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Pathways to informal leadership: The moderating role of gender on the relationship of individual differences and team member network centrality to informal leadership emergence

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Abstract

Despite extensive research on leadership, very little is known about the emergence of informal leaders in teams that have worked together over an extended period of time within "real" organizational contexts. These teams are increasingly composed of both men and women, making gender a potentially critical variable in the dynamics of informal leadership emergence. This study examines how gender moderates the relationship between individual characteristics and informal leadership emergence in the context of intact manufacturing teams. Whereas a high level of conscientiousness, emotional stability, and team member network centrality predicted informal leadership more for men than for women, a high level of general mental ability predicted informal leadership more for women than for men. The implications for gender and informal leadership in intact teams are discussed.

Keywords: Leadership; Teams; Personality; Gender

1. Introduction

Only 3% of the top management positions in the United States are held by women (Adler, 1999), and only 11% of the directors of Fortune 500 companies are women (Brett & Stroh, 1999). This situation is not unique to the United States; women's participation in leadership positions is limited in many countries (Wilson, 1999). Yet, women are gaining ground across the board as their participation in the labor force continues to increase (Vecchio, 2002). Despite the considerable research on the role of gender

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in explaining leadership, the results are equivocal. In a recent review of gender-based leadership research, Vecchio (2002) argues that gender research needs to move away from simple main effect laboratory studies to the study of gender in intact groups.

Teams, which can be distinguished from groups in that members work interdependently, are a particularly relevant context for studying gender and leadership. Today's teams are given more autonomy and decision-making responsibility (Guzzo & Dickson, 1996). In these teams, informal or emergent leaders impact how team members work together and how teams perform (Luft, 1984; Neubert, 1999). These informal leaders emerge and wield influence even when the team has a formally designated leader or supervisor (Hackman, 1992; Wheelan & Johnston, 1996). Thus, even if women are hindered in attaining formal positions of leadership, they can exert considerable influence on team performance as informal leaders (Neubert, 1999). Although there is a substantial debate regarding the effect gender plays on leadership, the investigation of how gender interacts with other variables to explain leadership emergence in "real" teams has been limited (e.g., Vecchio, 2002).

To date, there has been relatively little study of real teams. Most previous academic research has focused on the achievement of a specific task (e.g., novel problem solving) in contrived experimental settings (generally, laboratory settings) with groups that have been together for only a short period of time (e.g., one 20-min session). In real work settings, teams commonly complete a variety of tasks, over an extended time. In contrast, the focus of most team leadership research has been on formal leaders or emergent leadership in short-term laboratory settings or assessment centers (Hogan, Curphy, & Hogan, 1994; Wheelan & Johnston, 1996).

Changes in workforce demographics have led to an increasing number of teams being composed of both men and women. The theory underlying diversity research has roots in three primary areas: social categorization, similarity/attraction, and information diversity (Williams & O'Reilly, 1998). The latter perspective proposes that diverse team composition should generally be beneficial to achieving team outcomes, while the former perspectives point to suboptimal outcomes resultant from diversity in team composition. Williams and O'Reilly (1998) conclude that "the preponderance of empirical evidence suggests that diversity is more likely to impede team functioning" (p. 120). Hence, the challenge for diversity research is to better understand group processes to develop means to counteract the negative consequences of diversity and, moreover, to benefit from team diversity.

In summary, very little is known about gender diversity and leadership in teams that complete a variety of tasks and are together for 8 hours a day for several years (e.g., work teams in manufacturing plants). Integrating several theoretical perspectives, we investigate the potential moderating role of gender in explaining the relationship of individual differences and team member network centrality (support and advice network nominations) to informal leadership emergence within intact manufacturing work teams. This study not only serves to extend scholarly work on gender and leadership to intact teams but also has practical utility for firms and their managers who seek to understand and influence the dynamics of increasingly autonomous and diverse teams.

2. Pathways to informal leadership emergence

Regardless of gender, informal leaders emerge through a complex process of role taking and peer perceptual processes that determine who becomes leader (cf. Seers, 1989; Taggar, Hackett, & Saha, 1999). Mann's (1959) early research on leadership emergence offered three explanations for how an

individual might emerge as a leader: (1) through contributing to satisfying the needs of others, (2) through fulfilling roles necessary for a group to function successfully, and/or (3) through exhibiting traits that are associated with or trigger socially defined leadership expectations of others. Similarly, Arnoff and Wilson (1985) explain sources of status as either ascribed or achieved. Ascribed sources of status stem from a process whereby readily observable individual differences, such as gender or personality, result in attributions of competency and leadership ability that affect status within a group. Thus, status is ascribed based on implicit theories, schemas, or societal stereotypes, with or without accompanying behavioral support. In contrast, achieved sources of status stem from a process whereby over-time valued behaviors and tangible contributions to others or the group result in a person earning status within the group. Similar to Mann's conceptualization, these explanations for leadership emergence are distinct but not mutually exclusive.

By integrating Arnoff and Wilson's theory of sources of status, Mann's three explanations for leadership emergence can be simplified into two pathways for informal leadership in intact teams: (a) team members are ascribed emergent leader status by means of identifiable individual differences; or (b) team members achieve emergent leader status by fulfilling valued roles within the team and/or providing valued contributions. Whether the research on the differences between men and women is biological (e.g., Archer, 1996; Maccoby & Jacklin, 1980; Reinsch, Rosenblum, Rubin, & Schulsinger, 1991) or sociopsychological (e.g., Beal, 1994; Eagly, 1987), there seems to be consensus that gender differences exist and are accompanied by differing expectations. What is not clear is how gender influences leadership emergence in real work teams. Thus, the intent of this study is to ascertain how men and women in intact teams differ in their use of ascribed and achieved pathways to emerge as informal leaders.

2.1. Ascribed informal leadership

An important advance in the study of leadership traits has been the acknowledgment of the role of perception in explaining leadership emergence (Lord, Brown, Harvey, & Hall, 2001). Research on leader perceptions has emphasized the role of cognitive structures, such as implicit personality theories (Lord, De Vader, & Alliger, 1986; Lord, Foti, & De Vader, 1984; Sedikides & Anderson, 1994), prototypes (Rosch, 1978), schemas (Fiske & Taylor, 1991), and exemplar representations (Smith & Zarate, 1992) in assessing leadership. Observers are fairly good at assessing the characteristics of others (e.g., McCrae, 1982; McCrae & Costa, 1987) and appear to share a set of general beliefs about the characteristic behaviors and traits of a leader (Eden & Leviatan, 1975; Lord et al., 1984; Lord & Maher, 1991). Categorization theory suggests that a judgment of another individual is made on the basis of the congruence or match between the stimulus person and a prototype or exemplar (Fraser & Lord, 1988; Lord et al., 1984; Lord & Maher, 1991). If a target individual's traits strongly match the perceiver's leader prototype or exemplar, that individual is more likely to be viewed as a leader.

In the 1980s, Lord et al. (1986) and Kenny and Zaccaro (1983) led a resurgence of trait-based explanations of leadership emergence by empirically rebutting early research that failed to identify traits that consistently differentiated leaders from nonleaders across situations (Mann, 1959; Stogdill, 1948). The Lord et al. meta-analysis demonstrated that intelligence (general mental ability), adjustment, dominance (determined, directive, inflexible, and uncooperative), masculinity (assertive, decisive, and unemotional), and extraversion (verbal and outgoing) were positively related to perceptions of leadership.

More recently, trait-based leadership research has continued using a robust and generally accepted five-factor taxonomy of personality. The five factors consist of conscientiousness (dependable, responsible, and achievement oriented), extraversion (sociable, active, and assertive), agreeableness (cooperative, flexible, and courteous), emotional stability (calm, unemotional, and not neurotic), and openness to experience (imaginative, original, and broad-minded; Barrick & Mount, 1991; Digman, 1990).

In a study of 119 MBAs, Craik et al. (2002) found that Strategic Managerial Style (e.g., decision making, fact-finding) was associated with conscientiousness and openness to experience while an Interpersonal Managerial Style (e.g., oral communication, initiative) was associated with extraversion, openness, and low agreeableness. Judge and Bono (2000), using 14 samples of leaders from over 200 organizations, found small-to-moderate relationships between transformational leadership and agreeableness, openness to experience, and extraversion. However, in a multiple regression, only agreeableness, and to a lesser extent, extraversion, were significantly related to leadership. Judge and Bono suggest that the importance of agreeableness is rooted in its positive association with transformational and charismatic leader characteristics of trust, compassion, and empathy. The relationship of agreeableness to informal team leadership is less clear, although agreeableness has been found to positively influence the quality of team interactions and relationships (Barrick, Stewart, Neubert, & Mount, 1998).

Most recently, Judge, Ilies, Bono, and Gerhardt (2002), used the five-factor model of personality as an organizing framework and meta-analyzed 222 correlations from 73 samples. Overall, the correlations with leadership were neuroticism = − .24, extraversion=.31, openness to experience=.24, agreeableness=.08, and conscientiousness=.28. Extraversion was the most consistent correlate of leadership across study settings and leadership criteria (leader emergence and leadership effectiveness). Overall, the five factors had a multiple correlation of .48 with leadership, indicating strong support for the leader trait perspective when traits are organized according to the five-factor model.

Taggar et al. (1999) conducted the only study that to our knowledge has looked at leadership emergence in teams and standard individual differences. They found that general mental ability contributed the most to leadership emergence in teams, followed by conscientiousness, extraversion, and neuroticism. Although their student teams demonstrated many characteristics of autonomous work teams, they acknowledged the need to extend research on emergent leadership to actual work environments.

Combining the meta-analytic research on leadership perceptions with recent research using the five-factor model of personality and general mental ability, a general leadership prototype can be identified. The evidence points toward team members with high levels of general mental ability, extraversion, conscientiousness, emotional stability, and openness to experience as more likely to be ascribed leadership. Although there is consensus regarding traits that make up a general leadership prototype, it is not clear if mirroring the traits of the leadership prototype has universal utility in influencing how men and women emerge as informal leaders within teams. The proportion of unexplained variance across studies in previous meta-analytic research suggests that gender may moderate the relationship between individual differences and leadership emergence in intact teams (Pearlmann, Schmidt, & Hunter, 1980).

Research on social role theory (Eagly, 1987) has found that men are generally socialized from a young age to be outgoing, assertive, task oriented, adventurous, chivalrous, and achievement oriented, while women are generally taught to be emotional, nurturing, communal, and socially oriented in their

interactions with others, to respect male power and authority, and to refrain from expressions of aggressiveness or assertiveness (e.g., Eagly & Johnson, 1990; Eagly & Wood, 1991; Fennell, Barachas, Cohen, McMahon, & Hildebrand, 1978). Gender stereotypes also are evident in assessments of mental ability. According to Smith and Stewart (1983), people generally judge women to be intellectually less competent than men. Not only are women ascribed lower levels of competence in initial interactions (Wood & Karten, 1986), but if they perform well, their success is attributed more to luck and effort than mental ability (Yarkin, Town, & Wallston, 1982).

In gender-mixed groups, diversity tends to increase stereotypical categorizations of men and women, which in some cases leads to self-fulfillment of these expectations as group members evoke behavior consistent with stereotypes (Williams & O'Reilly, 1998). Societal stereotypes can disadvantage women in the emerging process of informal leadership. Stereotypical female behaviors are generally incongruent with leader prototypes (Eagly, 1987, Lord et al., 1986; Nye & Forsyth, 1991). Brenner, Tomkiewicz, and Schein (1989) found male perceptions of successful leader characteristics to be highly related to typical male behavior but completely unrelated to descriptions of typical women. Moreover, women who step outside their societal stereotypes may be penalized if they do not adhere to their socially defined roles. For example, women who act in an uncooperative or assertive manner are perceived more negatively than men who act similarly, even when women evaluate other women (Cooper, 1997; Frisch & McCord, 1987; Mathison, 1986).

Integrating research on gender stereotypes and leadership prototypes, we hypothesize that team members with traits that are consistent with the general leadership prototype and their gender stereotype are likely to be ascribed leadership due to perceptual congruence. Using this congruence criterion, men with high levels of general mental ability, conscientiousness, emotional stability, and openness to experience are more likely to be ascribed informal leadership status than are women with the same traits. Extraversion is associated with leadership, but an interaction is not likely because both gender stereotypes contain elements of extraversion, with men expected to be assertive and outgoing and women expected to be sociable and talkative. Moreover, due to its limited association with leadership, agreeableness is not likely to interact with gender to predict informal leadership emergence. Thus,

Hypothesis 1a. Gender will moderate the relationship between general mental ability and informal leadership emergence such that men with high levels of general mental ability will be more likely to emerge as informal leaders than will women with high levels of general mental ability.

Hypothesis 1b. Gender will moderate the relationship between conscientiousness and informal leadership emergence such that men with high levels of conscientiousness will be more likely to emerge as informal leaders than will women with high levels of conscientiousness.

Hypothesis 1c. Gender will moderate the relationship between emotional stability and informal leadership emergence such that men with high levels of emotional stability will be more likely to emerge as informal leaders than will women with high levels of emotional stability.

Hypothesis 1d. Gender will moderate the relationship between openness to experience and informal leadership emergence such that men with high levels of openness to experience will be more likely to emerge as informal leaders than will women with high levels of openness to experience.

2.2. Achieved informal leadership

In addition to ascribed pathways, leadership emergence may be explained through individual team members achieving informal leadership status by performing important roles or making valued contributions (Mann, 1959; Zaccaro, Rittman, & Marks, 2001). Social structures within teams stem from the negotiated roles or relationships between team members (Seers, 1989). Stable social networks develop as team members repeatedly interact with specific team members who help satisfy individual or team-related needs (Granovetter, 1973; Hackman, 1992). Mullen, Johnson, and Salas (1991) found in their meta-analysis that network centrality, reflecting self-reported group member interaction with other group members, positively related to leadership emergence.

Carter, Haythorn, Shriver, and Lanzetta (1951) analyzed 53 categories of behavior and found that providing advice (giving information on how to carry out a task and making interpretations based on diagnosing the situation) clearly distinguished between those who emerged as leaders and those who did not. Sorrentino and Field (1986) also found a strong relationship between giving task-related advice and leadership emergence. Additionally, those who provide support are likely to be perceived as leaders, because group members consider supportiveness to be a role of leadership (Hamblin, 1958). For instance, in a study of role dimensions, a leader's interest in other group members' personal well-being was positively related to his or her acceptance as a leader (Julian & Hollander, 1966). In other words, occupying central support and advice roles within the team (referred to herein as team member network centrality) satisfies the needs of group members (Forsyth, 1990). Thus, even low-status members of a group can enhance their power if they foster majority group dependency through performing critical roles or offering valued contributions (Kanter, 1977; Mechanic, 1962).

Research on actual and stereotypical female behavior agrees that women, in comparison to men, are more oriented toward social activity and tend to occupy nurturing and supportive roles in a social context (Eagly & Steffen, 1986; Gilligan, 1982; Reinsch, Rosenblum, Rubin, & Schulsinger, 1991). In their meta-analysis, Eagly and Karau (1991) report that women attained higher levels of leadership status than men when the team task required greater levels of social interaction. On the other hand, in actual work contexts, providing advice was the most frequently cited helping behavior for both male and female leaders (Bowes-Sperry, Veiga, & Yanouzas, 1997).

Although research on helping behavior has shown that men help more frequently than women, this conclusion is drawn from primarily short-term interactions with strangers (Eagly & Crowley, 1986). Eagly and Crowley (1986) argue that the nonroutine, risk-oriented heroic helping behavior of males is well suited for brief encounters while the nurturing and service-oriented helping behavior of women is not as likely to be displayed in these contexts. Conversely, the helping orientation of women is well suited to intact teams where in the context of long-term relationships, women offer socioemotional support as well as advice to further the goal achievement of others (Eagly & Crowley, 1986; Vaux, 1988). In addition, women may be more likely to provide advice and support within a mixed-gender team because the chivalrous orientation of men is oriented toward primarily helping women while women were helpful to both genders (Eagly & Crowley, 1986).

In summary, it seems that in comparison to men, women have an advantage in that their social orientation and stereotypical expectations lend themselves to achieving status through engaging in helping interactions within the team. Alternatively, being central in social networks may not be typically male and therefore, may be a path less traveled by men. As such, even when men offer these

contributions, the stereotypical incongruence of these contributions with male stereotypes may result in men accruing less leadership status from this path than do women. Thus,

Hypothesis 2. Gender will moderate the relationship between team member network centrality and informal leadership emergence such that women with high levels of team member network centrality will be more likely to emerge as informal leaders than will men with these same contributions.

3. Method

3.1. Sample and procedures

Participants were members of teams engaged in the production and assembly of small appliances or in support of such tasks in a Midwestern manufacturing organization. Using the terminology of McGrath's (1984) task typology, the team engaged primarily in "executing" performance tasks of a routine and structured nature. On the other hand, the quality improvement and team environment also provided opportunities for "generating" tasks associated with planning, problem-solving, and improvement processes. As a check on leadership opportunities within this team task context, team members indicated whether 20 leadership behaviors (e.g., conducting meetings, identifying problems, and changing work processes) drawn from the self-management literature (Manz, 1992; Manz & Sims, 1993) were the responsibility of the external team supervisor (scaled as a 1), a shared responsibility between the supervisor and team (scaled as a 3), or the responsibility of the team (scaled as a 5) on a five-point Likert scale. The mean score on the 20 items was used as the measure of leadership opportunities within the domain of the team, with higher scores indicating higher self-leadership.

The mean self-leadership score across teams ($M = 3.53$; $SD = 0.53$) that indicates a substantial amount of leadership activity occurring within the team is performed by informal leaders. In all but one team, the formal supervisor was external to the team and did not contribute to the daily functioning of the team. Because the pattern of results was the same whether or not the team with the formal supervisor was excluded, all the teams were included in the analysis.

Team members were given time during the work day to complete the questionnaires. The questionnaires were administered by the lead researcher, as part of a larger research project investigating self-managing team processes. Completed questionnaires were collected from all the members of 18 teams (237 team members). The size of the teams ranged from 1 to 25, with a mean of 12. The teams were similar in exhibiting moderate levels of task interdependence (defined below) on a five-point Likert scale ($M = 3.6$; $SD = 0.36$). The respondents ranged in age from 22 to 68 years with a mean of 44 years ($SD = 7.88$). The composition of the sample was 67% female and 33% male, with 97% having indicated their race as White (non-Hispanic), 1% Black, and 2% did not provide race information. A majority of respondents (60%) had only a high school education or less, with an additional 36% having some college education or a 2-year degree. The final 4% of the respondents had a 4-year degree, some graduate education, or a graduate degree. The mean level of organizational tenure was 18 years ($SD = 5.04$) with the maximum tenure extending to 36 years. Team members' tenure with their current team ranged from 6 weeks to 5 years with the mean team tenure being slightly over 3 years ($M = 3.13$, $SD = 1.82$).

3.2. Measures

3.2.1. Control variables

Task interdependence and team gender composition were used as team-level control variables in acknowledgement of the influence these team context variables have had on gender-based leadership research (Eagly & Karau, 1991; Karakowsky & Siegal, 1999). Task interdependence was measured with Kiggundu's (1983) five-point Likert task interdependence scale. The α reliability for the seven-item scale was .74. A one-way analysis of variance revealed that across the sample, 79% of the variance on this measure was between teams rather than within. This finding supported aggregating team members' assessments of task interdependence to create a team-level variable (across teams, $M = 3.6$, $SD = 0.36$). Team gender composition was a proportional measure of men in relation to team size. Individual difference variables related to age, education level, and tenure within the organization also were used as controls. The individual controls were included to account for the variance in status that is typically associated with these variables (Berger, Cohen, & Zelditch, 1972).

3.2.2. Individual difference variables

Gender was a dichotomous self-report measure (females were coded as a 1 and males were coded as a 0). General mental ability (g) was assessed by the Wonderlic Personnel Test (Form 5), a validated ability test used in selection. Across forms, test–retest reliabilities reported in the test manual range from .82 to .94. Measures of internal consistency reliabilities range from .88 to .94 (see Wonderlic & Associates, 1983). The Wonderlic correlates well (.60–.70) with training program grades in industrial settings, .92 with the Wechsler Adult Cognitive Ability Scale (Hawkins, Faraone, Pepple, & Seidman, 1990), and .74 with the GATB (McCormick, Mecham, & Jeanneret, 1989). Personality characteristics associated with the Big Five were assessed with the Personal Characteristics Inventory (Barrick & Mount, 1995). It consists of 120 items utilizing a three-point Likert scale (from 1 = *disagree* to 3 = *agree*). Coefficient α reliability estimates reported in the test manual are .87, .86, .82, .86, and .83 for conscientiousness, extraversion, agreeableness, emotional stability, and openness to experience, respectively.

Team member network centrality was measured by aggregating the responses from all team members to the following two requests: please write the names of team members who are important sources of professional advice, who you approach if you have a work-related problem, or when you want advice on a decision you have to make (advice); please write the names of team members you can count on, who you view as allies, who are dependable in times of crisis (support). Respondents could list as many team members as were deemed appropriate for each question.

Questions of this type are typical to social network research (e.g., Ibarra & Andrews, 1993; Wasserman & Faust, 1994). The two questions were highly correlated ($r = .78$) and therefore, combined into a composite measure. This measure was standardized by summing the number of nominations a team member received, across both questions, and dividing this by the team size minus two (to account for the fact that team members could not nominate themselves). The α reliability of the two-item scale was .88. Altogether, 203 out 237 team members were nominated as a source of advice or support.

3.2.3. Dependent variable

Informal leadership was measured by aggregating the responses of all team members to the following question: has a leader emerged within the team (someone who is both a team member and a leader)? If yes, who is it? As is common in assessing emergent leadership in groups, respondents were not limited

to a specific definition of leadership, but instead were simply asked to nominate a leader of the team (e.g., DeSouza & Klein, 1995; Goktepe & Schneier, 1989; Petzel, Johnson, & Bresolin, 1990). In a separate sample of intact student teams (working interdependently for 15 weeks), informal leadership was related to, but distinct from (r=.35) a two-item likeability composite from Byrne's (1971) interpersonal attraction scale. This finding provides some evidence that our nomination measure assesses more than interpersonal attraction.

The informal leadership emergence measure in this study is a proportion measure that reflects the number of times each team member was indicated as being the emergent informal leader divided by the number of possible nominations (team size). A higher proportion indicates a higher degree of shared perception of informal leadership emergence. This measure ranged from .00 to .60. As expected, the measure was skewed with only 37 out of 237 team members nominated as informal leaders. The skewness of the dependent variable contributed to violations of the regression assumptions of homoscedasticity and normality of residuals. In practice, violations of these assumptions do not lead to significant bias in the regression coefficients or significance tests (Cohen, Cohen, West, & Aiken, 2003).

Single-item nominations transformed into a proportion measure provide an indication of agreement, but do not allow for assessing reliability directly using traditional means. However, reliability assessments associated with similar one-item measures may serve as an estimate for the informal leadership emergence measure. Kane and Lawler's (1978) review of peer nominations included a list of test–retest reliabilities for single-item nomination measures. These reliabilities were meta-analyzed to provide an estimate of reliability for peer nominations. The resulting estimate of test–retest reliability was .77, which suggests that our methodology of using a single nomination measure yields a reliable assessment of leadership emergence.

3.3. Analyses

In teams, leadership emergence research can be individual-level, team-level, or cross-level, where team characteristics interact with individual-level characteristics to predict individual-level leadership emergence. Individual-level data, originating from either an individual's self-reports or others' assessments (e.g., team members' nominations), are unique to each individual. Team-level constructs can emerge from aggregating individual constructs, if there is perceptual agreement among team members, but characterize the team as a whole and not as individuals (Kozlowski & Klein, 2000). In this study, a team-level control variable, task interdependence, is an aggregation of individual perceptions of task interdependence.

Klein, Dansereau, and Hall (1994) suggest that theory should guide the analytic approach to testing hypotheses. The theoretical focus of this study is that of individual-level characteristics (personality, general mental ability, team member network centrality, and gender) interacting to predict individual leadership emergence. Although the hypotheses do not include cross-level effects, the relationships between the individual characteristics are not context free (House, Rousseau, & Thomas-Hunt, 1995). As such, team-level controls (task interdependence and gender composition) are included in the analyses.

Preliminary analyses were conducted using moderated regression to confirm that the interactions significantly contributed to explaining variance above the control variables and main effects. Furthermore, moderated multiple regression was used to test the significance of each interaction term after the controls, main effects, and other interactions were entered. Consistent with the admonitions of Murphy

(1996) to study personality using a multivariate framework, these analyses assessed the unique variance of each hypothesized interaction. This is a conservative approach that reflects the reality that individual differences are not perceived independently; yet, this approach can make it difficult to find significant interactions (Villa, Howell, Dorfmann, & Daniel, 2003).

In a context where influences on the dependent variable might span multiple levels, moderated multiple regression has an important limitation that can be addressed by hierarchical linear modeling (Bryk & Raudenbush, 1992; Hofmann, 1997). In moderated regression at an individual level, team-level variables are assigned to individuals within the team which can violate the assumption of independence. Furthermore, statistical tests associated with the team-level variables are conducted using the number of individual-level units of analysis which can result in biased significance tests of these parameters (Bryk & Raudenbush, 1992; Hofmann, 1997). Potential bias is not as problematic when team-level variables are used simply as controls, but if the team-level variables are hypothesized to have a main effect or to interact with individual-level variables, this can substantially influence statistical inferences.

Although we used team-level variables as controls, the advantages of hierarchical linear modeling over moderated regression in explicitly modeling both within and between group variance (Hofmann, Griffin, & Gavin, 2000) led us to use hierarchical linear modeling as the final test of the hypotheses. One final advantage of adopting this approach is that we were able to ascertain the degree to which our individual-level interactions varied significantly across groups which could have implications for future research.

4. Results

Table 1 contains descriptive statistics and correlations for the study variables. The correlations were corrected for attenuation using reliability estimates. Of the personality variables, only extraversion was significantly related to informal leadership such that those who are more extraverted (both males and females) are more likely to be considered informal leaders. Consistent with meta-analytic research, gender was associated with emerging as the informal leader within the team with males being more likely than women to emerge in these intact teams. Team member network centrality also was significantly and positively associated with informal leadership emergence (r=.57), although only 17% of those who were nominated as sources of advice or support were nominated as an informal leader. Overall, the correlations make clear that the individual difference and team member network centrality variables are distinct, yet related to some extent. For example, as might be expected, extraversion was related to team member network centrality (r=.28, p<.01).

Prior to conducting the regression and hierarchical linear modeling analyses, the study variables were centered (subtracting the mean of each variable from each individual score) to minimize the effect of multicollinearity. The variance inflation factor (VIF) also was calculated for each independent or control variable to assess multicollinearity. As a rule of thumb, VIF values above 10.0 indicate troublesome levels of multicollinearity. The VIFs ranged within acceptable values from 1.12 to 3.70 with a mean value of 1.72.

The moderated regression analyses indicated that the independent variables explain a significant portion of variance in informal leadership emergence above the control variables (ΔR^2=.28, p<.001) and that the interactions explain a significant portion of variance above that explained by the independent variables (ΔR^2=.15, p<.001). In a separate series of moderated regressions, each interaction term also was individually added after all other study variables were entered to examine incremental variance accounted for by each interaction term. Both the unique (regression coefficients) and incremental

Table 1
Descriptive statistics and correlations ($N = 237$)

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13
(1)Task interdependence	3.63	.32	–												
(2) Team gender composition	.34	.32	−.79**	–											
(3) Age	44.21	7.77	.10	−.04	–										
(4) Education	2.41	.69	−.27**	.26**	−.13**	–									
(5) Organization tenure	17.80	5.10	.02	−.10	.18**	−.16*	–								
(6) Agreeableness	2.49	.36	.22**	−.17**	.08	−.06	−.03	–							
(7) Emotional stability	2.13	.46	−.03	.03	.12	.09	.01	.60**	–						
(8) Extraversion	1.88	.36	−.24**	.14**	−.27**	.24**	−.14*	.15	.29**	–					
(9) Conscientiousness	2.57	.30	−.01	−.10	.11	.06	.03	.47**	.52**	.30**	–				
(10) Openness to experience	2.16	.51	−.38**	.34**	−.11	.45**	−.12	.22**	.34**	.59**	.36**	–			
(11) General mental ability	21.97	5.84	−.26**	.21**	−.25**	.39**	−.03	−.06	.02	.24**	.06	.42**	–		
(12) Team member network centrality	.20	.19	−.35**	.20**	−.19**	.01	.10	−.13	−.05	.32**	.02	.12*	.14	–	
(13) Gender	.66	.47	.55**	−.69**	.08	−.18**	.03	.24**	−.02	−.23	−.06	−.32**	−.13	−.32**	–
(14) Informal leadership	.03	.08	−.13	.05	−.16*	−.3	−.07	−.14	.04	.31	.04	.14	.03	.57**	−.24**

Note. * $p<.01$ two-tailed test. ** $p<.05$ two-tailed test.

Table 2
Results from hierarchical linear modeling ($N = 237$)

Variable	*B*	*SE B*	T ratio	*p* value
Intercept	.016	.005	3.27	.005
Task interdependence	.025	.019	1.30	.215
Gender composition	− .000	.000	− 0.72	.482
Age	.000	.001	− 0.50	.615
Education	− .008	.007	− 1.23	.217
Organizational tenure	− .002	.001	− 2.50	.013
Agreeableness	− .051	.021	− 2.38	.017
Emotional stability	.057	.019	3.05	.003
Extraversion	.012	.024	0.50	.620
Conscientiousness	.056	.033	1.74	.081
Openness to experience	.024	.021	1.17	.243
General mental ability	− .005	.001	− 3.53	.001
Team member network centrality	.328	.035	9.41	.000
Gender	− .017	.013	− 1.29	.198
Gender × Agreeableness	.044	.028	1.58	.132
Gender × Emotional Stability	− .043	.024	− 1.84	.082
Gender × Extraversion	− .002	.029	0.08	.942
Gender × Conscientiousness	− .075	.037	− 1.99	.063
Gender × Openness to Experience	− .032	.024	− 1.39	.183
Gender × General Mental Ability	.007	.002	3.94	.001
Gender × Team Member Network Centrality	− .262	.046	− 5.64	.000

Note. The *p* values represent two-tailed tests of significance.

variance results from the moderated multiple-regression analysis indicate that gender moderates the relationship of general mental ability (H1a; β=.41, ΔR^2=.04, $p < .01$) conscientiousness (H1b; $\beta = -.20$, ΔR^2=.01, $p < .10$), emotional stability (H1c; $\beta = -.23$, ΔR^2=.01, $p < .10$), and team member network centrality (H2; $\beta = -.43$, ΔR^2=.08, $p < .01$) to informal leadership emergence. The expected moderation of the relationship between informal leadership and openness to experience (H1d) did not receive support. In addition, gender did not moderate the relationships between informal leadership and extraversion and agreeableness.[2]

The results of the hierarchical linear modeling are presented in Table 2. The results mirror those of the moderated regressions in magnitude and significance. In addition to confirming the moderated regression results, an examination of the chi-square values associated with each interaction indicates that the variance accounted for by the interactions did not significantly vary across teams. In other words, the significant interactions could be viewed as a fixed effect (i.e., a relationship that does not significantly vary across groups).

[2] Using the alternative approach suggested by Villa et al. (2003), we investigated the interactions that were not significant. This alternative approach to using moderated regression tests each interaction in a separate regression that only includes the main effects involved in the interaction and the interaction term itself. In essence, this approach involves investigating the significance of each interaction without accounting for the variance of the other hypothesized variables. Although we chose an alternative approach in our moderated regressions and hierarchical linear modeling, the Villa et al. approach demonstrated that if not for the inclusion of associated variables (e.g., team member network centrality) the gender-extraversion interaction would have been significant.

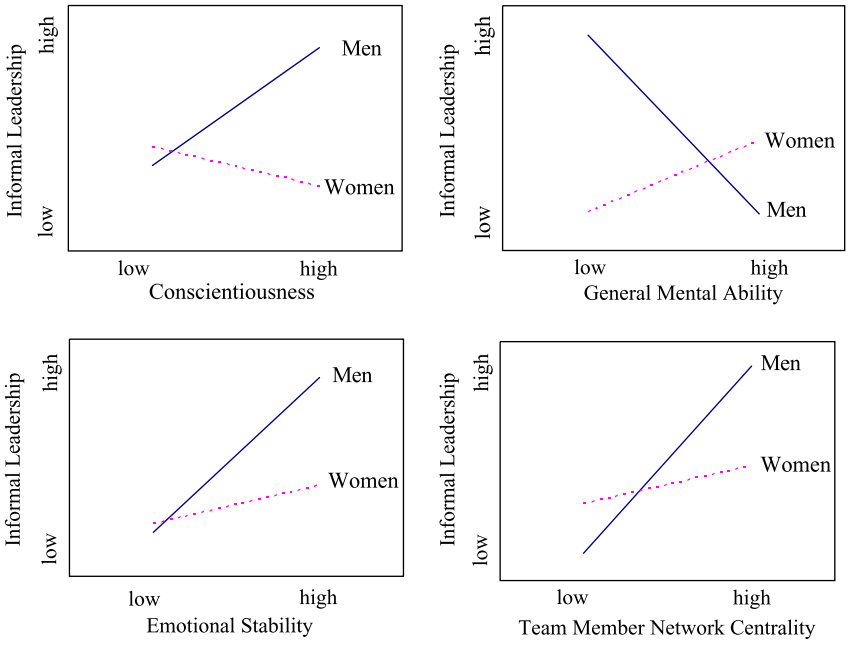

Fig. 1. Plots of significant interactions from hierarchical linear modeling analyses.

Fig. 1 illustrates the nature of the significant interactions. Gender moderated the relationship between conscientiousness and informal leadership such that for men, increases in conscientiousness substantially improved the likelihood of being considered the informal leader, whereas for women, increases in conscientiousness slightly decreased their likelihood of emerging as the leader. Gender also moderated the relationship between emotional stability and informal leadership such that for men, increases in emotional stability improved the likelihood of being considered the informal leader, whereas for women, it had a similar yet less substantial influence. The significance and direction of the interactions associated with conscientiousness and emotional stability are consistent with H1b and H1c.

The statistical relationships between informal leadership and both general mental ability and team member network centrality were not consistent with our hypotheses (H1a and H2, respectively). Contrary to our theory, for men, increases in general mental ability decreased the likelihood of being considered informal leaders, while for women, increases in general mental ability improved the likelihood of being considered the informal leader. Similarly, converse to our theory, increases in team member network centrality increased more pronouncedly the likelihood of being considered the informal leader for men more so than women.

5. Discussion

In a sample of 237 members of 18 manufacturing teams, where collective performance is necessary for sustaining employment, gender moderated the relationships between informal leadership emergence and conscientiousness and emotional stability such that when men fulfill expectations for a leader to be

conscientious and emotionally stable, they are more likely to emerge as informal leaders than are women who fulfill the same expectations. It appears that because conscientiousness and emotional stability are not stereotypical expectations for women, these characteristics do not accrue the same leadership credit for women as they do for men. Whereas a high level of conscientiousness (e.g., achievement oriented, responsible) is perceived positively and therefore, associated with leadership for men, the same is not true for women, possibly due to incongruence of leadership and gender stereotypes. Similarly, the congruence of gender and leadership stereotypes may explain why being stable, calm, and emotionally less expressive contribute to informal leadership in men more so than in women.

For general mental ability, the congruence theory does not hold. The results of the present study indicate that women who exhibit high levels of general mental ability are more likely to emerge as leaders whereas the opposite is true for men. This finding requires further research to determine if general mental ability is manifested in meaningfully different ways for male and female team members. For instance, in relation to communication, men are socialized to gain status through conversational strategies of interrupting and dominating the talk time (Cameron, 1997; Tannen, 1990, 1995). Perhaps, because men generally gain status by being assertive and dominant (Baird, 1976), their intelligence is perceived by others as overbearing. On the other hand, women are socialized to express themselves in an egalitarian manner (Owen, 1986; Tannen, 1990, 1995) and therefore, may express their intelligence in a manner that is more humble and unassuming.

Although being included in other team members' networks of advice and support was important for the leadership emergence of men and women, our results indicate that it was more instrumental for men than for women. This finding is the opposite to the hypothesized advantage women may have over men in their proclivity to achieve leadership through providing valuable contributions to the team. In this case, the expectations of women as being social and nurturing may work against women receiving recognition as leaders. This finding and possible explanations require further study.

With respect to informal team leadership, our results suggest that some of the traits and contributions of women remain relatively unappreciated. Women who have traits typically associated with male leadership, or those who alter their behavior to be more consistent with male stereotypes (Eagly & Johnson, 1990; Ely, 1995) may receive less leadership credit than their male counterparts who possess some similar traits. Furthermore, even if women hold similar positions within team members' advice and support networks, their contributions are undervalued.

Ely and Meyerson (2000) argue that common interventions to remedy this inequity have failed. One approach has been for organizations to implement policies that increase opportunities for women to lead and reduce typical female barriers to leadership development (e.g., a lack of mentors). Although our research does not speak directly to this possibility in teams, there can be a backlash to providing opportunities to women that are not offered to men (Ely & Meyerson, 2000). Organizations also might attempt to trumpet the competitive advantage of "feminine" management, but this may have the unintentional consequence of increasing the strength of gender stereotypes and their impact on team dynamics (Ely & Meyerson, 2000).

A less invasive intervention might be for organizations to encourage the practice of intentional self-reflection where team members provide specific feedback to one another regarding team-relevant traits and contributions. Information made salient through discussion that is contradictory to stereotypes or first impressions can minimize the impact of these perceptions (Ridgeway, 1991). Over time, groups can informally restructure around real contributions that improve the functioning of the team.

Another approach might be to encourage and train teams to use shared leadership. In contrast with the more traditional vertical leadership process of one individual leading others, shared leadership is a dispersion of leadership within the team such that multiple team members influence one another and the rest of the team (Neubert, 1999; Pearce & Sims, 2002; Taggar et al., 1999). Implementing shared leadership is likely to increase the opportunity for women to take leadership roles and, in turn, to expand team members' perception of leadership to be more cognizant of women's contributions. In effect, the stereotypical categorization processes that previously excluded women from being perceived as leaders can be reconfigured to be inclusive of women's contributions, regardless of their traits.

Further theory development is needed on two fronts. First, much of our understanding of individual differences, group diversity, and leadership emergence in teams is based on research conducted in short-lived student teams. Theory development is needed on the pathways to leadership in intact teams in relevant organizational contexts. Second, theory on leadership emergence needs to move towards incorporating multilevel influences (individual, group, and organization) to account for the complexities of leadership in intact contexts. Researchers cannot assume that theories developed in the laboratory or directed at one level have high fidelity for organizations (Schriesheim, Castro, Zhou, & Yammarino, 2001).

Applying hierarchical linear modeling to team contexts permits testing the influence of team-level variables on individual-level variables without biasing the standard error estimates (Bryk & Raudenbush, 1992; Hofmann, 1997). This advantage of hierarchical linear modeling is particularly important when team-level variables are hypothesized to influence individual-level variables (e.g., Hofmann & Stetzer, 1996; 1998; Hofmann, Morgeson, & Gerras, 2003).

In this study, where hypotheses were individual-level, the results were similar regardless of whether moderated regression or hierarchical linear modeling was used to analyze the data. Nonetheless, the use of hierarchical linear modeling offered the advantage over moderated regression of using chi-square tests to assess the extent to which the variance accounted for by each of the interactions varies across teams (Hofmann, Griffin, & Gavin, 2000). Hierarchical linear modeling also allows for analyzing cross-level frog pond effects whereby the impact of an individual-level variable is dependent on the relative standing of this construct within a unit or group (Dansereau & Yammarino, 2000; Hofmann, 1997). Again, although this is not the focus of this research, the analytic advantage of hierarchical linear modeling in separating out variance across levels, is an important advance in research assessing leadership relationships in context.

A limitation to the generalizability of our findings is that the research sample is confined to a relatively stable manufacturing environment. Investigating teams that are engaged in structured assembly line related tasks might have attenuated the potential of traits to explain leadership perceptions. Moreover, despite controlling for the gender composition of the team, a sample with 67% women may have biased the results. Research contexts with strong contextual cues can limit the influence individual differences have on behavior (Mischel, 1977; Weiss & Alder, 1984). As Lord et al. (2001) point out, individual differences combine with contextual constraints to influence leadership prototype generation. Thus, the relative importance of individual differences and team member network centrality in explaining informal leadership emergence may vary considerably across organizations as well as tasks, and may be underestimated in this study.

The results of this research are, to some extent, influenced by the measurement of the dependent variable. In this study, informal leadership for each team member was operationalized as a proportion measure that indicated the number of informal leadership nominations received divided by his or her

team's size. Despite the regularity of these measures in leadership emergence research (e.g., DeSouza & Kline, 1995; Goktepe & Schneier, 1989; Petzel, Johnson, & Bresolin, 1990), an alternative approach in future research might be to have team members rate all team members on several distinct leadership dimensions. In field research, the time required for respondents to provide this information may be untenable from the perspective of the organization, yet, if viable, this alternative approach to assessing informal leadership would be a valuable extension of the current research.

This study represents a novel integration of leadership, gender, trait, and team member network theories in exploring informal leadership in teams. It illuminates the pathways in which men and women emerge as informal leaders in a real work environment. The findings extend prior research by elaborating on the role of gender in explaining the relationship of traits and team member network centrality to leadership. In particular, this research is important because it focuses on informal leadership, an increasingly important team dynamic in real team environments that are increasingly autonomous (Guzzo & Dickson, 1996). As such, this study is another piece in a puzzle that is emerging to explain the interplay of gender diversity and leadership in organizations that invest in teams to gain a competitive advantage.

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References

Adler, N. J. (1999). Global leaders. *Executive Excellence*, *16*, 15–16.

Archer, J. (1996). Sex differences in social behavior: Are the social role and evolutionary explanations compatible? *American Psychologist*, *51*(9), 909–917.

Arnoff, J., & Wilson, J. P. (1985). *Personality in the social process*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Baird, J. E. (1976). Sex differences in group communication: A review of relevant research. *Quarterly Journal of Speech, 62*(2), 179–192.

Barrick, M. R., & Mount, M. K. (1991). The Big Five personality dimensions and job performance: A meta-analysis. *Personnel Psychology*, *44*, 1–26.

Barrick, M. R., & Mount, M. K. (1995) *The personal characteristics inventory manual*. Unpublished manuscript, The University of Iowa at Iowa City, IA.

Barrick, M. R., Stewart, G., Neubert, M. J., & Mount, M. K. (1998). Relating team composition and team processes to work team effectiveness. *Journal of Applied Psychology*, *83*, 319–377.

Beal, C. R. (1994). *Boys and girls: The development of gender roles*. New York: McGraw-Hill.

Berger, J., Cohen, B. P., & Zelditch Jr., M. (1972). Status characteristics and social team member interaction. *American Sociological Review*, *37*, 241–255.

Bowes-Sperry, L., Veiga, J. F., & Yanouzas, J. N. (1997). An analysis of managerial helping responses based on social role theory. *Group & Organization Management*, *22*, 445–459.

Brenner, O. C., Tomkiewicz, J., & Schein, V. E. (1989). The relationship between sex role stereotypes and requisite management characteristics revisited. *Academy of Management Journal*, *32*(3), 662–669.

Brett, J. M., & Stroh, L. K. (1999). Women in management: How far have we come and what needs to be done as we approach 2000? *Journal of Management Inquiry*, *8*, 392–398.

Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models*. Newbury Park, CA: Sage.

Byrne, D. (1971). *The attraction paradigm*. New York: Academic Press.
Cameron, D. (1997). Theoretical debates in feminist linguistics: Questions of sex and gender. *Gender and discourse* (pp. 21–36). Thousand Oaks, CA: Sage Publications.
Carter, L., Haythorn, W., Shriver, B., & Lanzetta, J. (1951). The behavior of leaders and other group members. *Journal of Abnormal and Social Psychology*, *46*, 589–595.
Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences*. Mahwah, NJ: Lawrence Erlbaum Associates.
Cooper, V. W. (1997). Homophily or the queen bee syndrome: Female evaluation of female leadership. *Small Group Research*, *28*, 483–499.
Craik, K. H., Ware, A. P., Kamp, J., O'Reilly III, C., Staw, B., & Zedeck, S. (2002). Explorations of construct validity in a combined managerial and personality assessment programme. *Journal of Occupational and Organizational Psychology*, *75*, 171–193.
Dansereau, F., & Yammarino, F. J. (2000). Within and between analysis: The variant paradigm as an underlying approach to theory building and testing. In S. W. J. Kozlowski, & S. J. Klein (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 3–90). San Francisco, CA: Jossey-Bass.
DeSouza, G., & Klein, H. J. (1995). Emergent leadership in the group goal setting process. *Small Group Research*, *26*, 475–496.
Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. In M. R. Rosenzweig, & L. W. Porter (Eds.), *Annual Review of Psychology, vol. 41* (pp. 417–440). Palo Alto, CA: Annual Reviews.
Eagly, A. H. (1987). *Sex differences in social behavior: A social-role interpretation*. Hillsdale, NJ: Erlbaum.
Eagly, A. H., & Crowley, M. (1986). Sex and helping behavior: A meta-analytic review of the social psychological literature. *Psychological Bulletin*, *100*, 283–308.
Eagly, A. H., & Johnson, B. T. (1990). Gender and leadership style: A meta-analysis. *Psychological Bulletin*, *108*(2), 233–256.
Eagly, A. H., & Karau, S. J. (1991). Gender and the emergence of leaders: A meta-analysis. *Journal of Personality and Social Psychology*, *60*, 685–710.
Eagly, A. H., & Steffen, V. J. (1986). Gender and aggressive behavior: A meta-analytic review of the social psychological literature. *Psychological Bulletin*, *100*(3), 309–330.
Eagly, A. H., & Wood, W. (1991). Explaining sex differences in social behavior: A meta-analytic review of the social psychological literature. *Psychological Bulletin*, *100*, 309–330.
Eden, D., & Leviatan, U. (1975). Implicit leadership theory as a determinant of the factor structure underlying supervisory behavior scales. *Journal of Applied Psychology*, *60*(6), 736–741.
Ely, R. J. (1995). The power of demography: Women's social constructions of gender identity at work. *Academy of Management Journal*, *38*, 589–634.
Ely, R. J., & Meyerson, D. E. (2000). Theories of gender in organizations: A new approach to organizational analysis and change. *Research in Organizational Behavior*, *22*, 103–151.
Fennell, M. L., Barachas, P. R., Cohen, E. G., McMahon, A. M., & Hildebrand, P. (1978). An alternative perspective on sex differences in organizational settings: The process of legitimation. *Sex Roles*, *4*(4), 589–604.
Fiske, S. T., & Taylor, S. E. (1991). *Social cognition* (2nd ed.). New York, NY: McGraw-Hill.
Forsyth, D. R. (1990). *Group dynamics* (2nd ed.). Pacific Grove, CA: Brooks/Cole Publishing.
Fraser, S. L., & Lord, R. G. (1988). Stimulus prototypicality and general leadership impressions: Their role in leadership and behavioral ratings. *Journal of Psychology*, *122*(3), 291–303.
Frisch, M. B., & McCord, M. (1987). Sex role orientation and social skill: A naturalistic assessment of assertion and conversational skill. *Sex Roles*, *7*, 437–448.
Gilligan, C. (1982). *In a different voice: Psychological theory and women's development*. Cambridge, MA: Harvard University Press.
Goktepe, J. R., & Schneier, C. E. (1989). Role of sex, gender roles, and attraction in predicting emergent leaders. *Journal of Applied Psychology*, *74*, 165–167.
Granovetter, R. M. (1973). The strength of weak ties. *American Journal of Sociology*, *70*, 820–835.
Guzzo, R. A., & Dickson, M. W. (1996). Teams in organizations: Recent research on performance and effectiveness. *Annual Review of Psychology*, *47*, 307–338.
Hackman, J. R. (1992). Group influences on individuals in organizations. In M. D. Dunnette, & L. H. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed.) (pp. 199–267). Palo Alto, CA: Consulting Psychologists Press.

Hamblin, R. L. (1958). Leadership and crises. *Sociometry*, *21*, 322–335.
Hawkins, K. A., Faraone, S. V., Pepple, J. R., & Seidman, L. J. (1990). WAIS-R validation of the Wonderlic Personnel Test as a brief intelligence measure in a psychiatric sample. *Psychological Assessment*, *2*, 198–201.
Hofmann, D. A. (1997). An overview of the logic and rationale of hierarchical linear models. *Journal of Management*, *23*(6), 723–744.
Hofmann, D. A., Griffin, M. A., & Gavin, M. B. (2000). The application of hierarchical linear modeling to organizational research. In K. J. Klein, & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 467–511). San Francisco, CA: Jossey-Bass.
Hofmann, D. A., Morgeson, F. P., & Gerras, S. (2003). Climate as a moderator of the relationship between LMX and content specific citizenship: Safety climate as an exemplar. *Journal of Applied Psychology*, *88*, 170–178.
Hofmann, D. A., & Stetzer, A. (1996). A cross-level investigation of factors influencing unsafe behaviors and accidents. *Personnel Psychology*, *49*, 307–339.
Hofmann, D. A., & Stetzer, A. (1998). The role of safety climate and communication in accident interpretation: Implications for learning from negative events. *Academy of Management Journal*, *41*, 644–657.
Hogan, R., Curphy, G. J., & Hogan, J. (1994). What we know about leadership. *American Psychologist*, *49*, 493–504.
House, R., Rousseau, D. M., & Thomas-Hunt, M. (1995). The meso paradigm: A framework for the integration of micro and macro organizational behavior. In L. L. Cummings, & B. M. Staw (Eds.), *Research in Organizational Behavior, vol. 17* (pp. 71–1114). Greenwich, CT: JAI Press.
Ibarra, H., & Andrews, S. B. (1993). Power, social influence, and sense making: Effects of network centrality and proximity on employee perceptions. *Administrative Science Quarterly*, *38*, 277–303.
Judge, T. A., & Bono, J. E. (2000). Five-factor model of personality and transformational leadership. *Journal of Applied Psychology*, *85*, 751–765.
Judge, T. A., Ilies, R., Bono, J. E., & Gerhardt, M. W. (2002). Personality and leadership: A qualitative and quantitative review. *Journal of Applied Psychology*, *87*, 765–781.
Julian, J. W., & Hollander, E. P. (1966). *A study of some role dimensions of leader follower relations*. Buffalo: State University of New York. (Technical report).
Kane, J. S., & Lawler, E. E. (1978). Methods of peer assessment. *Psychological Bulletin*, *85*, 555–586.
Kanter, R. M. (1977). Some effects of proportions on group life: Skewed sex ratios and responses to token women. *American Journal of Sociology*, *82*, 965–990.
Karakowsky, L., & Siegal, J. P. (1999). The effects of proportional representation and gender orientation of the task on emergent leadership behavior in mixed-gender work groups. *Journal of Applied Psychology*, *84*, 620–631.
Kenny, D. A., & Zaccaro, S. J. (1983). An estimate of variance due to traits in leadership. *Journal of Applied Psychology*, *68*, 678–685.
Kiggundu, M. N. (1983). Task interdependence and job design: Test of a theory. *Organizational Behavior and Human Performance*, *31*, 145–172.
Klein, K. J., Dansereau, F., & Hall, R. J. (1994). Levels issues in theory development, data collection, and analysis. *Academy of Management Review*, *19*(2), 195–229.
Kozlowski, S. W. J., & Klein, K. (2000). A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In K. J. Klein, & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions* (pp. 3–90). San Francisco, CA: Jossey-Bass.
Lord, R. G., Brown, D. J., Harvey, J. L., & Hall, R. J. (2001). Contextual constraints on prototype generation and their multilevel consequences for leadership perceptions. *The Leadership Quarterly*, *12*, 311–338.
Lord, R. G., De Vader, C. L., & Alliger, G. M. (1986). A meta-analysis of the relationship between personality traits and leadership perceptions: An application of validity generalization procedures. *Journal of Applied Psychology*, *71*, 402–410.
Lord, R. G., Foti, R. J., & De Vader, C. L. (1984). A test of leadership categorization theory: Internal structure, information processing, and leadership perceptions. *Organizational Behavior and Human Decision Processes*, *34*, 343–378.
Lord, R. G., & Maher, K. J. (1991). *Leadership and information processing: Linking perceptions and performance*. New York: Routledge.
Luft, J. (1984). *Group processes: An introduction to group dynamics* (3rd ed.). Palo Alto, CA: Mayfield.
Maccoby, E. E., & Jacklin, C. N. (1980). Sex differences in aggression: A rejoinder and reprise. *Child Development*, *51*(4), 964–980.

Mann, R. D. (1959). A review of the relationships between personality and performance in small groups. *Psychological Bulletin*, *56*, 241–270.

Manz, C. C. (1992). Self-leading work teams: Moving beyond self-management myths. *Human Relations*, *45*, 119–1140.

Manz, C. C., & Sims, H. P. (1993). *Business without bosses: How self-managing teams are building high performance companies*. New York: Wiley.

Mathison, D. L. (1986). Sex differences in the perception of assertiveness among female managers. *Journal of Social Psychology*, *126*, 599–606.

McCormick, E. J., Mecham, R. C., & Jeanneret, P. R. (1989). *Technical manual for the position analysis questionnaire*. West Lafayette, IN: Purdue Research Foundation.

McCrae, R. R. (1982). Consensual validation of personality traits: Evidence from self reports and ratings. *Journal of Personality and Social Psychology*, *43*, 293–303.

McCrae, R. R., & Costa Jr., P. T. (1987). Validation of the five-factor model of personality across instruments and observers. *Journal of Personality and Social Psychology*, *52*, 81–90.

McGrath, J. E. (1984). *Groups: Interaction and performance*. Englewood Cliffs, NJ: Prentice-Hall.

Mechanic, D. (1962). Sources of power and lower participants in complex organizations. *Administrative Science Quarterly*, *7*, 349–364.

Mischel, W. (1977). On the future of personality measurement. *American Psychologist*, *32*, 246–254.

Mullen, B., Johnson, C., & Salas, E. (1991). Effects of communication network structure: Components of positional centrality. *Social Networks*, *13*, 169–185.

Murphy, K. R. (1996). Individual differences and behavior in organizations: Much more than g. In K. R. Murphy (Ed.), *Individual differences and behavior in organizations* (pp. 3–30). San Francisco: Jossey-Bass.

Neubert, M. J. (1999). Too much of a good thing or the more the merrier? Exploring the dispersion and gender composition of informal leadership in intact manufacturing teams. *Small Group Research*, *30*, 635–646.

Nye, J. L., & Forsyth, D. R. (1991). The effects of prototype-based biases on leadership appraisals: A test of leadership categorization theory. *Small Group Research*, *22*(3), 360–379.

Owen, W. F. (1986). Rhetorical themes of emergent female leaders. *Small Group Behavior*, *17*, 475–486.

Pearce, C. L., & Sims Jr., H. P. (2002). Vertical versus shared leadership as predictors of the effectiveness of change management teams: An examination of aversive, directive, transactional, transformational, and empowering leader behaviors. *Group Dynamics, Theory, Research, and Practice*, *6*(2), 172–197.

Pearlmann, K., Schmidt, F. L., & Hunter, J. E. (1980). Validity generalization results for tests used to predict job proficiency and training success in clerical occupations. *Journal of Applied Psychology*, *65*, 373–406.

Petzel, T. P., Johnson, J. E., & Bresolin, L. (1990). Peer nominations for leadership and likeability in problem solving groups as a function of gender and task. *Journal of Social Psychology*, *130*, 641–648.

Reinsch, J. M., Rosenblum, L. A., Rubin, D. B., & Schulsinger, M. F. (1991). Sex differences in developmental milestones during the first year of life. *Journal of Psychology & Human Sexuality*, *4*(2), 19–36.

Ridgeway, C. L. (1991). The social construction of status value: Gender and other nominal characteristics. *Social Forces*, *70*, 367–386.

Rosch, E. (1978). Principles of categorization. In E. Rosch, & B. B. Lloyd (Eds.), *Cognition and categorization*. Potomac, MD: Lawrence Erlbaum.

Schriesheim, C. A., Castro, S. L., Zhou, X., & Yammarino, F. J. (2001). The folly of theorizing "A" but testing "B" A selective level-of-analysis review of the field and a detailed leader–member exchange illustration. *The Leadership Quarterly*, *12*, 515–551.

Sedikides, C., & Anderson, C. A. (1994). Causal perceptions of inter-trait relations: the glue that holds person types together. *Personality & Social Psychology Bulletin*, *20*(3), 294–302.

Seers, A. (1989). Team-member exchange quality: A new construct for role making research. *Organizational Behavior and Human Decision Processes*, *43*, 118–135.

Smith, A., & Stewart, A. J. (1983). Approaches to studying racism and sexism in Black women's lives. *Journal of Social Issues*, *39*, 1–15.

Smith, E. R., & Zarate, M. A. (1992). Exemplar-based model of social judgment. *Psychological Review*, *99*(1), 3–21.

Sorrentino, R. M., & Field, N. (1986). Emergent leadership over time: The functional value of positive motivation. *Journal of Personality and Social Psychology*, *50*, 1091–1099.

Stogdill, R. M. (1948). Personal factors associated with leadership. *Journal of Psychology*, *23*, 35–71.

Taggar, S., Hackett, R., & Saha, S. (1999). Leadership emergence in autonomous work teams: Antecedents and outcomes. *Personnel Psychology*, *52*, 899–926.

Tannen, D. (1990). Gender differences in topical coherence: Creating involvement in best friends' talk. *Discourse Processes*, *13*, 73–90.

Tannen, D. (1995). The power of talk: Who gets heard and why. *Harvard Business Review*, *73*(5), 138–148.

Vaux, A. (1988). *Social support: Theory, research, and intervention*. New York: Praeger.

Vecchio, R. P. (2002). Leadership and gender advantage. *The Leadership Quarterly*, *13*, 643–671.

Villa, J. R., Howell, J. P., Dorfmann, P. W., & Daniel, D. L. (2003). Problems with detecting moderators in leadership research using moderated multiple regression. *The Leadership Quarterly*, *14*, 3–23.

Wasserman, S., & Faust, K. (1994). *Social network analysis*. New York: Cambridge University Press.

Weiss, H. W., & Alder, S. (1984). Personality and organizational behavior. In B. M. Staw, & L. L. Cummings (Eds.), *Research in Organizational Behavior, vol. 6* (pp. 1–50). Greenwich, CT: JAI Press.

Wheelan, S. A., & Johnston, F. (1996). The role of informal member leaders in a system containing formal leaders. *Small Group Research*, *27*, 33–55.

Williams, K. Y., & O'Reilly, C. A. (1998). Demography and diversity in organizations: A review of 40 years of research. *Research in Organizational Behavior*, *20*, 77–140.

Wilson, E. (1999). Genderquake? Did you feel the earth quake? *Organization*, *6*, 529–541.

Wonderlic Personnel Test Manual (1983). Northfield, IL: E.F. Wonderlic & Associates.

Wood, W., & Karten, S. J. (1986). Sex differences in team member interaction style as a product of perceived sex difference in competence. *Journal of Personality and Social Psychology*, *50*, 341–347.

Yarkin, K. L., Town, J. P., & Wallston, B. S. (1982). Blacks and women must try harder: Stimulus persons' race and sex attributions of causality. *Personality and Social Psychology Bulletin*, *8*(1), 21–24.

Zaccaro, S. J., Rittman, A. L., & Marks, M. A. (2001). Team leadership. *The Leadership Quarterly*, *12*, 451–483.