Running Head: LEADERSHIP SKILLS STRATAPLEX

# The Leadership Skills Strataplex: Leadership Skill Requirements Across Organizational Levels

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## Abstract

Leadership scholars have called for additional research on leadership skill requirements and how those requirements vary by organizational level. In this study, leadership skill requirements are conceptualized as being layered (strata) and segmented (plex), and are thus described using a strataplex. Based on previous conceptualizations, this study proposes a model made up of four categories of leadership skill requirements: Cognitive skills, Interpersonal skills, Business skills, and Strategic skills. The model is then tested in a sample of approximately 1000 junior, midlevel, and senior managers, comprising a full career track in the organization. Findings support the "plex" element of the model through the emergence of four leadership skill requirement categories. Findings also support the "strata" portion of the model in that different categories of leadership skill requirements emerge at different organizational levels, and that jobs at higher levels of the organization require higher levels of all leadership skills. In addition, although certain Cognitive skill requirements are important across organizational levels, certain Strategic skill requirements only fully emerge at the highest levels in the organization. Thus a strataplex proved to be a valuable tool for conceptualizing leadership skill requirements across organizational levels.

# The Leadership Skills Strataplex: Leadership Skill Requirements Across Organizational Levels

Despite literally thousands of leadership studies, many scholars lament that conceptualizations of leadership skills have received inadequate attention (Wright & Taylor, 1985, 1994; Yukl & Van Fleet, 1992). Others have suggested that additional research is needed to understand the specific skills needed by leaders (Kanungo & Misra, 1992; Wright, 1996). These calls for a focus on leadership skills are important for at least two reasons. First, a focus on leadership skill requirements emphasizes that leaders can become better leaders, in part because skills represent capabilities that can be developed. This complements other research that has helped our understanding of fairly enduring abilities or personality characteristics of leaders (Bass, 1990). Second, by focusing on leadership skill requirements, the focus is shifted from the person holding the job (i.e., the leader) to the job itself. Thus, instead of attempting to identify the characteristics of leaders (which has had a checkered history of success), the focus is squarely on the job of the leader, and the skills it requires.

We seek to further our understanding of leadership skill requirements across organizational levels by identifying four distinct categories of leadership skill requirements that emerge differentially across organizational levels. Using this conceptual model of leadership skill requirements, we empirically examine the nature of skill requirements in a large sample of leaders across three organizational levels.

## The Leadership Skills Strataplex

Leadership skill requirements are often described as being stratified by organizational level (Jacobs & McGee, 2001) and a complex of multiple categories (Phillips & Hunt, 1992; Zaccaro, 2001). As such, leadership skill requirements across organizational levels can be usefully described using a "strataplex." The term strataplex is derived from the term "strata"

which comes from the word "stratify" meaning having a number of layers or levels in an organized system, and the term "plex" which comes from the word "complex" meaning divided into a specified number of parts. Thus, the term strataplex captures the stratified and complex nature of the leadership skill requirements and their relationship with level in the organization.

Previous conceptualizations of leadership skill requirements (Connelly et al., 2000; Kanungo & Misra, 1992; Katz & Kahn, 1978; Lau, Newman, & Broedling, 1980; Mahoney, Jerdee, & Carroll, 1965; Mintzberg, 1973; Mumford, Marks, Connelly, Zaccaro, & Reiter-Palmon, 2000; Zaccaro, 2001) suggest they can be understood in terms of four general categories: (1) Cognitive skills, (2) Interpersonal skills, (3) Business skills, and (4) Strategic skills. Table 1 summarizes how past research into leadership skill requirements is related to these four categories. As can be seen in the table, the nine previous articles that have discussed taxonomies of leadership skills have repeatedly identified skill types that are captured by the four categories in the leadership strataplex. Further support for this conceptualization is provided below.

Figure 1 depicts the leadership skills strataplex. Although the relationships among skill categories, skill amounts, and organizational levels will be articulated in the hypotheses, the basic representations are as follows. First, the four triangles represent the four categories of leadership skill requirements. Second, dotted horizontal lines stratify the requirements for managerial jobs at different organizational levels. Three levels are chosen for illustration in the figure (i.e., junior, mid, and senior levels), but the concept could be applied to more organizational levels. Third, the area subsumed in each successive triangle, stratum, or triangle-stratum segment represents the hypothesized amount of that particular leadership skill that would be required for that particular job level. For example, the fact that the Cognitive triangle

(horizontal lines) has greater area than the Interpersonal triangle (vertical lines) illustrates that, overall, Cognitive skills will be needed more than Interpersonal skills. As another example, the fact that within the senior level strata (which subsumes the other two strata), a greater portion of the total area is accounted for by the Strategic skills indicates that Strategic skill requirements are relatively more important for senior level jobs.

*Cognitive Skills*

Cognitive skills are the foundation of the leadership skill requirements. They are comprised of those skills related to basic cognitive capacities, such as collecting, processing, and disseminating information (Lau & Pavett, 1980; Mintzberg, 1973; Zaccaro, 2001) and learning (Mahoney et al., 1965) and are the fundamental skills required for a large portion of the activities in which leaders are engaged (Carroll & Gillen, 1987). These skills include such oral communication skills as *speaking* (Graham, 1983; Shipper & Dillard, 2000; Yukl, 1989) to effectively convey information such as what needs to be accomplished and why it needs to be done and *active listening* (Graham, 1983) to appropriately comprehend and question in order to achieve a complete understanding. Written communication skills are also fundamental, and they include *writing* (Luthans, Welsh, & Taylor, 1988; Wright, 1996; Zaccaro, 2001) to effectively communicate audience-specific messages and *reading comprehension* skills to understand voluminous and complex written information.

Another important Cognitive skill requirement is the ability to learn and adapt. This is facilitated by the possession of *active learning* skills (Jacobs & Jaques, 1987) enabling leaders to work with new information and grasp its implications. These skills allow leaders to adapt behaviors and strategies to deal with emergent, non-routine, and dynamic components of their jobs (Kanungo & Misra, 1992). Finally, skills in the area of *critical thinking* (Gillen & Carroll,

1985) are an important aspect of leadership in order to use logic to analyze the strengths and weaknesses of various approaches to the work.

*Interpersonal Skills*

The next category of leadership skill requirements are referred to as Interpersonal skill requirements because they involve the interpersonal and social skills relating to interacting with and influencing others (Katz, 1974; Mumford, Marks, et al., 2000). This category grows out of what previous research has referred to as social capacities (Zaccaro, 2001), Social Judgment (Mumford, Marks, et al. 2000), Social Complexity and Differentiation (Hooijberg, Hunt, & Dodge, 1997) and Human Relation skills (Katz & Kahn, 1978). Interpersonal skills involve *social perceptiveness* (Graham, 1983; Mintzberg, 1973; Yukl, 1989) to allow for an awareness of other's reactions and understanding of why they react the way they do. The Interpersonal category of leadership skill requirements also includes the skills required for *coordination* of actions of oneself and others (Gillen & Carroll, 1985; Mumford, Marks, et al., 2000), and *negotiation* skills to reconcile differences among employee perspectives and establish mutually satisfying relationships (Copeman, 1971; Mahoney, Jerdee, & Carroll, 1963, 1965; Mintzberg, 1973), and *persuasion* skills to influence others to more effectively accomplish organizational objectives (Katz, 1974; Mintzberg, 1973; Yukl, 1989).

*Business Skills*

The third category, Business skill requirements involves skills related to specific functional areas (Hambrick & Mason, 1984; Zaccaro, 2001) that create the context in which most leaders work (Connelly et al., 2000; Lau, Newman, & Broadling, 1980). Business skills involving the *management of material resources* (Katz, 1974) and *operations analysis* (Hoffman & Hegarty, 1993) are important as managers make decisions about procuring and allocating

equipment, technology, and materials. In addition, business skills involve the specific skills for *management of personnel resources* (Luthans et al., 1988; Mahoney et al., 1963, 1965) to identify, motivate, develop, and promote individuals in their work as well as *management of financial resources* (Copeman, 1971; Katz, 1974) of the organizational unit.

*Strategic Skills*

Strategic skill requirements are highly conceptual skills needed to take a systems perspective to understand complexity, deal with ambiguity, and to effect influence in the organization (Hooijberg et al., 1997; Mahoney et al., 1965; Zaccaro, 2001). These include the important planning-related skills of *visioning* (Conger & Kanungo, 1987), and *systems perception* (Connelly, Marks, & Mumford, 1993; Copeman, 1971; Gillen & Carroll, 1985; Mumford, Dansereau, & Yammarino, 2000; Mumford, Zaccaro, Harding, Jacobs, & Fleishman, 2000) that require the development of an image of how a system should work and determining when important changes to the system have occurred or are likely to occur. This is related to the environmental scanning skills of *identification of downstream consequences* and *identification of key causes* (Cox & Cooper, 1988; Kanungo & Misra, 1992; Mumford, Zaccaro, et al., 2000), which provide the understanding of causal relationships in the environment and their long-term outcomes (Yukl, 1989). This concept is referred to by Jacobs and colleagues (Jacobs & Jaques, 1987; Jacobs & Lewis, 1992) and discussed by Zaccaro (2001) as the creation of a causal map that defines the important elements, events, and relationships in the leader's environment. The identification of the components of this map allows leaders to recognize relationships among problems and opportunities, and then choose appropriate strategies to deal with them. Strategic skills also have a significant problem solving component. *Problem identification* skills (Cox & Cooper, 1988; Yukl, 1989) become increasingly important for these jobs to determine the true

nature of problems faced by the organization. Leaders often also have the important role of evaluating alternative courses of action to solve organizational problems, referred to as *solution appraisal* and *objective evaluation* skills (Mumford, Marks, et al., 2000).

The distinction existing between Cognitive, Interpersonal, Business, and Strategic skill requirements underlies the "plex" notion of the strataplex. Although past work supports the conceptual distinction between the categories, the current study contributes to the literature by investigating the distinction empirically.

*Hypothesis 1*: The Cognitive, Interpersonal, Business, and Strategic skill categories will be empirically distinguishable.

## Skill Requirement Strata

Cognitive skills (e.g., oral and written communication) are the most fundamental of the leadership skills. This is, in part, because the majority of leadership activities draw heavily upon these primary skills. For example, many skill requirements in the Interpersonal domain (e.g., persuasion, negotiation) draw from more fundamental cognitive skills (e.g., oral communication). In addition, leadership research that has examined activities of managers suggests that the majority of their time is spent performing tasks that draw upon these Cognitive skills, such as oral and written communication (Gillen & Carroll, 1985). Thus, it is proposed that these Cognitive skills will be required in greater amounts than the other three skill categories. This relationship is proposed to exist across job levels.

Similarly, the Interpersonal skills are likely to be required in greater amounts than Business and Strategic skills. This assertion is supported by the fact that leadership positions at all levels involve a significant amount of interpersonal interaction, persuasion, and coordination (Zaccaro, 2001), whereas Business and Strategic skills are more important at higher leadership

levels. Finally, Business skills are likely to be required in greater amounts than Strategic skills. This is supported by evidence that effective leadership has been associated with greater functional expertise, and these function-specific skills are typically relevant to the systems in which the system skills are used (Hambrick & Mason, 1984). This is not to suggest that Strategic skill requirements are unimportant, but simply that they are required in lesser amounts than the other three more fundamental leadership skill requirements.

*Hypothesis 2*: Leadership skill requirements will vary by skill category such that Cognitive skills will be needed the greatest amount, followed by Interpersonal, Business, and Strategic skills, respectively.

As noted previously, Figure 1 illustrates this hypothesis in the area contained in the Cognitive skills triangle and the successive triangular areas for Interpersonal, Business, and Strategic skill requirements. Note that the Cognitive skills triangle (horizontal lines) contains more area than the Interpersonal (vertical lines), Business (dots on white), or Strategic (dots on black) triangular areas. Likewise, the area contained in the Interpersonal triangular area is greater than the area contained in the Business and Strategic triangular areas, and so forth.

## Skill Requirements by Organizational Level

Increasingly, leadership research has recognized that the leadership phenomena may manifest itself in different ways at different levels in the organization (McCall & Lombardo, 1983; Zaccaro, 2001). An example of this is a number of studies that investigate leadership among top executives (Cleveland, 1985; Prahalad & Yves, 1984; Schriesheim, Hunt, Hosking, & Stewart, 1984), distinguishing it from leadership at lower organizational levels.

One of the seminal discussions of how leadership requirements differ across organizational levels was provided by Jaques (1978). His Stratified Systems Theory (SST)

provides a theoretical framework that breaks the organizational structure into three to five levels. At the first level, front line supervisors must be able to understand, articulate, and carry out the work to be done. At the second level, the departmental manager must be able to both carry out current tasks and prepare for likely changes in the future. The third level is the general manager who must have the ability to make comparisons among multiple systems and choose effectively among them. Fourth, the leader of a small firm must deal with additional cognitive complexity by having to make predictions about future organizational challenges. Fifth the senior officer of a large corporation must deal with ambiguities and complexities in the environment through establishing priorities and managing external relationships. Thus, the nature of leadership changes both quantitatively (increasing in complexity) and qualitatively (greater interaction with environment) as you go up in job level (Hooijberg et al., 1997; Jaques, 1978).

This view of quantitative and qualitative change is supported in a range of empirical research (Boyatzis, 1982; Flanders, Carlson, & Klauss, 1983; McHenry, 1986). Recent work by Mumford, Marks, et al. (2000) is characteristic of this body of research. In a sample of over 1,500 officers in the United States Army, they found that managers at higher organizational levels possessed higher leadership skills, and increases in leadership skills were related to criterion measures of leadership performance. From these findings, the authors infer that "more senior leadership positions apparently require higher levels of skills in general" (p. 109) but the study did not directly measure skill requirements of jobs. Because leadership requirements increase in complexity at higher organizational levels (Jacobs & Lewis, 1992), and higher skill levels would be needed to manage this complexity, there should be a positive relationship between organizational level and the four leadership skill requirements. Although it is true that jobs at higher organizational levels are likely to have additional leadership skill requirements

(e.g., visioning), they are also likely to require more fundamental leadership skills (e.g., oral communication). These cognitive skills are likely to become increasingly important at higher organizational levels because the environment in which they are used grows more complex, novel, and ill-defined (Mumford & Connelly, 1991). Thus, the positive relationship between organizational level and leadership skill requirements will exist for each of the four leadership skill requirement categories.

*Hypothesis 3*: Cognitive, Interpersonal, Business, and Strategic skill requirements will be positively related to the job's level in the organization.

The leadership skills strataplex in Figure 1 illustrates this relationship. The three organizational strata can be considered subsuming. That is, jobs at the successively higher strata also require all those skills of lower strata. For example, the amount of Cognitive skill required at the mid-level would equal the junior level segment of the Cognitive skills triangle as well as the mid-level segment of the Cognitive skills triangle.

## Interaction of Skill Requirements and Organizational Level

In addition to the quantitative difference is complexity levels, leadership requirements at different levels may also differ qualitatively (Jacobs & Jaques, 1987). This suggests that even though the four skill requirement categories will be relevant to some degree at all levels, the relative importance is likely to be different at different levels in the organization. The skills gain in importance to a greater extent at higher job levels and the higher level skills in the Strataplex emerge more strongly as one goes up the organizational hierarchy. That is, the strength of the relationship between organizational level and leadership requirements is stronger for higher level skills. This is because higher level jobs involve more uncertainty, complexity, and decision making demands, thus necessitating the higher level skills.

*Hypothesis 4*: Leadership skill requirements will interact with organizational level such that:

*Hypothesis 4a*: Strategic skill requirements will be more strongly related to organizational level than Cognitive, Interpersonal, and Business skill requirements.

*Hypothesis 4b*: Business skill requirements will be more strongly related to organizational level than Cognitive or Interpersonal skill requirements.

*Hypothesis 4c*: Interpersonal skill requirements will be more strongly related to organizational level than Cognitive skill requirements.

These hypotheses can also be inferred from the leadership skills strataplex in Figure 1, in that the ratio between the area for each skill type varies for each job level. For example, the amount of Cognitive skill required at the junior level is much higher than the amount of Strategic skill required at that level. At the senior level, however, the amounts of Cognitive and Strategic skills that are required are almost equal, primarily because more Strategic skills are needed. Thus, the relative importance of the skill categories is different at different levels in the organization.

## Method

### *Sample*

The sample consisted of 1,023 professional employees working in an international agency of the U.S. government. These employees were generalists working in five different career specialties in 156 different countries, including the United States. The major duties of each of the five career specialties are as follows. Administrative positions involved overseeing procurement of goods and services, managing financial operations, and negotiating and monitoring contracts with various external groups. Public relations positions involved assisting U.S. citizens, interacting with foreign government officials and members of the public, and

processing official documents. Economic analyst positions involved assisting U.S. business representatives and negotiating treaties and other agreements. Political analyst positions involved monitoring, developing, and implementing U.S. policies and strategies. Finally, multifunctional positions represented a combination of the other four positions. These five career specialties can be thought of as five distinctly different jobs, each with unique tasks and duties (although multifunctional positions simply represent a unique combination of tasks and duties performed in the other specialties).

The employees were sampled from three levels in the organization that will be referred to as junior (1-5 years experience), mid-level (6-20 years), and senior (21+ years). The sample is particularly advantageous for the current research because it represents an entire career path in the organization, with all higher level employees having passed through all the lower levels in this organization through a competitive performance based promotional system.

All the employees received questionnaires asking about the jobs' skill requirements and other general work-related activities. All jobs had leadership responsibilities, with leadership being particularly important because promotion committees make decisions based on yearly performance reviews that mainly focus on leadership potential. This is due to the fact that the organization maintains an up-or-out career progression system where employees must be promoted within a certain period of time within the organization or must leave the organization.

*Measures*

*Leadership skill requirements*. Leadership skill requirements were measured with the Occupational Information Network (O*NET) scales developed by the U.S. Department of Labor (Peterson et al., 2001). The O*NET is a comprehensive job analysis system that was designed to replace the Dictionary of Occupational Titles. Its primary purpose is to provide a systematic and

comprehensive measurement system for describing work. It does this in three ways: (1) by using multiple descriptors to provide "multiple windows" on the world of work (skills is one of the descriptor domains), (2) using cross-job descriptors to provide a common language to describe different jobs, and (3) using a hierarchical taxonomic approach to occupational descriptors. As such, O*NET provides a comprehensive and useful model that can enable cross-domain and cross-occupation examinations of leadership skills and other capabilities. The leadership skill requirements specified in the leadership strataplex were measured by their corresponding skill requirement scales from the O*NET work measurement system.

The 1,023 employees rated the level of skills needed to perform the job on 7-point Likert-type scales. Behavioral anchors were provided for the high, medium, and low points of each scale. As an example, the anchors for the persuasion scale are, "changing the opinion of the jury in a complex legal case" (high), "convincing a supervisor to purchase a new copy machine" (medium), and "soliciting donations for a charity" (low). The respondents were instructed that the anchors were illustrative of the skill level, although the particular example may not apply to their particular job.

*Cognitive skill requirements* were assessed using six items including: Speaking (talking to others to convey information effectively), active listening (listening to what other people are saying and asking questions as appropriate), writing (communicating effectively in writing as appropriate for the needs of the audience), reading comprehension (understanding written sentences and paragraphs in work related documents), active learning (working with new information to grasp its implications) and critical thinking (using logic and analysis to identify the strengths and weaknesses of different approaches). Internal consistency reliability was .90.

*Interpersonal skill requirements* were assessed using four items including: Social perceptiveness (being aware of others' reactions and understanding why they react as they do), coordination (adjusting actions in relation to others' actions), negotiation (bringing others together to reconcile differences), and persuasion (persuading others to change their minds or behavior). Internal consistency reliability was .84.

*Business skill requirements* were measured using four items including: Operations analysis (analyzing needs and product requirements to create a design), management of personnel resources (motivating, developing, and directing people as they work), management of financial resources (determining how money will be spent to get the work done), and management of material resources (obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work). Internal consistency reliability was .75.

*Strategic skill requirements* were measured using six items including: Visioning (developing an image of how a system should work under ideal conditions), systems perception (determining when important changes have occurred in a system or are likely to occur), system evaluation (looking at many indicators of system performance, taking into account their accuracy), identification of downstream consequences (determining the long-term outcomes of a change in operations), identification of key causes (identifying the things that must be changed to achieve a goal), problem identification (identifying the nature of problems), and solution appraisal (observing and evaluating the outcomes of problem solution to identify lessons learned or redirect efforts). Internal consistency reliability was .91.

*Job level*. The level of the job in the organization was measured using the organization's job classification system. Jobs were grouped into three levels: senior, mid, and junior. This was

done because of natural distinctions in the organizational structure as well as for conceptual clarity.

*Control variables*. The sample was taken from an international organization. In order to account for any differences that may be due to the jobs being located outside of the United States, the location of the job was controlled for using a dummy coded variable. Because there were five different career specialties in the organization, career specialty was also included as a dummy coded control variable to eliminate any differences due to career specialty.

## Results

Descriptive statistics and correlations among the variables are reported in Table 2. The leadership skill requirement means range from 4.59 to 5.84 and the standard deviations range from .75 to 1.10, thus showing good range and variation. The leadership skill requirements correlations ranged from .23 to .71. Although the skill categories are related, the average correlation of .62 equates to only 38% shared variance, suggesting that the majority of the variance in the measures is non-shared. In addition, the relationships are not surprising, given that we expect all skills to be required of all leaders. Finally, substantial theoretical reasoning and empirical results suggest that qualitatively different types of leadership skill requirements exist (e.g., Connelly et al., 2000; Mumford et al., 2000; Zaccaro, 2001). This research is bolstered by the conceptual delineations made in this manuscript.

Hypothesis 1 captured the “plex” element of the leadership skill requirement strataplex by proposing that the four leadership skill requirement categories would be empirically distinct. This hypothesis was assessed empirically using maximum likelihood method of covariance structure analysis. Such confirmatory factor analysis is appropriate when theoretical relationships and structures have been specified a priori (Hurley et al., 1997), as they have been in this study.

The four-factor model of leadership skill requirements was compared to an alternative one-factor model using confirmatory factor analysis to test both of the nested models using a chi-squared difference test to determine if the differences in fit were statistically significant. Model goodness of fit was assessed by two fit indices: the comparative fit index (CFI) and normed fit index (NFI). CFI and NFI values above .90 indicate an acceptable fit (Bentler, 1992). These fit indices are shown in Table 3. Examining the fit indices suggests that both the one-factor model ($\chi^2$ = 714.8, CFI=.981, NFI=.980) and the four-factor model ($\chi^2$ = 324.1, CFI=.991, NFI=.991) provided an adequate fit for the leadership skill requirement data. Comparing the fit indices for the two models, however, suggests that the four-factor model provides a slightly better fit. With large samples, the chi-square statistic loses its usefulness as a direct indicator of the model fit (James, Mulaik, & Brett, 1982), but comparing the chi-squared statistics for both models using the chi-squired difference test is useful to determine the relative fit of the models (Long, 1983). The $\chi$2 difference test indicates that the four-factor model fit the data better than the one-factor model ($\chi^2$ = 390.7, 6, $p < .01$). This provides support for the four-factor model of leadership skill requirements and Hypothesis 1.

Hypothesis 2 proposed that the four leadership skill requirement categories would be required to different degrees. That is, that Cognitive skill requirements would be needed the most, followed by Interpersonal, Business, and Strategic skill requirements, respectively. Hypothesis 2 was evaluated using multivariate analyses of covariance (MANCOVA) to test for mean differences in skill requirements. Job level, organizational specialty, and location were included as controls. Because participants provided ratings for each of the four skill requirements, a within-subjects design was utilized to control for rater effects. Significant mean differences, after using the Bonferroni procedure for multi-comparisons, would support the

hypothesis. The results of the MANCOVA are shown in Table 4. The results indicated that the main effect for leadership skill type was significant (Wilks Lambda = .982, $p < .01$). Examination of the adjusted means for each of the leadership skill requirements indicated that the Cognitive skill requirements were, in fact, the highest, followed by Interpersonal, Business, and Strategic, respectively. Pairwise comparisons of these mean differences adjusted using the Bonferroni procedure indicated that mean requirement for Cognitive and Interpersonal skills were each significantly higher than Strategic. Similarly, Cognitive was higher than Business. Other mean differences, although in the predicted direction, were not statistically significant. Thus, Hypothesis 2 was partially supported.

To test Hypothesis 3, we examined the relationship between organizational level and each leadership skill requirement while controlling for organizational function and location (Table 5). The partial correlation results indicated that there was a significant positive relationship between all four leadership skill requirements, even while controlling for the effects of other variables. These partial correlations varied from .15 for Cognitive skill requirements to .28 for Business skill requirements. Thus, Hypothesis 3 received full support. This relationship is illustrated in Figure 2, which shows that leadership skill requirements increase with organizational level.

Hypothesis 4 proposed that the relationship between leadership skill requirements and organizational level would be moderated by type of skill requirement. That is, that the leadership skill categories will be differentially related to organizational level. This hypothesis was tested by comparing the correlation coefficients between the leadership skill requirement and organizational level for each of the skill categories. The correlations were compared via the procedures outlines by Cohen and Cohen (1983), and using the Bonferroni correction for

multiple comparisons. Statistically significant differences among the correlation coefficients that are successively larger would indicate support for the hypothesis. The partial correlation coefficients are shown in Table 5. Results indicate that the relationship between leadership skill requirements and organizational level is stronger for Strategic skill requirements than for Interpersonal and Cognitive skill requirements, providing partial support for Hypothesis 4a. Hypothesis 4b was fully supported in that the relationship between skill level and organizational level was stronger for Business skill requirements than for Interpersonal and Cognitive skill requirements. Finally, Hypothesis 4c was also fully supported, as the difference between the leadership skill-organizational level correlation for Interpersonal and Cognitive skill requirements was significant.

These relationships and interactions are visually illustrated in Figure 2, which plots the estimated marginal means for each leadership skill requirement type at each level in the organization while controlling organizational function and location. The figure illustrates the interaction between skill type and organizational level. The Strategic leadership skills have the steepest slope across levels (as illustrated by correlational analysis), followed by the Business, the Interpersonal, and the Cognitive skill requirements.

## Discussion

This paper proposes and tests a model of leadership skill requirements to better understand the nature of leadership skill requirements in jobs at different organizational levels. The skill requirements are organized into a Strataplex to illustrate the layered (strata) and divided (plex) nature of leadership skill requirements when considered in conjunction with organizational level. The Strataplex is derived from the prevailing models and categories of leadership skill requirements, such as those by Connelly et al., (2000) and Zaccaro (2001).

Several aspects of the leadership skills hierarchy were then tested, most of which received empirical support. The central findings are as follows. First, leadership skill requirements can be theoretically and empirically grouped into a four-part complex: Cognitive, Interpersonal, Business, and Strategic. Second, leadership skill requirements are related to organizational level. That is, jobs at higher levels in the organization have significantly greater overall leadership skill requirements. Third, the study found that the amount of leadership skill required by a job varied depending upon the leadership skill category. That is, across all levels in the organization, Cognitive skills were needed to the greatest degree. Similarly, Interpersonal skills were required to a greater degree than Business and Strategic. This finding is somewhat fundamental, but has received surprisingly little empirical attention in the literature. Fourth, the study found that the strength of the relationship between organizational level and leadership requirements is stronger for Strategic and Business skill requirements than for Interpersonal and Cognitive skill requirements. This suggests that as managers are promoted up through jobs in the organizational hierarchy, the acquisition of Strategic and Business skills will be more critical than the acquisition of Interpersonal and Cognitive skills.

These findings have important implications for organizational research and practice. First, they provide empirical evidence of the usefulness of considering different categories of leadership skills in the form of a strataplex model. Although references are often made to the heterogeneity of the leadership phenomena at different organizational levels (Jacobs & McGee, 2001), the assertion has been lacking empirical evidence. The current study empirically validates this phenomenon. Theoretically, it is a conceptually rich model that defines different leadership skills in terms of a parsimonious set of major categories, and then shows how these skill categories relate to each other and to organizational level. Practically, it illustrates the

importance of tailoring leadership development programs to the particular categories of skills that are important at each level.

Second, the study indicates that Informational leadership skills do not diminish at higher levels in the organization, but rather increase. Theoretically, this suggests that leadership skills in the hierarchy are somewhat cumulative in that higher level skills are needed in addition to more fundamental skills, and that leadership skills are, therefore, more cumulative than exclusive. Practically, this suggests that organizations should focus part of their management development programs on the continual refinement of existing leadership skills as well as the development of new skills.

This also suggests that promotional criteria should be linked not only to demonstrated proficiency in the current job, but also tied to the demonstration of skills that are needed at the next level. Selection and placement systems within the organization attempt to match employee capabilities to the requirements of jobs. A better understanding of how the leadership requirements of jobs differ at different levels in the organization can inform judgments regarding promotional criteria to assure they account for the nature of skill requirements at the next organizational level.

Third, not withstanding the fact that all categories of leadership skills are more important at higher levels in the organization, the study demonstrates that Strategic skill requirements and, in some cases, Business skill requirements, have a stronger relationship with organizational level. That is, the importance of Strategic and Business skills grows at a greater rate with organizational level than Interpersonal and Cognitive skills. Theoretically, this provides a clear indicator of qualitative differences, as well as quantitative differences, in the leadership skill requirements of lower level, mid level, and upper level jobs. This highlights the importance of

considering the organizational context (e.g., level in the hierarchy) while researching the leadership phenomenon.

Practically, this indicates that careful attention should be paid to management development systems in general because as managers proceed from lower, to mid, to senior level jobs, the rate at which they acquire Strategic skills will need to be faster than that for leadership skills in general. For example, the standards employed in 360-degree feedback systems should receive differential emphasis depending upon which level the organizational leader is preparing.

Fourth, the current research suggests that the O*NET skills domain can provide a common language for future research that investigates leadership skills. This skills domain represents a taxonomic approach to integrating decades of academic research on skills (Mumford, Peterson, & Childs, 1999; Peterson et al., 2001). As such, it is the most comprehensive skills model currently available. It can provide a framework around which future research is conducted.

Notwithstanding the contributions of this study, there are several potential limitations that should be taken into consideration. First, this study was completed in a public-sector government organization. It is unclear if the skills required in "public" leadership roles (where public leadership refers to the political sector and the individuals and organizations dedicated to governance and public policy; Kellerman & Webster, 2001) are the same as those required in business roles. It is likely that public leaders are more heavily influenced by and sensitive to political forces, the needs of diverse stakeholders, and a focus on collaboration (Crosby & Bryson, 2005; Kellerman & Webster, 2001) than leaders in business settings. Such a focus may affect the types and amounts of leadership skills needed for successful performance. As a

consequence, the results of the current study may not generalize to private business leadership roles.

Although this is a potential difference between the current context and traditional business settings, organizations are increasingly empowering subordinates and pushing decision making responsibility to lower levels of the organization. This has led some to suggest the role of leadership is likely to change, where leaders act in a more facilitative and collaborative manner (Hackman & Wageman, 2005; Manz & Sims, 1987; Morgeson, 2005). As these changes occur in organizations, divisions between business and political leadership are likely eroding. As Kellerman and Webster (2001, pp. 494-495) note, "The contexts in which business and political leaders operate are converging, and the skill sets needed to succeed in each sector are also becoming indistinguishable." Clearly, future research needs to examine the leadership skills strataplex in business contexts as well to determine if the present results generalize.

Second, in addition to this public sector context, the organization studied had a highly formalized "up or out" leadership promotion system. One result of such a system is that it is likely to create more homogeneity in the skills possessed by employees than in organizations that have a less formalized and internally driven promotional system. Caution, may be necessary, therefore, in generalizing its finding to private-sector employees or organizations that are more heterogeneous in terms of career progressions.

Third, while the results supported the four-factor structure of the leadership skill requirements, the factors were moderately to highly correlated. Future research should explore the stability of this structure across organizational contexts. Fourth, the study used a cross-sectional design. Given the developmental implications associated with skill development across one's career, future research should employ longitudinal designs. Finally, the current study relied

upon incumbent ratings of leadership skill requirements. Future research should explore the extent to which the results replicate when other sources of information are drawn upon to determine the leadership skill requirements.

## Conclusion

In closing, this paper has proposed a theoretically rich leadership skills hierarchy, and tested that hierarchy in a sample of over 1,000 lower, mid, and upper level leaders. Results provide support for the model and its key hypotheses. The current research contributes to our understanding of leadership in three ways. First, we integrate across these numerous different conceptualizations of leadership skills. Thus, the current investigation represents an integrative model. Second, we provide an empirical test of our hypotheses. Although there has been previous discussion of leadership skills, there is comparatively little empirical research. Third, we examine the interaction of skill requirements and hierarchical level. There has been little empirical research on this topic and thus represents a new direction for the leadership skills area. We hope that future research will take advantage of the conceptual and practical findings, and further test the model in other organizations, as well as refine management development, placement, and selection systems in organizations.

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Table 1

*The Relationship Between the Leadership Strataplex and Previous Conceptualizations of Leadership Skill Requirements*

| Leadership Strataplex | Cognitive | Interpersonal | Business | Strategic |
|---|---|---|---|---|
| **Mahoney et al., 1965** | ▪ Investigating | ▪ Supervisory<br>▪ Negotiating | ▪ Coordination<br>▪ Staffing | ▪ Planning<br>▪ Evaluating |
| **Mintzberg, 1973** | ▪ Monitor<br>▪ Disseminator | ▪ Leader<br>▪ Negotiator<br>▪ Disturbance Handler | ▪ Resource Allocator | ▪ Figurehead<br>▪ Spokesperson<br>▪ Liaison |
| **Katz & Kahn, 1978** | | ▪ Human Relations | ▪ Technical Know-how | ▪ System Perspective |
| **Lau & Pavett, 1980** | ▪ Information Gathering and Dissemination | ▪ Supervision | ▪ Allocating Resources | ▪ Decision Making<br>▪ Problem Solving |
| **Kanungo & Misra, 1992** | | ▪ People Orientation | | ▪ Intellectual Competence |
| **Hooijberg et al., 1997** | | ▪ Social Complexity | | ▪ Cognitive Complexity |
| **Connelly et al., 2000** | ▪ General Cognitive Capacities | ▪ Social Judgment | | ▪ Problem Solving Skills |
| **Mumford, Marks, et al., 2000** | | ▪ Social Judgment | | ▪ Problem Solving |
| **Zaccaro, 2001** | ▪ Basic Cognitive Capacities | ▪ Social Capacities | ▪ Functional Expertise | ▪ Higher Cognitive Capacities |

Table 2

*Descriptive Statistics and Correlations for Job Level and Leadership Skill Requirements*

| Variable | Mean | SD | 1 | 2 | 3 | 4 |
|---|---|---|---|---|---|---|
| 1. Job Level | 1.91 | .72 | – | | | |
| 2. Cognitive Skill Requirements | 5.84 | .75 | .28 | – | | |
| 3. Interpersonal Skill Requirements | 5.63 | .89 | .32 | .71 | – | |
| 4. Business Skill Requirements | 4.59 | 1.10 | .24 | .23 | .41 | – |
| 5. Strategic Skill Requirements | 5.25 | 1.00 | .34 | .62 | .70 | .53 |

*Note*: $N = 1{,}023$. All correlations are significant at $p < .01$, two-tailed.

Table 3

*Fit Indices for Confirmatory Factor Analysis*

| Test | $\chi^2$ | *df* | CFI | NFI | RMSEA | $\chi^2$ difference | *df* |
|---|---|---|---|---|---|---|---|
| 1. Four-factor Model | 324.1 | 14 | .991 | .991 | .147 | | |
| 2. One-factor Model | 714.8 | 20 | .981 | .980 | .184 | | |
| Model difference | | | | | | -390.7** | 6 |

Note., CFI = Comparative fit index; NFI = Normed Fit Index; RMSEA = Root mean square error of approximation.

N = 1,023.

** $p < .01$.

Table 4

*Estimated Marginal Means for Cognitive, Interpersonal, Business, and Strategic Skill Requirements Controlling for Organizational Level, Organizational Specialty, and Location*

| Variable | Estimated Marginal Mean with Controls |
|---|---|
| Strategic Skill Requirements | $5.05_{a}$ |
| Business Skill Requirements | $5.11_{a\ b\ c}$ |
| Interpersonal Skill Requirements | $5.34_{b\ c}$ |
| Cognitive Skill Requirements | $5.44_{c}$ |
| Wilks Lambda | .982 $F = 6.020$** |

** $p < .01$, two-tailed.

*Note*: $N = 1{,}023$. Means in each column that do *not* share subscripts differ at $p < .05$ using the Bonferroni procedure for multicomparison adjustment.

Table 5

*Partial Correlation between Leadership Skill Requirement Categories and Organizational Level Controlling for Organizational Specialty and Location*

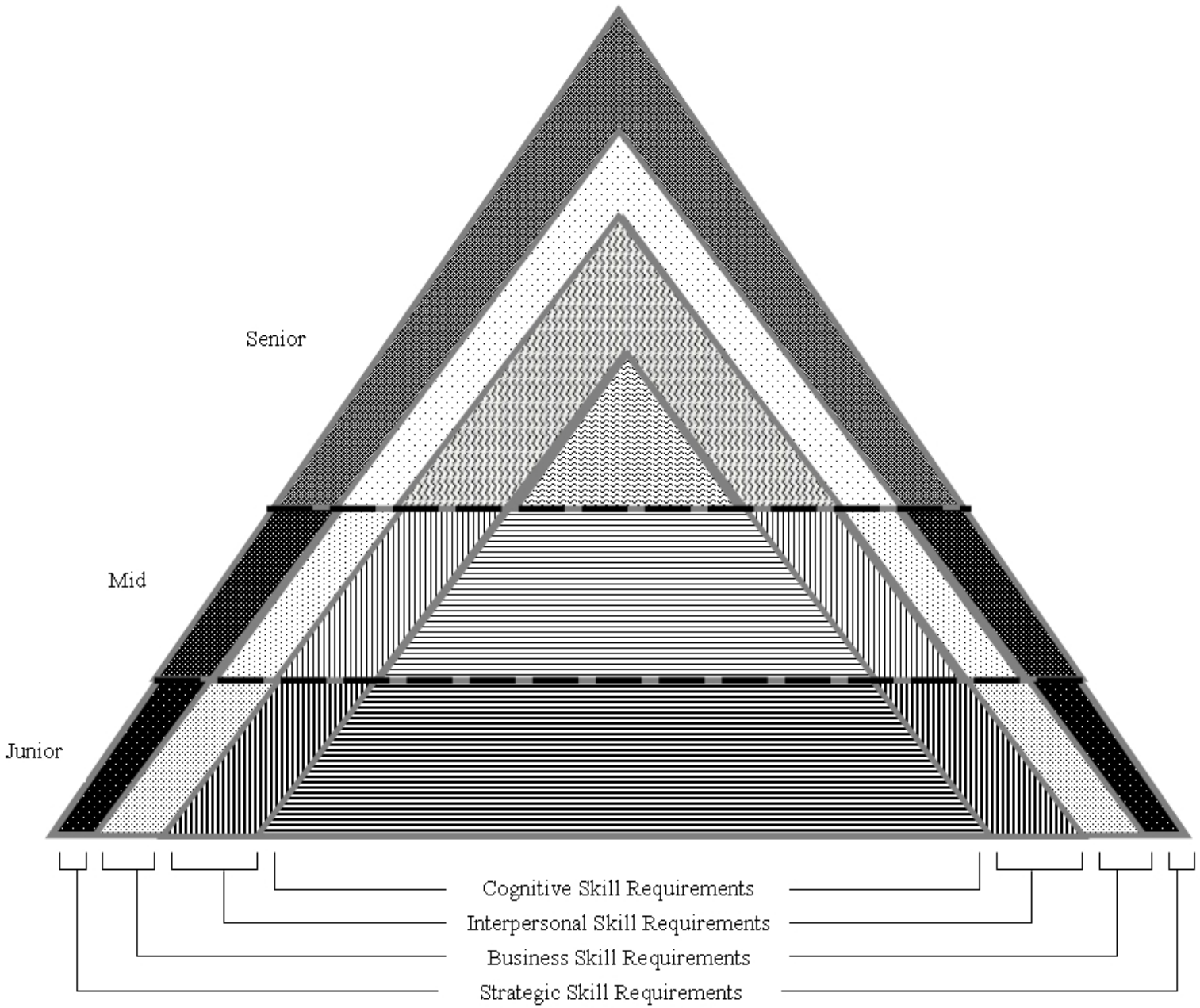
| Variable | Organizational Level |
|---|---|
| Strategic Skill Requirements | .25 $_{a}$ ** |
| Business Skill Requirements | .28 $_{a}$ ** |
| Interpersonal Skill Requirements | .20 $_{b}$ ** |
| Cognitive Skill Requirements | .15 $_{c}$ ** |

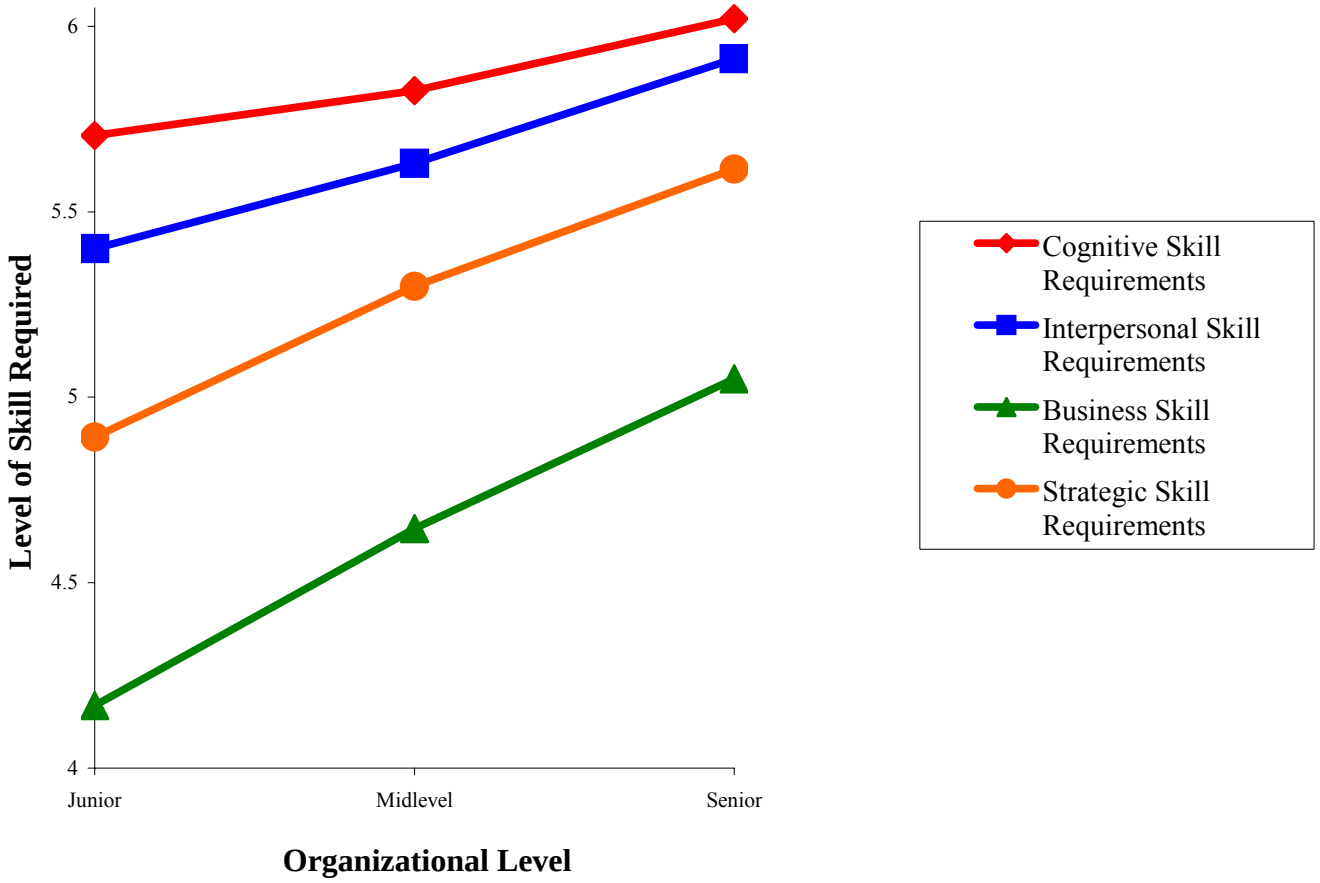
*Note*: $N$ = 1,023. Correlations that do not share subscripts differ at $p < .05$ in the Cohen and Cohen's (1983) test for significant difference between dependent *r*s.

Figure Caption

*Figure 1.* The Leadership Skill Requirements Strataplex.

*Figure 2.* Estimated Marginal Means for Leadership Skill Requirements Across Organizational Levels Controlling for Organizational Specialty and Location.


Senior
Mid
Junior
Cognitive Skill Requirements
Interpersonal Skill Requirements
Business Skill Requirements
Strategic Skill Requirements


6
5.5
5
4.5
4
Level of Skill Required
Junior
Midlevel
Senior
Organizational Level
Cognitive Skill Requirements
Interpersonal Skill Requirements
Business Skill Requirements
Strategic Skill Requirements