Science Research Group Leader's Power and Members' Compliance and Satisfaction with Supervision

Yi Meng, Jia He, and Changkun Luo

Third Military Medical University

ABSTRACT

This study investigated the correlations between science research group members' perceptions of power bases used by their group(lab, team) leader (coercive, reward, legitimate, expert and referent) and the effect of those perceptions on group members' attitudinal compliance, behavioral compliance, and satisfaction with supervision. Participants were postdoctoral and Ph.D. students at a research institution in the UK that is a world leader in its fields. Three questionnaires, including the Rahim Leader Power Inventory (RLPI), the Compliance with Supervisor's Wishes (CSW), and the satisfaction with supervision facet of the Job Descriptive Index (JDI), were used. The results of statistical descriptive analysis indicated that group members perceived expert power used by the leader as the greatest among five power bases; while the results of the multiple regression analysis indicated legitimate power and expert power were positively related to attitudinal compliance; legitimate power, coercive power and expert power had positive correlations with group members' behavioral compliance; and referent power, reward power, and expert power were positively associated with group members' satisfaction with supervision. Based on the findings, this study offers recommendations for the effective exercising of power in research groups and draws implications for advancing administration in science institutions.

INTRODUCTION

"Leadership is a process whereby an individual influences other individuals to achieve a common goal in a group or an organization" (Northouse, 2010, p. 3). The essence of leadership is influence over followers; the role of power in leadership is to act as an engine of influence (Bass & Bass, 2008). However, no research has been conducted on the power-influence processes underlying the relationship between power and effective

leadership; as Pfeffer (1981) pointed out, power has been neglected in management studies. While Yukl (1989) stated that some studies on the power-influence approach attempted to explain leadership effectiveness in terms of the degree of power possessed by a leader, types of power, and how power is exercised, Gordon and Yukl (2004) concluded that the answer remains elusive despite the countless studies carried out to identify effective leadership over the past half-century. People have lost interest in the topic of power because of the flat organizational structure and empowerment popular in today's worls. Nevertheless, power still exists in flattening organizations and empowerment still involves sharing power with others. As always, understanding power is significant for understanding organizational behavior and leadership effectiveness (Benfari, Wilkinson, & Orth, 1986; Pfeffer, 1981; Rahim, 1989; Yukl & Falbe, 1991).

. . . understanding power is significant for understanding organizational behavior and leadership effectiveness . . . .

Earlier research (Rahim, 1989; Rahim & Afza, 1993; Rahim, Antonioni, Krumov, & Ilieva, 2000; Rahim & Buntzman, 1989; Rahim, Kim, & Kim, 1994; Student, 1968; Yagil, 2002) on leader power mainly focused on business and political organizations, and seldom on the area of education, health, and other public service organizations, and even more rarely on science research institutions. Nevertheless, science research organizations contribute not only to human progress but also directly to the national economy. Research groups are the basic units of research institutions, where great inventions and discoveries are made. The performance-related outcomes desired by a leader for research groups include infinite commitment and satisfaction by group members. Thus, leaders should be aware of multiple sources of power in work situations and how they affect the attitudes of group members.

The aim of this study was to clarify correlations between research group members' perceptions of the power bases used by their leader and the effect of those perceptions on group members' compliance and satisfaction with supervision. The framework for this study is shown in Figure 1. The five power bases of French and Raven (1959)—reward power, coercive power, legitimate power, referent power, and expert power—were defined as independent variables of the correlation, while members'

attitudinal compliance, behavioral compliance and satisfaction with supervision were dependent variables. This study attempted to supply the missing link in leadership effectiveness research; draw implications for administrators in building and maintaining an advanced institution for science research; and give recommendations for effective leadership practice in research groups. The specific objective was to obtain answers to the following questions:

1. How do science research group members perceive their group leader's use of coercive power, reward power, legitimate power, expert power, and referent power?
2. What is the correlation between science research group members' perceptions of leader power bases and group members' attitudinal compliance, behavioral compliance and satisfaction with supervision?

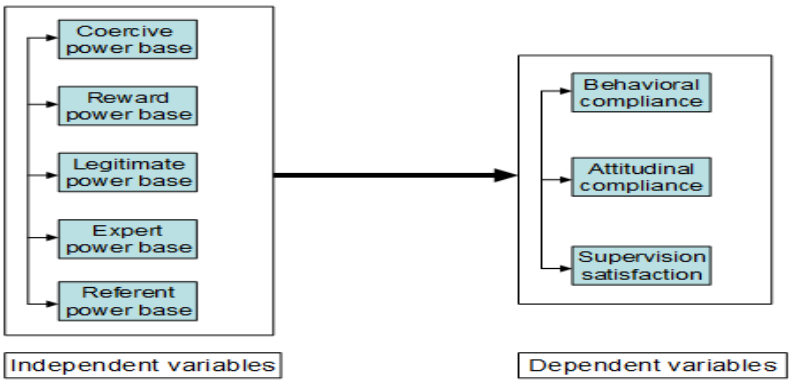

Figure 1. Leaders' Power Bases and Group Members' Compliance and Satisfaction

LITERATURE REVIEW

Power and Power Bases

Power is an intangible force in an organisation (Daft, 1999). However, the phenomenon of power is pervasive in all groups and organizations; yet the concept of power is so complex that each one of us probably thinks about it a little differently. From among numerous definitions, two are more popular. The first defines power as a force (Bass & Bass, 2008; Pfeffer, 1981). The second defines power as a capacity (Greiner & Schein, 1988; Rahim, 1989). Nevertheless, "all definitions seem to be concerned with the exercise of social influence to fill some need or meet some goal" (Greiner & Schein, 1988, p. 13). In this study, the term power was defined as the capability of an individual agent to influence the behavior or attitudes of one or more designated target persons

(Rahim, 1988). This definition implies that this study on power was limited to the influence of one individual (group leader) over other individuals (group members).

. . . the phenomena of power are pervasive in all groups and organizations; yet the concept of power is so complex that each one of us probably thinks about it a little differently.

Where does the capability of one person to influence another one come from? In other words, where does power come from? Power bases have been conceptualized in a variety of ways by scholars. French and Raven (1959) presented a power bases taxonomy: legitimate power, reward power, coercive power, exert power, and referent power. Benfari, Wilkinson, and Orth (1986) added three more power bases to French and Raven's: information power, affiliation power, and group power. Another way to conceptualize power bases is a simple two-factor taxonomy of position power versus personal power developed by Bass in 1960 (Bass & Bass, 2008). Power can derive from one's personal or social position. The findings of Student (1968) indicated a qualitative distinction between referent power and expert power (personal power) on the one hand, and reward power, coercive power and legitimate power (position power) on the other. Such findings supported Bass's categories. According to Yukl and Falbe (1991), these two types of power are relatively independent and each includes several distinct but partially overlapping components. Moreover, they extend the number of power sources within three broad categories: information power, persuasiveness, and charisma. However, "some problems in overlap within two pairs of scales need to be resolved" (Yukl & Falbe, 1991, p. 442). Gaski (1986) also pointed out that these alleged power sources appear to have already been captured within the French and Raven framework.

So far, the power bases suggested by French and Raven seem to be fairly representative and popular in application. Earlier studies (Hinson & Schriesheim, 1989; Podsakoff & Schriesheim, 1985; Rahim, 1989) provided empirical evidence of this framework. Hence, this study employed the power bases described by French and Raven. Admittedly, legitimate power, reward power, and coercive power derived from leaders' position are called position power; while expert and referent power from a leader's own training, experience, and personal qualities are called

personal power (Rahim, 1988; Rahim, Kim, & Kim, 1959). The definitions of these power bases by French and Raven (1959) are provided below:

1. Reward power is based on the perceptions of subordinates that a superior can reward for desired behavior.
2. Coercive power is based on subordinates' perceptions that a superior has the ability to punish them if they fail to conform to his or her influence attempt.
3. Legitimate power is based on the belief of subordinates that a superior has the right to prescribe and control their behavior.
4. Expert power is based on subordinates' belief that a superior has job experience and special knowledge or expertise in a given area.
5. Referent power is based on subordinates' desires to identify with a superior because of their admiration or personal liking of the superior.

Outcomes of Power

Burke and Wilcox (1971) stated that people will ask two interrelated questions when the relationship between a supervisor and a subordinate is discussed in terms of influence and control. One is why people in organizations comply with the requests of their supervisors; the other is about the various reasons for subordinates' job satisfaction and job performance. The principal reasons for the use of leader power are to gain compliance from followers and keep them satisfied with supervision (Rahim et al., 1994).

Job satisfaction is an attitude that individuals maintain about their jobs, developed from their perceptions of job characteristics (Robbins & Judge, 2010). Smith, Kendall, and Hulin (1969) described five areas of satisfaction: the work itself, the co-workers, the pay, the supervision, and the promotion opportunities. One facet of job satisfaction, satisfaction with supervision, was used to identify the superior-subordinate relationships in this study. Satisfaction with the leader is a function of team performance (Jernigan & Beggs, 2005). Early studies (Busch, 1980; Rahim, 1989; Rahim & Afza, 1993; Rahim & Buntzman, 1989; Skinner, Dunbinsky, & Donnelly, Jr., 1984; Yagil, 2002) illustrate that expert power and referent power are positively correlated with followers' satisfaction with supervision; the relationship between coercive power and satisfaction with supervision is negative; the relationship between legitimate power and reward power with satisfaction are inconsistent.

"Compliance implies acceptance of

the more powerful person's influence" (Bass & Bass, 2008, p. 263). In reality, the three distinct outcomes of the exercise of power for target persons are commitment, compliance, and resistance. Commitment is usually the most successful outcome from the agent's perspective with regard to carrying out a complex and difficult task; compliance is necessary to accomplish a simple and routine task; the result of resistance is the agent that may not perform any task (Yukl, 2010). Early studies (Rahim, 1988, 1989; Rahim & Afza, 1993; Rahim et al., 1994) based on French and Raven's power typology frequently touched upon followers' compliance with a superior's wishes and effectiveness in relation to the supervisor's particular power bases. They found that legitimate, expert and referent power bases generally induce compliance from followers, while coercive and reward power bases are weak reasons for compliance. More specifically, referent power is positively correlated with behavioral and attitudinal compliance; expert power to attitudinal compliance is significantly positive; and legitimate power influences behavioral compliance.

METHOD

Samples

The research site was a UK-based world-leading research institution. By the time the survey was conducted, there were over 400 scientists and support staff at this institution. Participants were postdoctoral and Ph.D. students who directly carried out research in 61 groups. Based on institution records, simple random sampling led to the selection of 150 (n) samples from 281(N) group members from the 61groups attached to 4 divisions. A total of 150 questionnaires were distributed; 97 were actually received by participants; 86 group members had responded; and 84 questionnaires were usable, for a response rate of 86.59%. The average age of the participants was 31.98(S.D=8.74) and 68.21% were male. Of 86 respondents, 47.64% were postdoctoral students and 52.46% were Ph.D. students; these reported an average dyadic tenure (years worked with research group leaders) of 2.74 years (S.D=3.52).

The insertion of each questionnaire into the pigeon hole mail rack at the research site was the only permissible way to distribute it. A total of 53 questionnaires were still in pigeon holes two weeks after 150 packages were sent out. High group member

turnover at the research site was possibly the main reason the distributed packages were not taken away: Ph.D. students and postdoctoral researchers listed in institution records had graduated or left workstations at the time of this survey. The other reason might be that some international postdoctoral and Ph.D. students lacked experience in participating in this kind of survey.

Measurement

1. Leaders' power bases

The power bases were measured using the Rahim Leader Power Inventory (RLPI) developed by Rahim (1988). This 29-item instrument uses a 5-point Likert scale to measure subordinates' perceptions of their supervisor's power bases. This scale has five dimensions: coercive power (5 items, α=.649), reward power (6 items, α=.717), legitimate power (5 items, α=.784), expert power (6 items, α=.791), and referent power (6 items, α=.882). Respondents (group members) were asked to rate these 29 statements from 1 to 5. Indices of the five power bases were constructed by averaging participants' responses to selected items in each factor. A higher score indicated that a supervisor had larger power bases. Sample items included: "it is reasonable for my superior to decide what he/she wants me to do", and "my superior does not have the expert knowledge I need to perform my job".

2. Compliance with Supervisor's Wishes

Group member compliance was measured with Compliance with Supervisor's Wishes (CSW) developed by Rahim (1988). This instrument has 10 items; respondents were asked to rate their agreement with each item on a 1–5 Likert scale. Five items formed a subscale for attitudinal compliance, while the other five items formed a subscale for behavioral compliance. Item responses were averaged to measure attitudinal and behavioral compliance. The reliability coefficients were .754 and .925, respectively. A higher score indicated greater compliance with the leader's wishes. Sample items included: "I prefer not to comply with my supervisor's instructions", and "I do what my supervisor suggests".

3. Satisfaction with Supervision

Group members' satisfaction with their supervision was measured using dimension of satisfaction with supervision from the Job Descriptive Index (JDI) (Smith, Kendall, & Hulin, 1969). This 18-item instrument asked the respondent to describe his/her satisfaction with supervision, stating 'yes', '?', or 'no' for each item. A 3-point scale was used to represent

'yes', '?', or 'no'. Based on the score for each item, the average of 18 items was used to measure satisfaction with supervision. The higher the average score, the greater was the satisfaction with supervision. The reliability coefficient was .819. Sample items included "supportive" and "hard to please".

Analysis

The data obtained from three questionnaires were analyzed using SPSS 18.0 for Windows. Mean scores for each item on the three questionnaires were calculated for each respondent. In this study, the independent variables were coercive, reward, legitimate power, expert power, and referent, while behavioral compliance (BC), attitudinal compliance (AC), and satisfaction with supervision (SS) were dependent variables. The number of items, mean, standard deviation and standardized Cronbach's alpha for all variables and Pearson correlations for the five independent variables and three dependent variables were calculated. Standardized Cronbach's alpha for each of these 8 sub-scales was used to establish the internal consistency of the items. Pearson correlations were calculated to assess intercorrelations among five power bases, for two types of compliance, and for all sub-scales on the three questionnaires. Three stepwise regression analyses were used to further investigate the relationship among the five independent variables and each of the three dependent variables. In the first, second, and third regression analyses, the five power bases were regressed on attitudinal compliance with leader's wishes, behavioral compliance with leader's wishes, and satisfaction with supervision score, respectively. Each dependent variable was regressed against the five independent variables at the stepwise criteria: $p<=.050$ to enter and $p >=.100$ to remove. The mean score for five sub-dimensions of RLPI provided an answer to research question 1 and the results of three stepwise regression analyses provided an answer to research question 2.

Results

Table 1 presents means, standard deviations, and Cronbach's alpha for the measures. Cronbach's alpha is a commonly used test of internal reliability (Bryman, 2008). According to Pallant (2011), Cronbach's alpha values above .7 are considered acceptable, while values above .8 are preferable. Among sub-scales for RLPI, CSW and JDI, only the Cronbach's alpha for coercive was slightly less than .7. The mean scores for power

bases indicated that expert power (3.82) was greatest, followed by referent (3.78), legitimate (3.45), reward (3.11), and coercive (3.08). The results from the descriptive analysis for CSW revealed that group members' attitudinal compliance with group leader's power (3.64) was stronger than behavioral compliance (3.54). Group members' responses to the satisfaction with supervision facet of JDI suggested that group members' satisfaction with their leader (2.59) was very high. Thus, research question 1 has been addressed.

Table 2 presents Pearson correlations between power bases and compliance and satisfaction with supervision subscales. Correlation analysis was used to describe the strength and direction of the linear relationship between two variables. The Pearson correlation coefficient (r) can only take on values from -1 to +1. The minus or plus symbols indicate whether there is a negative or positive correlation, while the size of the absolute value indicates the strength of the relationship (Pallant, 2011). (Pallant, 2011)Cohen (as quoted in Pallant, 2011) suggests the following guidelines for interpreting the values of the correlation coefficient: .10<*r*>.29 demonstrates a weak correlation between two variables; .30<*r*<.49 shows a medium correlation; and .50<*r*>1.0 indicates a strong correlation.

Regression analysis is a statistical technique for investigating the strength of the relationship between variables. Multiple regression analysis indicates the influence of two or more independent variables on a designated dependent variable (Bryman, 2008). Therefore, with the Pearson correlations identified above, regression analysis was used to further investigate the relationship between the independent and dependent variables. The results are shown in Table 3. Stepwise regression analysis for attitudinal compliance showed that legitimate and expert met the entry requirement, while the other three variables were excluded. The adjusted R^2 indicated that about 30.5% of the variance in attitudinal compliance could be explained by the two predictor variables (ΔR^2= .305, F=19.183, p=.000). Statistically significant correlations emerged between attitudinal compliance and group members' perception that a group leader uses legitimate power ($ß$=.354, t=2.966, p=.004) and expert power (($ß$=.271, t=2.267, p=.026). Stepwise regression analysis for behavioral compliance revealed that three variables—legitimate, coercive, and expert—were included in the final equation, while the other two variables—reward and referent—were rejected. The adjusted R^2 indicates that

about 56.2% of the variance in behavioral compliance is explained by the three predictor variables (ΔR^2=.562, F=36.529, p=.000). Statistically significant correlations emerged between behavioral compliance and group members' perception that a group leader uses legitimate power (ß=.370, t=3.763, p=.000); uses coercive power (ß=.403, t=5.338, p=.000); and uses expert power (ß=.283, t=2.945, p=.004). Stepwise regression analysis for satisfaction indicated that referent, reward and expert met the entry requirement, while the other two were rejected. About 55.0% of the variance in satisfaction was accounted for by the predictors (ΔR^2= .550, F=34.860, p=.000). Statistically significant correlations emerged between satisfaction with supervision and group members' perception that a group leader is using referent power (ß=.531, t=5.351, p=.000); reward power (ß=.187, t=2.472, p=.016); and expert power (ß=.209, t=2.125, p=.037). These results answered research question 2.

Table 1
No. of Items, Means, Standard Deviations (SD), and Cronbach's Alpha for Subscales of the RLPI, CSW, and JDI

Subscales	No. of Items	Mean	SD	Cronbach's Alpha
Coercive	5	3.08	.650	.649
Reward	6	3.11	.641	.717
Legitimate	6	3.45	.598	.784
Expert	6	3.82	.661	.791
Referent	6	3.78	.734	.882
AC	5	3.64	.616	.754
BC	5	3.54	.808	.925
SS	18	2.59	.297	.819

Table 2
Pearson Correlation among All Independent Variables and Dependent Variables

Variables	1	2	3	4	5	6	7	8
1.Coercive	1	.085	.210	.002	-.099	.221*	.482**	.037
2.Reward		1	-.034	.185	.218*	.048	-.049	.341**
3.Legitimate			1	.642**	.414**	.528**	.637**	.328**
4.Expert				1	.664**	.498**	.522**	.597**
5.Referent					1	.246*	.300**	.711**
6.AC						1	.717**	.340**
7.BC							1	.415**
8.SS								1

* Correlation is significant at 0.05 level (2-tailed) ** Correlation is significant at 0.01 level (2-tailed)

Table 3
Stepwise Regression Analysis among Three Dependent Variables with Five Independent Variables

Dependent Variables	Model	ΔR2	df	F	Sig.	ß (Standardized Coefficients)	t	Sig.
AC	1	.305	2,81	19.183	.000			
	(Constant)						3.883	.000
	Legitimate					.354	2.966	.004
	Expert					.271	2.267	.026
	Predictors (Constant), Legitimate, Expert							
BC	2	.562	3,80	36.529	.000			
	(Constant)						-2.345	.021
	Legitimate					370	3.763	.000
	Coercive					.403	5.338	.000
	Expert					.283	2.945	.004
	Predictors (Constant), Legitimate, Coercive, Expert							
SS	3	.550	3,80	34.860	.000			
	(Constant)						7.327	.000
	Referent					531	5.351	.000
	Reward					.187	2.472	.016
	Expert					.209	2.125	.037
	Predictors (Constant), Referent, Reward, Expert							

DISCUSSION

The purpose of this study was to clarify the relationship between research group members' perceptions of the power bases used by their leader and the effect of those perceptions on group members' compliance and satisfaction with supervision. To this point, there has been no previous field study of those correlations in the science research area. Findings from this study will aid efforts to refine and broaden management theory relating to power and effective leadership. To achieve the purpose of this study, two research questions were asked and studied. The first was answered using statistics descriptive analysis: from a list of five power bases, group members perceived that expert power was used most often by the leader, followed by referent power, legitimate power, reward power, and coercive power. This finding differs from that offered in earlier studies (Rahim & Buntzman, 1989; Rahim, Kim, & Kim, 1994), which showed that legitimate power was the greatest power employed. The leaders of science research groups in this study are gurus in biology,

genetics, biochemistry, chemistry and physics; therefore, it is reasonable for these leaders to use expert power most often, rather than legitimate power. The second question was addressed by stepwise regression analysis: legitimate power and expert power were positively associated with attitudinal compliance; legitimate power, coercive power and expert power were positively correlated with behavioral compliance; referent power, reward power, and expert power were positively associated with satisfaction. These results were similar those from previous studies (Burke & Wilcox, 1971; Podsakoff & Schriescheim, 1985; Rahim & Afza, 1993), which tended to suggest that legitimate power, expert power, and referent power were related to compliance, while expert power and referent power were related to satisfaction.

The implications of this study for leadership practice include the following: group leaders can be more effective in promoting their group members' satisfaction by combining their own referent power, expert power, and reward power; and leaders can acquire their group members' compliance by increasing their use of legitimate power and expert power. Expert power had a notably significant effect on both satisfaction and compliance. The possible reason for such results could be that knowledge and expertise are valued by group members in research settings. Yukl (2010) suggested the following ways to use and maintain this power: explain the reasons, importance, and perspective of a proposal by using evidence; avoid making rash, careless, or inconsistent statements; never lie, exaggerate, or misrepresent the facts; listen to the others' concerns and suggestions seriously; and act confident and decisive in a crisis. In terms of science research groups, the most convincing way to display expert power is by solving important problems, making good decisions, providing sound advice, and successfully completing challenging but highly visible projects. Nevertheless, expert power should be used carefully to avoid lowering group members' creativity, which is the most precious contributor to research group tasks. Moreover, the group leader should remember that "expert power used by itself is very limited power base" (Benfari, Wilkinson, & Orth, 1986, p. 14).

The implication for administrators of research institutions is that the authority of group leaders (legitimate power) should be defined in as clear and explicit a manner as possible in institutions' documents, such as the organization charter and written job

descriptions. Those documents should be consistent with the basic values and culture of the organizations in order to promote leadership effectiveness. In addition, as referent power relates to satisfaction with supervision, the human resources department should consider the individual's personal characteristics and integrity in selecting a group leader although the basic requirement is expertise capacity.

Three limitations apply to this study. The first has to do with the study's generalizability, since the research work was only conducted at one institution. The second is an objective limitation from the research site concerning confidentiality and the condition of anonymity. The last was a subjective limitation, in which the study only paid attention to independent and dependent variables, while extraneous variables were ignored, such as leaders' age, leaders' gender, length of time as a group leader, and so on. However, representatives of the research site and the strong psychometric properties of the three published research instruments used are study strengths

Future studies could replicate this study with a larger sample size at other leading research institutions in different countries, or examine further outcomes of the use of power in a research group, such as group creativity. Also, the qualitative approach—a case study employing interview and observation techniques—might be used to better understand some of this study's interesting findings, such as the removal of the group leader's use of referent and reward power from equations of attitudinal and behavioral compliance. In addition, extraneous variables ignored by this study, such as gender, age, time spent being a group leader and so on, should be considered by future studies.

Literature Cited

Bass, B. M., & Bass, R. (2008). *The Bass handbook of leadership: Theory, research, and managerial applications*, 4th ed. New York: Free Press.

Benfari, R. C., Wilkinson, H. E., & Orth, C. D. (1986). The effective use of power. *Business Horizons, 29*(3), 12–16.

Bryman, A. (2008). *Social research methods*, 3rd ed. New York: Oxford University Press.

Burke, R. J., & Wilcox, D. S. (1971). Bases of supervisory power and subordinate job satisfaction. *Canadian Journal of Behavioral Science, 3*(1), 183–193.

Busch, P. (1980). The sales manager's bases of social power and influence upon the sales force. *Journal of Marketing, 44*(3), 91–101.

Daft, R. L, (1999). *Leadership: Theory and practice*. Orlando, FL: Harcourt Brace and

Company.

French, J. R. P., & Raven, B. (1959). The bases of social power. In D. Cartwright & A. Zander (Eds.), *Group dynamics: Research and theory*, 3rd ed. Wilshire: Redwood Press Limited of Trowbridge.

Gaski, J. F. (1986). Interrelations among a channel entity's power sources: Impact of the exercise of reward and coercion on expert, referent, and legitimate power sources. *Journal of Marketing Research, 23*(1), 62–77.

Gordon, A., & Yukl, G. (2004). The future of leadership research challenges and opportunities. *German Journal of Human Resource Research, 18*(3), 359–365.

Greiner, L. E., & Schein, V. E. (1988). *Power and organization development: Mobilizing power to implement change.* New York: Addison-Wesley Publishing Company.

Hinkin, T. R., & Schriesheim, C. A. (1989). Development and application of new scales to measure the French and Raven (1959) bases of social power. *Journal of Applied Psychology, 74*(4), 561–567.

Jernigan, I. E., & Beggs, J. M. (2005). An examination of satisfaction with my supervisor and organizational commitment. *Journal of Applied Social Psychology, 35*(10), 2171–2192.

Northouse, P. G. (2010). *Leadership: Theory and practice*. London: SAGE Publications Ltd.

Pallant, J. (2011). *SPSS survival manual*, 4th ed. Crows Nest: Allen & Unwin.

Pfeffer, J. (1981). *Power in organizations*. New York: Harper Business.

Podsakoff, P. M., & Schriescheim, C. A. (1985). Field studies of French and Raven's bases of power: Critique, reanalysis, and suggestions for future research. *Psychological Bulletin, 97*(3), 387–411.

Rahim, M. A. (1988). The development of a leader power inventory. Multivariate *Behavioral Research, 23*(4), 491–503.

Rahim, M. A. (1989). Relationships of leader power to compliance and satisfaction with supervision: Evidence from a national sample of managers. *Journal of Management, 15*(4), 545.

Rahim, M. A., & Afza, M. (1993). Leader power, commitment, satisfaction, compliance, and propensity to leave a job among U.S. accountants. *The Journal of Social Psychology, 133*(5), 611–625.

Rahim, M. A., Antonioni, D., Krumov, K., & Ilieva, S. (2000). Power, conflict, and effectiveness: A cross-cultural study in the United States and Bulgaria. *European Psychologist, 5*(1), 28–33.

Rahim, M. A., & Buntzman, G. F. (1989). Supervisory power bases, styles of handling conflict with subordinates, and subordinate compliance and satisfaction. *Journal of Psychology: Interdisciplinary and Applied, 123*(2), 195–210.

Rahim, M. A., Kim, N. H., & Kim, J. S. (1994). Bases of leader power, subordinate compliance, and satisfaction with supervision: A cross-culture study of managers in the U.S. and S. Korea. *International Journal of Organizational Analysis, 2*(2), 136–154.

Robbins, S. P., & Judge, T. A. (2010). *Organizational behaviour*. Beijing: Tsinghua

University Press.
Skinner, S. J., Dubinsky, A. J., & Donnelly, Jr., J. H. (1984). The use of social bases of power in retail sales. *Journal of Personal Selling & Sales Management, 4*(2), 49–56.
Smith, P. C., Kendall, L. M., & Hulin, C. L. (1969). *The measurement of satisfaction in work and retirement: A strategy for the study of attitudes*. Chicago, IL: Rand McNally and Company.
Student, K. R. (1968). Supervisory influence and work-group performance. *Journal of Applied Psychology, 52*(3), 188–194.
Yagil, D. (2002). Substitution of a leader's power bases by contextual variables. *International Journal of Organization Theory and Behavior, 5*(3&4), 383–399.
Yukl, G. (1989). Managerial leadership: A review of theory and research. *Journal of Management, 15*(2), 251–289.
Yukl, G. (2010). *Leadership in organizations*. Newark, NJ: Pearson Education
Yukl, G., & Falbe, C. M. (1991). Importance of different power sources in downward and lateral relations. *Journal of Applied Psychology, 76*(3), 416–423.

ABOUT THE AUTHORS

Changkun Luo is a senior researcher in health administration; president of the Third Military Medical University of China (TMMU); vice chairman of the Science Research Management Committee for Chinese Medical Association; and senior editor of the *Chinese Journal of Medical Science Research Management*. He was closely involved in the planning and management of TMMU's research projects for many years. His main area of research interest is science research management.

Yi Meng, MSc, is a PhD candidate of Health Management and a lecturer of the Department of Social Medicine and Health Service Management, Third Military Medical University of China. She is interested in the leadership at the science research group.

Jia He, MHPE, is a professor of Medical Education and the head of the Department of Social Medicine and Health Service Management, Third Military Medical University of China. Her main area of research interest is medical education.