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The Social Networks of
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monitors: Implications
for Workplace
Performance

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This article examines how different personality types create and benefit from social networks in organizations. Using data from a 116-member high-technology firm, we tested how self-monitoring orientation and network position related to work performance. First, chameleon-like high self-monitors were more likely than true-to-themselves low self-monitors to occupy central positions in social networks. Second, for high (but not for low) self-monitors, longer service in the organization related to the occupancy of strategically advantageous network positions. Third, self-monitoring and centrality in social networks independently predicted individuals' workplace performance. The results paint a picture of people shaping the networks that constrain and enable performance. ●

One of the enduring questions we face as human beings concerns why some people outcompete others in the race for life's prizes. In work organizations, for example, why are some people better performers than others? One answer to this question is provided by research on the importance of structural position. Within each specific work context, some individuals occupy more advantageous positions in social networks than other individuals. These positions allow access to people who are otherwise disconnected from each other. The individuals who act as go-betweens, bridging the "structural holes" between disconnected others, facilitate resource flows and knowledge sharing across the organization. Their contributions to organizational functioning may lead to enhanced rewards, including faster promotions (Burt, 1992) and higher performance ratings.

Research on structural position has emphasized the importance of being in the right place (Brass, 1984) but has neglected both the possibility that the network positions occupied by individuals might be influenced by their psychology and the possibility that personality and social network position might combine to influence important outcomes such as work performance. The structural approach to organizational dynamics tends to emphasize the structure of positions in social space (Pfeffer, 1991; Blau, 1993) and avoids dependence on difficult-to-measure psychological properties of actors (e.g., McPherson, Popielarz, and Drobnic, 1992). Recent calls for more insight into the origins of network positions and the importance of individual characteristics (e.g., Emirbayer and Goodwin, 1994) prompt us to investigate why some individuals occupy structurally advantageous positions and how individual differences in psychology and structural position combine to determine performance in organizational contexts.

The structuralist approach is not alone in disregarding the possible effects of individual characteristics on social structures. Despite a long history of psychological research suggesting that individuals differ with respect to social influence (e.g., McGuire, 1968; Riley and Eckenrode, 1986), there has been relatively little work in psychology on how individual differences affect the structures of the social worlds in which people live and work. Rather than neglecting either the structure of the social world or the psychology of the individual, we investigate how individuals strive within social structures

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that both enable and constrain action. We follow in the tradition of those who recognize the importance of understanding the micro-foundations of structural patterns (e.g., Granovetter, 1973; Ibarra, 1993; Uzzi, 1996).

Earlier work by social network pioneers included personality measures (e.g., Newcomb, 1961; Sampson, 1968) and interpersonal orientations (e.g., Breiger and Ennis, 1979; see also recent work by Janicik, 2000). In bringing the individual back into social network analysis (cf. Kilduff and Krackhardt, 1994), we build on this previous work. Rather than treat individual attributes and social attributes as separate realms of enquiry, we seek to understand how the social networks that significantly affect the performance of organizational participants are shaped by the attributes of interacting individuals.

THEORY

The Structural Advantage

Individuals may outperform their peers because of differences in the networks to which they belong. Links to friends and work partners can provide the assistance and social support necessary for high performance, but not all network configurations are likely to be equally helpful. Forming a large network, for example, may be less important than acquiring a structurally advantageous position within a network (Burt, 1992).

Social actors who connect disconnected others tend to gain both information and control benefits. Information concerning projects, crises, resources, and other contingencies flow from a diversity of social actors to the central actor whose ties link disconnected others. Actors whose social ties are limited to one clique are less likely to receive diverse information than are actors whose ties span cliques because information that circulates within a clique of highly connected workers is likely to be redundant. Evidence for the benefits of structural holes comes from both small-group and organizational research (see the review in Burt, Jannotta, and Mahoney, 1998). Small-group experiments showed that people with exclusive relations to otherwise disconnected contacts tended to gain greater resources (Cook and Emerson, 1978; Cook et al., 1983). One organizational study examined the importance for non-supervisory personnel of occupying high-betweenness centrality positions—that is, positions that enable occupants to act as potential go-betweens for those not connected with each other. Results showed that the higher the betweenness centrality in the informal communication network, the greater the social influence and the higher the likelihood of promotion to supervisor within the following three-year period (Brass, 1984).

Occupying a position between disconnected others is important not only for non-supervisory personnel but also for those in the managerial ranks. A study of the individual networks and achievements of senior managers in a high-tech firm showed that non-redundant contacts to diverse clusters of others were related to early promotions (Burt, 1992). Similar findings emerged in another study of mobility among employees of a high-technology firm: people with sparse social net-

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works that tied them to unconnected others tended to have high mobility (Podolny and Baron, 1997).

The accumulating evidence suggests that individuals with ties across social divides gain non-redundant information concerning opportunities and resources. The ability to obtain resources such as information is directly related to individual and group performance (O'Reilly, 1977; O'Reilly and Roberts, 1977a, 1977b). Further, actors who connect disconnected others can facilitate the flow of information across the whole system of coordinated activity that makes up the organization, thereby contributing to the accomplishment of organization-wide goals. Given this, when we discuss individual performance in this article, we refer to the extent to which individuals contribute to organizational purposes, building on the work in organization theory that emphasizes that job performance consists of individuals contributing to the tasks specific to the organization (Burns and Stalker, 1994: 97). Previous work has focused on the effects of structural position on outcome variables such as power and promotions but has offered little conclusive evidence concerning performance in organizations. One of the few studies that did examine work performance found that employees occupying central positions in the workflow network were no more likely to be high performers than employees occupying less central positions (Brass, 1981). In contrast, research on officers and enlisted men in three high-technology military organizations showed that people with two or more network contacts performed better than people with one or no network contacts (Roberts and O'Reilly, 1979). This research did not examine the importance of network centrality or ties that link disconnected others. Given these suggestive but inconclusive findings, it is useful to examine directly whether structural position predicts workplace performance.

Self-Monitoring

Individuals in organizations may outperform their peers not only because of differences in the networks to which they belong but also because of individual differences in personality. Of the many personality variables that could potentially affect performance, self-monitoring, a variable centrally concerned with individuals' "active construction of public selves to achieve social ends" (Gangestad and Snyder, 2000: 546), stands out for three reasons. First, self-monitoring theory provides compelling arguments linking individual differences in self-monitoring with a range of job outcomes, such as performance in the workplace, leadership emergence in work groups, conflict management, information management, impression management, and boundary spanning (Snyder, 1987: 88–90; Kilduff and Day, 1994). Second, self-monitoring theory makes clear predictions concerning the effects of self-monitoring orientation on how individuals shape social worlds (Snyder, 1987: 59–84). And, third, as one leading structuralist (White, 1992: 206) has noted, the cutting edge of personality research of interest to social networkers may lie in approaches that recognize individual differences in predictable patterns of variability across situations, as self-monitoring does.

According to self-monitoring theory, individuals differ in the extent to which they are willing and able to monitor and control their self-expressions in social situations. Some people resemble successful actors or politicians in their ability to find the appropriate words and behaviors for a range of quite different social situations. With chameleon-like ease, they present the right image for the right audience. Other people, by contrast, appear to take to heart the advice Polonius gave to Laertes in Shakespeare's *Hamlet*, "To thine own self be true": they insist on being themselves, no matter how incongruent their self-expression may be with the requirements of the social situation. Research on self-monitoring has provided important insights into individual differences in how individuals present themselves in social contexts (see Gangestad and Snyder, 2000, for a review).

In a social situation, high self-monitors ask, "Who does this situation want me to be and how can I be that person?" (Snyder, 1979). By contrast, low self-monitors ask, "Who am I and how can I be me in this situation?" (Snyder, 1979; Kilduff and Day, 1994). Self-monitoring theory, therefore, provides new insight into the age-old question of whether behavior is a function of consistent dispositions or strong situational pressures. From a self-monitoring perspective, some individuals (the low self-monitors) are consistent in demonstrating behavior that expresses inner feelings, attitudes, and beliefs. Other individuals (the high self-monitors) are consistent in adjusting behavior to the demands of different situations.

Because high self-monitors rely on social cues from others to guide their behaviors rather than on their own inner attitudes and emotions, high self-monitors are more likely than low self-monitors to resolve conflicts through collaboration and compromise (Baron, 1989). Further, high self-monitors tend to emerge as group leaders (Zaccaro, Foti, and Kenny, 1991), particularly in situations calling for high levels of verbal interaction (Garland and Beard, 1979) and in normative climates that support the emergence of leadership (Whitmore and Klimoski, 1984).

High self-monitors tend to emerge as leaders perhaps in part because they are more skilled at social interactions (Furnham and Capon, 1983). One study found that low self-monitors attended more to internal cues to produce effective work, whereas high self-monitors attended to situational cues, including the leadership behavior of supervisors (Anderson and Tolson, 1989). High self-monitors are more active in conversations (Ickes and Barnes, 1977) and tend to talk about the other person (and other people) instead of talking about themselves (Ickes, Reidhead, and Patterson, 1985). High self-monitors are better than low self-monitors at pacing conversations (Dabbs et al., 1980), using humor (Turner, 1980), and reciprocating self-disclosures during acquaintance processes (Shaffer, Smith, and Tomarelli, 1982). In a review of studies of interpersonal strategies used by high and low self-monitors, Snyder (1987: 42) wrote that the "lubricating" techniques employed by high self-monitors "would have warmed the heart of Dale Carnegie."

The social skills and leadership abilities of high self-monitors, therefore, may enable them to perform significantly better than low self-monitors in the modern workplace where cooperation with others to achieve organizational purposes is the norm and where leadership emergence is encouraged (see review by Baron and Markman, 2000). Although there is no reason to suppose that self-monitoring orientation affects the proficiency with which individuals perform technical duties, contextual activities, such as cooperating with others and following procedures even when they are personally inconvenient, are also a major part of workplace performance (Borman and Motowidlo, 1993). Much managerial work involves communicating with others (Gronn, 1983), performing a variety of different roles (Mintzberg, 1973), and relating to the needs of a large number of diverse people (Kotter, 1982). The social skills and leadership abilities characteristic of high self-monitors may enable them to perform better than low self-monitors in such contexts.

Previous research has shown that individual differences in how people approach social situations affect individual attainment in managerial careers. Self-monitoring effects have been demonstrated on managerial promotions over a five-year period: high self-monitors are more likely to be promoted in managerial careers than low self-monitors (Kilduff and Day, 1994). Much of the pioneering work concerning the effects of self-monitoring on performance-related variables has consisted of laboratory studies on students (e.g., Caldwell and O'Reilly, 1982a). The occasional field study has tended to focus either on the eventual outcomes of performance differences, such as early promotions (e.g., Kilduff and Day, 1994), or has focused on specific types of workers, such as boundary spanners (e.g., Caldwell and O'Reilly, 1982b). It is important, therefore, to test whether self-monitoring predicts workplace performance across the full range of organizational positions in an organization.

Three Models

Given the separate and unrelated literatures on social networks and personality, the question is how structural position and self-monitoring combine to affect individual performance in organizations. We explore three perspectives: a mediation model, an interaction model, and an additive model.

Mediation model. Performance differences among individuals in organizations may be due to the tendency of a particular personality type (the high self-monitor) to occupy structurally central positions that link otherwise disconnected people and provide differential resources. Research across a range of social relationships shows that high and low self-monitors tend to inhabit different social worlds (Snyder, Gangestad, and Simpson, 1983; Snyder and Simpson, 1984; Snyder, Simpson, and Gangestad, 1986). Able to tailor behavior to a range of different social situations, the high self-monitor tends to belong to a number of distinct social groups. The low self-monitor, by contrast, prefers to belong to a clique within which the individual can express a characteristic disposition (Snyder, 1987: 68–69).

The high self-monitor likes to have one friend for tennis, another friend for basketball, and yet another friend for chess. High self-monitors maintain flexibility and make little emotional investment in relationships. Friends are chosen based on how closely their skills match activity domains. As one high self-monitoring tennis player observed, "When I want to play tennis, I select a partner who can challenge me" (quoted in Snyder, 1987: 65). Low self-monitors, by contrast, tend to choose friends on the basis of liking, irrespective of whether the friends are proficient in tennis, basketball, or chess. They like to be with the same friends across activity domains (Snyder, Gangestad, and Simpson, 1983). As one low self-monitor commented about her choice of an activity partner, "Jan's my best friend. Besides, she's the most fun to be around, whatever the activity" (quoted in Snyder, 1987: 65).

Self-monitoring theory predicts, therefore, that high self-monitors, relative to low self-monitors, will tend to develop friendship relations at work with distinctly different people. Whereas low self-monitors will tend to occupy relatively homogenous social worlds, high self-monitors will tend to develop relationships across groups, using their flexible identities to play different roles in different groups. In a workplace, high self-monitors are therefore likely to bridge social worlds, acting as conduits through which otherwise unconnected people exchange information.

According to the mediation perspective, high self-monitors will occupy central positions in social networks in organizations and reap the benefits of access to diverse resource flows and information detailed by structural sociologists (e.g., Burt, 1992). Because they tend to serve as go-betweens between disconnected others, high self-monitors will enhance their value to the organization by facilitating resource flows and knowledge sharing across the organization and thereby achieve superior performance. Thus, high self-monitors will tend to perform better than low self-monitors as a direct result of their differential success in occupying structurally advantageous positions in social networks. Complete mediation would suggest that any effect of self-monitoring on work performance is due to the individual's structural position in social networks. Complete mediation, therefore, would offer some support for the structuralist view (e.g., Burt, Jannotta, and Mahoney, 1998) that individual dispositions can serve as proxies for the network positions that individuals are likely to occupy.¹

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It is also possible to formulate a model in which self-monitoring mediates the effects of structural position on performance. Such a model would imply that the individual's self-monitoring orientation could be changed by the occupation of a central position. This idea has no support in self-monitoring theory or self-monitoring evidence (as summarized in the methods section) and found no support in supplemental analyses of our data (results available from the first author). Other approaches, such as McClelland's (1961) acquired needs theory and Kilduff's (1992) individualist-egalitarian distinction, do feature dispositional orientations that can change depending on social circumstances.

Interaction model. The different, but not incompatible, interaction perspective suggests that different personality types may differentially take advantage of structural positions. High self-monitors may be more able and motivated than low self-monitors to seek out and use the resources available from the different social groups accessible from bridging positions in social networks. The success of high self-monitors in organizations may occur not because the high self-monitors tend to occupy structurally advantageous positions in social networks (the mediation argument) but because, irrespective of who happens to occupy the bridging positions in social networks, only the high self-monitors are willing and able to take

advantage of the opportunities represented by such positions. The interaction model suggests that both a high self-monitoring disposition and a structurally advantageous position in the social network are necessary for the individual to achieve high work performance.

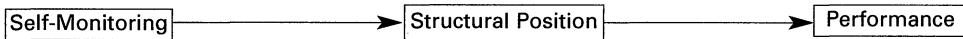
Numerous studies have confirmed that high self-monitors, compared with low self-monitors, tend to be more responsive to the specific characteristics of situations (see review in Snyder, 1987: 33–46). For example, in one study, high self-monitors showed themselves acutely sensitive to the differing contexts in which social interaction took place. The high self-monitors were conformist in social situations in which conformity was the most appropriate interpersonal orientation and were nonconformist when reference group norms favored autonomy. By contrast, low self-monitoring group members were virtually unaffected by their social settings (Snyder and Monson, 1975). This differential responsiveness is likely to affect work performance. In a field study of people whose jobs required that they interact with groups whose norms differed from one another, high self-monitors outperformed low self-monitors (Caldwell and O'Reilly, 1982b). This study, which focused on workers' links outside the organization, provides support for the interaction model. Extending this research to the current study of workers within the organization, we might expect to find that only high self-monitors are able to take advantage of structurally advantageous network positions to enhance performance.

A further reason to expect performance differences for high and low self-monitors occupying bridging positions relates to the detection of useful social information. High self-monitors are better at scanning the social world for information about people and their intentions. High self-monitors are more likely than low self-monitors to notice and remember information concerning others (Berscheid et al., 1976), to be more successful at detecting people's intentions (Jones and Baumeister, 1976), and to be more accurate at eyewitness identification (e.g., Hosch et al., 1984). If valuable information is available to those occupying bridging positions in social networks, then it is more likely to be detected by high self-monitors than by low self-monitors.

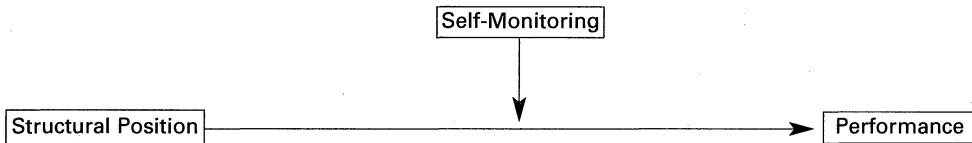
Additive model. We have argued that high and low self-monitors may differentially succeed in organizations because they differentially occupy structurally advantageous positions in social networks (the mediation perspective) or because high self-monitors may be differentially able to capitalize on structurally advantageous positions (the interaction perspective). A third possibility is that structural position and self-monitoring may have relatively independent, additive effects on performance in organizations. The additive model involves twin predictions concerning work performance. The structural position prediction is that the greater the extent to which individuals act as potential go-betweens for those not connected to each other, the higher the work performance. The self-monitoring prediction is that the higher the individual's self-monitoring score, the higher the performance. Support for the additive model would suggest two independent but not mutually exclusive ways for individuals to gain advan-

Figure 1. Three models of how self-monitoring and structural position affect individual performance in organizations.

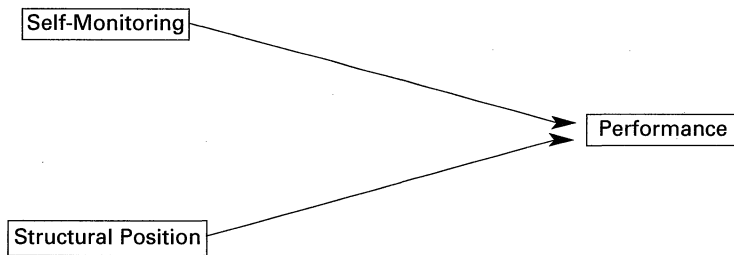
MEDIATION MODEL



INTERACTION MODEL



ADDITIVE MODEL



tages in work performance: (a) occupy a structurally advantageous network position; (b) possess a high self-monitoring orientation.

Figure 1 summarizes the three models of the possible effects of structural position and self-monitoring on performance that we tested in our study.

METHOD

Site

Bayou Corporation (a pseudonym) was a small high-technology company involved in the chemical analysis of complex compounds. Employees researched, produced, and marketed high-precision chromatographic equipment for laboratories and other clients that analyzed the chemical composition of foods, fragrances, petrochemicals, pharmaceuticals, and other products. Bayou was founded in 1985 by an entrepreneur who left his job at a medium-sized chemical company to take advantage of a business-incubator program at a major university. By 1998, Bayou Corporation had grown to 116 employees, all located in one state-of-the-art facility. The company had won numerous awards for the quality of its products and its environmentally conscious business practices. The self-styled "head-coach" and founder of the orga-

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nization had created an entrepreneurial culture that emphasized informality rather than bureaucracy.

Bayou competed in fast-moving markets against much larger companies such as Hewlett-Packard. The company founder emphasized the importance of innovation and creativity as the keys to survival in this competitive marketplace. Organizational structure was kept deliberately flat, with only three levels of hierarchy. Instead of departments, employees were organized into fluid workgroups that ranged in size from two to sixteen. The company prided itself on being in the forefront of equal opportunity employment and had won awards for its success in recruiting and promoting women.

Data

We collected network and personality data by means of a questionnaire sent to all 116 employees (68 men and 48 women). We collected performance-rating data by means of a separate questionnaire sent to all 22 supervisors (17 men and 5 women). Data about reporting relationships, demography, and tenure came from company records.

The response rate was 88 percent for the questionnaire sent to all employees and 100 percent for the questionnaire sent only to supervisors. Non-respondents did not differ significantly from respondents with regard to sex, tenure, or performance. Missing data on self-monitoring reduced the usable sample from 102 to 93 individuals for analyses involving this variable. Because there were no performance measures for the head of the company, analyses concerning both performance and self-monitoring used a sample of 92.

Measures

Social networks. We collected data on friendship relations and workflow relations using the roster method. For each network, we asked respondents to look down an alphabetical list of employees and place checks next to the names of people they considered friends or work partners. Data for each relation were arranged in 102 x 102 binary matrices. In each matrix, cell X_{ij} corresponded to i 's relation to j as reported by i . For example, if i reported j as a friend, then cell X_{ij} in the friendship matrix was coded as 1, otherwise X_{ij} was coded as 0. Each matrix contained 10,302 observations on all possible pairs of people.

For each network question, respondents were free to nominate as many network contacts as they deemed appropriate. This format is preferable to a fixed-choice design in which respondents are asked, for example, "List your four best friends," because it is unlikely that all people have exactly four best friends. Limiting respondents to a fixed number of choices tends to introduce measurement error into network data (Holland and Leinhardt, 1973).

We depart from recent research on structural holes in ego networks (e.g., Burt, 1997) by including in our sampling all the actors in the organization rather than just the actors mentioned by the focal individual. In ego-network research, the individual (or "ego") is the source of information concerning whether ego's contacts are themselves connected or discon-

nected. Research has shown that individuals are reliable sources of information concerning the membership of stable networks to which they themselves belong (Freeman, Romney, and Freeman, 1987), but ego's responses concerning possible interconnections between people to whom ego is tied are subject to systematic bias (Kumbasar, Romney, and Batchelder, 1994; Krackhardt and Kilduff, 1999). Thus, ego-network data used to assess structural holes are potentially distorted by perceptual biases.

Comparing workflow and friendship networks. As research on social networks has pointed out (e.g., Roethlisberger and Dickson, 1939: 493–510), in considering the importance of network position in an organization, two types of networks need to be considered: the workflow and informal networks. The workflow network is the formally prescribed set of interdependencies between employees established by the division of labor in the organization. Work flows through the organization as workers exchange inputs and outputs. A successful interaction in the workflow network enables the flow of work from one person to another (Brass and Burkhardt, 1992: 197).

By contrast, informal social networks, such as the friendship network, derive from mutual liking, similarity of attitudes, or personal choice. Compared with the workflow network, the friendship network represents more individual choice and initiative. People have more discretion in the choice of friends than they have in the choice of with whom to interact to accomplish work. Achieving a structurally advantageous position in either the more formal workflow network or the more informal friendship network can bring benefits to the individual in terms of diverse information and other resources.

Friendship network. Respondents were asked to look down an alphabetical list of fellow employees and place checks next to the names of those individuals they considered "especially good friends." Friends were defined as "people with whom you like to spend your free time, people you have been with most often for informal social activities, such as visiting each other's homes, attending concerts or other public performances."

Workflow network was modeled after Brass (1981: 332), who argued that "task positions and the workers occupying those positions [can be] viewed as interrelated on the basis of the flow of work through the organization." Respondents were asked to place a check next to the names of their workflow contacts. We combined workflow inputs and workflow outputs to make the questionnaire more manageable and because Brass (1984) found no differences between the predictive power of input and output contacts. Workflow contacts were defined as the "set of people that provide you with your workflow inputs taken together with the set of people to whom you provide your workflow output." We defined workflow inputs as "any materials, information, clients, etc., that you must acquire in order to do your job." Workflow output was defined as "the work that you send to someone else when your job is complete." This network was, therefore, anchored in the actual work processes of the

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organization rather than in the more discretionary task advice networks studied by others (e.g., Podolny and Baron, 1997).

Network size and structure. A large network, one with many contacts, can enable the individual to access numerous others for information and other resources. But the benefits of a large network may be offset by the costs involved in maintaining a large number of relationships (Rook, 1984). People who interact with numerous others in organizations run the risk of running short of time and other resources necessary for work performance. Thus, people with large networks within the organization may not necessarily achieve the highest performance ratings. They may be so busy maintaining ties at work that their work performance suffers (see Burt and Ronchi, 1990, for a case study). In considering how network position relates to work performance, it is therefore important to examine simultaneously the relationships between network size and performance and between betweenness centrality and performance. One of the questions that our research attempts to answer is, controlling for the size of the individual's network, does the extent to which the individual's network spans social divides predict workplace performance? By looking at both network measures simultaneously, we can assess whether network size and network betweenness have independent relationships with work performance.

Betweenness centrality. As a measure of the extent to which each individual occupied a structurally advantageous position, connecting otherwise unconnected others in the friendship and workflow networks, we used betweenness centrality (Freeman, 1979). We chose this measure rather than a more local measure of autonomy, such as constraint (Burt, 1992), because betweenness centrality takes both direct and indirect ties into account (Brass, 1984; Krackhardt, 1990; Brass and Burkhardt, 1993), whereas constraint focuses primarily on the direct ties in ego's immediate circle of contacts. More local measures of the extent to which individuals span structural holes are useful when sampling from large populations for which whole network data are unavailable (e.g., Burt, 1992).

The (102 x 102) friendship matrix and the (102 x 102) workflow matrix were each submitted to the betweenness procedure in the network program UCINET IV (Borgatti, Everett, and Freeman, 1992: 85; see Freeman, 1979, for the formula). The higher the betweenness score of an actor, the greater the extent to which that actor serves as a structural conduit connecting others in the network. More formally, betweenness centrality measures the frequency with which an actor falls between other pairs of actors on the shortest or geodesic paths connecting them (Freeman, 1979: 221).

Because it is difficult to interpret measures of betweenness centrality for nonsymmetric data, we symmetrized the friendship and workflow matrices using the rule that if either member of a pair nominated the other, the pair was considered to have a tie. To check whether the results were affected by this definition, we also symmetrized each matrix using the rule that there was a link between two people only if each

member of the pair nominated the other. The pattern of results remained unchanged.

Network size was measured as the total number of each individual's direct links with other actors in the network, a measure also known as degree centrality (Scott, 1991: 86–87). To be compatible with measures of betweenness centrality, we calculated size on friendship and workflow matrices symmetrized according to the rule that if either member of a pair nominated the other, the pair was considered to have a tie.

Performance. Our theory of job performance emphasizes the extent to which individuals succeed (in the eyes of management) in contributing to organizational ends. In the absence of objective measures of performance across job types in this organization, we relied on supervisory ratings. Using a 6-item scale arranged in 5-point Likert format, supervisors rated the performance of those subordinates who reported directly to them. As researchers have noted, in work organizations "the vast majority of performance ratings come directly from the immediate supervisor" (Bretz, Milkovich, and Read, 1992: 331; see also Scullen and Mount, 2000). A recent comprehensive review of performance evaluation in work settings concluded that supervisory ratings "are most likely valid reflections of true performance" (Arvey and Murphy, 1998: 163).

We informed supervisors that performance ratings would be confidential and used only for research purposes. Performance ratings obtained for research purposes tend to be more reliable and valid than those obtained for administrative purposes (Wherry and Bartlett, 1982). The six performance items were selected after extensive discussions with the firm's human resource director and a group of four employees representing a range of job types at the firm.

Supervisors first evaluated subordinates' performance on these three items: (1) "the overall job performance of the individual" (1 = poor, 5 = excellent); (2) the likelihood that the subordinate would "achieve future career related success (such as promotions, awards, bonuses, and involvement in high-profile projects)" at Bayou (1 = very unlikely, 5 = very likely); and (3) "the likelihood that you would pick [the subordinate] to succeed you in your job" (1 = very unlikely, 5 = very likely).

Given the strong emphasis placed on innovation at Bayou and the growing recognition among researchers of the importance of contextual aspects of job performance (e.g., Borman and Motowildo, 1993; Arvey and Murphy, 1998), we also included three items, taken from Scott and Bruce (1994), to capture employees' workplace innovativeness. Supervisors rated subordinates' innovativeness (using 5-point scales) on these three items: (1) the degree to which the subordinate generated creative work-related ideas; (2) the degree to which the subordinate promoted and championed work-related ideas to others; and (3) the degree to which the subordinate searched out new technologies, processes, techniques, and/or product related ideas.

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The reliability of the six-item scale, as measured by Cronbach's (1951) alpha, was .90. The results of a component analysis showed all six items loaded on the same component (eigenvalue = 4.06; all loadings were above .76) that explained 68 percent of the overall variance. To check whether our results were an artifact of the composition of our performance measure, for all analyses that included performance, we ran separate tests using (1) the final six-item measure of performance, (2) a three-item measure that excluded the three innovativeness items, and (3) a three-item measure that included only the innovativeness items. The pattern of results was unchanged irrespective of the performance measure used.

Self-monitoring was measured with the 18-item true-false version of the Self-Monitoring Scale (Snyder and Gangestad, 1986). Items include "I would probably make a good actor," and "In different situations and with different people, I often act like very different persons." The self-monitoring score, used as a continuous variable, indicates the probability that an individual is a high or low self-monitor (Gangestad and Snyder, 1985). The shortened 18-item scale is both more reliable and more factorially pure than the original 25-item measure (described in Snyder, 1974) with which it correlates at a .93 level (Snyder and Gangestad, 1986). In the present research, Cronbach's (1951) alpha for the 18-item scale was .80.

The validity of the self-monitoring scale has been actively discussed (see Snyder and Gangestad, 1986; Kilduff, 1992). A recent comprehensive review pointed out that the most persuasive evidence for the scale's predictive and construct validity consists of the several hundred studies of behavioral and attitudinal differences between high and low self-monitors consistent with self-monitoring theory and detected by means of the Self-Monitoring Scale (Gangestad and Snyder, 2000). With respect to discriminant validity, the Self-Monitoring Scale reliably predicts a range of criterion behaviors that seemingly similar scales, such as need for approval, locus of control, and field dependence, do not predict (Snyder, 1979).

Support for the stability of self-monitoring comes from evidence that the latent causal variable corresponding to self-monitoring has a biological basis (Dworkin, 1977; Gangestad, 1984; Gangestad and Snyder, 1985): Monozygotic (MZ) twins are nearly always concordant on the latent factor, whereas dizygotic twins are "concordant at better than a chance rate, but at a rate substantially less than MZ twins" (Snyder and Gangestad, 1986: 128). Additional support for the temporal stability of the self-monitoring scale comes from test-retest studies over periods from one month to 3.5 months (summarized in Snyder, 1987: 17). Self-monitoring orientation can be understood as a distinctive aspect of each individual's personality. Accumulating evidence "suggests that self-monitoring is a stable personality trait throughout one's lifespan" (Jenkins, 1993: 84).

Control Variables

Rank. Differences in formal rank are likely to influence patterns of interaction in organizations. For example, high-rank-

ing individuals, by virtue of their control over resources and their decision-making authority, may be better positioned to emerge as central actors in social networks (e.g., Lincoln and Miller, 1979; Ibarra, 1992). There were three levels of hierarchy in the company. From company records, we coded rank as 0 for non-supervisors, 1 for supervisors, and 2 for top management team members.

Tenure. The length of time a person has been with the company is also likely to affect the pattern of participation in social networks. For example, individuals who have been with the company longer may be more likely to occupy central positions in social networks. Using company records, tenure was coded as the number of months an individual had been employed by the company.

Sex. We controlled for sex in each of the regression models because of its possible impact on network configuration (Brass, 1985; Ibarra, 1993) and performance evaluation (Burt, 1992). Sex was coded as 0 for women and 1 for men.

Analysis

Our approach to testing the mediation, moderation, and additive models follows standard statistical procedures (detailed in Baron and Kenny, 1986). We controlled for rank, tenure, and sex in each test. To assess support for mediation, we conducted three statistical tests to see if any significant relationship between self-monitoring and performance was eliminated or significantly reduced once network position was controlled for. First, we used OLS regression to examine the relationship between self-monitoring and performance. Second, we used MANOVA to examine whether self-monitoring significantly predicted the four network variables taken as a set. Finally, to evaluate support for the overall mediation model, we used hierarchical regression analysis to examine whether the inclusion of the four network variables significantly affected the relationship between self-monitoring and performance. If a significant relationship between self-monitoring and performance is eliminated or significantly reduced as a result of controlling for the four network variables, then this would indicate support for mediation.

We used hierarchical regression analysis to test the interaction model. To correct for the multicollinearity that arises when testing moderated relationships among continuous variables, we centered self-monitoring and the centrality variables before generating interaction terms (Cohen and Cohen, 1983; Aiken and West, 1991). Centering consists of subtracting the sample mean from each independent variable. The adjusted variables each have a mean of zero, but their sample distribution remains unchanged. We computed four interaction terms by multiplying the centered self-monitoring score with each of the four centered centrality scores. Interaction terms were entered in a separate step after the main terms had already been entered. If the addition of the interaction terms results in a statistically significant improvement over the regression model containing the main terms, then this would indicate support for the interaction model.

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Testing the additive model was straightforward: self-monitoring and the four network variables were included simultaneously as independent variables. If self-monitoring and the centrality variables were significantly related to performance, then the additive model would be supported.

Size and betweenness-centrality collinearity. Despite the clear conceptual distinction between the size of the individual's network and the extent to which the individual's network links otherwise disconnected employees, size and betweenness centrality are often highly correlated (Bonacich, Oliver, and Snijders, 1998: 135). Popular individuals tend to have high-betweenness centrality scores. Based on our theoretical arguments, we were interested in examining how betweenness centrality relates to dependent variables while controlling for network size.

Collinearity between variables such as size and betweenness centrality tends to inflate the standard errors of their regression coefficients, making it more difficult to obtain significant values, but the inflation of standard errors does not affect the validity of any significant results that are found. As one regression expert explained, a significant value for the beta coefficient in a regression "is just as conclusive when collinearity is present as when it is absent" (Darlington, 1990: 130).

To check on the severity of the multicollinearity between size and betweenness centrality we examined the conditioning index and variance proportions associated with each independent and control variable (see Belsley, Kuh, and Welsch, 1980, for a discussion). According to Tabachnik and Fidell (1996: 86–87), a conditioning index greater than 30 and at least two variance proportions greater than .50 indicates serious multicollinearity. None of our independent variables violated this criterion; multicollinearity thus posed no serious threats to the validity of our analyses.

RESULTS

Table 1 presents means, standard deviations, and zero-order correlations among the variables. The typical employee had been with the firm for 54 months. Men made up 62 percent of the sample. Individuals who were higher in rank, self-monitoring, and betweenness centrality tended to have higher job performance ratings in these univariate tests. The density of the workflow network, as measured by the average cell value in the 102 x 102 binary workflow matrix, was .34. The friendship network was considerably sparser, with a mean density of .04.

The Mediation Model

According to the mediation model, the success of high self-monitors in outperforming low self-monitors is due to the greater success of the high self-monitors in occupying strategically advantageous positions in social networks in organizations. To test this model, we first examined the relationship between self-monitoring and performance. The regression results presented in model 2 of table 2 show that high self-monitors, as expected, tended to outperform low self-mo-

Table 1

Means, Standard Deviations, and Correlations*										
Variable	Mean	S.D.	1	2	3	4	5	6	7	8
1. Rank	0.31	0.61								
2. Tenure (months)	53.95	39.03	.16							
3. Sex	0.62	0.49	.14	-.06						
4. Self-monitoring	7.12	3.93	.14	.07	.12					
Workflow network										
5. Betweenness centrality	63.90	77.19	.18*	.04	.10	.12				
6. Size	49.27	19.50	.24**	.04	.15	.24**	.87****			
Friendship network										
7. Betweenness centrality	146.63	243.61	-.07	.33****	.01	.18**	.07	.14		
8. Size	7.24	5.50	.03	.36**	.01	.04	.13	.21**	.80****	
9. Performance	20.25	5.08	.36****	-.26**	.02	.23**	.26**	.17	.04	-.10

* $p < .10$; ** $p < .05$; *** $p < .01$; **** $p < .001$.
 * N = 93, except performance (N = 92)

tors. Controlling for rank, tenure, and sex, self-monitoring significantly predicted performance ($\beta = 0.21$, $p < .05$), explaining an additional 4 percent of the variance over the baseline model.

Although high self-monitors may achieve higher job performance than low self-monitors, we still need to know if they also tend to occupy structurally advantageous positions in social networks. The MANOVA results presented in the last three columns of table 3 show that controlling for rank, tenure, and sex, self-monitoring significantly predicted the four network variables taken as a set ($F = 3.40$, $p < .05$), explaining an additional 14 percent of the variance over the baseline model. Table 3 also shows that higher self-monitoring scores predicted both higher betweenness centrality in the friendship network and larger size in the workflow net-

Table 2

Standardized Regression Coefficients from Analyses Predicting Performance (N = 92)

Independent variable	Model				
	1	2	3*	4	5
Rank	.40****	.38****	.42****	.40****	.40****
Tenure	-.31***	-.32***	-.36****	-.37****	-.39****
Sex	-.06	-.08	-.07	-.08	-.09
Self-monitoring (SM)		.21**		.19**	.20**
Workflow network					
Betweenness centrality			.53***	.59***	.67***
Size			-.37**	-.47**	-.51***
Friendship network					
Betweenness centrality			.41***	.32**	.28*
Size			-.29**	-.22*	-.19
SM x Workflow betweenness					-.11
SM x Size of workflow network					.11
SM x Friendship betweenness					.11
SM x Size of friendship network					-.09
Model F	8.51****	7.89****	6.39****	6.33****	4.10****
ΔF		4.29**	3.95***	4.19**	0.26
R^2	.23	.27	.35	.38	.38
ΔR^2		.04	.12	.03	.00
Adjusted R^2	.20	.23	.29	.32	.29

* $p < .10$; ** $p < .05$; *** $p < .01$; **** $p < .001$.

* ΔF and ΔR^2 report changes from previous model, except for model 3, which reports change statistics from model 1 to 3.

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Table 3

Standardized Regression and MANOVA Coefficients from Analyses Predicting Structural Position and Size (N = 93)

Variable	Friendship Network		Workflow Network		MANOVA		
	Betweenness centrality	Size	Betweenness centrality	Size	Wilk's lambda	Eta-squared	F
Rank	-.15	-.03	.15	.20*	.92	.09	1.96
Tenure	.34****	.37****	.01	.00	.86	.15	3.59***
Sex	.03	.04	.07	.10	.99	.01	0.26
Self-monitoring	.17**	.02	.09	.20**	.86	.14	3.40**
Model F	3.92***	3.35**	1.06	2.76**			
R ²	.15	.13	.05	.11			
Adjusted R ²	.11	.09	.003	.07			

* $p < .10$; ** $p < .05$; *** $p < .01$; **** $p < .001$.

work. Thus, high self-monitors, relative to low self-monitors, did tend to occupy strategically advantageous positions in the friendship network and to have larger workflow networks.

To evaluate support for the overall mediation model, we examined whether the relationship between self-monitoring and performance was due to the significant relationship between self-monitoring and the network variables. Including the four network variables in the regression equation, however, did not significantly affect the relationship between self-monitoring and performance. The results presented in model 4 of table 2 show that even though the high self-monitors tended to occupy high-betweenness positions in friendship networks, and even though the occupants of these positions tended to have higher performance, the higher performance of high self-monitors was not explained by their differential success in occupying high-betweenness positions. After controlling for the significant relationships between the four network variables and performance, self-monitoring continued to explain significant variance in performance. The full set of results indicate that although self-monitoring explains significant variance in performance and in the set of structural variables, and the structural variables predict performance, the mediation model is not supported. There is no evidence of either full mediation or partial mediation.

To understand these results more fully, we looked at the differing relationships between self-monitoring and the structural variables. Table 3 shows that higher self-monitoring scores predict higher betweenness centrality in the friendship network but also larger size in the workflow network. High self-monitors, relative to low self-monitors, not only occupy strategically advantageous positions in the friendship network, they also find themselves busier than the low self-monitors providing work outputs and receiving work inputs from more people. Table 2 suggests that the advantages the high self-monitors may gain from occupying central positions in the friendship network may be counterbalanced by the disadvantages of having to maintain large workflow networks. Whereas betweenness centrality in the friendship network has a positive relationship with individual performance, size in the workflow network has a negative relationship with performance.

These counterbalanced results suggest that the performance of high self-monitors, relative to low self-monitors, is simultaneously increased and decreased by the structure of social networks. The high self-monitors' success in spanning structural holes in the friendship network may help them increase their performance, but their acceptance of large workflow networks may make successfully accomplishing tasks more difficult.

The Interaction Model

The interaction model suggests that the relationship between network position and performance depends on the self-monitoring orientation of the person occupying the network position: high self-monitors (relative to low self-monitors) should be able to exploit high-betweenness positions more effectively. We found no support for this prediction. Model 5 in table 2 shows that high self-monitors were no more likely than low self-monitors to benefit from occupying high-betweenness positions. Adding the four interaction terms as a set failed to significantly improve variance explained over the direct-effects model 4. There was, therefore, no support for the interaction model.

The Additive Model

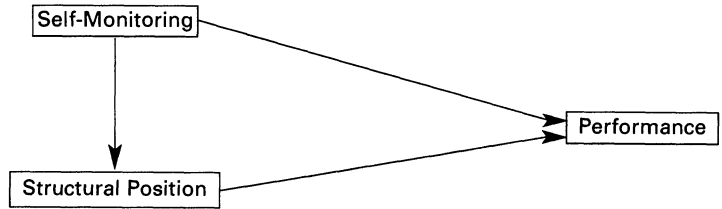
According to the additive model, self-monitoring and structural position should independently predict performance in organizations. To test this model, we included self-monitoring and the four network variables in the same regression equation. In support of the additive model, the results show that high self-monitors tended to outperform low self-monitors, and those occupying high-betweenness centrality positions tended to outperform those occupying low-betweenness centrality positions: model 4 in table 2 shows that (controlling for rank, sex, and tenure) self-monitoring and each of the four network variables explained significant variance in performance. The full model explained significantly more variance in performance than model 2, which contained only the controls and the self-monitoring variable, and model 3, which contained only the controls and the four network variables.

An Emergent Model

Of the three proposed models, the additive model best explains the data, but the overall results suggest a more complex relationship among self-monitoring, structural position, and performance than anticipated by any of the three proposed models. High self-monitors tended to achieve higher performance, as did individuals who occupied high-betweenness centrality positions in the friendship and workflow networks. Consistent with the additive model, self-monitoring and structural position were relatively independent predictors of performance. But we also found that self-monitoring explained significant variance in the set of structural variables: high self-monitors (compared with low self-monitors) tended to occupy high-betweenness positions in the friendship network and tended to interact with more people to get their work done. These results indicate that the variance shared between self-monitoring and the set of structural variables did not overlap with the variance that either of

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Figure 2. Emergent model of self-monitoring and structural position effects on individuals' work performance.

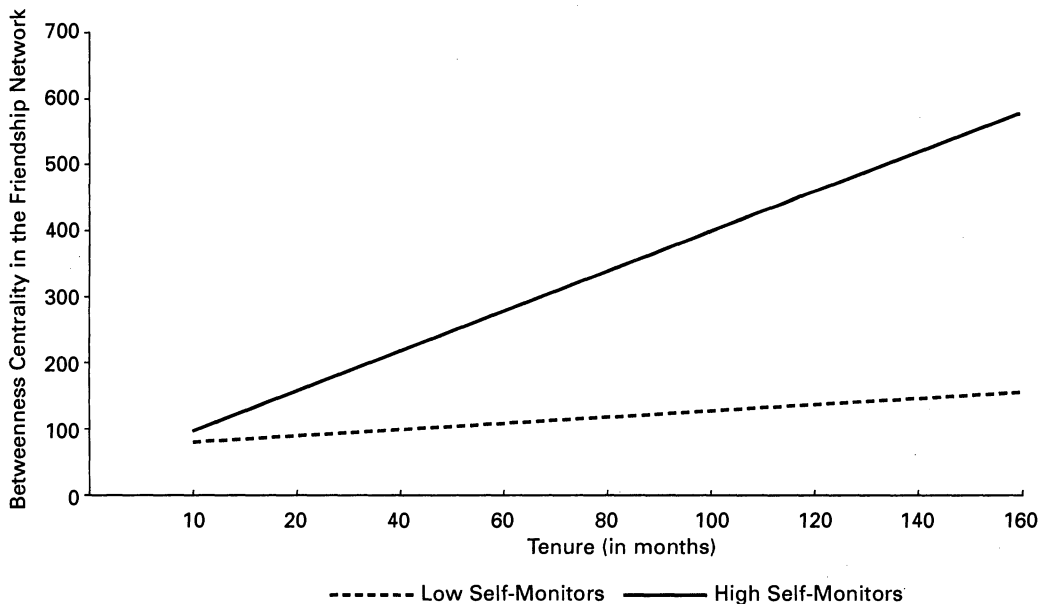


these variables shared with performance, which leads us to the emergent model summarized in figure 2.

Network Differences over Time

To further explore the relationship between self-monitoring and social network position, we looked closely at the net-

Figure 3. Relationship between tenure and betweenness centrality for high and low self-monitors.



work that was most amenable to individual preferences: the friendship network. According to self-monitoring theory, high self-monitors should move over time into positions in the friendship network that link different social worlds, whereas low self-monitors should remain in homogenous social worlds.

In the absence of longitudinal data, we tested this argument by looking at whether the interaction of self-monitoring and organizational tenure predicted betweenness centrality in the friendship network. We first centered self-monitoring and tenure and then added the interaction between these centered variables. The results shown in model 3 in table 4 suggest that the longer the tenure, the more likely were high self-monitors to occupy high-betweenness positions, but length of tenure made no apparent difference to the likelihood that low self-monitors would occupy high-betweenness

positions. The interaction term explained an additional 11 percent of the variance in betweenness centrality in the friendship network, a statistically significant improvement ($p < .001$) over model 2, which assessed the direct relationships between self-monitoring and betweenness centrality (controlling for tenure, rank, and sex).

To chart this significant interaction, we partitioned the sample so that individuals with scores of 11 or greater were classified as high self-monitors (e.g., Gangestad and Snyder, 1985; Kilduff, 1992). Figure 3 shows that longer-serving high self-monitors tended to have higher betweenness-centrality scores, whereas length of time in the organization made little difference to the betweenness centrality of low self-monitors. These results are compatible with the idea that high and low self-monitors tend to develop different social network structures over time.

Table 4

Standardized Regression Coefficients Predicting Betweenness Centrality in the Friendship Network (N = 93)

Variable	Model		
	1	2	3
Rank	-.07	-.15	-.15
Sex	.02	.03	.06
Tenure		.34***	.27***
Self-monitoring		.17**	.11
Self-monitoring x Tenure			.35****
Model F	.21	3.92***	6.24****
ΔF		7.59***	13.33****
R ²	.01	.15	.26
ΔR^2		.14	.11
Adjusted R ²	.00	.11	.22

* $p < .10$; ** $p < .05$; *** $p < .01$; **** $p < .001$.

DISCUSSION

This research represents a theory-driven examination of how personality relates to social structure and how social structure and personality combine to predict work performance. Consistent with self-monitoring theory, we found that high self-monitors tend to occupy positions of high-betweenness centrality. Further, we found that the relation between self-monitoring orientation and performance in the organization remained significant despite controlling for several other significant variables, including four measures of network structure. Although strong claims of causality would require studying the effects of self-monitoring on social structure over time, we did find that for high self-monitors (but not for low self-monitors) longer service in the organization predicted the occupancy of strategically advantageous network positions. Our research therefore suggests three important conclusions. First, personality predicts social structure: the high self-monitors tended to occupy central positions in social networks. Second, personality affects the way individuals build friendship networks over time: the high self-monitors (but not the low self-monitors) became more central the longer they stayed in the organization. Third, self-monitoring and centrality in social networks independently predict individuals' workplace performance. The results paint a picture of individuals

shaping the networks that constrain and enable performance. It appears that high and low self-monitors pursue different network strategies, with high self-monitors tending to occupy positions that span social divides, whereas low self-monitors remain tied to more homogenous social worlds. High and low self-monitors, therefore, appear to be active agents in the structuring of distinctive social worlds at work.

In formulating three models of how self-monitoring and network position together might affect work performance, we have emphasized the importance of considering alternative linkages between our constructs (cf. Elder, 1973). The particular site we examined consisted of a relatively small, cohesive organization in which there were relatively few high self-monitors. We need further research in other organizational settings to understand more fully how self-monitoring orientation and network position might combine to affect workplace performance.

Future research could also examine different types of performance outcomes to supplement our reliance on supervisory ratings. We are reassured by considerable research evidence that, even when supervisors and ratees are members of the same network (as in our sample), supervisors tend to like subordinates who prove themselves as high performers (Robbins and DeNisi, 1994). It is unlikely, therefore, that ratings were biased by liking, given that "affect is likely to be a function of how well or poorly a person performs his or her job" (Arvey and Murphy, 1998: 151).

The picture we present in this article of people taking advantage of their personality orientations to forge different types of network structures offers a new direction for social network analysis. In the past, network research focused almost exclusively on "the overall structure of network ties" (Emirbayer and Goodwin, 1994: 1415), neglecting or omitting individual-level variables (see, for example, Mayhew's 1980 manifesto). Individual dispositions, to the extent that they have been discussed at all in recent network research, have tended to be dismissed as "the spuriously significant attributes of people temporarily occupying particular positions in social structure" (Burt, 1986: 106). In this article we demonstrate that self-monitoring theory can enrich our understanding of such vital network topics as who is likely to bridge structural holes and the connection between structural position and work performance. We encourage further examination of the ways in which different types of people forge distinctively different patterns of social ties in the workplace.

One of the major unanswered questions concerning self-monitoring and social networks is what motivates high and low self-monitors to build such different social worlds? A recent review of the self-monitoring literature (Gangestad and Snyder, 2000) suggested that high and low self-monitors might have different orientations toward status enhancement. High self-monitors might seek, above all, to "create public images . . . that connote social status." Low self-monitors, by contrast, may be more interested in investing in "close social relationships in which they and their partners can be trusted" (Gangestad and Snyder, 2000: 547). High and

low self-monitors may be building different types of social capital, with high self-monitors focused on constructing social worlds that function as "effective instruments of status enhancement" and low self-monitors focusing on constructing social worlds that support their reputations as "genuine and sincere people" (Gangestad and Snyder, 2000: 547). Future research could investigate whether high and low self-monitors are differentially aware of the structural holes in social networks and whether they consider the career consequences of different social network strategies.

The theory and results we present in this article suggest that high self-monitors, the chameleons of the social world, resemble the prototypical person featured in sociological research on social networks. In sociological research, individuals tend to take on the attributes and ideas of their associates rather than relying on their own inner beliefs and values (e.g., Carley, 1991). According to sociologists, people strive to occupy central positions in social networks in order to advance their careers (Burt, 1992). Low self-monitors, despite making up approximately 60 percent of the population (Snyder, 1987), seem strangely absent from the sociological literature. In our research as well, low self-monitors have featured mainly as the background against which we have discussed the contributions and outcomes of the more visible high self-monitors. For future research, the question remains, how do the organizational networks of low self-monitors affect contributions and outcomes?

Self-monitoring theory suggests that the social networks of low self-monitors may help enhance several aspects of organizational effectiveness. Low self-monitors' tendency to forge deep emotional attachments, for example, may facilitate the development of strong network ties that research has shown are particularly useful in crisis situations (Krackhardt and Stern, 1988) and in the transfer of tacit knowledge (Hansen, 1999). The networks of low self-monitoring individuals, therefore, may help organizations respond to unexpected jolts and to transmit expertise. Further, low self-monitors' greater commitment to work relationships may lead to greater commitment to the organization (Jenkins, 1993). But if a low self-monitor does leave an organization, there may be a larger impact on coworkers (in terms of turnover, for example) than when a high self-monitor leaves (see the discussion of turnover effects on coworkers in Krackhardt and Porter, 1985, 1986).

Self-monitoring orientation is a stable component of the individual's personality, but a stable personality trait can be expressed through a range of possible behaviors. The practical implications of our findings, therefore, can involve individuals changing behaviors even if they are unable to change self-monitoring orientations. High self-monitors, for example, are more other-directed than low self-monitors, meaning that high self-monitors tend to be more susceptible to pressure from other people (Snyder and Gangestad, 1986; Kilduff, 1992). In our results, this other-directedness shows up as an increased work load for high self-monitors in terms of a larger number of connections in the workflow network. The challenge for the high self-monitor is how to avoid accepting too

many different work responsibilities while maintaining friendship ties that span social divides. The challenge for low self-monitors is to build on their ability to say no to an overload of work responsibilities by spending more time overcoming their marked inclination to retreat into stable friendship cliques.

Structural analysis offers tools for identifying role structures within groups (e.g., White, Boorman, and Breiger, 1976) and dynamics between groups (e.g., McPherson, Popielarz, and Drobnic, 1992). Adding personality theory to structural analysis can help forge a powerful approach to understanding individual behavior in the context of social structure. Rather than accepting an inevitable duality between those interested in the psychological determinants of behavior and those interested in how network structure affects social processes, we need more interdisciplinary research that draws from different perspectives and contributes to an enhanced picture of how action affects outcomes in organizations.

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