance, job performance*, and *turnover*. Second, we reviewed the reference sections of the collected articles for additional relevant articles, dissertations, book chapters, or conference proceedings. Our search yielded 296 published articles, working papers, book chapters, and dissertations.

We established five inclusion criteria for this study: First, studies must have used either the roster or the ego-centric network method to assess network characteristics. Second, the social network variable must have been at the interpersonal level of analysis as opposed to the interorganizational level (Carpenter, Li, & Jiang, 2012), and the network must have been based upon interpersonal interactions (as opposed to virtual interactions—e.g., e-mail). In addition, we included studies that assessed intraorganizational networks of various boundaries (e.g., organizational, team, unit) and extraorganizational networks (e.g., professional and personal contacts) because we considered both types of networks to be relevant to decisions to leave (less than 5% of included studies assessed extraorganizational networks). Third, studies must have been based on samples of adults associated with an organization because turnover is relevant to this population. Fourth, studies must have included one of the dependent variables of interest: job satisfaction, organizational commitment, job alternatives, job performance, or turnover. We excluded studies that assessed satisfaction with or commitment to other aspects of work or career besides the job (i.e., career satisfaction or team commitment), performance at any other level than the individual level (e.g., team or group performance), and rewards that stem from high job performance, such as salary or promotion (e.g., Gargiulo, Ertug, & Galunic, 2009). Finally, the study must not have been a duplicate of a previously coded study. Out of the 296 studies collected, 101 studies met all inclusion criteria. Of these, 59 studies (64 samples) contained effect size information reported as bivariate correlation coefficients. Appendix B reports study information, including sample size, network type, network position, dependent variable effect size, and reliability estimates. The online supplemental materials reports the 14 studies that did not contain the relevant empirical information (i.e., effect size) that was necessary to code them, and the 28 studies that assessed a network position or outcome measure that was not relevant to this meta-analysis (e.g., closeness centrality).

Coding Procedures

Caitlin M. Porter and Melissa G. Keith coded study information. To develop a common frame of reference for coding the studies, they coded 20% of the studies together. Then, the remaining studies were coded separately, and the two coders met weekly to review and discuss the studies coded. The initial percentage agreement between the coders was 95.6%. During weekly meetings, the coders discussed any disagreements until consensus was achieved; disagreements were primarily a result of unclear or ambiguous reporting of information in the primary studies.

First, we coded the type of network, instrumental or expressive. Instrumental networks were considered those that facilitated work activities, such as relations based upon advice and communication. Expressive networks were those that were based on friendship or social interaction (e.g., Ibarra, 1993). Networks that did not clearly fall in one of these two categories were excluded from further analysis (e.g., bullying, adversarial, gossip). Second, we coded all studies that reported effect sizes for degree centrality (i.e., number of network contacts), in-degree centrality (i.e., number of contacts who nominated a focal actor as a contact), and out-degree centrality (i.e., number of contacts who a focal actor nominated as a contact). Unless the authors of the studies noted otherwise, network size in ego-centric network studies were coded as out-degree centrality because ego-centric network studies require a focal actor to construct the network. In addition, we also coded the bivariate correlations between network characteristics of the same social network to estimate the associations between network positions.

Several studies reported effect sizes for multiple social network characteristics based on the same sample, yielding multiple dependent effect sizes. To account for the dependence of effect sizes, we constructed composite correlations using the formula provided by Schmidt and Hunter (2013). First, we combined effect sizes for different operationalizations of degree centrality. Specifically, we combined out-degree centrality and in-degree centrality to form degree centrality (Wasserman & Faust, 1994), and we combined the same network characteristic from two different types of networks, instrumental and expressive, to form degree centrality, as is common in organizational network studies (e.g., Sparrowe et al., 2001; Venkataramani et al., 2013). When we aggregated the effect

sizes, degree centrality was based on all forms of centrality (i.e., degree centrality, in-degree centrality, and out-degree centrality) as long as the effect sizes were drawn from different studies. Likewise, meta-analytic effect sizes for degree centrality across networks are based on effect sizes for degree centrality in combined networks, instrumental networks, and expressive networks if the effect sizes were from different studies.[1]

Several studies also reported multiple effect sizes for different operationalizations of the dependent variables, which we handled differently depending on the dependent variable under consideration. When there were multiple measures of job satisfaction, we chose the effect size associated with the measure that most closely aligned with general evaluations of the job (as opposed to aspects of the job). In two cases, the job satisfaction measures assessed satisfaction with different aspects of the job (Flap & Volker, 2001; Welch & Jha, 2016); in these cases, we combined the dependent effect sizes using the same procedures outlined above. When there were multiple measures of organizational commitment, we chose the effect size associated with affective commitment because it was the most often studied form of organizational commitment; the meta-analytic effect size is based upon both affective organizational commitment and organizational commitment measures (e.g., Organizational Commitment Questionnaire; Mowday, Steers, & Porter, 1979). We included multiple measures of perceived job alternatives, including assessments of "concrete prospects" (Griffeth et al., 2005). When there were multiple measures of job performance, we included the effect size based upon supervisor-ratings (if available) or ratings most closely associated with task or in-role performance (as opposed to measures of other performance constructs, such as organizational citizenship behaviors). When there were multiple measures of turnover, we included effect sizes that were based upon voluntary turnover (as opposed to involuntary). However, some studies did not distinguish between voluntary and involuntary turnover. We discuss the implications of not distinguishing between these forms of turnover in our limitations section. Finally, although turnover intentions are often used as a proxy for turnover, we excluded them from our analyses because intentions represent a distinct phase in the decision processes leading to behavioral turnover (e.g., Mobley et al., 1979).

Calculating Meta-Analytic Effect Sizes

To calculate the meta-analytic effect sizes, we followed the procedures recommended by Schmidt and Hunter (2013). Each effect size was individually corrected for measurement error in the dependent variables using the internal consistency reliability estimate reported in each study; if the internal consistency reliability estimate was not reported, we used the mean of the internal consistency reliability estimates for the dependent variable drawn from all studies that reported an effect size for the relationship in question, with the exception of supervisor-rated job performance and turnover. For supervisor-rated job performance, we corrected for interrater reliability because it accounts for measurement error associated with both random response error and rater idiosyncrasy (Schmidt & Hunter, 2013); we used Viswesvaran, Ones, and Schmidt's (1996) meta-analytic estimate of interrater reliability (.52) to correct for unreliability in the job performance criterion because none of the studies reviewed reported interrater reliability information.[2] For turnover, we corrected for the dichotomization of the turnover criterion because turnover is not considered a "true dichotomy," as the propensity to quit (a continuous variable) is typically the outcome of interest in turnover studies (Hunter & Schmidt, 1990; cf. Griffeth et al., 2000). To be consistent with recent turnover meta-analyses (e.g., Rubenstein, Eberly, Lee, & Mitchell, 2018), we corrected for dichotomization using the biserial correlation attenuation formula, as suggested by Schmidt and Hunter (2013) and Hunter and Schmidt (1990). We did not correct for unreliability in the network variables because they are observed variables. Corrected effect sizes were weighted by the sample size and attenuation factor, and then aggregated for each independent variable and dependent variable combination. The precision of the effect size estimates is evaluated by 95% confidence intervals (CIs), which index the likely amount of error in the estimate due to sampling error. We calculated confidence intervals for the corrected mean effect sizes (r_c) using the standard error based on the standard deviations of corrected effect sizes (SD_{rc}) divided by the square root of the number of studies (k), as recommended by Schmidt and Hunter (2013, p. 230).

As we followed the procedures of Schmidt and Hunter (2013), the error structure of the data followed a random effects model, which assumes that the variability of the effect sizes is due to both within-study and between-study variability. In general, a random effects model is most appropriate for organizational research because research in organizational sciences is drawn from heterogeneous populations (e.g., differing occupations, organizations); this heterogeneity is modeled in random effects models by the between-study variability parameter (Aguinis, Gottfredson, & Wright, 2011; Cooper, 2010). To evaluate whether the variance in effect sizes is due to sampling error or other factors (e.g., moderators), we tested for the homogeneity of effect sizes using the Q statistic (Cooper, 2010) and the I^2 statistic, which is an estimate of the dispersion that can be attributed to real differences in effect sizes as opposed to within study error. Whereas the Q statistic is highly dependent upon the number of studies included in a meta-analysis, the I^2 statistic does not depend on the number of studies and therefore, can be used to compare between-study heterogeneity across meta-analyses. The I^2 statistic reports a percentage of between-study heterogeneity that indicates the impact of heterogeneity on the meta-analytic effect size, where 0–40% represents minor heterogeneity, 40–70% represents moderate heterogeneity, and 70–100% represent substantial heterogeneity (Higgins & Thompson, 2002). We used the metafor package in R (Viechtbauer, 2010) to estimate these heterogeneity statistics (Q and I^2). Tables 1 and 2 present the meta-analytic results.

[1] The results of meta-analyses that distinguish between in-degree and out-degree centrality are available from the authors upon request.

[2] This practice has been debated as some researchers have suggested that idiosyncratic rater effects should not be attributed to measurement error (Murphy & DeShon, 2000; Schmidt, Viswesvaran, & Ones, 2000). In addition, Lebreton and colleagues have suggested that the Viswesvaran et al. estimate is downwardly biased due to range restriction and the use of such an estimate overestimates the relationship between predictors and job performance (LeBreton, Burgess, Kaiser, Atchley, & James, 2003; also see LeBreton, Scherer, & James, 2014).

Table 1
Summary of Meta-Analytic Relationships of Degree Centrality With Turnover Antecedents

	k	*N*	*r*	r_c	SD_{rc}	95% CI	Q	I^2(%)
Job satisfaction								
Degree	23	7,695	.06	.07	.09	[.03, .11]	49.13**	51.40
Instrumental degree	19	7,135	.05	.05	.07	[.02, .08]	30.26*	35.35
Expressive degree	11	2,374	.12	.14	.11	[.07, .20]	25.57**	56.25
Organizational commitment								
Degree	16	3,108	.20	.22	.08	[.18, .26]	18.84	14.84
Instrumental degree	11	2,423	.17	.19	.08	[.14, .24]	13.92	20.59
Expressive degree	11	2,337	.18	.20	.08	[.15, .25]	12.74	13.37
Job alternatives								
Out-degree	4	1,090	.03	.03	.06	[−.03, .09]	3.37	.00
Instrumental out-degree	3	914	.03	.03	.04	[−.02, .08]	1.42	.00
Expressive out-degree	3	964	.00	.00	.06	[−.07, .07]	2.87	.00
Job performance								
Degree	36	7,413	.10	.13	.19	[.07, .20]	170.39***	78.48
Instrumental degree	26	5,683	.12	.16	.18	[.09, .23]	112.59***	76.29
Expressive degree	15	2,651	.03	.02	.19	[−.08, .11]	59.22***	73.62

Note. *k* = the number of studies contributing to the meta-analytic effect size estimate; *N* = the total sample size; *r* = the sample size weighted mean observed correlation; r_c = the mean effect size corrected for unreliability in the criterion; SDr_c = the standard deviation of the corrected effect size estimate; 95% CI = 95% confidence interval around r_c; *Q* = heterogeneity in the effect sizes; I^2 = the percentage of observed total variation across studies that is due to true heterogeneity between studies.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Analytic Procedures

To examine the proposed hypotheses, we created a meta-analytic correlation matrix, which is reported in Table 3 (Viswesvaran & Ones, 1995). The meta-analytic relationships between job satisfaction, organizational commitment, job alternatives, job performance, and turnover were retrieved from previous studies (Jiang, Liu, McKay, Lee, & Mitchell, 2012; Judge et al., 2001; Riketta, 2002; Rubenstein et al., 2018). These 10 meta-analytic correlations were corrected for measurement error in the predictors and criterion, and meta-analytic correlations involving turnover were corrected for the dichotomization of the turnover criterion. We estimated the meta-analytic effect sizes for the relationships of instrumental and expressive degree centrality with job satisfaction, organizational commitment, job alternatives, job performance, and turnover. In addition, we calculated the average sample-weighted correlation between forms of degree centrality in the current sample of studies to test path models in which multiple indices of degree centrality were examined simultaneously.

The meta-analytic correlation matrix was used to test the study hypotheses using path analysis in Mplus Version 8 (Muthén & Muthén, 1998–2017). The sample size of each model was set as the harmonic mean of the sample sizes of the effect sizes (Landis, 2013). Each model was tested using maximum likelihood estimation because the analyses were based upon summary data (i.e., a correlation matrix). Model fit was evaluated using the following fit indices: chi-square statistic, comparative fit index (CFI), root mean squared error of approximation (RMSEA), and standardized root mean residual (SRMR). CFI values of .95 or higher indicate that the model fits the data well; RMSEA and SRMR values of .05 or lower are considered indications that the model fits the data well (Hu & Bentler, 1999).

In specifying the path model, we allowed mediators to covary based on previous research (Judge et al., 2001; Riketta, 2002). Specifically, job performance and work attitudes were expected to positively relate to one another because employees who perform well may receive rewards that encourage positive reactions to their job or organization; likewise, those with positive work attitudes may be motivated to perform well. We also included an association between work attitudes and job alternatives because those with more positive work attitudes may be less likely to contemplate or

Table 2
Summary of Meta-Analytic Relationships of Degree Centrality With Turnover

Turnover	*k*	*N*	*r*	r_c	SD_{rc}	95% CI	Q	I^2(%)
Degree	11	2,882	−.14	−.23	.21	[−.35, −.10]	78.58***	84.74
Instrumental degree	7	2,304	−.10	−.17	.11	[−.23, −.07]	17.11*	55.32
Expressive degree	3	569	−.30	−.48	.10	[−.60, −.37]	4.54	33.67

Note. *k* = the number of studies contributing to the meta-analytic effect size estimate; *N* = the total sample size; *r* = the sample size weighted mean observed correlation; r_c = the mean effect size corrected for unreliability in the criterion; SDr_c = the standard deviation of the corrected effect size estimate; 95% CI = 95% confidence interval around r_c; *Q* = heterogeneity in the effect sizes; I^2 = the percentage of observed total variation across studies that is due to true heterogeneity between studies.
* $p < .05$. *** $p < .001$.

Table 3
Meta-Analytic Correlation Matrix

Study variables	1	2	3	4	5	6
1. Instrumental degree centrality						
2. Expressive degree centrality	.35 19 (4,118)					
3. Job satisfaction	.05 19 (7,135)	.14 11 (2,374)				
4. Organizational commitment	.19 11 (2,423)	.20 11 (2,337)	.65[c] 69 (23,656)			
5. Job alternatives	.03 3 (914)	.00 3 (964)	−.19[a] 14 (5,269)	−.23[a] 10 (3,888)		
6. Job performance	.16 26 (5,683)	.02 15 (2,651)	.30[b] 312 (54,471)	.18[d] 87 (20,973)	.03[a] 2 (745)	
7. Turnover	−.17 7 (2,304)	−.48 3 (569)	−.28[e] 174 (107,625)	−.29[e] 129 (71,862)	.23[e] 79 (58,512)	−.21[e] 85 (111,562)

Note. All correlations are corrected for measurement error in the dependent variable with the exception of turnover; turnover correlations are corrected for dichotomization. Number of studies (*k*) is reported on the outside of the parentheses; the total sample size (*N*) is reported within the parentheses.
[a] Jiang, Liu, McKay, Lee, and Mitchell (2012). [b] Judge, Thoresen, Bono, and Patton, (2001). [c] Meyer, Stanley, Herscovitch, and Topolnytsky (2002). [d] Riketta, 2002 (in-role performance). [e] Rubenstein, Eberly, Lee, and Mitchell (2018).

pursue alternative job opportunities. Finally, we included an association between job alternatives and job performance because those who perform well in the organization may have a more robust perception that they could acquire alternative employment either within or outside of their employing organization.

For the path analysis, we examined two alternative models: A fully mediated model in which the relationships between degree centrality positions and turnover were fully mediated by work attitudes, job alternatives, and job performance; and a partially mediated model in which degree centrality predicted turnover directly. Because of concerns of multicollinearity between the work attitudes of organizational commitment and job satisfaction, we examined each instantiation of work attitudes separately. For the organizational commitment model (H = 1,961), we found that the full mediation model fit the data poorly (χ^2 = 519.74, df = 2, $p < .001$; CFI = .55; RMSEA = .36; SRMR = .10). The partial mediation model was just-identified (i.e., no degrees of freedom), so we were unable to estimate model fit. To provide an indication of model fit, we removed the nonsignificant path from job alternatives to job performance, which allowed us to provide evidence that the model fit the data well (χ^2 = 1.24, df = 1, p = .27; CFI = 1.00; RMSEA = .01; SRMR = .01). We retained and interpreted this model (Model 1 in Table 4). For the job satisfaction model (H = 2,064), we found that the full mediation model fit the data poorly (χ^2 = 566.55, df = 2, $p < .001$; CFI = .55; RMSEA = .37; SRMR = .10). Similar to the organizational commitment model, the partial mediation model was just identified. To provide an indication of model fit, we removed the nonsignificant path from job alternatives to job performance, which provided evidence that the model fit the data well (χ^2 = 1.30, df = 1, p = .25; CFI = 1.00; RMSEA = .01; SRMR = .01). We retained and interpreted this model (Model 2 in Table 4). The path estimates of the models containing the covariance between job alternatives and job performance varied very little from the path estimates of the retained models.

To evaluate study hypotheses, we tested whether the direct and indirect effect sizes for the associations of instrumental and expressive degree centrality with turnover antecedents were different from one another. To compare the direct effects, we named the parameters that represented the relationships between instrumental degree centrality (A1) and turnover antecedents (e.g., job satisfaction), and between expressive degree centrality (A2) and turnover antecedents. Then, using the model constraint option in Mplus, we created a new variable to represent the difference between the two parameters (A12 = A1 – A2). Mplus evaluates whether this parameter is different from 0. If the parameter is different from 0, it indicates that the two parameters are different from one another, providing an indication of whether instrumental or expressive network positions have a stronger influence on turnover and turnover antecedents. We used a similar procedure to compare the magnitude of the indirect effects. For example, the indirect effect of turnover on instrumental degree centrality via job satisfaction was created by multiplying the effect of job satisfaction on instrumental degree centrality (A1) and the effect of turnover on job satisfaction (B1) [A1B1 = A1 × B1]. Then, we did the same for expressive degree centrality: the indirect effect of turnover on expressive degree centrality via job satisfaction was created by multiplying the effect of job satisfaction on expressive degree centrality (A2) and the effect of turnover on job satisfaction (B1) [A2B1 = A2 × B1]. Then, we created a variable that represented the difference between the two indirect effect estimates [AB1 = A1B1 – A2B1]. We evaluated whether this parameter was different from 0 to assess whether the difference in the magnitude of effect sizes were statistically significantly different. In the results, we report beta weights that indicate the magnitude of the difference in effect sizes.

Results

The meta-analytic estimates are reported in Tables 1 and 2.[3] We evaluate study hypotheses by examining the bivariate meta-analytic estimates and the simultaneous model testing where or-

[3] We note that the meta-analytic estimates of instrumental and expressive degree centrality with job performance exhibit a substantial degree of heterogeneity (about 76% and 73%, respectively), suggesting that there may be moderators of these relationships; for instance, the magnitudes of the relationships of in-degree centrality and out-degree centrality with job performance may differ.

Table 4
Path Estimates for Path Models Where the Work Attitudes of Job Satisfaction and Organizational Commitment Are Analyzed Separately

	Work attitude			
	Organizational commitment (Model 1)		Job satisfaction (Model 2)	
Paths	Estimate	*SE*	Estimate	*SE*
Outcome: Turnover				
Work attitude	−.12***	.02	−.12***	.02
Job alternatives	.21***	.02	.21***	.02
Performance	−.19***	.02	−.17***	.02
Instrumental degree	.04***	.02	.02	.02
Expressive degree	−.47***	.02	−.47***	.02
Outcome: Work attitude				
Instrumental degree	.14***	.02	.00	.02
Expressive degree	.15***	.02	.14***	.02
Outcome: Job alternatives				
Instrumental degree	.03	.02	.03	.02
Expressive degree	−.01	.02	−.01	.02
Outcome: Job performance				
Instrumental degree	.17***	.02	.17***	.02
Expressive degree	−.04†	.02	−.04†	.02
Covariates		—		
Work attitude with job alternatives	−.24***	.02	−.20***	.02
Work attitude with job performance	.16***	.02	.30***	.02
Performance with job alternatives	—	—	—	—
Indirect effects of instrumental degree centrality on turnover				
Mediator				
Work attitude	−.02***	.00	.00	.00
Job alternatives	.01	.01	.01	.01
Job performance	−.03***	.01	−.03***	.01
Indirect effects of expressive degree centrality on turnover				
Mediator				
Work attitude	−.02**	.01	−.02**	.00
Job alternatives	−.00	.00	−.00	.01
Job performance	.01†	.01	.01†	.00

Note. Estimates are standardized.
† $p < .10$. ** $p < .01$. *** $p < .001$.

ganizational commitment and job satisfaction are examined in separate models (see Table 4). Hypothesis 1 proposed that, compared to instrumental degree centrality, expressive degree centrality would have a stronger positive relationship with work attitudes. Examining the bivariate, meta-analytic estimates (see Table 2), we found that the associations of expressive (r_c = .20, 95% CI [.15, .25]) and instrumental (r_c = .19, 95% CI [.14, .24]) degree centrality with organizational commitment were comparable, but that expressive degree centrality was more strongly, positively associated with job satisfaction (r_c = .14, 95% CI [.07, .20]) compared to instrumental degree centrality (r_c = .05, 95% CI [.02, .08]). Thus, the bivariate correlations offer some initial support Hypothesis 1 for job satisfaction, but not for organizational commitment. When we compared the magnitude of the relationships using simultaneous analyses and the model constraint option, our findings coincided with the bivariate relationships: We found that both instrumental and expressive degree centrality were positively related to organizational commitment to a comparable magnitude ($\beta = -.02$, $p = .69$), and expressive degree centrality had a stronger positive relationship with job satisfaction compared to instrumental degree centrality ($\beta = -.14$, $p < .001$). Therefore, we found support for Hypothesis 1, but only when job satisfaction was under investigation.

Hypothesis 2 extended the logic of Hypothesis 1 by proposing that expressive degree centrality has a stronger, negative indirect effect on turnover via work attitudes compared to instrumental degree centrality. Using the model constraint option in Mplus to compare the magnitude of the indirect effects, we found that the indirect effect from expressive degree centrality to turnover via organizational commitment was comparable to that of instrumental degree centrality ($\beta = .002$, $p = .69$), yielding no support for Hypothesis 2. However, when we examined job satisfaction, we found that the relationship from expressive degree centrality to turnover via job satisfaction was stronger than that of instrumental degree centrality ($\beta = .02$, $p < .01$), providing support for this hypothesis. Therefore, Hypothesis 2 was supported with job satisfaction under consideration, but not with organizational commitment.

Hypothesis 3 proposed that, compared to expressive degree centrality, instrumental degree centrality would have a stronger positive relationship with (a) job alternatives and (b) job performance. Regarding job alternatives, the bivariate associations revealed that neither instrumental nor expressive degree centrality was related to job alternatives (see Table 1). Furthermore, neither instrumental nor expressive degree centrality was associated with job alternatives in either the job satisfaction or the organizational commitment model, providing no support for Hypothesis 3a. Regarding job performance, the bivariate relationships reveal that instrumental degree centrality was positively associated with job performance (r_c = .16, 95% CI [.09, .23]), whereas expressive degree centrality was unrelated (r_c = .02, 95% CI [−.08, .11]), providing initial support for Hypothesis 3b. The simultaneous analyses replicate these findings: When we compared the magnitude of the relationships of instrumental and expressive degree centrality with job performance, we found that instrumental degree centrality was more strongly associated with job performance, regardless of whether job satisfaction ($\beta = .22$, $p < .001$) or organizational commitment ($\beta = .22$, $p < .001$) was under consideration. Thus, study findings converge to provide support for Hypothesis 3b.

Hypothesis 4 extended the logic of Hypothesis 3 by proposing that, compared to expressive degree centrality, instrumental degree centrality had a stronger (a) positive indirect effect on turnover via job alternatives and (b) negative indirect effect on turnover via job performance. We found no evidence that either instrumental or expressive degree centrality influenced turnover via job alternatives. Therefore, Hypothesis 4a received no support. In comparing the magnitude of the indirect effects associated with job performance using the model constraint option in Mplus, we found that instrumental degree centrality had a stronger negative indirect effect via job performance compared to the positive indirect effect of expressive degree centrality via job performance, regardless of whether the work attitude under investigation was organizational commitment ($\beta = -.04$, $p < .001$) or job satisfaction ($\beta = -.04$, $p < .001$), providing support for Hypothesis 4b.

Finally, Hypothesis 5 proposed that, compared to instrumental degree centrality, expressive degree centrality has a stronger negative relationship with turnover after accounting for turnover an-

tecedents (work attitudes, job alternatives, and job performance). The meta-analysis of degree centrality with turnover (see Table 2) revealed that expressive degree centrality was more strongly, negatively associated with turnover ($r = -.48$, 95% CI [−.60, −.37]) compared to instrumental degree centrality ($r = -.17$, 95% CI [−.23, −.07]) as evidenced by nonoverlapping confidence intervals, which provides initial evidence that expressive degree centrality has a stronger, negative relationship with turnover than instrumental degree centrality. Turning to the simultaneous analyses, the organizational commitment model reveals that that expressive degree centrality was negatively related to turnover after accounting for turnover antecedents, but instrumental degree centrality was weakly, positively related to turnover (Table 4, Model 1). This finding offers evidence in support of Hypothesis 5 and reveals the relative importance of expressive networks to employees' decisions to stay at their employers after accounting for turnover antecedents, as compared to instrumental degree centrality. Examining the job satisfaction model (Table 4, Model 2), we found that expressive degree centrality was negatively related to turnover, whereas instrumental degree centrality was unrelated to turnover, offering additional support for Hypothesis 5. Furthermore, we compared the magnitude of the relationships of instrumental and expressive degree centrality with turnover using the model constraint option discussed in the analytic procedures; we found that the magnitude of the relationship between expressive degree centrality and turnover was larger than that of instrumental degree centrality and turnover across both organizational commitment and job satisfaction models (Model 1: $\beta = .51$, $p < .01$; Model 2: $\beta = .49$, $p < .01$), illustrating the stronger relative influence of expressive degree centrality on turnover compared to instrumental degree centrality.

Discussion

Although previous research has illustrated that employees with a central position in their networks are less likely to leave, there have been few attempts to examine how different forms of degree centrality (expressive or instrumental) influence employee turnover or the process through which degree centrality relates to employee turnover. We sought to address these gaps in understanding with the current meta-analytic investigation: We evaluated the extent to which degree centrality in two broad types of networks, instrumental and expressive, reduce the likelihood of turnover via key turnover antecedents recognized in "classic" turnover decision models (March & Simon, 1958; Mobley et al., 1979).

To elaborate, this study offers a more integrated and nuanced view of how network positions influence turnover in two interrelated ways. First, this study extends the networks-turnover literature by more carefully considering what has been theorized and discovered in past turnover research. Networks-turnover studies have begun to adopt psychological theories to explain how network positions exert their influence on turnover outcomes, but few have drawn specifically from turnover process models as an explanation for how networks relate to turnover (cf. Feeley, 2000). An extensive literature illustrates that employees typically (but not always; Lee & Mitchell, 1994; Maertz & Campion, 2004) proceed through a decision process prior to leaving their employers, and that there are key considerations that influence their decisions. We identified three key turnover antecedents that persist across multiple turnover models (March & Simon, 1958; Mobley et al., 1979; Maertz & Griffeth, 2004): perceived desirability of movement (represented by work attitudes), perceived ease of movement (or expected utility of leaving, represented by perceived job alternatives), and expected utility of staying (or calculative forces, represented by job performance). Our results suggest that instrumental and expressive degree centrality can reduce turnover risks due to increased work attitudes and job performance. These findings begin to shed light on why employees with certain types of network ties are more likely to stay compared to others, presenting a more integrative picture of how different forms of social capital (represented by instrumental and expressive degree centrality) uniquely influence major factors in turnover decisions.

Second, we distinguished between the influence of instrumental and expressive network ties on turnover, which enriched previous social capital accounts of how network positions relate to turnover. Although instrumental and expressive networks are commonly discussed in the networks literature (Ibarra, 1993; Podolny & Baron, 1997), it was unclear how these different types of network ties influence turnover processes. To more clearly delineate how one's access to different types of resources influences turnover, we investigated the distinctive influences of instrumental versus expressive degree centrality on turnover processes. In the following section, we discuss major findings from our meta-analysis that offer new theoretical insights and/or signal the need for further clarification in future research.

Research Implications

In line with our general expectations, the current findings illustrate that different types of network ties predict turnover through different pathways, suggesting it is important consider the content of resources received through network relationships when evaluating the influence of "networks" on employee turnover processes. Specifically, we found that expressive degree centrality was positively related to job satisfaction and negatively related to turnover via job satisfaction, whereas instrumental degree centrality was positively related to job performance and negatively related to turnover via job performance.

Also, expressive degree centrality had a stronger, negative relationship with turnover after accounting for turnover antecedents, compared to instrumental degree centrality. This finding suggests that having many friends at work compels employees to stay beyond other key factors influencing turnover decisions. Although this idea has been recognized in the turnover literature as constituent forces (Maertz & Griffeth, 2004), the current study offers a more nuanced perspective on how constituent forces operate by suggesting that the strongest attachment to the organization may not result from *all* workplace connections equally, but primarily those that offer access to social support or friendship (i.e., expressive ties).

In addition, although both types of degree centrality were positively related to job satisfaction, the association between expressive degree centrality and job satisfaction tended to be slightly stronger than the association between instrumental degree centrality and job satisfaction. These findings suggest that having many friends at work contributes to positive evaluations of one's job and may therefore be more relevant to promoting job satisfaction

compared to instrumental network relationships. At the same time, we found that both expressive and instrumental degree centrality were positively associated with organizational commitment to a comparable degree. Therefore, it appears that both expressive and instrumental relationships promote commitment to one's organization, whereas expressive relationships are more effective for promoting positive evaluations of one's job. Additional research is needed to better understand why instrumental contacts promote commitment rather than job satisfaction. For instance, it may be that instrumental contacts provide specific resources (e.g., sponsorship, organizational knowledge) that help employees develop a greater sense of fit with their organizations (e.g., Morrison, 2002) or increased perceptions of organizational support (Hayton, Carnabuci, & Eisenberger, 2012; Zagenczyk, Scott, Gibney, Murrell, & Thatcher, 2010), which may encourage organizational commitment.

Our meta-analyses also reveal that instrumental degree centrality was positively related to job performance, whereas expressive degree centrality was unrelated to job performance. As such, expressive degree centrality represents somewhat of a double-edged sword in that having many friends at work encourages people to stay but does not necessarily facilitate their job performance. More research is required to better understand the potential tradeoffs of having many friends at work.

Practical Implications

These results provide several implications for practitioners interested in leveraging employee networks to reduce turnover. First, it is clear that degree centrality in expressive networks tends to have a strong negative association with turnover. As such, organizations may offer opportunities for employees to develop friendships at work to encourage retention. For example, organizations or departments within large organizations may have group lunches, monthly happy hours, or company events (e.g., picnics, fairs) that promote a sense of community between organizational members (Holtom, Mitchell, & Lee, 2006). Apart from informal events, more formal work-oriented activities, such as rotating project teams, committees, or conferences, may indirectly accomplish this goal. Although both instrumental and expressive network connections contribute to organizational commitment, expressive network relationships tend to have a stronger, negative relationship with turnover, suggesting that workplace friends create more reasons to stay than instrumental colleagues.

Second, these results provide insights into how employee networks promote organizational commitment and job satisfaction. Instrumental and expressive degree centrality were positively related to organizational commitment, and degree centrality in expressive networks was positively related to job satisfaction. One way organizations may leverage this information is to provide incoming employees with peer mentors, who are capable of providing both instrumental and expressive resources as well as connecting the incoming employee with additional organizational contacts. Access to such support is likely to promote not only work attitudes that discourage turnover, but also facilitate socialization and possibly greater job embeddedness (Allen, 2006; Allen, McManus, & Russell, 1999).

Limitations and Future Research Directions

Certain limitations of this research should be kept in mind when interpreting the results. First, some meta-analytic correlations are based upon a small number of studies (i.e., job alternatives), which increases the likelihood of second-order sampling error; thus, readers should interpret these results with caution. Despite this, we believe that meta-analysis is still useful for summarizing the literature, as the meta-analytic method allows us to tease apart the associations between distinct types of network ties and turnover antecedents, and the combined estimates across studies provide a more reliable estimate of these relationships than looking at each study in isolation (Schmidt et al., 1985).

Second, networks are inherently distinct from one another (e.g., they have different boundaries, represent various contexts). Although meta-analysis offers the benefit of identifying how networks typically relate to employee outcomes, it may also obscure the unique context in which these networks operate. Therefore, future research may need to more seriously consider the unique organizational and occupational contexts of employee networks, as there may be theoretically relevant contextual moderators, such as high-performance work practices, that accentuate or attenuate the relationships reported in this paper.

Third, the primary studies that contributed to the meta-analytic estimates consisted chiefly of cross-sectional designs, with the exception of studies evaluating turnover. As such, this study can say little about the causal relationships between networks and work attitudes, job alternatives, and job performance. Although most networks research rests on the assumption that social network positions precede individual attitudes and behaviors (Borgatti & Halgin, 2011), additional research is needed to examine the relationships between different network positions and employee attitudes and behaviors over time as well as the reciprocal processes between employee attitudes and behaviors and their network positions.

Fourth, most of the studies included in this meta-analysis (~95%) were based on intraorganizational networks. Future research may investigate how employee turnover is influenced by employees' external networks both within the local community, as suggested by job embeddedness theory (e.g., Mitchell, Holtom, Lee, Sablynski, & Erez, 2001), as well as within the broader professional community in which the individual works. Although these network contacts theoretically have implications for individuals' turnover decisions, they have rarely been considered in empirical research (cf., Porter, Woo, & Campion, 2016; Wolff & Moser, 2010). The distinction between intraorganizational and extraorganizational networks is particularly relevant to how instrumental networks influence employees' perceived job alternatives. Although we maintain that instrumental network contacts may promote perceived job alternatives regardless of whether they are located within or outside of their employing organizations, we also suggest that network contacts within versus outside of the organization have access to different types of resources that promote perceived job alternatives differently. For example, extraorganizational network contacts may be privy to different alternative job information at different employers than intraorganizational network contacts; furthermore, extraorganizational network contacts are more capable of referring a focal employee to their employer

and guiding them through the application and interview processes (Barbulescu, 2015). As such, instrumental network contacts are useful for promoting perceived (and actual) job opportunities, but the location of the network contact, within versus outside of focal employees' organizations, is likely an important boundary condition of this relationship. Indeed, as extraorganizational networks are more likely to influence perceptions of job alternatives (Griffeth et al., 2005), the null association between employee network degree centrality and job alternatives may be a function of the primary studies mostly assessing intraorganizational employee networks. In sum, additional research is needed to evaluate how extraorganizational networks influence employees' decisions to leave (relative to intraorganizational networks).

Fifth, this study investigated the associations between network positions and turnover, but it did not distinguish between voluntary and involuntary turnover due to the nature of the primary studies. As such, the magnitude of the relationship between degree centrality positions and turnover reported in this study may be attenuated, as involuntary leavers typically exit their employing organizations under different circumstances than voluntary leavers. Finally, the studies contributing to the effect size estimates between degree centrality positions and job alternatives were based on out-degree centrality only (i.e., based on self-reported networks collected via the egocentric network method). Although prior research has suggested that self-reported ego-centric network methods are effective for assessing networks (Marsden, 1990), self-reported networks may not be as accurate as networks measured using the roster method.

Apart from addressing the limitations noted above, this paper also points to multiple directions for future research. For example, although we attempted to include turnover antecedents that are relevant across turnover models, we recognize that additional turnover antecedents may explain how instrumental and expressive network positions influence turnover processes. Given that degree centrality is associated with turnover after accounting for the turnover antecedents identified, it may be worthwhile to investigate additional mediators of these relationships. For instance, job embeddedness has emerged as an important precursor to employee turnover that is likely influenced by employees' networks (Hom & Xiao, 2011; Porter et al., 2016), and therefore, may explain why employees high in expressive degree centrality are less likely to leave. Future research may also extend our findings by investigating how network positions influence more detailed turnover processes that incorporate more proximal cognitive processes preceding turnover, such as thoughts of quitting and turnover intentions. On a related note, the measures upon which this study is based may not fully capture the theoretical constructs posed in turnover theories. For instance, prior research has lamented that perceived job alternatives have not been adequately assessed (e.g., Griffeth et al., 2005). Furthermore, we use job performance as a proxy for "expected utility of staying" in the organization (Mobley et al., 1979). Due to the potential for construct deficiency in the measures upon which this study is based, we can only offer an approximate test of the proposed theoretical model. Thus, a more direct test of our theoretical model may be warranted in future research, as potential construct deficiency poses an alternative explanation for the direct relationships between degree centrality and turnover.

Furthermore, the current study implicitly assumes that instrumental and expressive network contacts offer access to instrumental and expressive resources. However, we do not measure resources separately from network positions due to a lack of primary studies that measure resources. To better understand the mechanisms through which network positions influence employee outcomes, future research could more directly measure different types of resources available from network actors (e.g., influence, information, social support) and examine how these resources differentially predict work outcomes. Foa (1971) and Podolny and Baron (1997) offered frameworks that delineate types of resources, which could be adopted in future research.

In addition, the current study focused on degree centrality as the primary network position due to its conceptual association with the amount of available resources; however, there are other network characteristics that may be considered in relation to turnover. Indeed, research investigating the associations between network positions and turnover have taken four network approaches: structural equivalence, social influence, Simmelian ties, and social capital (see Appendix A). Of these four approaches, the social capital approach is the most pervasive and flexible in that it encompasses a wider range of network positions than the other approaches, including degree centrality, betweenness centrality, closeness centrality, eigenvector centrality, and structural holes. Only recently has research considered how the different advantages that are conferred by distinct network positions (e.g., degree centrality vs. structural holes) relate to turnover for separate reasons (Ballinger et al., 2016). Future research may continue this line of inquiry by specifying the advantages offered by different types of network positions, which would provide added conceptual clarity into how different network positions relate to turnover. Not only this, but future research may also examine the impact of the strength of network relationships, as such network contacts may be more willing to provide strategic or valuable information to a focal employee. In other words, the number of contacts provides information about potential access to resources (i.e., more contacts yield more resources), but the strength of the relationship provides information about the likelihood of the contact actually providing those resources (i.e., stronger relationships may be more willing to offer resources).

Our meta-analytic summary of degree centrality in relation to turnover antecedents and turnover distinguished between instrumental and expressive networks, but it did not consider the direction of the relationship, that is whether the focal actor nominated his or her contacts (out-degree centrality) or was nominated by his or her contacts (in-degree centrality). Although examining this distinction was beyond the scope of this paper, future research may consider how the direction of the relationship influences turnover processes, and whether this relationship is dependent upon the nature of the network. For instance, prior research has revealed a positive relationship between in-degree centrality and performance (e.g., Sparrowe et al., 2001), but in-degree centrality in expressive networks (akin to popularity) may lead one to have less time or fewer resources to devote to one's work.

Finally, considering the growing body of job embeddedness research, we suggest that additional conceptual and empirical research is necessary to better understand the associations between network positions and Mitchell et al.'s (2001) job embeddedness construct. Prior research has suggested that network approaches may be leveraged to operationalize job embeddedness (Holtom et al., 2008; Zhang, Fried, & Griffeth, 2012), yet questions remain regarding which network positions are appropriate operationalizations and whether such network positions adequately capture the full range of the job embeddedness construct, which not only encompasses "links" to people and groups at the organization and in the community, but also "fit" with the job or community and perceptions of "sacrifice" if one were to leave the job or community (Mitchell et al., 2001). Recent operationalizations of "organizational embeddedness" recognize that people weight these components differently when developing their perceptions of their embeddedness (Crossley, Bennett, Jex, & Burnfield, 2007). Thus, job embeddedness is a psychological perception, whereas network positions are more objective realities. Additional conceptual research is needed to reconcile these two perspectives. One example of such an endeavor is Hom and Xiao (2011); they provide a strong conceptual foundation for how network constraint (an assessment of structural holes) captures job embeddedness (when both organizational and personal contacts are assessed) in a Chinese cultural context, which may provide a useful template for future research.

Conclusion

Using meta-analytic path analysis, this study revealed that work attitudes and job performance are relevant mediators of the associations between network positions and turnover. Furthermore, these mediating mechanisms were somewhat dependent upon the type of network tie, instrumental or expressive, as expressive degree centrality encouraged retention via job satisfaction whereas instrumental degree centrality encouraged retention via job performance. Thus, this study not only sheds light on the process through which networks relate to turnover, but it also illustrates the importance of distinguishing between different types of network ties when predicting turnover.

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* References marked with an asterisk indicate studies included in the meta-analysis.

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Appendix A

Review of Networks-Turnover Studies

Social networks research investigating employee turnover has been approached from multiple disciplinary (e.g., communications, management, psychology) and theoretical perspectives. Often a single theory is invoked to explain why multiple network positions deter turnover, even though network positions relate to turnover for different reasons. To offer clarity for the application of network approaches to turnover research, we review the extant networks-turnover literature, which we organize according to predominant network perspectives: structural equivalence, social influence, Simmelian tie theory, and social capital theory. Prior research has conceptually categorized these research traditions into two groups, with the first three theoretical traditions falling into the "social homogeneity" category because social connections are theorized to constrain one's actions to be similar (Borgatti & Halgin, 2011). The latter perspective, social capital, posits that social relations can either facilitate or constrain individual action depending upon the social structure and resources (e.g., information, influence, or solidarity) derived from network contacts. Table A1 summarizes the studies reviewed.

To begin, structural equivalence explanations propose that people occupying the same (formal or informal) position in a network (i.e., holding relationships with the same contacts) likely hold similar attitudes or behave similarly because they have access to similar information or resources (Lorrain & White, 1971). In one of the first examinations of how network positions relate to turnover, Krackhardt and Porter (1986) found that turnover occurred in clusters in which people occupying similar positions in their communication networks tended to leave their employers. Similarly, Feeley and Barnett (1997) found that structurally equivalent actors tended to stay at or leave their organizations depending on whether they were more or less central in their networks, respectively. Despite structural equivalence being among the first explanations for networks influencing turnover, little research has investigated these processes further.

(*Appendices continue*)

Second, social influence (or social contagion) perspectives assert that people tend to adopt the attitudes, cognitions, and/or behaviors of those people with whom they commonly interact. Feeley and Barnett (1997) examined a social influence model by investigating whether people with connections to leavers were more likely to leave, and they found some support. Similarly, Wang, Newman, and Dipboye (2016) found that coworkers' turnover was positively associated with focal employee's likelihood of turnover. In addition, although they did not adopt a network approach, Felps et al. (2009) found that focal employees' connections with coworkers who were embedded in their jobs was negatively associated with their likelihood of voluntary turnover, whereas connections to coworkers who were searching for jobs was positively associated with their likelihood of turnover. Thus, there is growing support for the influence of fellow employees' attachment and withdrawal on focal employees' likelihood of exit, with this evidence coming from multiple lines of research.

Third, Simmelian tie theory asserts that a network position in which one is part of a closed triad (i.e., being connected to two people who are also connected) creates a situation in which one is inhibited from acting independently, which is why they are sometimes referred to as the "ties that torture" (Krackhardt, 1999). Empirical research on the relationship between Simmelian ties and turnover is somewhat mixed. Hasan (2010) found that Simmelian tie brokerage (i.e., being the bridge between two triads) was positively associated with turnover, whereas other research revealed that increased occurrences of Simmelian ties in friendship networks are negatively associated with voluntary turnover (across two studies; Vardaman et al., 2015). The discrepancies within prior research may be due to the content of the networks; it may be that closed triads "torture" when they exist between instrumental contacts, but that they encourage commitment when they exist between expressive contacts because they generate solidarity (Coleman, 1988; Krackhardt, 1992).

Finally, perhaps the most prominent theoretical perspective on why network positions relate to employee turnover is the social capital perspective. Broadly, *social capital* refers to access to resources through a network of relationships, which may be mobilized to facilitate one's activities (Adler & Kwon, 2002; Burt, 1992; Coleman, 1988; Granovetter, 1973, 1985). Research taking a social capital perspective typically argues that "more is better." For instance, Feeley and colleagues have proposed the "erosion model" of employee turnover in which they assert that central employees are more likely to stay at their organizations due to increased access to informational resources, which generates commitment (Feeley & Barnett, 1997). In support of their theorizing, Feeley and colleagues found that central network positions (degree, betweenness, and closeness centrality) are negatively associated with turnover across multiple studies (Feeley, 2000; Feeley & Barnett, 1997; Feeley et al., 2008).

Furthermore, researchers have argued that social capital "embeds" employees in their organizations by offering increased access to informational and solidarity benefits, which not only generate constituent attachments to employing organizations (Mossholder et al., 2005), but also are recognized as key resources that employees are hesitant to give up by leaving (Vardaman et al., 2015). Along these lines, Ballinger et al. (2016) suggested that social capital is a resource that takes different forms, which are represented by different network positions (in-degree centrality, network constraint, and in-degree eigenvector centrality). They deepened prior social capital perspectives by identifying specific types of resources associated with each network position under investigation and boundary conditions of these relationships (e.g., structural holes reduce the likelihood of turnover for upper-level employees, but not lower-level employees).

Apart from these network perspectives, researchers have also married network theories with psychological theories to elaborate on why network positions predict turnover. For instance, Hom and Xiao (2011) integrated job embeddedness theory (Mitchell et al., 2001) with Burt's (1992) social capital theory to explain how networks (network constraint based on relationships within and outside of the organization) "embed" employees in their organizations in a Chinese context (also see Soltis, Agneessens, Sasovova, & Labianca, 2013). Furthermore, Vardaman and colleagues invoked temporal construal theory (Trope & Liberman, 2003) to explain why network positions (instrumental and expressive in-degree/out-degree centrality and Simmelian ties) inhibit the translation of turnover intentions into turnover behaviors. They argued that employees are willing to discount their resources when forming turnover intentions, but as the time to commit to behavioral turnover approaches, they increasingly value their social capital, which encourages them to stay. Finally, Ballinger and colleagues (2016) used conservation of resources theory (Hobfoll, 2001) as an explanation for why employees are hesitant to give up their social capital (or resources) by leaving.

(*Appendices continue*)

Table A1
Summary of Empirical Research Investigating Network Positions and Turnover

Study	Theoretical perspective(s)	Network position	Key findings
Krackhardt & Porter (1986)	Structural equivalence	Structural equivalence (block modeling)	Employees who held similar informal roles (based on their communication networks) left their employers at similar rates.
Feeley & Barnett (1997)	Erosion model Structural equivalence Social influence	Centrality (average number of links required to reach every network contact[a]) Structural equivalence (block modeling) Percentage of links with leavers	This study pitted three models of network turnover against one another. They found the most support for the structural equivalence and "erosion" explanations for turnover: Structurally equivalent members who were less central were more likely to leave, whereas structurally equivalent members who were more central were more likely to stay. Furthermore, employees with links to leavers were more likely to leave, supporting the social influence perspective. Finally, in support of the "erosion model", more central employees were less likely to leave. In general, the authors concluded that structural equivalence and "erosion model" explanations explained turnover better than social influence.
Feeley (2000)	Erosion model	Degree centrality Closeness centrality Betweenness centrality	Multiple measures of network centrality (degree, betweenness, and closeness) were negatively related to turnover after three months; degree centrality remained a negative predictor of turnover after six months. In general, this study provides support for the erosion model of employee turnover.
Mossholder, Settoon, & Henagan (2005)	Social capital	In-degree centrality	The purpose of this paper was to examine the extent to which different types of relational constructs promoted employee retention. Among other associations, the authors found that instrumental in-degree centrality was negatively associated with the likelihood of voluntary turnover.
Feeley, Hwang, & Barnett (2008)	Erosion model Social support	Peer in-degree/out-degree centrality Friendship in-degree/out-degree centrality	This study compared the relative influence of "peer" networks and "friendship" networks on turnover. They found that both peer in-degree centrality and friendship out-degree centrality were negatively related to turnover, and friendship network positions explained more variance in turnover than peer network positions.
Feeley, Moon, Kozey, and Slowe (2010)	Erosion model Social support	Network centrality (degree, betweenness, and closeness centrality combined)	Using meta-analysis, the authors investigated the interrelationships of network centrality, social support, turnover intentions and turnover. They found network centrality was negatively associated with turnover, and positively associated with social support. Furthermore, they found that social support was negatively related to turnover intentions and turnover.

(*Appendices continue*)

Table A1 (*continued*)

Study	Theoretical perspective(s)	Network position	Key findings
Hasan (2010)	Structural hole theory Simmelian tie theory	Network constraint Simmelian tie brokerage (bow-tie pattern)	The purpose of this study was to investigate whether brokerage of disconnected individuals (i.e., structural hole brokerage) or connected individuals (i.e., Simmelian brokerage) have differential relationships with turnover. She found that brokerage across strong ties reduces the likelihood of turnover, whereas brokerage across Simmelian ties increases the likelihood of turnover.
Hitler (2010)	Social support	Network constraint (i.e., structural holes)	The author posits that having people at work with whom one gossips increases attachments to work when the gossip is "healthy venting" and reduces attachments when gossip is "unhealthy complaining." She found that higher network constraint (i.e., fewer structural holes) was positively related to turnover.
Hom & Xiao (2011)	Social capital job embeddedness	Network constraint (i.e., structural holes)	This study investigated how guanxi ties "embed" people in their organizations in a Chinese context. They discuss how guanxi ties influence job and community embeddedness, and they find that network constraint (an indicator of fewer structural holes) positively predicted intentions to stay and negatively predicted voluntary turnover.
Parker & Gerbasi (2016)	Theory of energetic activation	In-degree/out-degree centrality	The authors argue that "energizing" interactions with colleagues promotes positive perceptions and attitudes towards coworkers and the employing organization, which subsequently reduces the likelihood of voluntary turnover. They found that the more an employee feels energized by interactions with colleagues, the less likely they are to voluntarily leave their employer.
Vardaman, Taylor, Allen, Gondo, & Amis (2015)	Social capital Simmelian tie theory Temporal construal theory	Degree centrality Simmelian ties	The purpose of this paper was to investigate the role of network ties (degree centrality) and structure (simmelian ties) in inhibiting the translation of turnover intentions into voluntary turnover. Drawing from temporal construal theory, these authors argue that employees discount the value of their network connections up until an actual turnover decision needs to be made, at which time, the value of these connections becomes more salient, which discourages turnover. They found that in-degree advice centrality, in-degree and out-degree expressive centrality weakened the positive relationship between turnover intentions and turnover.

(*Appendices continue*)

Table A1 (*continued*)

Study	Theoretical perspective(s)	Network position	Key findings
Ballinger, Cross, & Holtom (2016)	Social capital Conservation of resources theory	In-degree centrality Network constraint (structural holes) In-eigenvector centrality	These authors propose that social capital is a resource that employees are hesitant to lose, which discourages turnover. They identify three network positions (in-degree centrality, incoming eigenvector centrality, and network constraint) that act as different forms of social capital that discourage turnover. They found that in-degree and eigenvector centrality were negatively associated with voluntary turnover, and that holding a brokerage position was negatively associated with the likelihood of voluntary turnover for executives, but not for lower-level employees.
Wang, Newman, & Dipboye (2016)	Social influence (contagion)		The authors propose and test a model that integrates the individual level satisfaction-intention-turnover mediation model and the social network contagion model. Results indicate that peer job satisfaction and turnover had a direct effect on focal employees' job satisfaction and turnover, respectively. Moreover, the effect of network contagion on turnover was nearly as large as turnover intention, suggesting that network contagion is an important predictor of turnover.

[a] Rogers and Kincaid (1981).

(*Appendices continue*)

Appendix B

Summaries of Studies and Samples Included in the Meta-Analyses

Table B1
Characteristics of Studies Included in the Job Satisfaction Meta-Analyses

Source	*N*	Network characteristic	Network content	Network method	Network boundary	Measure	*ryy*	*r*
Betts (2016)	318	Out-degree	Inst.	Ego-centric	Org.	General job satisfaction	.89	.13
Betts (2016)	318	Out-degree	Exp.	Ego-centric	Org.	General job satisfaction	.89	.18
Brass (1981)	140	Degree	Inst.	Ego-centric	Org.	General job satisfaction	.79	.09
Chow, Ng, and Gong (2012)	126	Out-degree	Inst.	Ego-centric	Org.	General job satisfaction	.72	.05
Cohen (2007)	470	Out-degree	Inst.	Ego-centric	Org.	General job satisfaction	.81	−.07
Cohen (2007)	470	Out-degree	Exp.	Ego-centric	Org.	General job satisfaction	.81	.06
Feeley et al. (2008)	40	In-degree	Inst.	Roster	Org.	General job satisfaction	—	−.08
Feeley et al. (2008)	40	Out-degree	Inst.	Roster	Org.	General job satisfaction	—	−.18
Feeley et al. (2008)	40	In-degree	Comb.	Roster	Org.	General job satisfaction	—	.10
Feeley et al. (2008)	40	Out-degree	Comb.	Roster	Org.	General job satisfaction	—	.10
Flap & Volker (2001)	76	Out-degree	Comb.	Ego-centric	Org.	Instrumental job satisfaction	—	.02
Graf (1999), Study 1	235	Out-degree	Inst.	Ego-centric	Org./personal	General job satisfaction	.89	.14
Graf (1999), Study 1	235	Out-degree	Exp.	Ego-centric	Org./personal	General job satisfaction	.89	.19
Graf (1999), Study 2	216	Out-degree	Inst.	Ego-centric	Org./personal	General job satisfaction	.90	.17
Graf (1999), Study 2	216	Out-degree	Exp.	Ego-centric	Org./personal	General job satisfaction	.90	.14
Kozey (2008)	74	In-degree	Inst.	Ego-centric	Org.	Job in General	.84	.31
Kozey (2008)	74	Out-degree	Inst.	Ego-centric	Org.	Job in General	.84	.10
Kozey (2008)	74	In-degree	Exp.	Ego-centric	Org.	Job in General	.84	.23
Kozey (2008)	74	Out-degree	Exp.	Ego-centric	Org.	Job in General	.84	.21
Lamertz (2006)	120	Degree	Inst.	Roster	Work unit	General job satisfaction	.75	−.08
McAlpine (2015)	279	Degree	Inst.	Roster	Org.	General job satisfaction	.83	.15
McAlpine (2015)	279	Degree	Exp.	Roster	Org.	General job satisfaction	.83	.10
Mossholder et al. (2005)	176	In-degree	Inst.	Ego-centric	Org.	General job satisfaction	.79	.06
Newman (2004)	79	In-degree	Exp.	Roster	Org.	Job in General	.88	.04
Regts & Molleman (2016)	299	In-degree	Inst.	Roster	Work unit	General job satisfaction	.88	.08
Regts & Molleman (2016)	299	Degree	Exp.	Roster	Work unit	General job satisfaction	.88	.31
Soltis, Agneessens, Sasovova, and Labianca (2013)	229	In-degree	Inst.	Roster	Org. Division	General job satisfaction	.89	.05
Soltis et al. (2013)	229	Out-degree	Inst.	Roster	Org. Division	General job satisfaction	.89	.05
van Emmerik (2004)	1010	Out-degree	Inst.	Ego-centric	Org.	Intrinsic job satisfaction	.82	.09
Vardaman et al. (2015), Study 1	145	In-degree	Inst.	Roster	Org.	General job satisfaction	.70	−.08
Vardaman et al. (2015), Study 1	145	Out-degree	Inst.	Roster	Org.	General job satisfaction	.70	−.09
Vardaman et al. (2015), Study 1	145	In-degree	Exp.	Roster	Org.	General job satisfaction	.70	−.03
Vardaman et al. (2015), Study 1	145	Out-degree	Exp.	Roster	Org.	General job satisfaction	.70	.04
Vardaman et al. (2015), Study 2	183	In-degree	Exp.	Ego-centric	Org.	General job satisfaction	.83	−.12
Vardaman et al. (2015), Study 2	183	Out-degree	Exp.	Ego-centric	Org.	General job satisfaction	.83	.00
Venkataramani, Green, and Schleicher (2010)	184	In-degree	Inst.	Roster	Org.	Overall job satisfaction	.85	−.03
Venkataramani, Labianca, and Grosser (2013), Study 1	154	In-degree	Comb.	Roster	Org.	General job satisfaction	.90	.07
Venkataramani et al. (2013), Study 1	154	Out-degree	Comb.	Roster	Org.	General job satisfaction	.90	.06
Venkataramani et al. (2013), Study 2	144	In-degree	Comb.	Roster	Org.	General job satisfaction	.82	.22
Venkataramani et al. (2013), Study 2	144	Out-degree	Comb.	Roster	Org.	General job satisfaction	.82	.19
Volpone (2013), Sample 3	1400	Out-degree	Inst.	Ego-centric	Org.	Overall job satisfaction	.94	.01
Welch & Jha (2016)	1598	Out-degree	Inst.	Ego-centric	Org. & personal	Overall job satisfaction	.77	.02

Note. Inst. = Instrumental; Exp. = Expressive; Comb. = Combined; Org. = Organization. *ryy* refers to internal consistency reliability estimate for the outcome variable. *r* refers to the bivariate correlation effect size for each relationship.

(*Appendices continue*)

Table B2
Characteristics of Studies Included in the Organizational Commitment Meta-Analyses

Source	*N*	Network characteristic	Network content	Network method	Network boundary	Measure	*ryy*	*r*
Betts (2016)	318	Out-degree	Inst.	Ego-centric	Org.	Aff. Org. Commitment	.92	.27
Betts (2016)	318	Out-degree	Exp.	Ego-centric	Org.	Aff. Org. Commitment	.92	.32
Cohen (2007)	470	Out-degree	Inst.	Ego-centric	Org.	Aff. Org. Commitment	.79	.06
Cohen (2007)	470	Out-degree	Exp.	Ego-centric	Org.	Aff. Org. Commitment	.79	.19
Feeley (2000)	70	Degree	Comb.	Roster	Org.	Org. Commitment	.89	−.03
Graf (1999), Study 1	235	Out-degree	Inst.	Ego-centric	Org./personal	Aff. Org. Commitment	.76	.18
Graf (1999), Study 1	235	Out-degree	Exp.	Ego-centric	Org./personal	Aff. Org. Commitment	.76	.08
Graf (1999), Study 2	216	Out-degree	Inst.	Ego-centric	Org./personal	Aff. Org. Commitment	.82	.17
Graf (1999), Study 2	216	Out-degree	Exp.	Ego-centric	Org./personal	Aff. Org. Commitment	.82	.13
Hancock (2012)	143	Out-degree	Exp.	Ego-centric	Org./personal	Aff. Org. Commitment	.82	.17
Harris (2006)	196	Out-degree	Inst.	Ego-centric	Org.	Aff. Org. Commitment	.89	.25
Harris (2006)	196	Out-degree	Exp.	Ego-centric	Org.	Aff. Org. Commitment	.89	.14
Kozey (2008)	74	In-degree	Inst.	Ego-centric	Org.	Org. Commitment	.83	.31
Kozey (2008)	74	Out-degree	Inst.	Ego-centric	Org.	Org. Commitment	.83	.24
Kozey (2008)	74	In-degree	Exp.	Ego-centric	Org.	Org. Commitment	.83	−.03
Kozey (2008)	74	Out-degree	Exp.	Ego-centric	Org.	Org. Commitment	.83	.12
Lee & Kim (2011)	174	Degree	Inst.	Roster	Org.	Aff. Org. Commitment	.76	.35
McAlpine (2015)	279	Degree	Inst.	Roster	Org.	Aff. Org. Commitment	.81	.15
McAlpine (2015)	279	Degree	Exp.	Roster	Org.	Aff. Org. Commitment	.81	.18
Morrison (2002)	154	Out-degree	Inst.	Ego-centric	Org.	Aff. Org. Commitment	.89	.22
Morrison (2002)	154	Out-degree	Exp.	Ego-centric	Org.	Aff. Org. Commitment	.89	.22
Soltis (2012)	104	In-degree	Inst.	Roster	Org.	Aff. Org. Commitment	.83	.14
Soltis (2012)	104	Out-degree	Inst.	Roster	Org.	Aff. Org. Commitment	.83	.24
Soltis (2012)	104	In-degree	Exp.	Roster	Org.	Aff. Org. Commitment	.83	.04
Soltis (2012)	104	Out-degree	Exp.	Roster	Org.	Aff. Org. Commitment	.83	.07
Soltis et al. (2013)	229	In-degree	Inst.	Roster	Org. Division	Aff. Org. Commitment	.80	.14
Soltis et al. (2013)	229	Out-degree	Inst.	Roster	Org. Division	Aff. Org. Commitment	.80	.12
Vardaman, Amis, Dyson, Wright, and Randolf (2012)	148	In-degree	Inst.	Roster	Org.	Org. Commitment	.73	.07
Vardaman et al. (2012)	148	In-degree	Exp.	Roster	Org.	Org. Commitment	.73	.24
Venkataramani et al. (2013), Study 1	154	In-degree	Comb.	Roster	Org.	Aff. Org. Commitment	.85	.08
Venkataramani et al. (2013), Study 1	154	Out-degree	Comb.	Roster	Org.	Aff. Org. Commitment	.85	.11
Venkataramani et al. (2013), Study 2	144	In-degree	Comb.	Roster	Org.	Aff. Org. Commitment	.80	.26
Venkataramani et al. (2013), Study 2	144	Out-degree	Comb.	Roster	Org.	Aff. Org. Commitment	.80	.14

Note. Inst. = Instrumental; Exp. = Expressive; Comb. = Combined; Org. = Organization/Organizational; Aff. = Affective. *ryy* refers to internal consistency reliability estimate for the outcome variable. *r* refers to the bivariate correlation effect size for each relationship.

Table B3
Characteristics of Studies Included in the Job Alternatives Meta-Analyses

Source	*N*	Network characteristic	Network content	Network method	Network boundary	Measure	*ryy*	*r*
Betts (2016)	318	Out-degree	Inst.	Ego-centric	Org.	Perceived job alternatives	.85	.03
Betts (2016)	318	Out-degree	Exp.	Ego-centric	Org.	Perceived job alternatives	.85	.03
Chow et al. (2012)	126	Out-degree	Inst.	Ego-centric	Org.	Perceived job alternatives	.83	.12
Cohen (2007)	470	Out-degree	Inst.	Ego-centric	Org.	Perceived job alternatives	.82	.00
Cohen (2007)	470	Out-degree	Exp.	Ego-centric	Org.	Perceived job alternatives	.82	−.05
Hancock (2012)	176	Out-degree	Exp.	Ego-centric	Org./Personal	Crystalized job alternatives	.71	.09
Spurk, Meinecke, Kauffeld, and Volmer (2015)	82	Out-degree	Inst.	Ego-centric	Org.	Perceived external marketability	.91	.10

Note. Inst. = Instrumental; Exp. = Expressive; Comb. = Combined; Org. = Organization. *ryy* refers to internal consistency reliability estimate for the outcome variable. *r* refers to the bivariate correlation effect size for each relationship.

(*Appendices continue*)

Table B4
Characteristics of Studies Included in the Job Performance Meta-Analyses

Source	*N*	Network characteristic	Network content	Network method	Network boundary	Measure	*ryy*	*r*
Ballinger et al. (2016), Study 1	484	In-degree	Inst.	Ego-centric	Work unit	Supervisor ratings	—	.09
Ballinger et al. (2016), Study 2	1116	In-degree	Inst.	Ego-centric	Work unit	Supervisor ratings	—	.08
Barsness et al. (2005)	91	Out-degree	Other	Roster	Org.	Supervisor ratings	.95	−.24
Bizzi (2017)	138	Degree	Inst.	Ego-centric	Org.	Supervisor ratings	.85	−.17
Brass (1981)	140	Degree	Inst.	Roster	Org.	Supervisor ratings	.87	−.04
Bruque, Moyano, and Piccolo (2016)	371	Out-degree	Exp.	Ego-centric	Org.	Supervisor ratings	—	.15
Carboni & Ehrlich (2013)	295	In-degree	Inst.	Roster	Team	Supervisor ratings	—	−.03
Carboni & Ehrlich (2013)	295	Out-degree	Inst.	Roster	Team	Supervisor ratings	—	−.03
Casciaro (2014)	430	In-degree	Inst.	Roster	Team	Supervisor ratings	—	.53
Chen & Gable (2013)	93	Out-degree	Inst.	Ego-centric	Org.	Supervisor ratings	—	−.13
Chou, Cheng, Huang, and Cheng (2006)	179	Out-degree	Inst.	Roster	Team	Self-ratings	.94	.02
Chou et al. (2006)	179	Out-degree	Exp.	Roster	Other	Self ratings	.94	−.13
Chow et al. (2012)	168	Degree	Comb.	Ego-centric	Org.	Supervisor ratings	—	.29
Claro & Neto (2009)	500	Degree	Inst.	Ego-centric	Org.	Objective measure (sales)	—	.07
Claro & Neto (2009)	500	Degree	Exp.	Ego-centric	Org.	Objective measure (sales)	—	−.16
Graf (1999), Study 1	125	Out-degree	Inst.	Ego-centric	Org./personal	Supervisor ratings	.91	.05
Graf (1999), Study 1	125	Out-degree	Exp.	Ego-centric	Org./personal	Supervisor ratings	.91	.08
Graf (1999), Study 2	84	Out-degree	Inst.	Ego-centric	Org./personal	Supervisor ratings	.89	.09
Graf (1999), Study 2	84	Out-degree	Exp.	Ego-centric	Org./personal	Supervisor ratings	.89	.06
Jokisaari (2013)	102	Out-degree	Inst.	Ego-centric	Org.	Supervisor ratings	.89	.13
Marineau, Labianca, and Kane (2016)	90	In-degree	Exp.	Roster	Org.	Supervisor ratings	.88	.26
Marineau et al. (2016)	90	Out-degree	Exp.	Roster	Org.	Supervisor ratings	.88	.16
Mehra, Kilduff, and Brass (2001)	92	Degree	Inst.	Roster	Org.	Supervisor ratings	.90	.17
Mehra et al. (2001)	92	Degree	Exp.	Roster	Org.	Supervisor ratings	.90	−.10
Methot (2010)	180	In-degree	Inst.	Roster	Org.	Supervisor ratings	.93	.13
Methot (2010)	180	Out-degree	Inst.	Roster	Org.	Supervisor ratings	.93	.18
Methot (2010)	180	In-degree	Exp.	Roster	Org.	Supervisor ratings	.93	−.02
Methot (2010)	180	Out-degree	Exp.	Roster	Org.	Supervisor ratings	.93	.27
Methot (2010)	180	Out-degree	Exp.	Roster	Org.	Supervisor ratings	.93	.27
Methot, LePine, Podsakoff, and Christian (2016), Study 1	168	Out-degree	Inst.	Ego-centric	Org.	Supervisor ratings	.88	.15
Methot et al. (2016), Study 1	168	Out-degree	Exp.	Ego-centric	Org.	Supervisor ratings	.88	−.19
Oldroyd (2007)	64	Degree	Comb.	Ego-centric	Org.	Supervisor ratings	.80	.09
Papa (1990), Sample 1	137	Out-degree	Inst.	Roster	Org.	Objective measure	—	.35
Papa (1990), Sample 2	164	Out-degree	Inst.	Roster	Org.	Objective measure	—	.30
Parker & Gerbasi (2016)	102	In-degree	Inst.	Roster	Department	Supervisor ratings	—	.23
Parker & Gerbasi (2016)	102	Out-degree	Inst.	Roster	Department	Supervisor ratings	—	.16
Peng & Quan (2012)	109	Degree	Inst.	Roster	Org.	360 degree ratings	—	−.15
Peng & Quan (2012)	109	Degree	Exp.	Roster	Org.	360 degree ratings	—	.04
Regts & Molleman (2016)	293	In-degree	Inst.	Roster	Work Unit	Supervisor ratings	.83	.30
Regts & Molleman (2016)	293	Degree	Exp.	Roster	Work Unit	Supervisor ratings	.83	.11
Rhee & Ji (2011)	136	Out-degree	Inst.	Ego-centric	Org.	Self-ratings	.93	.55
Rodan & Galunic (2004)	106	Out-degree	Comb.	Ego-centric	Org.	Supervisor ratings	.93	.36
Sasovova, Mehra, Borgattie, and Schipprs (2010)	123	Out-degree	Exp.	Roster	Org.	Supervisor ratings	.93	.26
Shah (2010), Sample 2	154	In-degree	Inst.	Roster	Org.	Supervisor ratings	—	.19
Shah (2010), Sample 2	154	In-degree	Exp.	Roster	Org.	Supervisor ratings	—	.08
Soltis (2012)	104	In-degree	Inst.	Roster	Org.	360 degree ratings	—	.15
Soltis (2012)	104	Out-degree	Inst.	Roster	Org.	360 degree ratings	—	−.10
Soltis (2012)	104	In-degree	Exp.	Roster	Org.	360 degree ratings	—	.09
Soltis (2012)	104	Out-degree	Exp.	Roster	Org.	360 degree ratings	—	−.13
Sparrowe, Liden, Wayne, and Kraimer (2001)	190	In-degree	Inst.	Roster	Team	Supervisor ratings	.94	.26
Ustüner & Iacobucci (2012)	76	Out-degree	Inst.	Roster	Org.	Supervisor ratings	.73	.20
Ustüner & Iacobucci (2012)	76	Out-degree	Exp.	Roster	Org.	Supervisor ratings	.73	.25
Volpone (2013), Sample 3	89	Out-degree	Inst.	Ego-centric	Org.	Supervisor/coworker ratings	.79	−.06
Zhang & Venkatesh (2013)	104	In-degree	Comb.	Roster	Work unit	Supervisor ratings	.74	.31
Zou & Ingram (2013)	318	Out-degree	Comb.	Ego-centric	Org.	360 degree ratings	.79	−.01

Note. Inst. = Instrumental; Exp. = Expressive; Comb. = Combined; Org. = Organization. *ryy* refers to internal consistency reliability estimate for the outcome variable. *r* refers to the bivariate correlation effect size for each relationship.

(*Appendices continue*)

Table B5
Characteristics of Studies Included in the Turnover Meta-Analyses

Source	*N*	Network characteristic	Network content	Network method	Network boundary	Measure	*r*
Ballinger et al. (2016), Study 1	484	In-degree	Inst.	Ego-centric	Work unit	Voluntary turnover	.15
Ballinger et al. (2016), Study 2	1,116	In-degree	Inst.	Ego-centric	Work unit	Turnover	.07
Feeley (2000)	70	Degree	Comb.	Roster	Org.	Turnover	−.39
Feeley & Barnett (1997)	166	Degree	Comb.	Roster	Org.	Turnover	−.13
Feeley et al. (2008)	40	In-degree	Inst.	Roster	Org.	Turnover	−.17
Feeley et al. (2008)	40	Out-degree	Inst.	Roster	Org.	Turnover	.17
Feeley et al. (2008)	40	In-degree	Comb.	Roster	Org.	Turnover	−.17
Feeley et al. (2008)	40	Out-degree	Comb.	Roster	Org.	Turnover	−.38
Hasan (2010)	241	In-degree	Inst.	Roster	Org.	Turnover	−.22
Hasan (2010)	241	Out-degree	Inst.	Roster	Org.	Turnover	−.17
Hasan (2010)	241	In-degree	Exp.	Roster	Org.	Turnover	−.23
Hasan (2010)	241	Out-degree	Exp.	Roster	Org.	Turnover	−.15
Hitler (2010)	159	Out-degree	Comb.	Ego-centric	Org.	Turnover	.15
Mossholder et al. (2005)	176	In-degree	Inst.	Ego-centric	Org.	Voluntary turnover	−.22
Parker & Gerbasi (2016)	102	In-degree	Inst.	Roster	Department	Voluntary turnover	.05
Parker & Gerbasi (2016)	102	Out-degree	Inst.	Roster	Department	Voluntary turnover	.01
Vardaman et al. (2015), Study 1	145	In-degree	Inst.	Roster	Org.	Voluntary turnover	−.11
Vardaman et al. (2015), Study 1	145	Out-degree	Inst.	Roster	Org.	Voluntary turnover	−.12
Vardaman et al. (2015), Study 1	145	In-degree	Exp.	Roster	Org.	Voluntary turnover	−.38
Vardaman et al. (2015), Study 1	145	Out-degree	Exp.	Roster	Org.	Voluntary turnover	−.24
Vardaman et al. (2015), Study 2	183	In-degree	Exp.	Ego-centric	Org.	Voluntary turnover	−.30
Vardaman et al. (2015), Study 2	183	Out-degree	Exp.	Ego-centric	Org.	Voluntary turnover	−.28

Note. Inst. = Instrumental; Exp. = Expressive; Comb. = Combined; Org. = Organization. *ryy* refers to internal consistency reliability estimate for the outcome variable. *r* refers to the bivariate correlation effect size for each relationship.

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