



Multiple intelligences of transformational leaders: an empirical examination

Intelligences of transformational leaders

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Abstract

Purpose – To examine the impact of emotional, social, and cognitive intelligences on the dimensions of transformational leadership using both paper-and-pencil measures and assessment center dimensions.

Design/methodology/approach – Multiple measurement methodologies were used to conceptualize emotional, cognitive, and social intelligence. Subordinate ratings of three dimensions of transformational leadership were used as the criteria. Correlation analysis and a series of multiple hierarchical regressions were used to determine the relationship between the multiple intelligences and three dimensions of transformational leadership.

Findings – Results indicate that a multiple intelligences framework is a useful approach to predict transformational leadership. Correlation analyses and multiple regression results indicated that the multiple intelligence framework explained between 10 and 25 percent of the variance in perceptions of transformational leadership and that assessment center dimensions explained additional variance beyond paper-and-pencil measures in transformational leadership.

Originality/value – This paper extends previous research by examining the impact of cognitive, emotional, and social intelligences on transformational leadership using multiple measurement methodologies. The results of this study provide a useful framework for practitioners interested in assessing precursors to transformational leadership, with a focus on assessment centers as a useful tool for predicting transformational leadership.

Keywords Transformational leadership, Intelligence tests, Emotional intelligence, Cognition, Charisma, Management skills and qualities

Paper type Research paper

Over the last decade, the majority of the leadership research has been dominated by transformational and charismatic theories of leadership. Briefly, these theories posit that leadership is most effective when an individual utilizes emotional and inspirational influence tactics on the behalf of bolstering the well being of the organization and its members (Bass, 1985). A recent meta-analysis indicated that transformational leadership is an important determinant of a variety of outcome variables including: subordinate commitment and satisfaction as well as the effectiveness of the leader's work group (Judge and Piccolo, 2004). Less evident are the specific traits, dispositions, and abilities that facilitate the display of transformational behaviors.

Recent leadership research has pointed towards exploring multidimensional facets of intelligence as a fruitful arena for ascertaining such evidence. In particular, it has been suggested that those who establish themselves as successful leaders consistently

The authors would like to acknowledge Mike Rush for his helpful comments on an earlier draft of this paper and Betsy Smith for her assistance with the data collection.



across situations possess key social, emotional, behavioral, and cognitive capacities. Individuals with these capacities are successful at interpreting diverse situational cues, dealing emotionally with the diversity of those cues, calling upon an extensive behavioral repertoire, and selecting and enacting the appropriate behavioral responses (Bass, 2001; Zaccaro, 2002). Essentially, these individuals are adept at managing their own behavior to influence others' perceptions of themselves as competent and persuasive organizational figures. Bass (2001) has suggested that these cognitive, social, and emotional components of intelligence should serve as a framework for exploring the impact of individual differences on the facilitation of transformational behaviors. Specifically, Bass postulated that the traits, dispositions, and abilities that make up cognitive, social, and emotional intelligences would differentially relate to the three dimensions of transformational leadership. To date, no empirical research has directly examined these assertions. Thus, the purpose of the present study was to empirically examine the relationships between the cognitive, social, and emotional components of intelligence and the facets of transformational leadership. And, a secondary purpose of this study was to explore assessment center dimensions as an alternative methodology for measuring the multiple forms of intelligence.

Transformational leadership

Transformational leadership has traditionally been defined as the display of the following components: charisma, intellectual stimulation, and individualized consideration (Avolio *et al.*, 1999). The charisma dimension is associated with a leader who instills pride, faith, and respect in subordinates and who provides a vision and a sense of mission to a team through excellent communication skills. Intellectual stimulation characterizes a leader who promotes intelligence, rationality, careful problem solving, and who encourages subordinates to pursue innovative solutions to problems. A leader who gives personal attention to subordinates, treats each employee as an individual, and takes an interest in the long-term development of each employee characterizes the individualized consideration component of transformational leadership.

Multiple intelligences and leadership

As mentioned above, cognitive, social, and emotional intelligences have been postulated as key contributors to the display of the transformational dimensions (Bass, 2001). Very little research though, has been conducted on the cognitive component of intelligence as it relates to the transformational leadership dimensions. Cognitive intelligence includes aptitudes such as dealing with abstract concepts and complex problem solving. It can be assessed through both traditional IQ tests and problem solving tasks of both the paper-and-pencil and simulated forms. In regards to the dimensions of transformational leadership, cognitive intelligence would seem to most likely explain a leader's ability to intellectually stimulate followers. One would need to have strong problem solving skills to firstly, serve as a role model through a series of problem solving successes, secondly to challenge and mold objective reasoning capabilities, and finally to identify the resources needed to empower innovative and creative work from others. In other words, it would seem that for a leader to encourage careful-problem solving and creativity in his subordinates, he himself would have to possess cognitive intelligence. Without strong cognitive skills, it would be difficult for

one to challenge and stimulate the cognitive capacities of others. Therefore, it is proposed that:

- H1.* Cognitive intelligence will be positively related to subordinate ratings of their leader's intellectual stimulation behaviors.

Social intelligence has been defined as the ability to read and adapt to diverse social situations (Bass, 2001; Zaccaro, 2002). Socially intelligent leaders should possess the characteristics to detect the necessary skills for the task, attune themselves to intricate social cues, and manage their behaviors appropriately to influence the pertinent perceptions of other group members. Stogdill (1948) has noted that "alertness to the surrounding environment and understanding of situations are intimately associated with leadership ability". Most researchers in this area have agreed on the notion that a truly successful leader possesses the characteristics of both social perceptiveness and the behavioral flexibility to respond to the needs of the various social situations. Traits characteristic of individuals with strong social intelligence include good oral communication skills, self-confidence, sociability, capacity for status, stress tolerance, and an understanding of the social dynamics of organizational problem solving (Bass, 2001). Moreover, the first stage of the Conger and Kanungo (1987) behavioral model of charismatic leadership involves the leader's status quo evaluation of the existing situation. In their model, a charismatic leader must first be able to accurately assess the "inclinations, abilities, needs, and level of satisfaction experienced by followers" (Conger, 1999). The accuracy of this environmental assessment determines the eventual effectiveness of the leader's actions in the next stage in which the leader acts to create a strategic vision and convey the group's goals. In that charisma has been defined as the ability to instill a sense of group mission, the social form of intelligence appears to be of particular importance to charismatic leadership. Therefore:

- H2.* Social intelligence will be positively related to subordinate ratings of the leader's charismatic behaviors.

Emotional intelligence is defined as the awareness and ability to control one's emotions as well as understand the emotions of others (Caruso *et al.*, 2001; Goleman, 2000). It includes the abilities to perceive emotions in the self and others, to use emotions to facilitate actions, to understand the meaning of emotional cues, and to manage the emotions of the self and of others. Besides the ability-based competencies, this definition invokes traits such as empathy, conscientiousness, sensitivity, and awareness of others' needs (Bass, 2001). Emotional intelligence has been the focus of research into the relationships between specific facets of intelligence and the exhibition of transformational leadership behaviors. This is largely because it has become generally accepted that the relationship between a leader and a follower is a strongly emotional one. Most of these studies have demonstrated emotional intelligence to be a significant predictor of transformational leadership style, in general (Mandell and Pherwani, 2003; Hartsfield, 2003; Ashkanasy and Tse, 2000; Sosik and Megerian, 1999). However, results pertaining to the specific dimensions of transformational leadership have been inconsistent. While emotional intelligence could be theoretically connected to all three dimensions of transformational leadership, it appears most similar to the transformational component of individualized consideration. Specifically, a leader who is viewed as individually considerate is one who takes an interest in each employee on

an individual level, both professionally and personally, and is aware of the needs of individual followers. To effectively exhibit this component, transformational leaders must possess the ability to identify or relate emotionally to others and provide intuitive insight and guidance where necessary. Therefore, it is proposed that:

- H3.* Emotional intelligence will be positively related to subordinate ratings of their leader's individualized consideration.

It is worthwhile to note that no hypothesis has been offered that the three intelligences would be unrelated with any particular component of transformational leadership. Instead, because all three forms include the general ability to interpret diverse cues and abstract concepts, all three intelligences should overlap to some degree. Therefore, a relationship plausibly exists between each of the dimensions of intelligence and each of the components of transformational leadership.

Assessing multiple intelligences

Previous research on the multiple forms of intelligence has measured the components solely by way of paper-based ability and personality tests. Meanwhile, researchers have argued that alternate methods of assessing these multiple intelligences be employed (Zaccaro, 1991; Yukl, 2002). Research has found that individuals willingly distort their responses on self-report personality measures (Barrick and Mount, 1996; Douglas *et al.*, 1996; Ones *et al.*, 1996; Rosse *et al.*, 1998). Rosse *et al.* (1998) found that both job applicants and incumbents significantly distorted their scores to present themselves in a favorable light. Similarly, Bass (2001) argued that range restriction may attenuate the relationship between traditional paper-and-pencil measures of cognitive ability and intellectual stimulation. Further, method bias is often an issue with research using paper-and-pencil measures as predictors and criteria. Researchers studying the multiple intelligences of leaders have called for the design of new methodologies in order to advance science beyond what leadership behaviors we already know are predicted by established ability and personality tests and also to more accurately capture the complex concepts of emotional and social intelligence.

To illustrate, Bass (2001) called for the incorporation of alternate methods of assessing cognitive intelligence that would be more discriminative in differentiating between above average and exceptional levels of cognitive ability. Specifically, Bass recognized range restriction as a primary limitation of existing paper-and-pencil intelligence measures. One potential method for remedying this problem is the assessment center methodology.

Use of AC behavioral dimensions

To operationalize the constructs associated with the multiple intelligences of leaders, this study will employ assessment center (AC) dimensions (for definitions see Appendix 1) in addition to the traditional paper-and-pencil measures. The exercises in assessment centers include real-life job simulations of one-on-one and group meeting settings. Essentially, these AC exercises encapsulate real-life managerial settings by requiring candidates to respond to a wide range of work-related issues across diverse situations. That is, candidates are placed in a variety of socially, emotionally, and cognitively challenging situations and assessed on their ability to read, adapt, and manage the behavior and emotions of themselves and others. Therefore, with the

appropriate conceptual model, these AC behavioral ratings can serve as another methodology for measuring the multiple intelligences of leaders.

AC dimensions, however, have yet to be explored as a potential solution to the need for alternative and more accurate methodologies of capturing the key components of the multiple intelligences. Further, despite the established success of AC's in predicting managerial performance (Gaugler, 1987), no study to date has examined the relationship between AC dimension ratings and transformational leadership. Nevertheless, research has shown that AC's explain additional variance beyond paper-and-pencil measures of personality in predicting general job performance (Goffin, 1996). Therefore, it was predicted that:

- H4.* Assessment center dimensions will add incremental validity beyond paper-and-pencil measures in predicting the dimensions of transformational leadership.

Present research agenda: operationalizing the multiple intelligences

The present study operationalized the constructs associated with the multiple intelligences of leaders using a personality inventory, a paper-and-pencil measure of cognitive ability, and final dimension ratings from an assessment center. The two authors independently assigned dimensions of these measures on a conceptual basis into the framework of cognitive, social, and emotional intelligences. The measurements of the constructs associated with each form of intelligence are discussed herein in order to clarify hypotheses regarding the predictions of the transformational leadership components.

Cognitive intelligence was assessed using overall test scores on paper-and-pencil measures of intelligence (specific traits and their corresponding transformational dimension are displayed in Table I). Past research supports the association between measures of intelligence and perceptions of leadership (see Lord *et al.*, 1986). Additionally, the AC dimensions of analysis and judgment were assigned as measures of cognitive intelligence.

Social intelligence was assessed using AC dimensions and scales from the personality inventory. Dominance has received support as a predictor of leadership (Judge and Bono, 2000) and is a trait indicative of social intelligence (Bass, 2001). Confrontation and influence skills are characteristic of social intelligence (Zaccaro,

Cognitive intelligence	Social intelligence	Emotional intelligence
Watson Glaser	Dominance (CPI)	Conscientiousness (CPI)
Analysis (AC)	Social presence (CPI)	Empathy (CPI)
Judgment (AC)	Capacity for status (CPI)	Coaching (AC)
	Self-Acceptance (CPI)	Sensitivity (AC)
	Confrontation (AC)	
	Teambuilding skills (AC)	
	Leadership skills (AC)	
	Oral communication skills (AC)	

Notes: AC denotes measured by the assessment center; CPI denotes measured by the California Psychological Inventory

Table I.
Components of cognitive,
social, and emotional
intelligence

2002). Oral communication skills are also indicative of social intelligence in that they facilitate the solving of social problems (Bass, 2001). Oral communication skills are intuitively necessary to communicate the motivational message associated with charismatic leaders. Teambuilding skills are a component of social intelligence in so far as this skill set would allow for “the enhancement of collective motivation” (Zaccaro, 2002; pp 34). Self-acceptance is indicative of social intelligence in that this trait facilitates the willingness to “stick one’s neck out” and seek out ways to improve the organization (Zaccaro, 2002). Social presence involves awareness of and boldness in social situations. This trait is similar to the environmental awareness and self-presentation components of social intelligence. Capacity for status is described as a desire to be successful and willingness to express one’s views and opinions. This trait is similar to the social intelligence concept called “social acumen” (Zaccaro, 2002). Finally, leadership, as measured in the AC, is defined as the ability to impact others. This is conceptually similar to the components of social intelligence that stress the implementation of mutually acceptable solutions in small group settings.

Emotional intelligence was also assessed using personality scales and assessment center dimensions. Caruso *et al.* (2001) proposed that conscientiousness is an important component of emotional intelligence. For example, because conscientious individuals are more likely to be attentive to the detailed needs of their subordinates, they will likely be characterized by a high level of emotional intelligence. Empathy, defined as an understanding of how others feel, is very similar to the core definition of emotional intelligence. Further, interpersonal sensitivity, or the display of behaviors indicating a concern for the feelings and needs of others, is an important component of emotional intelligence. Finally, since Caruso and his colleagues suggested developing others as a primary skill of the emotionally intelligent, the AC dimension of coaching was also grouped under the emotional intelligence framework.

Method

Participants

The sample for this study was acquired over a four-year period from 86 physicians enrolled in an MBA program at a large southeastern university. The research participants were concurrently working as physicians in a diverse range of specialties. The sample consisted of 73 males with a mean age of 38.4.

Procedure

Before beginning the MBA program, participants completed the Watson-Glaser Critical Thinking Appraisal (CTA) and the California Psychological Inventory (CPI; Gough and Bradley, 1996). They also participated in a developmental assessment center (AC). For the criterion data, participants were mailed multi-source feedback forms to be completed by themselves as well as their supervisors, subordinates, and peers prior beginning the MBA program. These forms included items drawn from the Multifactor Leadership Questionnaire (MLQ; Bass and Avolio, 1990). Those completing the surveys were instructed to mail multi-source feedback forms back to the university upon completion. Participants were also assured that any information provided would be confidential and used for statistical purposes only.

Measures

Assessment center procedure. The assessment center was used for developmental purposes only. Exercises included two simulation exercises (e.g. 1-on-1 role plays), a leaderless group discussion, and an in-basket exercise. At least two experienced assessors made ratings for each participant on each exercise. Participants received consensus ratings on 16 behavioral dimensions across all exercises in the AC. Dimensions used in this study included analysis, judgment, oral communication, sensitivity, confrontation, leadership, team building, and coaching. Dimensions were rated on a five-point behaviorally anchored rating scale ranging from 1 (“Unsatisfactory”) to 5 (“Outstanding”).

Personality. Personality dimensions were assessed using the CPI. The CPI is an instrument that measures 20 folk scales (for definitions see Appendix 2) and several special-purpose scales and is a widely used and accepted measure of normal personality. Respondents are presented with items in the form of true-false statements. The coefficient alpha reliabilities for the folk scales used in the present study are listed in Table II.

Cognitive ability. Cognitive ability was assessed using the Watson-Glaser Critical Thinking Appraisal (CTA) (Watson and Glaser, 1980). This 80-item instrument is designed to measure critical thinking skills and has frequently been used in research as a measure of cognitive intelligence. Watson and Glaser (1980) report split-half reliabilities ranging from 0.69 to 0.85 and a parallel form reliability coefficient of 0.75.

Leader behavior. Transformational behaviors were assessed using selected items from Bass and Avolio’s (1990) Multifactor Leadership Questionnaire. Consistent with prior research, subordinate ratings on the MLQ were used to assess subordinate perceptions of transformational leadership dimensions. The four scales used to measure transformational leadership were: a four-item measure of inspirational motivation, a four-item measure of charisma, a three-item measure of individualized consideration, and a four-item measure of intellectual stimulation.

Results

Preliminary analyses

Descriptive statistics, reliability estimates, and correlations among study variables can be found in Table II. Confirmatory factor analysis was performed using AMOS Version Four in order to test the factor structure and dimensionality of the transformational scales. Three models were tested:

- (1) a single-factor transformational model;
- (2) a four-factor transformational model; and
- (3) a three-factor transformational model (where inspirational motivation and charisma combined to form a single factor).

The root mean square error approximation (RMSEA) and the comparative fit index (CFI) were used to compare these models. Browne and Cudek (1993) have noted that RMSEA values below 0.10 are considered “reasonable” fit, while RMSEA values below 0.05 are considered “very good.” CFI values greater than 0.9 represent relatively “good fit” (Loehlin, 1998). The three-factor transformational model demonstrated superior fit to the other two models (RMSEA = 0.07; CFI = 0.9). These findings are consistent with the factor structure of the MLQ reported by Avolio *et al.* (1999).

Table II.
Correlation among study
variables

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1. CTA	0.75																	
2. Analysis	0.14	*																
3. Judgment	0.14	0.72**	*															
4. Confrontation	0.03	0.28*	0.29*	*														
5. Dominance	0.10	0.08	0.05	0.05	0.83													
6. Social presence	0.19	0.05	0.11	0.23*	0.58**	0.71												
7. Capacity for status	0.27	0.08	0.00	0.14	0.47**	0.58**	0.72											
8. Self-acceptance	0.24	0.10	0.07**	0.14	0.66**	0.66**	0.51**	0.67										
9. Teambuilding	0.13	0.25*	0.35**	0.03	0.00	0.10	-0.09	0.08	*									
10. Leadership	0.18	0.61**	0.58**	0.37**	0.02	0.16	0.14	0.10	0.26*	*								
11. Oral Com.	0.02	0.40**	0.37**	0.30**	0.19	0.28*	0.16	0.23*	0.31**	0.51**	*							
12.																		
Conscientiousness	0.05	0.00	-0.06	-0.09	0.32**	0.08	0.06	0.04	0.06	0.04	0.21	0.77						
13. Empathy	0.35**	0.10	0.08	0.18	0.44**	0.55**	0.56**	0.40**	0.01	0.27**	0.17	0.09	0.63					
14. Coaching	0.14	0.37**	0.51**	0.16	-0.05	0.30*	0.17	0.16	0.32**	0.40**	0.29**	-0.03	-0.08	*				
15. Sensitivity	0.05	0.27*	0.29*	0.35**	-0.01	0.16	0.01	0.02	0.20	0.54**	0.46**	0.05	0.18	0.15	*			
16. Charisma	0.09	0.28*	0.19	0.10	0.32**	0.27*	0.24*	0.22*	0.25*	0.27*	0.22*	0.25*	0.28**	0.20	-0.03	0.82		
17. Intellectual Stim.	0.13	0.32*	0.24*	0.11	0.21*	0.11	0.20	0.17	0.11	0.28*	0.08	0.05	0.25*	0.14	-0.16	0.76**	0.76	
18. Consideration	0.13	0.10	0.15	0.01	0.26*	0.12	0.06	0.08	0.13	0.11	0.16	0.31**	0.25*	0.25*	-0.06	0.74**	0.54**	0.79

Notes: *Denotes significant at the 0.05 level; **Denotes significant at the 0.01 level; coefficient alpha reliabilities are displayed along the diagonal

In order to ensure adequate agreement between subordinates on the leadership scales, with-in rater agreement (r^{wg}) was calculated (James *et al.*, 1984). R^{wg} is a statistic used to assess interrater agreement based on a comparison of observed with-in group agreement to the agreement one would expect by chance (James *et al.*, 1984). James and colleagues argue that r^{wg} is a more accurate, realistic method of assessing interrater agreement than traditional interrater reliability coefficients. These analyses were conducted to provide empirical justification for aggregating follower ratings ($n = 295$ followers). Analyses indicated that sufficient agreement existed to aggregate subordinate responses (mean $r^{wg} = 0.87$). Given the results of the CFA and agreement analyses, the researchers were confident that the three-factor transformational scales appropriately fit the data and also that sufficient agreement existed in subordinate perceptions of leaders to justify aggregation across subordinates.

Hypotheses 1-3

Correlation analysis was used to examine the relationships between individual components of the three intelligences and ratings on transformational scales. Analyses revealed that intellectual stimulation was significantly related to the cognitive intelligence dimensions of analysis ($r = 0.32$; $p < 0.05$) and judgment ($r = 0.24$; $p < 0.05$) as measured by the AC. Interestingly, CTA scores were unrelated to ratings of intellectual stimulation ($r = 0.13$; *ns*). Thus, partial support was found for *H1* in that two of the three hypothesized components of cognitive intelligence were associated with intellectual stimulation.

The personality scales used to measure social intelligence, dominance ($r = 0.32$; $p < 0.01$), social presence ($r = 0.27$; $p < 0.05$), capacity for status ($r = 0.24$; $p < 0.05$), and self-acceptance ($r = 0.22$; $p < 0.05$), were all significantly related to subordinate perceptions of charisma. The AC dimensions of oral communication ($r = 0.22$; $p < 0.05$), team building ($r = 0.25$; $p < 0.05$), and leadership ($r = 0.27$; $p < 0.05$) were also significantly associated with subordinate perceptions of charisma. However, confrontation skills as assessed by the AC were not associated with this criterion. Thus, seven of eight hypothesized components were associated with charisma, indicating partial support for *H2*.

The personality scales assessing emotional intelligence that significantly related to ratings of individualized consideration were conscientiousness ($r = 0.31$; $p < 0.01$) and empathy ($r = 0.25$; $p < 0.05$). Additionally, the AC dimension of coaching was significantly related to ratings of individualized consideration ($r = 0.25$; $p < 0.05$). However, the AC dimension of sensitivity was not related to individualized consideration. Taken together, partial support was found for *H3*, as three of the four hypothesized relationships were significant.

Hypothesis 4

Multiple hierarchical regression (MHR) was used to test whether AC dimensions added incremental validity beyond paper-and-pencil measures in the prediction of each component of transformational leadership. The relevant personality and cognitive ability variables from the paper-and-pencil measures were entered as the first steps in a regression equation designed to predict the dependent variable of interest. The second and final step in these regression analyses consisted of dimensions from the AC. Of

interest here is whether the change in R^2 is significant at the second step of the MHR for each hypothesized multiple intelligence component-transformational link. For the cognitive intelligence, the AC dimensions explained significant variance beyond the paper-and-pencil measure in predicting intellectual stimulation ($\Delta R^2 = 0.08$; $p < 0.05$). For social intelligence, the AC dimensions explained significant variance beyond that accounted for by paper-and-pencil measures in predicting charisma ($\Delta R^2 = 0.09$; $p < 0.05$). Lastly, for emotional intelligence, the AC dimensions explained significant variance beyond that accounted for by paper-and-pencil measures in the predicting individualized consideration ($\Delta R^2 = 0.09$; $p < 0.01$). Thus, the AC dimensions added incremental validity to paper-and-pencil measures in the prediction of all three dimensions of transformational leadership indicating full support for $H4$ (see Table 3).

Discussion

The results of this study indicate that the multiple intelligences framework proposed by Bass (2001) provides a useful framework for understanding the individual differences associated with the dimensions of transformational leadership. More specifically, the results supported the propositions that specific forms of intelligence would be related to particular transformational dimensions. Significant relationships were found between cognitive intelligence components and intellectual stimulation, social intelligence components and charisma, and emotional intelligence components and individualized consideration. In particular, the abilities and traits that make up the environmental diagnosis and behavioral response flexibility components of social intelligence appear to be important factors for facilitating the display of charismatic leadership. Similarly, the abilities and traits necessary to consistently recognize and respond to followers' emotional needs appear to facilitate the display of individualized consideration.

The results do not indicate though that the specific traits, dispositions, and abilities that comprise each form of intelligence are exclusive to a particular transformational leadership dimension. That is, each form of intelligence predicted its hypothesized transformational dimension better than the other two dimensions; however, each of the forms of intelligence was also related to each of the three dimensions of transformational leadership. One possible explanation for this finding is that all three incorporate some form of interpreting abstract cues and solving problems through behavioral response choice.

This study did, however, produce some evidence to support the use of assessment centers as an alternative methodology for capturing the multiple forms of intelligence. That is, AC dimensions explained significant incremental variance beyond paper-and-pencil measures in the prediction of transformational leadership. These results also have implications for the practitioner interested in transformational leadership. Assessment centers, a previously unexamined method of assessing multiple intelligences and leadership, evidenced criterion-related validity in the prediction of the dimensions of transformational leadership. Thus, ACs may prove to be a fruitful area for assessing transformational leadership.

As always, it is necessary to recognize weaknesses of the study's design when interpreting the results. First, the generalizability of these results is suspect inasmuch as we drew our sample from physicians enrolled in an MBA program. Another

Variable	Intellectual stimulation			Charisma			Individualized consideration								
	R^2	R	ΔR^2	R^2	R	ΔR^2	R^2	R	ΔR^2	F	Sig.				
<i>Cognitive intelligence</i>															
Step 1: Paper and pencil (Watson Glaser)	0.02	0.13	0.02	1.34	0.25	0.01	0.07	0.01	0.45	0.51	0.01	0.12	0.01	1.15	0.29
Step 2: Assessment center (analysis and judgment)	0.10	0.32	0.08	3.93	0.02	0.08	0.28	0.07	3.17	0.05	0.04	0.19	0.03	1.08	0.35
<i>Social intelligence</i>															
Step 1: Paper and pencil (dominance, social presence, capacity for status, and self-acceptance)	0.07	0.27	0.07	1.20	0.32	0.16	0.39	0.16	2.9	0.02	0.14	0.36	0.14	2.4	0.05
Step 2: Assessment center (confrontation, oral communication, team building, and leadership)	0.17	0.41	0.10	2.2	0.08	0.25	0.50	0.09	2.49	0.05	0.16	0.40	0.02	0.62	0.65
<i>Emotional intelligence</i>															
Step 1: Paper and pencil (conscientiousness and empathy)	0.06	0.25	0.06	2.8	0.07	0.13	0.36	0.13	6.09	0.003	0.14	0.38	0.14	6.75	0.002
Step 2: Assessment center (coaching and sensitivity)	0.14	0.37	0.08	3.5	0.04	0.19	0.44	0.06	3.22	0.05	0.23	0.48	0.09	4.89	0.01

Table III.
Multiple regression
results for the prediction
of transformational
dimension by paper and
pencil measures and
assessment center
dimensions

potential limitation was the linkages drawn from the scales used to measure the multiple intelligences. Specifically, the decisions for classifying particular personality scales and AC dimensions into the dimensions of emotional and social intelligence may have inadequately captured the emotional and social intelligence constructs. Many of the same traits, abilities, and skills have been included in descriptions of both emotional and social intelligence. For instance, confrontation skills, social awareness, self-confidence, and adaptability have all been described as essential components of both emotional and social intelligence (Caruso *et al.*, 2001; Zaccaro, 2002).

Based on the findings from this study, future research should explore other methods of assessing the emotional and social intelligences. This study has highlighted assessment centers as a fruitful arena for explorations of this kind. Assessment centers, by presenting individuals with socially, emotionally, and cognitively diverse and challenging situations, may have a strong future with multiple intelligences researchers. Also, given the generalizability limitations mentioned above, future research should attempt to replicate our findings with larger and more diverse samples.

In sum, this study enhances our understanding of the essential components of transformational leadership and points to the multiple intelligences framework as a useful classification of the traits, dispositions, and abilities associated with transformational leaders. It is our hope that this study will serve to stimulate future research on the linkages between multiple intelligences and aspects of leaderships as well as instigate investigations into additional methodologies for adequately measuring the multiple intelligences of leaders.

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Appendix 1. Definitions of AC dimensions

Cognitive intelligences

Analysis – The ability to identify problems, secure relevant information, relate data from different sources, and identify potential causes of problems.

Judgment – The ability to take alternative courses of action and make decisions based on logical assumptions that reflect factual information.

Social intelligence

Confrontation – The ability and willingness to disagree or tactfully express opposing view points; willingness to assert or defend one's opinion when challenged.

Leadership – Utilizing appropriate interpersonal styles and methods in guiding individuals or groups task toward task accomplishment.

Oral communication – Effective expression in individual or group situations; includes delivery and speaking with enthusiasm and confidence.

Teambuilding – The ability to work effectively as part of a group; includes willingness to adopt the suggestions of others, giving credit where it is due, and sharing relevant information.

Emotional intelligence

Sensitivity – The extent to which an individual shows consideration for the needs and feelings of others.

Coaching – The extent to which an individual provides guidance and facilitates subordinate skill development.

Appendix 2. Definitions of California psychological inventory folk scales

Social intelligence

Dominance – Confident, dominant, assertive, shows initiative, task-oriented.

Social presence – Self-assured, spontaneous, a good talker, not easily embarrassed.

Capacity for status – ambitious, wants to be a success, versatile in social settings.

Self-acceptance – has good opinion of self, sees self as talented, defends position when challenged.

Emotional intelligence

Conscientiousness – clearly structured values, pragmatic, pays attention to detail.

Empathy – understands how others feel, open and understands own feelings.

About the authors

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