

**University of Houston**

---

**From the Selected Works of L. A. Witt**

---

2003

# The impact of leader-member exchange on communication type, frequency, and performance ratings



Available at: <https://works.bepress.com/witt/14/>

# The Interactive Effect of Leader–Member Exchange and Communication Frequency on Performance Ratings

K. Michele Kacmar  
Florida State University

L. A. Witt  
University of New Orleans

Suzanne Zivnuska  
Bond University

Stanley M. Gully  
Rutgers University

The authors tested the hypothesis that communication frequency moderates the relationship between leader–member exchange (LMX) and job-performance ratings. In a study of 188 private sector workers, they found that LMX was more strongly related to job-performance ratings among individuals reporting frequent communication with the supervisor than among those reporting infrequent communication. At high levels of LMX, workers reporting frequent communication with the supervisor received more favorable job-performance ratings than did workers reporting infrequent communication. In contrast, at low levels of LMX, workers reporting frequent communication with the supervisor received less favorable job-performance ratings than workers reporting infrequent communication. The authors conducted a 2nd study of 153 public sector workers to provide a constructive replication and found similar results.

A substantial body of research has been generated on leader–member exchange (LMX) theory (see Liden, Sparrowe, & Wayne, 1997, for a review). In essence, LMX theory suggests that supervisors determine which roles subordinates will hold (Graen, 1976). These assigned roles define the quality of the relationship that subordinates enjoy with their supervisors and help subordinates determine the appropriate behaviors to enact (Lind & Zmud, 1991, 1995). Subordinates who share a high-quality LMX relationship with their supervisor are afforded several advantages not provided to those in a low-quality LMX relationship, such as ample resources, premier assignments, emotional support, and cooperative interactions with the supervisor (Liden & Graen, 1980). Exposure to these advantages has been demonstrated to result in a variety of positive outcomes, such as greater levels of motivation and superior performance ratings, for high-quality as compared with low-quality LMX subordinates (Liden et al., 1997).

Supervisors are a frequent source of performance feedback for subordinates (Andrews & Kacmar, 2001), especially for those in high-quality LMX relationships. If, however, a low frequency of communication restricts the feedback and developmental attention that can be gained as a result of a high-quality dyadic relationship,

then this may create uncertainty, leaving subordinates unable to translate their high-quality relationship with their supervisor into improved performance that results in high-performance ratings. Research has shown that a variety of negative organizational outcomes (e.g., increased stress or decreased job involvement) can result when individuals work in an uncertain environment (Ganster & Schaubroeck, 1991; Schaubroeck & Merrit, 1997). Conversely, if a high-quality relationship between a supervisor and subordinate enhances the usefulness of dyadic communications, then subordinates may benefit from these interactions in a variety of ways, including higher levels of performance and higher performance ratings. Gaining a greater understanding of how relationship quality may differentially influence performance ratings depending on the frequency of communication between supervisors and subordinates should provide new insight into LMX relationships. The purpose of the present study was to explore this underdeveloped area by investigating the interactive effect of LMX and communication frequency on supervisor-rated subordinate performance.

## Hypothesis Development

The relationship quality between a supervisor and subordinate can be described in terms of the LMX model (Dienesch & Liden, 1986; Liden et al., 1997). This model posits that supervisors determine the work roles that subordinates enact. Individuals whom supervisors like or trust fill more significant roles, whereas secondary opportunities are reserved for subordinates who are less liked or trusted. Subordinates selected for key roles usually enjoy a close, high-quality LMX relationship with the supervisor (Dansereau, Graen, & Haga, 1975), characterized by continuous emotional support and formal and informal rewards (Dienesch & Liden, 1986; Graen & Scandura, 1987). Subordinates who do not enjoy a high-quality LMX relationship with their supervisor are not awarded the same privileges as those who do. Instead, the

---

K. Michele Kacmar, Department of Management, College of Business, Florida State University; L. A. Witt, Department of Management, University of New Orleans; Suzanne Zivnuska, School of Business, Bond University; Stanley M. Gully, Department of Human Resource Management, Rutgers University.

This article was significantly improved by the comments offered by John Carlson and Sandy J. Wayne.

Correspondence concerning this article should be addressed to K. Michele Kacmar, Department of Management, College of Business, Florida State University, Tallahassee, Florida 32306-1110. E-mail: mkacmar@fsu.edu

exchanges supervisors have with subordinates in low-quality LMX relationships are more formal, including only those that would be expected under the normal employment contract (Liden et al., 1997).

Communication style between supervisors and subordinates has been found to differ in high- and low-quality LMX relationships. Fairhurst, Rogers, and Sarr (1987) found that LMX quality was negatively related to the level of dominance exhibited by supervisors when communicating with subordinates. Fairhurst (1993) later substantiated this conclusion with her finding that subordinates in high-quality LMX relationships use communication behaviors that reinforce affect and relationship building with their supervisors, whereas subordinates in low-quality LMX relationships use antagonistic and adversarial communication behaviors.

Fairhurst's (1993) findings provide some interesting insights into the expected communication patterns of high- and low-quality LMX subordinates. Because communication in low-quality LMX relationships can be confrontational and negative, it makes sense that more frequent interactions of this type will exacerbate problems in the relationship. From an LMX perspective, this line of reasoning suggests that communication frequency amplifies the quality of the LMX relationship. Supervisors experiencing negative communication patterns when interacting frequently with their low-quality LMX subordinates may have negative impressions of these subordinates and reduce the usefulness of performance-related information that they may share (Fairhurst, 1993). On the other hand, given the pleasant and positive interactions that occur with subordinates who have a high-quality LMX relationship (Fairhurst, 1993), it seems reasonable that frequent communication interactions would accentuate the positive relationship shared between the dyadic pairs and provide information that would help maximize the performance of these individuals.

Further, as antagonistic and adversarial communications can be negative and threatening, supervisors' reactions to subordinates in low-quality LMX relationships who use this style of communication will be more negative than will their reactions to subordinates in high-quality LMX relationships who use communications that reinforce affect and strengthen the relationship. These divergent patterns should become increasingly strong as low- and high-LMX subordinates interact more frequently with their supervisor. We reasoned that these reactions would influence the supervisors' performance ratings, thereby yielding an interactive effect. It is possible that frequent communication with subordinates in low-quality LMX relationships results in negative interaction experiences that reinforce the supervisor's decision to keep these individuals at a distance. The notion of selective retention suggests that people tend to remember salient stimuli that reinforce their existing attitudes and beliefs. When recalling interactions with low-quality LMX subordinates, negative interactions will likely come to mind when the supervisor is called on to appraise the subordinate's performance, thereby negatively influencing his or her performance ratings (DeNisi & Williams, 1988; Feldman, 1981). We envision the opposite result for subordinates in high-quality LMX relationships. The more frequently a subordinate in a high-quality LMX relationship communicates with his or her supervisor, the more reinforced the supervisor feels about the strong relationship that has been built. The positive interactions are remembered when the supervisor is called on to rate the subordinate, resulting in high-performance ratings. However, when supervisors and subor-

ordinates interact relatively infrequently, one might expect the quality of the relationship to have less of an impact.

*Hypothesis 1:* Communication frequency moderates the LMX quality–job-performance ratings relationship such that LMX quality is more strongly related to performance ratings among workers who interact frequently with the supervisor than among those who interact infrequently with the supervisor. Among those reporting frequent communication with the supervisor, subordinates in a high-quality LMX relationship receive higher performance ratings than do subordinates in a low-quality LMX relationship.

As our discussion above indicates, we view frequency of communication as distinct from relationship quality but believe these two factors likely work together to influence employee performance ratings. We hypothesized that communication frequency moderates the relationship between LMX quality and performance ratings. To test this notion, we conducted two empirical investigations. In Study 1, we explored the effect of communication frequency on the relationship between LMX quality, as rated by the subordinate, and performance, as rated by the supervisor. In Study 2, we provided a constructive replication (Lykken, 1968) of Study 1 by examining the same relationship while using slightly different measures in a new setting and sample.

## Study 1

### *Method*

#### *Procedure and Subjects*

All 310 employees of a distribution services organization were invited to participate in the study. They were divided into small groups and asked to report to a training room with their group according to a preset schedule. On arrival at the training room, the employees were informed about the study, provided a chance to ask questions, and given the opportunity to discontinue their involvement in the project. A total of 254 (81.9%) employees volunteered to participate in the study and completed the survey. Workers reporting to specific supervisors performed essentially identical roles requiring sorting, packaging, shipping, and lifting. The average supervisory span of control was 11.75. During the same week, the 19 first-line supervisors were asked to complete performance ratings of their subordinates; of these, 16 (84%) supervisors (of whom 15 were female, 1 was male, and 4 were minorities) returned completed performance rating forms. Pairing these performance ratings with the survey data provided complete data for 188 (60.6%) employees. Of these, 144 (77%) were female, 44 (23%) were male, and 119 (63.6%) were minorities. These data were one of the four samples used in Hochwarter, Witt, and Kacmar (2000); however, there were no overlapping relationships between these two studies.

#### *Measures*

*LMX.* We measured perceptions of relationship quality with 7 items ( $\alpha = .87$ ) developed by Scandura, Graen, and Novak (1986). The word "manager" replaced "supervisor." Items (e.g., "My manager understands my problems and needs") were responded to on a 7-point scale (1 = *strongly disagree* to 7 = *strongly agree*). Higher scores indicate higher quality relationships.

*Communication frequency.* To measure frequency of supervisor–subordinate communication, we used McAllister's (1995) four-item instrument ( $\alpha = .85$ ), but we substituted "your manager" for "this person." Items

Table 1  
Means, Standard Deviations, and Intercorrelations Among the Variables for Study 1

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Job-performance ratings	3.19	0.90	—							
2. LMX	5.22	1.50	.22**	—						
3. Communication frequency	3.57	1.40	.14*	.47**	—					
4. Sex dissimilarity	0.27	0.45	-.02	-.14*	.02	—				
5. Race dissimilarity	0.60	0.49	-.12*	-.04	-.04	.01	—			
6. Age dissimilarity	11.15	7.30	-.20*	-.13*	.06	-.05	.01	—		
7. Organizational tenure	3.72	4.30	.22**	-.01	.08	.06	-.09	-.11	—	
8. Time report	0.76	0.94	.11	.10	.03	-.07	-.17**	-.12*	.43**	—

Note. *N* = 188. LMX = leader-member exchange; Sex dissimilarity = Subordinate and supervisor of the same (0) or different (1) gender; Race dissimilarity = Subordinate and supervisor of the same (0) or different (1) race; Age dissimilarity = Absolute difference in age between subordinate and supervisor; Organizational tenure = Length of time in years subordinate has worked for the organization; Time report = Length of time in years that subordinate has been a direct report to the rating supervisor.

\*  $p < .05$ . \*\*  $p < .01$ .

(e.g., “How often do you and your manager talk about work?”) asked participants to describe the frequency of their work-related communication with their first-line supervisor on a 7-point scale: 1 = *once or twice in the last 6 months*, 2 = *once or twice every 1–3 months*, 3 = *once or twice every month*, 4 = *once or twice every week*, 5 = *3–5 times every week*, 6 = *once or twice every day*, and 7 = *many times daily*. Higher scores indicate perceptions of a higher frequency of communication.

**Job-performance ratings.** The supervisors completed five items (e.g., “[Employee name] takes the initiative to do what is needed”) assessing job performance ( $\alpha = .91$ ). Each worker was rated by his or her first-line supervisor using the following scale: (a) *weak or bottom 10%*, (b) *fair or next 20%*, (c) *good or next 40%*, (d) *very good or next 20%*, or (e) *best or top 10%*. These responses were scored as 1, 2, 3, 4, and 5, respectively.

**Control variables.** Demographic variables potentially could account for variance in job-performance ratings (Turban & Jones, 1988). We gathered data on age, Equal Employment Opportunity Commission (EEOC) category (converted into minority vs. nonminority categories), and gender for each subordinate from the archives of the organization. We then computed three variables that represented the demographic similarities or differences between the rating supervisor and subordinate (Turban & Jones, 1988; Wayne & Liden, 1995). The first indicated whether the supervisor and subordinate were the same (coded as 0) or different genders (coded as 1). The second indicated whether the supervisor and subordinate were in the same (coded as 0) or different EEOC groups (coded as 1). The third was the absolute difference in age between the subordinate and supervisor. We also collected organizational tenure for each subordinate from organizational archives. Finally, we asked supervisors to indicate how many years and months the subordinate had been a direct report to them (i.e., tenure with supervisor).

## Results

Descriptive statistics and correlations among the variables for cases with complete data are presented in Table 1. Consistent with previous research, LMX scores were significantly and positively related to job-performance ratings ( $r = .22$ ,  $p < .01$ ), indicating that subordinates in a high-quality LMX relationship received higher performance evaluations than subordinates in a low-quality LMX relationship.

We used hierarchical linear modeling (HLM) techniques (Bryk & Raudenbush, 1992; Hofmann, 1997) to assess the moderating effect of communication frequency on the relationship between LMX and job-performance ratings.<sup>1</sup> Because supervisors provided multiple ratings, there is the possibility of dependency in obser-

vations that could violate the assumption of independence in ordinary least squares estimation. This can be considered a level of analysis estimation problem in which subordinates (Level 1) are nested within supervisors (Level 2). HLM can appropriately test the interaction while modeling dependence due to supervisory effects. We employed the formulae provided by Bryk and Raudenbush (1992, p. 70) to compute the proportions of variance explained at the subordinate level (Level 1).

An appropriate analysis requires estimation of a series of HLM models (Hofmann, 1997). The first model included only an intercept, and results were equivalent to a one-way analysis of variance (ANOVA) of supervisory effects on performance ratings. The second model included the intercept and control variables. The third model added the main effects of LMX and communication frequency. The final model included the interaction between LMX and communication frequency. With the exception of the intercept term, the issue of random or fixed slopes across supervisors (Level 2) was not germane to our hypothesis tests because we were interested in modeling Level 1 variance. However, we examined results of the chi-square test for random effects to ensure proper specification of the HLM models. A random parameter is allowed to vary across supervisors, whereas a fixed parameter presumes that the parameter holds across supervisors (Kreft & De Leeuw, 1998). We report relevant significance tests from each analysis in the text below, but because of space considerations, Table 2 presents complete results for only the final model.

The results of the first HLM model indicate that the grand mean of performance ratings pooled across subordinates and supervisors was 3.21 ( $t = 24.6$ ,  $p < .01$ ). The within supervisor (or subordinate level) variance on performance ratings was .653, whereas the between-supervisor variance was .198. The chi-square test indicated that the between-supervisor variance was significant,  $\chi^2(15, N = 188) = 61.02$ ,  $p < .01$ . The intraclass correlation for perfor-

<sup>1</sup> HLM and mixed linear analyses each are designed to deal with possible nonindependence in data. We used both approaches to ensure that the findings would hold regardless of analytical technique. Results from both sets of analyses in Studies 1 and 2 were virtually identical, including parameter estimates. We report results from the HLM analysis because this technique is more widely known.

Table 2  
Hierarchical Linear Modeling Results for Study 1

Random effects	Variance component	df	$\chi^2(N = 188)$
Subordinates (Level 1)	.602		
Supervisors (Level 2)	.136	15	49.1**
Parameter estimates	b	t	
Intercept		3.73	6.61**
Control variables			
Sex dissimilarity	-0.06	< 1	
Race dissimilarity	-0.22	-1.73	
Age dissimilarity	-0.01	-1.47	
Organizational tenure	0.04	2.43*	
Time report	-0.06	< 1	
Leader-member exchange (LMX)	-0.09	< 1	
Communication frequency	-0.29	-1.75	
LMX $\times$ Communication Frequency	0.06	2.04*	

Note. The estimated equation for Level 1 is as follows: performance ratings<sub>ij</sub> =  $\beta_{0j}$  +  $\beta_{1j}$ (organizational tenure) +  $\beta_{2j}$ (time report) +  $\beta_{3j}$ (age dissimilarity) +  $\beta_{4j}$ (sex dissimilarity) +  $\beta_{5j}$ (race dissimilarity) +  $\beta_{6j}$ (LMX) +  $\beta_{7j}$ (communication frequency) +  $\beta_{8j}$ (LMX  $\times$  Communication Frequency) +  $r_{ij}$ . The estimated equations for Level 2 are as follows:  $\beta_{0j} = \gamma_{00} + u_{0j}$ ;  $\beta_{1j} = \gamma_{10}$ ;  $\beta_{2j} = \gamma_{20}$ ;  $\beta_{3j} = \gamma_{30}$ ;  $\beta_{4j} = \gamma_{40}$ ;  $\beta_{5j} = \gamma_{50}$ ;  $\beta_{6j} = \gamma_{60}$ ;  $\beta_{7j} = \gamma_{70}$ ; and  $\beta_{8j} = \gamma_{80}$ . Sex dissimilarity = Subordinate and supervisor of the same (0) or different (1) gender; Race dissimilarity = Subordinate and supervisor of the same (0) or different (1) race; Age dissimilarity = Absolute difference in age between subordinate and supervisor; Organizational tenure = Length of time in years subordinate has worked for the organization; Time report = Length of time in years the subordinate has been a direct report of the rating supervisor.  
\*  $p < .05$ . \*\*  $p < .01$ .

mance ratings was .232, indicating that approximately 23% of the variance existed between supervisors.

After accounting for supervisory effects, the control variables explained 3.9% of the variance in subordinate-level performance ratings. After significance tests of random parameters, we treated slopes as fixed. This decision had no effect on conclusions of significance tests. Results indicated that only the effect of organizational tenure was significant. Longer term employees received higher performance ratings than shorter term employees ( $\gamma_{tenure} = .037$ ,  $t = 2.39$ ,  $p < .05$ ).

The next model added the main effects of LMX and communication frequency. The addition of these two variables explained an additional 2.2% of the variance in subordinate performance ratings. We tested the slopes for the two main effects as random effects. Neither was significant; therefore, we treated them as fixed. The main effect of LMX approached significance ( $\gamma_{LMX} = .090$ ,  $t = 1.92$ ,  $p < .10$ ), but the main effect for frequency of supervisor-subordinate communications did not ( $\gamma_{FreqComm} = .033$ ,  $t = 0.67$ ,  $p > .50$ ).

The final model, which is presented in Table 2, included the LMX  $\times$  Communication Frequency cross-product term. The addition of this variable explained an incremental 1.7% of the variance in job-performance ratings after accounting for supervisory effects, control variables, and main effects ( $\gamma_{LMX \times Comm} = .058$ ,  $t = 2.04$ ,  $p < .05$ ). We tested the slope for the interaction term as

a random effect. Because it was not significant, we treated it as a fixed effect.

The  $\Delta R^2$  produced by our interaction term is within the typical range (i.e.,  $\Delta R^2 = .01$  to  $.03$ ) for moderator effects in nonexperimental studies (Champoux & Peters, 1987; Chaplin, 1991) and indicates that the impact of LMX on job-performance ratings varied as a function of communication frequency. To understand the form of the interaction, we first substituted higher level equations into lower level equations and solved to obtain a single equation for performance ratings (Bryk & Raudenbush, 1992, p. 14; Hox, 2000). Next, we plotted the performance scores at high (1 SD), mean, and low levels (-1 SD) of LMX and communication frequency (Aiken & West, 1991; Stone & Hollenbeck, 1989).

Figure 1 provides a graphic depiction of the interaction. Consistent with our suggestion that communication frequency acts as an amplifier of the quality of the LMX relationship, Figure 1 reveals that LMX was most strongly related to job-performance ratings among individuals reporting frequent communication with the supervisor. Among workers reporting relatively infrequent communication with the supervisor, LMX was very weakly related to job-performance ratings. At low levels of LMX, workers reporting infrequent communication with the supervisor received the most unfavorable job-performance ratings, and workers reporting frequent communication with the supervisor received the most unfavorable ratings. At high levels of LMX, workers reporting frequent communication with the supervisor received the most favorable job-performance ratings and workers reporting infrequent communication with the supervisor received the most unfavorable ratings.

### Discussion

As hypothesized, frequency of communication with one's supervisor moderated the LMX quality-job-performance ratings relationship. Performance ratings for subordinates in high-quality LMX relationships increased the more they interacted with their

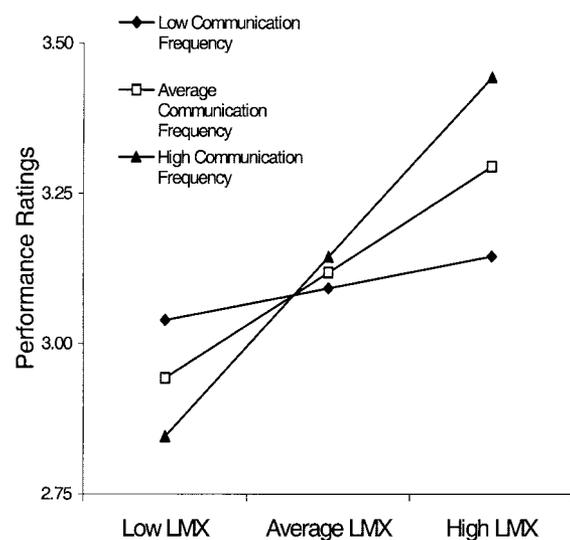


Figure 1. Study 1—Moderating effect of communication frequency on the relationship between leader-member exchange (LMX) and performance ratings.

Table 3  
Means, Standard Deviations, and Intercorrelations Among the Variables for Study 2

Variable	<i>M</i>	<i>SD</i>	1	2	3	4	5	6	7	8
1. Job-performance ratings	5.19	1.00	—							
2. LMX	5.22	1.39	.32**	—						
3. Communication frequency	1.93	0.83	-.03	.10	—					
4. Sex dissimilarity	0.50	0.50	-.10	-.12	.03	—				
5. Race dissimilarity	0.23	0.42	.15	.09	-.08	-.02	—			
6. Age dissimilarity	11.58	9.41	-.01	-.02	-.20*	.05	-.04	—		
7. Organizational tenure	7.28	6.41	.02	.02	.10	-.03	-.08	.01	—	
8. Time report	2.89	2.51	.00	-.14	.08	.02	-.18*	.08	.30**	—

Note. *N* = 153. LMX = leader-member exchange; Sex dissimilarity = Subordinate and supervisor of the same (0) or different (1) gender; Race dissimilarity = Subordinate and supervisor of the same (0) or different (1) race; Age dissimilarity = Absolute difference in age between subordinate and supervisor; Organizational tenure = Length of time in years subordinate has worked for the organization; Time report = Length of time in years that subordinate has been a direct report to the rating supervisor.

\**p* < .05. \*\**p* < .01.

supervisor, whereas performance ratings for subordinates in low-quality LMX relationships decreased the more frequently they interacted with their supervisor. In other words, when subordinates communicate infrequently with their supervisors, the quality of the LMX relationship has limited influence on performance ratings. However, when subordinates interact frequently with supervisors, it behooves them to ensure they share a high-quality relationship. Thus, communication frequency acted as an amplifier of the LMX quality-job-performance ratings relationship. These results suggest that communication frequency is distinguishable from the construct of LMX.

The generalizability of findings may be influenced by such study characteristics as the measures employed, the organizational context, and sample characteristics of the supervisor-subordinate dyads. Moreover, Golding (1975) emphasized the importance of replicating interactions. Therefore, we conducted a second study designed to provide a constructive replication of these findings.

## Study 2

### Method

#### Procedure and Subjects

All 65 managers in a division of a state government tax collection agency agreed to participate. A response from at least one subordinate had to be received to be included in the final sample. Under this restriction, 6 managers were eliminated, and data from a total of 59 (91%) managers were included in our analyses. The gender composition of the sample included 37 (63%) males and 22 (37%) females. The average age was 42 years (*SD* = 9.6 years). The positions they held represented all managerial levels. The racial distribution of the sample consisted of 39 (66.1%) Caucasians, 12 (20.3%) African Americans, 6 (10.3%) Hispanics, and 2 (3.3%) Asians. Because all of the subordinates reporting to a specific supervisor performed the same roles, the supervisors, in essence, directed a small team of employees (average span of control was 6.7).

Managers who participated in this study completed a two-page survey on five of their direct-report subordinates. They were asked to label each form with the subordinate's name prior to completion as a means of focusing their attention on each specific individual. Once the managers' completed surveys were returned, we mailed each subordinate a survey to complete. The return envelope was coded so that we could match the returned subordinate survey with the corresponding survey from the supervisor. The cover letter included with the subordinate survey indicated that the respon-

dent's supervisor, who was named in the letter, had identified him or her as a potential volunteer.

Of the 325 subordinates who received a survey, 203 (62%) returned them with usable data. Of those who indicated their gender, 102 (50%) were male and 95 (47%) were female. The average age was 46 years (range 24–66, *SD* = 10.25). There were a total of 148 (73%) Caucasians in the sample, 29 (14%) African Americans, 15 (7%) Hispanics, 2 (1%) Asians, and 9 (5%) respondents who identified themselves as "other."

### Measures

**LMX.** We used the same 7-item ( $\alpha = .83$ ) LMX scale (Scandura et al., 1986) used in Study 1 to measure the subordinates' perceptions of the quality of the relationship they had with their supervisors. Higher scores (1 = *strongly disagree* and 7 = *strongly agree*) indicate higher quality relationships.

**Communication frequency.** We measured frequency of communication with eight items ( $\alpha = .84$ ) developed for this study. The items and measurement scale are provided in the Appendix. Higher scores indicate perceptions of higher communication frequency with the supervisor.

**Job-performance ratings.**<sup>2</sup> Supervisors rated the performance level for each of their subordinates. A total of 5 items ( $\alpha = .91$ ) from Wayne and Liden (1995) were used. A sample item was "What is your personal view of your subordinate's performance in terms of overall effectiveness?" Each rating scale for these questions was unique so that it would correspond to the question asked, but all were anchored on the high end with the most positive description (e.g., very effective). Thus, higher scores indicate stronger performance ratings.

**Control variables.** We used the same control variables as in Study 1—gender, age, and minority status differences between supervisors and subordinates, organizational tenure, and tenure with the supervisor.

### Results

We report the results of the 153 cases with complete data for both supervisors and subordinates. We ran the same analyses for Study 2 as in Study 1. The means, standard deviations, and correlations among the variables examined in Study 2 are presented in Table 3. The HLM results are shown in Table 4. Turning

<sup>2</sup> We were unable to use the performance measure from Study 1 because the items that composed the scale were specifically designed for the jobs held by the respondents in Sample 1. Instead, we used an existing and more generic performance measure.

Table 4  
Hierarchical Linear Modeling Results for Study 2

Random effects	Variance component	df	$\chi^2(N = 153)$
Subordinates (Level 1)	.681		
Supervisors (Level 2)	.202	56	93.6**
Parameter estimates	b	t	
Intercept	5.32	7.73**	
Control variables			
Sex dissimilarity	-0.19	-1.28	
Race dissimilarity	0.34	1.88	
Age dissimilarity	-0.01	< 1	
Organizational tenure	-0.01	< 1	
Time report	0.04	1.21	
Leader-member exchange (LMX)	-0.01	< 1	
Communication frequency	-0.76	-2.19*	
LMX $\times$ Communication Frequency	0.14	2.03*	

Note. The estimated equation for Level 1 is as follows: performance ratings<sub>ij</sub> =  $\beta_{0j}$  +  $\beta_{1j}$ (organizational tenure) +  $\beta_{2j}$ (time report) +  $\beta_{3j}$ (age dissimilarity) +  $\beta_{4j}$ (sex dissimilarity) +  $\beta_{5j}$ (race dissimilarity) +  $\beta_{6j}$ (LMX) +  $\beta_{7j}$ (communication frequency) +  $\beta_{8j}$ (LMX  $\times$  Communication Frequency) +  $r_{ij}$ . The estimated equations for Level 2 are as follows:  $\beta_{0j} = \gamma_{00} + u_{0j}$ ;  $\beta_{1j} = \gamma_{10}$ ;  $\beta_{2j} = \gamma_{20}$ ;  $\beta_{3j} = \gamma_{30}$ ;  $\beta_{4j} = \gamma_{40}$ ;  $\beta_{5j} = \gamma_{50}$ ;  $\beta_{6j} = \gamma_{60}$ ;  $\beta_{7j} = \gamma_{70}$ ; and  $\beta_{8j} = \gamma_{80}$ . Sex dissimilarity = Subordinate and supervisor of the same (0) or different (1) gender; Race dissimilarity = Subordinate and supervisor of the same (0) or different (1) race; Age dissimilarity = Absolute difference in age between subordinate and supervisor; Organizational tenure = Length of time in years subordinate has worked for the organization; Time report = Length of time in years the subordinate has been a direct report of the rating supervisor.

\*  $p < .05$ . \*\*  $p < .01$ .

first to Table 3, as expected, LMX quality judged by the subordinate was positively related to the supervisor's ratings of the subordinates' performance ( $r = .32, p < .01$ ).

The first HLM model included only an intercept term. The grand mean of performance ratings pooled across subordinates and supervisors was 5.20 ( $t = 53.4, p < .01$ ). The within-supervisor (or subordinate level) variance on performance ratings was .766, whereas the between-supervisor variance was .234. The chi-square test indicated that the between-supervisor variance was significant,  $\chi^2(56, N = 153) = 99.66, p < .01$ . Consistent with Study 1, the intraclass correlation for performance ratings was .234, indicating that approximately 23% of the variance existed between supervisors. After accounting for supervisory effects, the control variables explained 4.1% of the variance in subordinate performance ratings. After significance testing, slopes for the control variables were treated as fixed. None of the control variables were significant.

The addition of LMX and communication frequency explained an additional 8.4% of the variance in subordinate level performance ratings. After testing, we treated the slopes for LMX and communication frequency as fixed effects. Consistent with Study 1, the main effect of LMX was significant ( $\gamma_{LMX} = .232, t = 3.94, p < .01$ ), but the main effect for frequency of supervisor-subordinate communications was not ( $\gamma_{FreqComm} = -.089, t = -.91, p > .35$ ).

The final model, presented in Table 4, included the LMX  $\times$  Communication Frequency cross-product term. The addition of

this variable explained an additional 1.4% of the variance in job-performance ratings ( $\gamma_{LMX \times Comm} = .135, t = 2.03, p < .05$ ). After testing, we treated the slope for the interaction term as fixed. As in Study 1, we substituted higher level equations into lower level equations and plotted the performance scores at high (1 SD), mean, and low levels ( $-1 SD$ ) of LMX and communication frequency.

The graphical depiction of the interaction shown in Figure 2 is quite similar to Figure 1, indicating a clear replication of the interactive effect of LMX and communication frequency on supervisor-rated performance. As in Study 1, Figure 2 reveals that LMX was most strongly related to job-performance ratings among individuals reporting frequent communication with the supervisor. These results replicate our findings from Study 1 and support our contention that communication frequency acts as an amplifier of the quality of the LMX relationship.

### Discussion

Consistent with the findings presented in Study 1, results from Study 2 illustrate that communication frequency acted as a moderator of the LMX quality-job-performance ratings relationship. As both figures depict, frequently communicating subordinates in a high-quality LMX relationship received higher performance ratings than did subordinates in a low-quality LMX relationship who frequently communicated with their supervisors.

One possible explanation for these findings can be found in the information processing literature. Because supervisors often have multiple subordinates reporting to them, it is virtually impossible to specifically remember every interaction they have with each. Instead, only critical incidents will be stored in memory and recalled when asked to evaluate their subordinates (DeNisi & Williams, 1988; Feldman, 1981). If the incidents recalled are mostly negative interactions, poor performance ratings are a likely

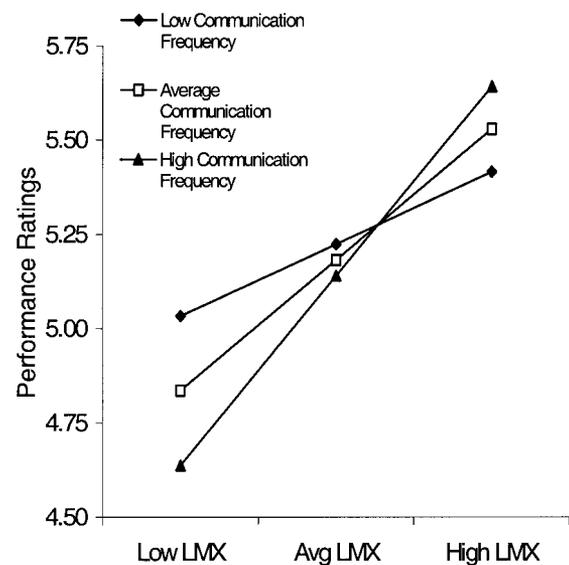


Figure 2. Study 2—Moderating effect of communication frequency on the relationship between leader-member exchange (LMX) and performance ratings. Avg = average.

result. This tendency will most probably be the case for subordinates in low-quality LMX relationships who interact frequently with their supervisor because their communications are likely to be negative (Fairhurst, 1993). Thus, it makes sense that performance ratings given to subordinates in a low-quality LMX relationship who frequently interact with their supervisor will not be positive. In contrast, managers who recall their frequent interactions with subordinates in high-quality LMX relationships are more likely to provide positive ratings because they recall generally positive interactions (Liden & Graen, 1980).

Although our explanation is plausible, it cannot be empirically confirmed by the present studies. Thus, in an effort to confirm this possible explanation and because of at least three limitations in the current study, future research in this area is needed. First, to determine whether the interaction between high-quality LMX subordinates and supervisors were positive and supportive, whereas the interactions between low-quality LMX subordinates and supervisors were negative and confrontational, the actual content of the exchanges needs to be examined. Although our studies were not designed to collect this information, future studies could be designed as such. For example, following in the footsteps of Fairhurst (1993), exchanges between supervisors and subordinates could be audio- or videotaped, and could be content analyzed for meaning and tone. Alternatively, researchers could select an environment, such as a virtual or telecommuting office in which supervisors and subordinates communicate almost exclusively by electronic means. Such a setting would provide a built-in, nonintrusive mechanism for capturing interactions between supervisors and subordinates. Although a virtual work environment would supply an exceptional stage for studying supervisor-subordinate interactions, it also introduces complications (Bell & Kozlowski, 2002). As Bailey and Kurland (2002) suggested, one way to explore these complications is by incorporating existing organizational theories. One theory that has shown promise in understanding virtual communication is the channel expansion theory (CET; Carlson & Zmud, 1999). Thus, future researchers should consider the explanatory power of CET and other existing theories as they move forward in this area of research.

A second limitation in the current studies is that the dynamic and reciprocal nature of the LMX-communication frequency relationship was not fully explored. To do this would have required longitudinal data, something the current studies lacked. However, because the LMX relationship is based on an exchange perspective (Liden et al., 1997) and because research has found that feedback offered by one's communication partner influences how and what is said in current and future interactions (Watzlawick, Beavin, & Jackson, 1967), this would be an important extension for future researchers to consider incorporating into their research designs. Although Wayne and Liden (1995) laid the groundwork for longitudinally studying LMX, their approach would need to be expanded to incorporate more than newly forming dyads and modified to capture actual interactions. One way to accomplish this would be to gather LMX ratings from both the supervisors and subordinates as well as interactions between them at various points in time. As LMX theory suggests, over time the LMX ratings should become fairly constant, allowing for relationship quality to be established. Similarly, stable communication patterns should emerge over time. Once these patterns have been established, the dynamic and reciprocal nature of the LMX-communication fre-

quency relationship should be uncovered. On a related point, we cannot be sure that the direction of causality in our study has been properly specified. However, it should be noted that it is unlikely that we reversed the causality because interactions do not appear the same when the dependent variable is reversed with one of the moderators (Landis & Dunlap, 2000).

A third limitation of the current study—that we were unable to fully explain the underlying mechanism for why the performance ratings changed—also has the potential to stimulate important follow-up research efforts. It is possible that individuals in the high communication category received important feedback about their performance that allowed them to modify their behavior and actually enhance their performance. That is, it is possible that performance ratings increased because actual performance changed. It also might be possible that supervisors who communicated more frequently with their subordinates simply had more information to use when creating their performance rating. Under this scenario, actual performance did not change, only the exposure of the supervisor to performance indicators offered by their subordinates. To determine which, if either, of these explanations is valid, future studies will need to incorporate additional variables. First, multiple performance indicators, preferably objective ones, will be needed to determine the accuracy of the supervisors' ratings. It also will be important to determine whether the subordinates received performance enhancing feedback from their supervisors. Once again, this will require collecting and analyzing the content of the exchanges between supervisors and subordinates.

In summary, results from the present studies extend previous research by demonstrating that the importance of LMX depends on how frequently supervisors and subordinates interact. LMX is most potent when interactions are frequent, whereas LMX has substantially less effect when interactions are infrequent. Thus, one of the key contributions that these studies offer is the illumination of a new path for future empirical research and theoretical development to follow in the area of LMX—the integration of communication content and patterns with LMX theory.

## References

- Aiken, L., & West, S. (1991). *Multiple-regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.
- Andrews, M. C., & Kacmar, K. M. (2001). Confirmation and extension of the sources of feedback scale in service-based organizations. *The Journal of Business Communication, 38*, 206–226.
- Bailey, D. E., & Kurland, N. B. (2002). A review of telework research: Findings, new directions and lessons for the study of modern work. *Journal of Organizational Behavior, 23*, 383–400.
- Bell, B. S., & Kozlowski, S. J. (2002). A typology of virtual teams: Implications for effective leadership. *Group & Organization Management, 27*, 14–49.
- Bryk, A. S., & Raudenbush, S. W. (1992). *Hierarchical linear models: Applications and data analysis methods*. Newbury Park, CA: Sage.
- Carlson, J. R., & Zmud, R. W. (1999). Channel expansion theory and the experiential nature of media richness perceptions. *Academy of Management Journal, 42*, 153–171.
- Champoux, J. E., & Peters, W. S. (1987). Form, effect size, and power in moderated regression analysis. *Journal of Occupational Psychology, 60*, 243–255.
- Chaplin, W. F. (1991). The next generation of moderator research in personality psychology. *Journal of Personality, 59*, 143–178.

- Dansereau, F., Graen, G. B., & Haga, W. J. (1975). A vertical dyad approach to leadership within formal organizations. *Organizational Behavior and Human Performance*, 13, 46–78.
- DeNisi, A. S., & Williams, K. J. (1988). Cognitive approaches to performance appraisal. In G. R. Ferris & K. M. Rowland (Eds.), *Research in personnel and human resources management* (Vol. 6, pp. 109–156). Greenwich, CT: JAI Press.
- Dienesch, R. M., & Liden, R. C. (1986). Leader–member exchange model of leadership: A critique and further development. *Academy of Management Review*, 11, 618–634.
- Fairhurst, G. T. (1993). The leader–member exchange patterns of women leaders in industry: A discourse analysis. *Communication Monographs*, 60, 321–351.
- Fairhurst, G. T., Rogers, L. E., & Sarr, R. A. (1987). Social structure in leader–member interactions: Manager–subordinate control patterns and judgments about the relationship. *Communication Yearbook*, 10, 395–415.
- Feldman, J. M. (1981). Beyond attribution: Cognitive processes in performance appraisal. *Journal of Applied Psychology*, 66, 127–148.
- Ganster, D., & Schaubroeck, J. (1991). Work stress and employee health. *Journal of Management*, 17, 235–271.
- Golding, S. L. (1975). Flies in the ointment: Methodological problems in the analysis of the percentage of variance due to persons and situations. *Psychological Bulletin*, 82, 278–288.
- Graen, G. B. (1976). Role-making processes within complex organizations. In M. D. Dunnette (Ed.), *Handbook of industrial and organizational psychology* (pp. 1201–1245). Chicago: Rand McNally.
- Graen, G. B., & Scandura, T. A. (1987). Toward a psychology of dyadic organizing. In L. L. Cummings & B. M. Staw (Eds.), *Research in organizational behavior* (Vol. 9, pp. 175–208). Greenwich, CT: JAI Press.
- Hochwarter, W. A., Witt, L. A., & Kacmar, M. K. (2000). Perceptions of organizational politics as a moderator of the relationship between conscientiousness and job performance. *Journal of Applied Psychology*, 85, 472–478.
- Hofmann, D. A. (1997). An overview of the logic and rationale of hierarchical linear models. *Journal of Management*, 23, 723–744.
- Hox, J. J. (2000). Multilevel analyses of grouped and longitudinal data. In T. D. Little, K. U. Schnabel, & J. Baumert (Eds.), *Modeling longitudinal and multilevel data* (pp. 15–32). Mahwah, NJ: Erlbaum.
- Kreft, I., & De Leeuw, J. (1998). *Introducing multilevel modeling*. Thousand Oaks, CA: Sage.
- Landis, R. S., & Dunlap, W. P. (2000). Moderated multiple regression tests are criterion specific. *Organizational Research Methods*, 3, 254–266.
- Liden, R. C., & Graen, G. B. (1980). Generalizability of the vertical dyad linkage model of leadership. *Academy of Management Journal*, 23, 451–465.
- Liden, R. C., Sparrowe, R. T., & Wayne, S. J. (1997). Leader–member exchange theory: The past and potential for the future. In G. R. Ferris (Ed.), *Research in personnel and human resources management* (Vol. 15, pp. 47–119). Greenwich, CT: JAI Press.
- Lind, M. R., & Zmud, R. W. (1991). The influence of a convergence in understanding between technology providers and users on information technology innovativeness. *Organization Science*, 2, 195–217.
- Lind, M. R., & Zmud, R. W. (1995). Improving interorganizational effectiveness through voice mail facilitation of peer-to-peer relationships. *Organization Science*, 6, 445–461.
- Lykken, D. T. (1968). Statistical significance in psychological research. *Psychological Bulletin*, 70, 151–159.
- McAllister, D. J. (1995). Affect- and cognition-based trust as foundations for interpersonal cooperation in organizations. *Academy of Management Journal*, 38, 24–59.
- Scandura, T. A., Graen, G. B., & Novak, M. A. (1986). When managers decide not to decide autocratically: An investigation of leader–member exchange and decision influence. *Journal of Applied Psychology*, 71, 579–585.
- Schaubroeck, J., & Merrit, D. E. (1997). Divergent effects of job control on coping with work stressors: The key role of self-efficacy. *Academy of Management Journal*, 39, 292–339.
- Stone, E. F., & Hollenbeck, J. R. (1989). Clarifying some controversial issues surrounding statistical procedures for detecting moderator variables: Empirical evidence and related evidence. *Journal of Applied Psychology*, 74, 3–10.
- Turban, D. B., & Jones, A. P. (1988). Supervisor–subordinate similarity: Types, effects, and mechanisms. *Journal of Applied Psychology*, 73, 228–234.
- Watzlawick, P., Beavin, J. H., & Jackson, D. D. (1967). *Pragmatics of human communication*. New York: W. W. Norton.
- Wayne, S. J., & Liden, R. C. (1995). Effects of impression management on performance ratings: A longitudinal study. *Academy of Management Journal*, 38, 232–260.

(Appendix follows)

## Appendix

Study 2 Communication Frequency Measure

---

## Response anchors

1. Less than once a month
2. Once or twice a month
3. Once or twice a week
4. Once a day
5. More than once a day

## Items

How frequently do you:

1. Write memos to your boss?
  2. Receive memos from your boss?
  3. Initiate face-to-face conversations with your boss?
  4. Have face-to-face conversations with your boss that were initiated by him or her?
  5. Send your boss an electronic mail message?
  6. Receive an electronic mail message from your boss?
  7. Call your boss on the phone?
  8. Receive phone calls from your boss?
- 

Received February 21, 2002  
Revision received October 24, 2002  
Accepted January 3, 2003 ■