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RESEARCH REPORTS

Intelligence and Leadership: A Quantitative Review and Test of Theoretical Propositions

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Meta-analysis was used to aggregate results from studies examining the relationship between intelligence and leadership. One hundred fifty-one independent samples in 96 sources met the criteria for inclusion in the meta-analysis. Results indicated that the corrected correlation between intelligence and leadership is .21 (uncorrected for range restriction) and .27 (corrected for range restriction). Perceptual measures of intelligence showed stronger correlations with leadership than did paper-and-pencil measures of intelligence. Intelligence correlated equally well with objective and perceptual measures of leadership. Additionally, the leader's stress level and the leader's directiveness moderated the intelligence–leadership relationship. Overall, results suggest that the relationship between intelligence and leadership is considerably lower than previously thought. The results also provide meta-analytic support for both implicit leadership theory and cognitive resource theory.

Few characteristics are more valued, or valuable, in modern Western society than intelligence. As Herrnstein and Murray's (1994) comprehensive analysis revealed, in addition to its link to job performance, intelligence is associated with many social advantages, including employment, economic self-sufficiency, affluence, educational achievement, marital stability, legitimacy, and lawful behavior. Schmidt and Hunter (2000) went so far as to proclaim, "Intelligence is the most important trait or construct in all of psychology, and the most 'successful' trait in applied psychology" (p. 4). The value that society places on intelligence is no more evident than in people's views of the traits and skills of leaders. In a Gallup Poll before the 2000 presidential election, 90% of Americans responded that understanding complex issues was extremely or very important in determining for which candidate they would vote. Lord, Foti, and De Vader (1984) found that of 59 characteristics such as honesty, charisma, and kindness, intelligence was the most prototypical of a leader. Indeed, Lord et al. found that intelligence was the only attribute that is seen as a critical feature that must be possessed by all leaders.

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Reviews of the literature on the traits of effective leaders have reinforced the importance of intelligence to leadership (e.g., House & Aditya, 1997). Intelligence has emerged as an important characteristic of leaders in most qualitative reviews of the literature (Bass, 1990; Kirkpatrick & Locke, 1991; Mann, 1959; Stogdill, 1948). Other reviewers of this literature, though, have been more equivocal. For example, Fielder (2002) concluded, "Intellectual abilities . . . do not predict leadership performance to any appreciable degree" (p. 92).

To more accurately determine the relationship between traits and leadership, Lord, De Vader, and Alliger (1986) used meta-analysis to aggregate the results of studies on the trait theory of leadership. In conducting their meta-analysis, Lord et al. confined their study to the traits included in Mann's (1959) review: intelligence, masculinity–femininity, adjustment, dominance, extroversion–introversion, and conservatism. Of the traits investigated, intelligence had the strongest correlation with leadership (r_c = .50). Although based on a relatively small number of correlations (k = 18), this correlation was distinguishable from zero. Further, the majority of the variance in the results across studies was found to be due to methodological artifacts. In interpreting their results, Lord et al. concluded, "Intelligence is a key characteristic in predicting leadership perceptions" (p. 407).

Despite this support, there are important areas for further development. Most fundamentally, past qualitative reviews and the Lord et al. (1986) meta-analysis did not directly test whether intelligence is associated with objective effectiveness. As noted by Rubin, Bartels, and Bommer (2002), one cannot assume that the effect of intelligence on perceptions of leader emergence will be the same as its effect on objective indicators of leadership effectiveness. Indeed, Rubin et al. (2002) found that intelligence was more strongly related to perceived intellectual competence of the leader than to leadership emergence. Lord et al. went to great lengths to distinguish leadership perceptions from objective measures of effective leadership, and moreover, they cautioned that their results generalized to leadership perceptions only. They noted that their results "pertain to leadership perceptions, not to leadership effectiveness or to group performance" (Lord et al., 1986, p. 407). In addition, Lord et al. called for more research linking intelligence and other traits to objective measures of leadership effectiveness.

Accordingly, the purpose of this study was to provide a quantitative review of the intelligence–leadership literature that (a) distinguishes between different measures of leadership outcomes, including perceptual measures of leader emergence and effectiveness and objective measures of leadership effectiveness; (b) distinguishes perceptual from paper-and-pencil measures of intelligence; and (c) tests propositions from two relevant leadership theories: implicit leadership theory and cognitive resource theory. In the next section of this article, we discuss theoretical expectations regarding the relationship between intelligence and leadership.

Theoretical Support for Link Between Intelligence and Leadership

General Intelligence–Leadership Relationship

From a theoretical viewpoint, there are many reasons to believe that intelligence is related to leadership. On the basis of a comprehensive review, Schmidt and Hunter (1998) reported that intelligence is one of the best predictors of general job performance, with an overall validity of .51. The intelligence–performance relationship is stronger for complex jobs (Schmidt & Hunter, 1998), supporting the importance of intelligence for leadership because the tasks performed by leaders are generally complex. Locke (1991) argued that cognitive ability "is an asset to leaders because leaders must gather, integrate, and interpret enormous amounts of information" (p. 46). Furthermore, leaders are responsible for such tasks as developing strategies, solving problems, motivating employees, and monitoring the environment. As Fiedler and Garcia (1987) noted, "These are intellectual functions, and many are similar or identical to those we find on typical intelligence tests" (p. 43).

Creativity is another mechanism linking intelligence to leadership (Jung, 2001). Not only may leaders generate creative solutions of their own, but they may stimulate follower creativity through follower intrinsic motivation and higher quality leader–member exchange (Tierney, Farmer, & Graen, 1999). Researchers have long analyzed the relationship between creativity and intelligence (Guilford, 1950) and have concluded that the two are distinct but related constructs (Rushton, 1990). Thus, not only are intelligent leaders better problem solvers, but they are likely to be more creative and foster the creativity of their followers.

Finally, beyond the actual leadership advantages intelligence affords, intelligence also may cause a leader to appear as leader-like. If individuals believe that leaders are endowed with certain characteristics, then when individuals observe these characteristics in others, they infer leadership or leadership potential to exist. As Rubin et al. (2002) noted, "Individuals seem to share a common understanding about the traits that leaders possess and these traits are used as benchmarks for deciding emergent leadership" (p. 106). Though we have further comment on the implicit theory of leadership, it is possible that intelligence is related to leadership perceptions not solely because intelligent leaders are effective but instead (or in addition) because individuals infer that intelligence is an exemplary characteristic of leaders.

> *Hypothesis 1:* Intelligence of the leader will be positively related to (a) leader emergence and effectiveness perceptions and (b) objective measures of leadership effectiveness.

Theoretical Extensions

In addition to examining the overall relationship between intelligence and leadership, we also consider several theoretical factors that affect the relationship. According to the implicit theory of leadership, individuals rely on schemas or *prototypes* to simplify information-processing tasks. Lord (1985) defines prototypes as "abstractions of the most widely shared features or attributes of category members" (p. 93). Implicit leadership theories represent a prototype of a leader and include the attributes that an individual associates with leadership. Research by Lord et al. (1984) identified many traits that are associated with a general leader prototype. In their study, intelligence was noted as a characteristic attribute of a leader in 10 of 11 leadership categories (e.g., business, education, sports, politics) and was the only trait that broadly generalized across these contexts. Thus, intelligence appears to be a part of many individuals' implicit leadership theories across leadership contexts. Because intelligence is the most prototypic of all leader characteristics (Lord et al., 1984), it stands to reason that perceptual measures—both of intelligence and of leadership—will produce the highest relations.

Whereas perceptual versus objective measures of leadership emergence or effectiveness have often been discussed in the literature (R. Hogan, Curphy, & Hogan, 1994), differences between intelligence as assessed by objective, standardized tests versus the perceptions of others are not often discussed, even though such studies were included in the Lord et al. (1986) meta-analysis. From a theoretical viewpoint, perceptual and objective assessments of intelligence, though correlated (Zwier, 1966), are potentially quite different. Geier (1967) commented, "There is a great deal of difference between a person being intelligent and appearing intelligent" (p. 317). Beyond their native intelligence, individuals can engage in behaviors that enhance others' perceptions of their intellect (Murphy, Hall, & LeBeau, 2001). Because the emergence of leadership is in part a product of impression or image management (Chemers, 2001; Gardner & Avolio, 1998), appearing smart may be more important than being smart (Rubin et al., 2002). Thus, perceptual measures of intelligence and leadership may produce higher correlations than would objective measures of these constructs. It is not that objective measures of intelligence (i.e., paper-and-pencil tests) or leadership (e.g., group performance) would have no validity; it is that, consistent with the above arguments, perceptual measures should have higher correlations with the leadership criteria.

> *Hypothesis 2:* Intelligence–leadership correlations will be higher when (a) intelligence is assessed perceptually rather than with paper-and-pencil tests and (b) when the criterion is perceptual rather than objective.

Fiedler and Garcia's (1987) cognitive resource theory also is relevant to the intelligence–leadership relationship. Cognitive resource theory suggests that when leaders are under a great deal of stress, their intellectual abilities will be diverted from the task. When under stress, intelligent leaders' attentional resources that could otherwise be devoted to planning, problem solving, and creative judgment are instead focused on worries over possible failure, crises of self-efficacy, and evaluation anxiety (Fiedler, 1986). Intellectual abilities that focus on dealing with a stressful situation are not available to assist the individual in executing the tasks necessary for leadership. Thus, cognitive resource theory proposes that intelligence will be more strongly related to leadership when leaders are experiencing low levels of stress.

In addition, cognitive resource theory proposes that leaders communicate using directive behavior. Fiedler (1989) noted, "Directive behavior is a means of communication and the leader's plans and decisions are usually communicated by telling group members what to do" (p. 294). Thus, although intelligent leaders may develop better strategies and make better decisions, followers will not receive the benefit of this intelligence unless the leader is directive. Therefore, intelligence and leadership will be more strongly related for leaders who exhibit directive behavior than for leaders who are participative. As noted by Fiedler and House (1994), intelligent leaders who are directive are more likely to be effective because they are more likely to possess the knowledge necessary to help their followers.

> *Hypothesis 3:* Intelligence–leadership correlations will be lower when (a) the leader is under stress and (b) the leader is less directive (more participative).

In summary, we hypothesized that intelligence and leadership will be positively related. On the basis of the implicit theory of leadership, we proposed that this relationship will be stronger when either or both of the constructs are measured perceptually. We also proposed that the level of stress that the leader is experiencing and the extent to which the leader exhibits directive behavior will affect the intelligence–leadership relationship. Intelligence and leadership will be more strongly related when stress levels are low and when the leader is more directive.

Method

Literature Search

To identify articles for inclusion, we first searched the PsycINFO database (1887–2002) for studies on intelligence and leadership. Additionally, we searched for all studies authored by Fred E. Fiedler, a prominent researcher in the area of leader intelligence. Reviews of the literature (e.g., Bass, 1990; Fiedler & Garcia, 1987; Lord et al., 1986; Mann, 1959) were searched to identify additional studies of the relationship between leader intelligence and a leadership criterion. Finally, a manual search of all issues of *Leadership Quarterly* was conducted. From these search procedures, 1,753 abstracts were identified. In reviewing these abstracts, we eliminated most because they did not include a measure of the leader's intelligence, they did not include a measure of leadership, or they did not report primary data. After the initial review of abstracts, 463 studies remained. We reviewed each of these studies. One hundred fifty-one independent samples in 96 sources met the criteria for inclusion.[1]

Measures of leader intelligence were classified as perceptual if they were based on ratings made by others (e.g., rate how intelligent you think each group member seemed; Rubin et al., 2002) or objective if they were based on paper-and-pencil measures of intelligence (e.g., the Wonderlic Personnel Test; Wonderlic & Associates, 1983). Based on a priori definitions (Judge, Bono, Ilies, & Gerhardt, 2002), we coded the leadership criteria as representing leader emergence or leader effectiveness. The leadership criterion was coded as leader emergence when it involved the selection of an individual as a leader. Examples of criteria classified as leader emergence included participation in leadership activities, selection as leader in a leaderless group discussion, nominations as a leader by peers or superiors, and sociometric measures of leadership. The criterion was coded as leader effectiveness when it provided a measure of the effectiveness of an individual who had the title of leader or who had emerged as the leader in a leaderless group.[2] Criteria coded as leader effectiveness included ratings of the effectiveness or influence of the leader and performance of the leader's group. Additionally, the leadership criteria were coded as perceptual when they were based on ratings made by others and objective when they were based on a quantifiable score (e.g., team performance on a survival simulation; Kickul & Neuman, 2000). All studies included in the leader stress analysis included both high- and low-stress conditions. Similarly, the primary studies included in the leader directiveness analysis included both high- and low-directiveness conditions. The high and low classifications were made on the basis of manipulation of the moderator variable or on the basis of measured levels of the moderator variable. Thus, stress and directiveness were coded on the basis of the classification in the original study.

In addition to coding the study characteristics that were used in hypothesis testing, we coded two methodological moderators. First, each study was classified as either unpublished (e.g., unpublished doctoral dissertation, unpublished data obtained directly from the researcher) or published (e.g., journals, books). Second, studies were coded on the basis of whether the sample consisted of students (e.g., high school students, college stu-

[1] Studies were excluded at this stage for several reasons. First, many studies did not report the data necessary to compute a correlation between leader intelligence and a leadership criterion (e.g., studies that reported means with no standard deviations, studies that provided a narrative summary of results, studies that reported only analysis of variance results). In addition, studies that did not include a perceptual or paper-and-pencil measure of intelligence and a perceptual or objective measure of leadership were excluded. When multiple correlations were reported for the same sample (e.g., when multiple measures of intelligence were correlated with a leadership criterion), we computed a composite correlation when trait intercorrelations were reported and a simple average when such intercorrelations were not reported (Hunter & Schmidt, 1990).

[2] Seventy-one of the 78 criteria coded as leader effectiveness measured the effectiveness of an appointed leader. To determine the effect of the seven studies that measured effectiveness of an emergent leader on the meta-analytic results, we examined the relationship of leader intelligence with leader effectiveness by excluding these samples. Excluding the seven samples changed the mean corrected correlation by only .01.

Table 1
Meta-Analysis of the Overall Relationship Between Leader Intelligence and Leadership

k	N	Average r	ρ_1	SD_{ρ_1}	ρ_2	SD_{ρ_2}	80% CV Lower	80% CV Upper	95% CI Lower	95% CI Upper
151	40,652	.17	.21	.16	.27	.17	.05	.48	.24	.30

Note. Whitener's (1990) formula for standard error of the mean correlation was used in computing confidence intervals. k = number of correlations; N = combined sample size; ρ_1 = estimated true score correlation corrected for unreliability in the predictor and criterion; SD_{ρ_1} = standard deviation of ρ_1; ρ_2 = estimated true score correlation corrected for unreliability in the predictor and criterion and for range restriction; SD_{ρ_2} = standard deviation of ρ_2; CV = credibility interval around ρ_2; CI = confidence interval around ρ_2.

dents, students in military academies) or members of work organizations (e.g., business organizations, military organizations).[3, 4]

Meta-Analysis Procedure

In conducting the meta-analysis, procedures developed by J. E. Hunter and Schmidt (1990) were used. We first corrected each correlation for measurement error in intelligence and leadership and for range restriction in intelligence, and then we computed the sample-size-weighted average corrected correlation. The variance in the observed correlations was corrected for both sampling and measurement error. Because "it is not correct to measure the reliability of a speed test in terms of internal consistency (α)" (Nunnally & Bernstein, 1994, p. 351), and because test–retest estimates are recommended instead (Nunnally & Bernstein, 1994, p. 339), test–retest reliability was used to correct intelligence measures for measurement error. When this estimate was not reported in the study or was not available in published test manuals, the midpoint of the test–retest reliability range (r_{xx} = .88) for the most commonly used and extensively validated intelligence test, the Wonderlic Personnel Test (Wonderlic & Associates, 1983), was used. The majority of the leadership criteria were based on ratings. Thus, following the procedures of Judge et al. (2002), interrater reliability estimates were used to correct the leadership criteria for measurement error (Viswesvaran, Ones, & Schmidt, 1996).[5]

The range restriction factor, or the u value (computed as the ratio of the sample standard deviation of the intelligence scores to the population standard deviation as reported in the test manual), was used to correct each primary correlation. When data to compute the u value were unavailable for a specific study, the average u value for all other studies (.835) was used. A strong argument can be made that correlations corrected for the effects of range restriction are better estimates of the true intelligence–leadership relationship than are estimates that are uncorrected for the effects of range restriction. However, Judge et al. (2002) did not report personality–leadership estimates corrected for range restriction nor has the majority of other leadership meta-analyses. Accordingly, we report two corrected correlations: ρ_1 represents the intelligence–leadership correlation corrected for measurement error in intelligence and leadership but uncorrected for range restriction, and ρ_2 represents the intelligence–leadership correlation corrected for measurement error in intelligence and leadership and for range restriction in intelligence.

In addition to computing estimates of the true score correlations, we also calculated 80% credibility intervals and 95% confidence intervals. A 95% confidence interval excluding zero indicates that if one repeatedly sampled the population of correlations, 97.5% or more of the intervals would exclude zero (the other 2.5% of the correlations would lie at the other end of the interval). An 80% credibility interval excluding zero for a positive average correlation indicates that more than 90% of the individual correlations in the meta-analysis are greater than zero.

Results

We first conducted an overall meta-analysis of the relationship aggregated across all operationalizations of intelligence with all operationalizations of leadership. The results of this meta-analysis are provided in Table 1. Intelligence exhibited a moderately low but positive correlation with leadership (ρ_1 = .21; ρ_2 = .27). Both the 80% credibility interval and the 95% confidence interval excluded zero, indicating that the average correlation was distinguishable from zero and that the relationship generalizes across studies. Because only 19.3% of the variability in the correlations was explained by study artifacts, we were justified in investigating the theoretically based factors that may affect intelligence–leadership relations.

[3] Amy E. Colbert coded all of the studies on the basis of the coding definitions previously described. To assess interrater agreement, a second rater recoded 25% of the studies. The average percentage agreement between the two raters across all study characteristics was 98%. Discrepancies were resolved by referencing the original coding definitions.

[4] House and Aditya (1997) also suggested that leader level might moderate the relationship between individual differences and leadership; however, in our meta-analytic database, the majority of the studies conducted in work settings did not provide sufficient description to determine the level of the leader. Additionally, in our database, field studies were conducted in both business and military organizations, and it was difficult to compare leader level across these two settings. Thus, we were unable to examine leader level as a moderator in this meta-analysis.

[5] When an estimate of interrater reliability was not reported in the study, published estimates of interrater reliability based on the number of raters and the source of rating (supervisor, peer, or subordinate) were used. Viswesvaran et al. (1996) provided estimates of the interrater reliability of supervisory and peer ratings of leadership; however, no estimate of interrater reliability of subordinate ratings of leadership was provided. Because Viswesvaran et al.'s estimate of interrater reliability of leadership ratings was similar to their estimate of interrater reliability of overall job performance ratings, we used Conway and Huffcutt's (1997) meta-analytic estimate of subordinate interrater reliability of job performance. These estimates of interrater reliability were corrected upward using the Spearman–Brown formula when multiple raters were used. For studies in which the source or number of raters could not be determined, the average interrater reliability across all studies of .77 was used to correct the primary correlations for measurement error in the leadership criterion.

Table 2
Meta-Analysis of Intelligence–Leadership Relations by Intelligence and Leadership Measures

	Intelligence measure									
	Perceived intelligence					Paper-and-pencil intelligence				
Leadership criterion	k	ρ_1	SD_{ρ_1}	ρ_2	SD_{ρ_2}	k	ρ_1	SD_{ρ_1}	ρ_2	SD_{ρ_2}
Perceived emergence	9	.60	.27	.65	.28	65	.19	.10	.25	.12
Perceived effectiveness	—	—	—	—	—	64	.15	.14	.17	.16
Perceived group performance	—	—	—	—	—	26	.19	.05	.22	.00
Perceived individual effectiveness	—	—	—	—	—	34	.15	.15	.18	.16
Objective effectiveness	—	—	—	—	—	14	.25	.16	.33	.21

Note. k = number of correlations; ρ_1 = mean correlation corrected for unreliability in the predictor and criterion; SD_{ρ_1} = standard deviation of ρ_1; ρ_2 = mean correlation corrected for unreliability in the predictor and criterion and for range restriction; SD_{ρ_2} = standard deviation of ρ_2. Dashes indicate that the data were not available.

Tests of Theoretical Extensions

Table 2 shows the results of the analysis testing differential intelligence–leadership relations based on the operationalization of the variables. Both perceived and paper-and-pencil assessments of intelligence showed nonzero mean correlations with the three leadership criteria. However, studies that measured intelligence based on perceptions had much higher correlations than those using a paper-and-pencil measure of intelligence (k-weighted average of .60 vs. .18, respectively). Additionally, we should note that for paper-and-pencil measures of intelligence, the 80% credibility interval excluded zero for the perceived leader emergence and objective leader effectiveness criteria but not for the perceived leader effectiveness criterion.

We further subdivided the perceived leader effectiveness criterion into measures of individual leader effectiveness or measures of group performance. (All of the objective leadership effectiveness criteria assessed group performance.) Although the correlation between objective intelligence and perceived group performance was slightly higher than the correlation between objective intelligence and perceived individual effectiveness, the two correlations were not significantly different on the basis of the Quiñones, Ford, and Teachout's (1995) t test. We should note that the 80% credibility interval excluded zero for the relationship between objective intelligence and perceived group performance but not for the relationship between objective intelligence and perceived individual effectiveness.

The meta-analytic test of cognitive resource theory, provided in Table 3, was consistent with Hypothesis 3. Intelligence had a positive nonzero correlation with leadership when the leader's stress level was low but not when the leader's stress level was high. Directiveness also moderated the intelligence–leadership relationship such that intelligence had a positive nonzero correlation with leadership when the leader was directive but not when the leader was nondirective.

Tests of Methodological Moderators

Table 4 reports the results of the methodological moderator analyses. First, the fully corrected mean correlation for published studies (ρ_2 = .31) was significantly (p < .01) greater than the fully corrected mean correlation for unpublished studies (ρ_2 = .23). However, we should note that the 80% credibility interval excluded zero only for the unpublished studies. In the second methodological moderator analysis, the fully corrected mean correlation for student samples was the same as the fully corrected mean correlation for samples taken from business and military organizations (ρ = .27). However, the 80% credibility interval for organizational samples included zero whereas the 80% credibility interval for student samples did not include zero.

Discussion

There is perhaps no individual difference that has been more important to psychology than intelligence. Schmidt and Hunter

Table 3
Meta-Analytic Test of Cognitive Resource Theory

Moderator	k	ρ_1	SD_{ρ_1}	ρ_2	SD_{ρ_2}
Leader stress level					
Low	20	.32	.11	.33	.15
High	20	−.04	.00	−.04	.00
Leader directiveness					
Low	8	−.08	.00	−.09	.00
High	8	.27	.14	.27	.12

Note. k = number of correlations; ρ_1 = mean correlation corrected for unreliability in the predictor and criterion; SD_{ρ_1} = standard deviation of ρ_1; ρ_2 = mean correlation corrected for unreliability in the predictor and criterion and for range restriction; SD_{ρ_2} = standard deviation of ρ_2.

Table 4
Meta-Analytic Test of Methodological Moderators

Moderator	k	ρ_1	SD_{ρ_1}	ρ_2	SD_{ρ_2}
Publication source					
Published	94	.27	.23	.31	.24
Unpublished	57	.17	.06	.23	.08
Type of sample					
Student	83	.21	.12	.27	.13
Organization	68	.24	.25	.27	.27

Note. k = number of correlations; ρ_1 = mean correlation corrected for unreliability in the predictor and criterion; SD_{ρ_1} = standard deviation of ρ_1; ρ_2 = mean correlation corrected for unreliability in the predictor and criterion and for range restriction; SD_{ρ_2} = standard deviation of ρ_2.

(2000) concluded, "No other trait—not even conscientiousness—predicts so many important real-world outcomes so well" (p. 4). Similarly, Gottfredson (1997) concluded that no other individual difference "has such generalized utility across the sweep of jobs in the U.S. economy" (p. 83). It is not surprising, then, that intelligence is a trait that is commonly believed to be important to leadership. Indeed, the relationship between intelligence and leadership may be viewed by some as "common sense" (Fiedler & Garcia, 1987, p. 43). At the same time, it is surprising that there has not been more attention focused on intelligence in leadership theories and research. As Fiedler (1986) noted, "The importance of intelligence in most other areas of human performance suggests that intellectual abilities must play a larger role in determining leadership performance than current leadership theories would suggest" (p. 532).

In a sense, our results belie the commonsense view in that they reveal only a moderate ($\rho_1 = .21$, $\rho_2 = .27$) average correlation between intelligence and leadership. A recent meta-analysis (Judge et al., 2002) revealed that both extraversion ($\rho_1 = .31$) and conscientiousness ($\rho_1 = .28$) had stronger average correlations with leadership than intelligence. Thus, whereas intelligence has proven indispensable to many areas of psychology (Schmidt & Hunter, 2000), its overall relationship to leadership is neither strong nor trivial. However, the average correlation is distinguishable from zero and moreover, more than 90% of the individual correlations are greater than zero. Thus, we found a positive nonzero correlation between intelligence and leadership that generalized across studies, but the strength of this correlation is not large.

Comparison With Previous Meta-Analytic Evidence

One purpose of this article was to update and extend the Lord et al. (1986) meta-analysis, the only previous meta-analytic review on the topic. Because the purpose of the Lord et al. meta-analysis was to estimate the operational validity of intelligence with respect to leadership perceptions, they corrected correlations only for criterion unreliability and range restriction. Thus, to compare our results with those of Lord et al., we conducted an additional meta-analysis correcting only for these two artifacts. Even when we did not correct for predictor unreliability, our results departed substantially from those of Lord et al. These authors found that the average intelligence–leadership correlation was .50, whereas the mean correlation corrected for criterion unreliability and range restriction in our study was .25. Additionally, the mean uncorrected correlation reported by Lord et al. was .37 as compared with the mean uncorrected correlation in our meta-analysis of .17. Several differences between the two studies may help explain why our results departed so substantially from this earlier review. First, the Lord et al. meta-analysis included only 18 correlations. It is likely that the increased scope and breadth of the meta-analytic results presented here (based on 717% more correlations) present a more representative portrait of the true intelligence–leadership relationship.

Second, a number of the studies included in the Lord et al. (1986) meta-analysis operationalized intelligence using measures of academic achievement. Although academic achievement is partially dependent on intelligence (McCabe, 1991), it is also substantially affected by other factors such as motivation and traits such as conscientiousness (Digman, 1989). Because the motivational component of academic achievement may also be correlated with perceptions of leadership, using academic achievement as a measure of intelligence may result in an overestimate of the intelligence–leadership relationship.

Third, the intelligence of almost one quarter of the total subjects in the Lord et al. (1986) meta-analysis was assessed on the basis of perceptual measures. In our meta-analysis, perceptual measures of intelligence comprised just over 5% of the correlations. As our analysis in Table 2 shows, the relationship of perceptual measures of intelligence with leadership is much stronger than the relationship of paper-and-pencil measures of intelligence with leadership.

Finally, all of the criteria included in the Lord et al. (1986) review were perceptual measures of leadership, whereas the present meta-analysis included a substantial number of studies using objective criteria, though we should note that in our data set, objective measures of leadership correlated as highly with intelligence as did perceptual leadership measures. Our purpose here is not to criticize Lord et al. In many ways, their study was an exemplary early application of meta-analytic methods, as evidenced by the 112 citations the article has generated. Rather, our goal here is to explain why our results departed so dramatically from the Lord et al. results and why the results presented here may provide a more accurate (yet quite different) understanding of the true relationship between intelligence and leadership.

Role of Perceptual Measures of Intelligence and Leadership

Beyond the overall analysis, the more fine-grained analyses provided additional insights into the relationship between intelligence and leadership. On the basis of the implicit theory of leadership (e.g., Lord, 1985), we expected that the relationship between intelligence and leadership would be stronger when either or both of the constructs were operationalized using a perceptual measure. We found that the operationalization of the intelligence construct did indeed affect the relationship such that the intelligence–leadership relationship was stronger when intelligence was measured perceptually than when paper-and-pencil measures of intelligence were used (though the results involving perceptual measures of intelligence were quite variable).

With respect to perceptual measures of leadership, Lord et al. (1986) went to great lengths to emphasize that their results pertained to leadership perceptions only, noting that the traits (e.g., intelligence) that predicted perceptions were not necessarily those that predicted "the performance of a leader's work group or organization" (p. 408). It is interesting that our results suggest that it is perceptual measures of intelligence rather than leadership that are particularly sensitive to implicit attributions. It seems possible that when individuals are estimating an individual's intelligence, they use their implicit views of the individual's leadership position or effectiveness as sources of information. As Hollander (1992) noted, it may be the social self—how leaders are perceived by others—rather than scores on objective instruments that is more important in attaining leadership roles. This view comports with that of other leadership researchers who have emphasized attributional or categorization processes (Lord & Maher, 1991) or a socioanalytic theory of personality (R. Hogan, 1996). It is possible the validity observed for perceptual measures of intelligence reflects the fact that leadership status is afforded to those who effectively manage a reputation for intelligence.

Support for Cognitive Resource Theory

Our results also provide the first meta-analytic evidence pertaining to cognitive resource theory (Fiedler & Garcia, 1987). Although Vecchio (1990) questioned the validity of the theory, support was found here for two basic moderators suggested by cognitive resource theory. Intelligence and leadership were more strongly related when leader stress was low and when leaders exhibited directive behaviors.

Because many of the studies conducted by Fiedler and his students may have been designed specifically to test cognitive resource theory (Fiedler & Garcia, 1987), it is possible that the results from these studies may be different from the results of studies conducted for other purposes. To investigate this possibility, we removed samples from the overall analysis from studies in which Fiedler was an author and from dissertations chaired by Fiedler. The fully corrected mean correlation after removing these studies was $\rho = .27$ ($n = 39{,}154$; $k = 98$), which is the same as the overall fully corrected mean correlation of $\rho = .27$ ($n = 40{,}652$; $k = 151$). Thus, the overall intelligence–leadership relationship was not affected by the presence of the Fiedler studies testing cognitive resource theory.

In addition to leader stress and directiveness, cognitive resource theory also suggests other moderators of the intelligence–leadership relationship, such as supportiveness of the followers and leader experience. We were unable to include these moderators in the meta-analysis because there were not enough primary studies from which these moderators could be coded. Given the support provided here, future research testing cognitive resource theory is warranted.

Role of Range Restriction

Because leaders are, by definition, a special subset of group members, it is likely that leader samples have higher average intelligence (if leaders are selected, in part, on the basis of their intelligence) and that there is range restriction in leader intelligence scores (if few leaders have intelligence scores from the lower part of the population distribution of intelligence). Both higher average intelligence and restricted range in intelligence were found when the leader samples included in this meta-analysis were compared with population data. In the 23 studies in which intelligence was measured using the Wonderlic Personnel Test, the mean intelligence level was 25.76 as compared with a mean score for the adult working population of 21.75. Additionally, an average u value of .835 was calculated across studies, indicating that the sample standard deviation was smaller than the population standard deviation. Thus, to address the impact of this restricted range on the intelligence–leadership relationship, we present results that corrected for range restriction in leader intelligence. The results indicate that correcting for range restriction had a significant effect on the corrected correlation, increasing it from .21 to .27.

Additionally, we investigated whether mean levels of intelligence in the sample affected validity. To do so, we correlated the mean intelligence level reported in sample, when measured using the Wonderlic Personnel Test, with the intelligence–leadership correlation corrected for unreliability. The correlation between sample average intelligence and the intelligence-leadership correlation in the sample was .14 ($k = 23$). Thus, it appears that more intelligent samples have slightly higher intelligence–leadership validities, which is the opposite of what one would predict if range restriction were reducing validities. In sum, the sample characteristics that are different from the population (mean and range) seem to bias the intelligence–leadership relationship in opposite ways. For this reason, we believe it is important to report the results both corrected ($\rho_2 = .27$) and uncorrected ($\rho_1 = .21$) for the effects of range restriction in intelligence.

Implications, Limitations, and Directions for Future Research

In considering the practical implications of the results, it may be productive to compare the validities observed in this meta-analysis with the correlations between personality and leadership (see Judge et al., 2002). Using validities uncorrected for range restriction, Judge et al. found that several traits had stronger correlations with leadership than intelligence and that, overall, the Big Five had a multiple correlation of .48 with leadership. It is true that these validities are higher than those for cognitive ability, suggesting that selecting leaders on the basis of personality appears to be relatively more important. However, though the overall relationship between intelligence and leadership may be modest, in selecting individuals, even moderate validities can have substantial practical implications (Schmidt & Hunter, 1998). Moreover, on the basis of cognitive resource theory, it is more important to select or place intelligent individuals in leadership positions when the stress level is low and the leader has the ability to be directive. In such cases, the validity of intelligence may be substantial.

One limitation of this review is the small number of studies included in some cells of the moderator analysis. Although 151 independent samples were identified that related intelligence and leadership, relatively few studies included perceptual measures of intelligence. Because reliable paper-and-pencil measures of intelligence are widely available, it is not surprising that only a few studies used perceptual measures of intelligence. However, to fully understand the impact of implicit leadership theories on intelligence–leadership relationships, research is needed that includes both paper-and-pencil and perceptual intelligence measures. Additionally, to avoid common method variance that may partially explain the relationship between perceptual intelligence and leadership measures, research is needed that includes objective leadership measures. Thus, it would be interesting to include, in a single study, perceptual and objective measures of both constructs to explicitly compare their validity and study the interpersonal processes that may explain the results found here. However, as R. Hogan et al. (1994) noted, objective measures of leadership may be contaminated by external factors. Future research that combines the use of both perceptual and objective measures of leadership effectiveness may help to overcome the limitations of each individual measure.

One possible explanation for the relatively modest relationship is that traits combine multiplicatively in their effects on leadership. It is possible that leaders must possess the intelligence to make effective decisions, the dominance to convince others, the achievement motivation to persist, and multiple other traits if they are to emerge as a leader or be seen as an effective leader. If this is the case, then the relationship of any one trait with leadership is likely to be low. For example, it may be that high levels of intelligence will lead to high levels of leadership only if the individual also possesses the other traits necessary for leadership. J. E. Hunter, Schmidt, and Judiesch (1990) drew a similar conclusion when studying sales performance. J. E. Hunter et al. speculated that the skewed distribution of sales performance might arise from the multiplicative effect of various traits and abilities on sales performance.

Future research might also explore other aspects of intelligence. Recently, leadership researchers have emphasized the importance of alternative conceptualizations of intelligence (Riggio, 2002). This school of thought has labeled this general concept "social intelligence" (Boal & Hooijberg, 2000; Zaccaro, 2002), "practical intelligence" (Sternberg, 1997), "emotional intelligence" (Sosik & Megerian, 1999), or "sociopolitical intelligence" (J. Hogan & Hogan, 2002). Notably, several books have been devoted to the topic (Goleman, Boyatzis, & McKee, 2002; Riggio, Murphy, & Pirozzolo, 2002), and a growing body of empirical research also has emerged (e.g., Charbonneau & Nicol, 2002; Wong & Law, 2002). It is important to note that a major hurdle for such investigations is a measurement one. In an investigation of various measures of emotional intelligence, Davies, Stankov, and Roberts (1998) concluded, "Little remains of emotional intelligence that is unique and psychometrically sound" (p. 1013). To date, interest in the multiple intelligences of leadership has surpassed the scientific evidence. However, this does not foreclose the possibility that future research could somehow solve the measurement problems and find unique relations between these alternative conceptualizations of intelligence and leadership (by controlling for general mental ability and personality).

Finally, Bass (1990), Stogdill (1948), and others have hypothesized that it is dysfunctional for a leader's intelligence to substantially exceed that of the group he or she leads. This suggests that group intelligence moderates the relationship between leader intelligence and leader effectiveness. Is this relationship confined to leadership perceptions—in which group members simply do not like leaders whose intellect far exceeds their own—or does it also generalize to objective measures of leadership effectiveness such as group performance? This also would be an interesting area for future research.

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