Research Briefing

Updated Reliability Analysis and Normative Comparison of the Leadership Navigator℠ for Corporate Leaders

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Executive Summary:
Updated Reliability Analysis and Normative Comparison of the Leadership Navigator for Corporate Leaders

The Leadership Navigator for Corporate Leaders was developed as a 360-degree feedback tool to assess job performance of mid-level managers. An initial study by Healy & Rose (2003) provided a detailed description of the survey development, initial norms and reliability analyses. The 2005 study was undertaken to provide updated norms based on a more recent sample, reassess the reliability of the measure, and evaluate the appropriateness of the competency scales for different demographic groups.

Norms

The Corporate Leader feedback reports contain competency norms that provide managers with a reference to compare their competency ratings to other similar-level managers across the United States.

- The 2005 norms are based on a sample of 1027 managers and 12,852 ratings from companies operating in numerous regions and industries across the United States.
- Although the item and competency means differ somewhat from the 2003 norms, no systematic differences were discovered between the 2003 and 2005 Corporate Leader norms.

Reliability

Reliability refers to the consistency of measurement of an assessment.

- As with the 2003 study, the 2005 study found strong support for the reliability of the eight Corporate Leader competency scales. All reliability values exceeded acceptable levels (each scale had a coefficient alpha greater than .80).

Demographic Comparisons

Two demographic variables were considered: sex and job level. Comparisons were made between the average competency ratings of employees in five job levels (president, vice president, director, manager, and individual contributor).

- No meaningful differences in average competency ratings were found between men and women; providing support for the appropriateness of the Corporate Leader for use with both male and female managers.
- More senior employees scored higher than less senior employees on Work Process competencies. While the differences between job levels were not large, they are meaningful given that these employees, as more senior managers, are expected to be more proficient at these competencies. Interpersonal and Core competencies, however, did not exhibit these tendencies.

Conclusions

- The results from the 2005 Leadership Navigator for Corporate Leaders Norm study provided further support for the reliability of the assessment tool and its applicability across different demographic groups. Therefore, the 2005 norms update the previous 2003 Corporate Leader competency and item norms.
- The 2005 Corporate Leader norms are appropriate for use with both male and female managers.
- Although designed to target mid-level managers, the Corporate Leader norms can be used with a range of managerial levels.

Updated Reliability Analysis and Normative Comparison of the Leadership Navigator for Corporate Leaders

The norms for the competency scales included in 3D Group's Leadership Navigator for Corporate Leaders were reassessed using survey responses received since the previous validation study for this instrument. The goals of this study were to assess the functioning of the competency scores as they relate to key demographic variables, to reassess reliability, and to expand the norm base to include a larger number of managers. It was found that competency scores are unrelated to sex, while there is a small relationship between job level and the score on specific competencies. Competency norms demonstrated consistency across the two studies and the scales continue to display high levels of reliability. This report represents a detailed analysis of the norms and reliabilities of the Leadership Navigator for Corporate Leaders and a description of these analyses and results.

Introduction

The Leadership Navigator Corporate Leader survey is a 360-degree feedback tool designed to assess mid-level managerial performance on eight critical leadership competencies. An earlier normative study, conducted in 2003, demonstrated the reliability of the eight competency scales included in the survey (Healy & Rose, 2003). Since this time, over three times the initial sample of managers have used this tool to receive performance feedback. With this more comprehensive sample from which to draw, an updated study was undertaken not only to reassess the reliability of the eight competencies, but also to update the normative comparison.

The Corporate Leader survey relies on a two-factor approach to leadership, based on the extensive leadership work developed out of The Ohio State Leadership studies. This research separates leadership behavior into two primary factors; initiating structure and consideration. The eight Corporate Leader competencies are separated into Work Process competencies and Interpersonal competencies. Initiating structure, or "Work Process", focuses on getting tasks accomplished and structuring work roles and organizational priorities. Consideration, or "Leading People" focuses on meeting people's needs so they can work most effectively. Recently, Judge, Piccolo, & Ilies (2004) reaffirmed the appropriateness of considering leadership as being composed of these two primary dimensions.

The current study was undertaken to add further evidence to the stability of the instrument and appropriateness for use with middle-level managers. The present study found high levels of reliability for each of the competencies, providing support for the internal consistency of the Corporate Leader competencies. The construct validity of the instrument was also assessed by examining relationships between competency scores and key demographic variables. Manager's sex and job level exhibited expected relationships with the competencies. Specifically, while the manager's sex was unrelated to competency scores, job level explained differences in scores for some competencies.

Procedure

Participant information and rater responses from the previous Corporate Leader normative study (Healy & Rose, 2003) were combined with new rater responses to the Corporate Leader survey. Not only were new survey responses included in the 2005 normative study, but demographic information about the participants (Managers), including name, job title, and sex was included as well. Survey responses from 1999 through 2004 were included in the results.

Results

National Sample Participant Characteristics – Sex and Job Level

The dataset included survey responses by raters for participants. Participants refer to Managers who received feedback. Raters refer to those individuals who completed the surveys. The final dataset used to generate the National Sample statistics included 12,852 surveys rating 1027 Managers. These surveys included 979 self-surveys, 1,098 boss surveys, 3,786 direct report surveys, and 6,989 peer surveys. Ratings for this initiative were collected primarily on the Internet, with paper utilized by fewer than 15% of survey raters. Results and conclusions derived from the consideration of these data are presented in the next several sections.

Analyses

The sex of each participant was determined based on an assessment of the first name. In those situations where the sex was not easily identifiable by the name, the open comments provided by raters were screened to determine the sex of the participant. In each of these cases, at least one rater used a sex-specific pronoun that allowed for a determination of the participant's sex. For example, if a comment read, "She is dedicated to the company", the participant was coded as female. 66% of the participants rated were female.

Males versus Females

When addressing the appropriateness of a comparison norm, one criterion by which to judge the quality of the norm is to understand the extent to which norms differ based on membership in key demographic groups. Therefore, analyses were conducted to determine the extent to which Corporate Leader competency scores differed among two key demographic groups. Specifically, sex and job level were chosen. Sex was selected as a variable to consider because across several studies, differences in performance ratings with respect sex are either small or inconsistent (Furnham & Stringfield, 2001; Landy & Farr, 1982; Lovell, et. al, 1999; Shore and Tashchian, 2003; Varma & Stroh, 2001). Therefore, for a single norm to be used with both males and females, the competency norms should accurately assess the normative scores for both sexes. An analysis was conducted using available demographic information to determine the extent to which mean differences existed between men and women with regards to the Corporate Leader competencies.

Due to the high sample size, the eta^2 statistic was used to gauge the extent to which sex was responsible for differences in competency means, rather than statistical significance. Commonly referred to as effect size, eta^2 represents the proportion of variance in a distribution that is attributable to group membership. Thus, higher effect sizes indicate greater importance of group membership; that groups differ with regards to the attribute under consideration. An eta^2 value greater than .15 is considered a large effect, meaning that over 15% of variability in scores can be attributed to group membership. An effect size around .10 is considered a moderate effect, meaning between about 10% of variability in scores can be attributed to group membership. An eta^2 value between around .05 is considered a weak effect (Jaccard & Becker, 1997). In this case that would indicate there is a small difference between groups on that competency.

No differences found

Table 1 displays the competency means for women and men and the effect size attributed to sex for each competency. As is evident from this table, sex explained less than 1% of the difference in competency means for all competencies with the exception of Business Focus (1.2%). Regardless, the influence of sex on Business Focus was still well below a level that is even considered a small effect. In sum, sex was not responsible for differences in competency scores. This indicates that the Corporate Leader is an appropriate tool for use with both sexes.

Table 1. Effect sizes for sex on each competency.

Competency	Sex	Mean	SD	Effect Size
Business Focus	**Women**	4.27	.29	**.012**
	Men	4.34	.28	
Customer Focus	**Women**	4.21	.34	**.000**
	Men	4.21	.32	
Results Orientation	**Women**	4.16	.29	**.000**
	Men	4.15	.31	
Communication	**Women**	4.22	.29	**.007**
	Men	4.18	.29	
Integrity	**Women**	4.21	.32	**.000**
	Men	4.21	.31	
Team Leadership	**Women**	4.14	.36	**.006**
	Men	4.08	.35	
Inclusiveness	**Women**	4.12	.35	**.001**
	Men	4.09	.34	
Developing Talent	**Women**	4.05	.35	**.006**
	Men	3.99	.36	

Job Level

Job level was determined by reviewing the job title provided by participants. As expected, the most common job level was mid-level Managers (48%). Table 2 displays the percentage of participants in each job level included in the sample. There were 371 participants for whom job titles were not available, representing approximately 36% of all participants. Percentages add to more than 100 due to rounding.

Table 2. Frequency and Percent of Job Levels Included in the National Sample of Managers.

Job Level			
	# of Participants	Overall Percent	Valid Percent*
President/CEO	14	1%	2%
Vice President	72	7%	11%
Director	116	11%	18%
Manager	317	31%	48%
Individual Contributor	137	13%	21%
Not Available	371	36%	0%
Total	1027	100%	100%

Note: * = This column depicts the percent of participants for whom job title was available.

What is the influence of job level?

Although the Corporate Leader survey is designed primarily for mid-level managers, professionals from a range of job levels have received feedback through this survey. Competency scores by job level were also compared to determine the extent to which these scores differ systematically by job level. For Work Process competencies, for which experience is likely to play a significant role, those occupying a higher job level ought to be rated higher than those occupying lower level positions. Specifically, higher-level participants should receive higher ratings on Business Focus, Customer Focus, and Results Orientation than lower-level managers.

This trend is expected to not be as pronounced for Leading People competencies, where lack of experience could be compensated for by more general interpersonal skills. A manager's ratings for Team Leadership, Inclusiveness, and Developing Talent, while likely influenced by experience, is also likely to be influenced by an interpersonal style of relating to people that is independent of experience, or job level. Thus, a linear relationship can be expected between job role and competency rating for Work Process competencies, but this is less likely for the Leading People competencies.

Senior managers score better than junior managers on Work Process competencies

Table 3 displays the competency means and effect sizes attributed to job level for Business Focus, Customer Focus, and Results Orientation. These three competencies comprise the Work Process competencies (Healy & Rose, 2003) of the Corporate Leader survey. These competencies involve a strong focus on the business, or organizational side of management. The effect sizes for all three competencies were between .02 and .06, representing a weak effect. These findings indicate that, at least on work process competencies, more senior-level participants tend to be rated slightly higher than less senior-level participants on Work Process competencies.

Table 3. Effect sizes for job level on Work Process competencies.

Work Process Competency	Job Level	Mean	SD	Effect Size
Business Focus	President/CEO	4.54	0.23	.060
	Vice President	4.38	0.29	
	Director	4.35	0.28	
	Manager	4.28	0.24	
	Individual Contributor	4.12	0.25	
Customer Focus	President/CEO	4.48	0.21	.035
	Vice President	4.21	0.37	
	Director	4.26	0.34	
	Manager	4.18	0.30	
	Individual Contributor	4.04	0.39	
Results Orientation	President/CEO	4.38	0.26	.025
	Vice President	4.20	0.31	
	Director	4.15	0.29	
	Manager	4.14	0.29	
	Individual Contributor	4.05	0.31	

Job Level is not related to scores on the Interpersonal Competencies

Table 4 displays the competency means and effect sizes for job level of the Interpersonal competencies Inclusiveness, Team Leadership, and Developing Talent. The effect sizes for these competencies are all below .02, indicating an absence of an effect for Interpersonal competencies in regards to job level. Contrasted with the Work Process competencies, higher-level participants tend to be rated about the same as lower-level participants on the Interpersonal competencies of the Corporate Leader. Although the competency means are relatively similar, the pattern that emerges is that more senior participants are perceived as more competent on those aspects of the job that involve structuring work, whereas participants do not differ by job level in the interpersonal realm.

Table 4. Effect sizes for job level on interpersonal competencies.

Interpersonal Competency	Job Level	Mean	SD	Effect Size
Team Leadership	President/CEO	4.22	0.29	.018
	Vice President	4.09	0.34	
	Director	4.06	0.35	
	Manager	4.09	0.34	
	Individual Contributor	4.20	0.42	
Inclusiveness	President/CEO	4.11	0.35	.005
	Vice President	4.05	0.33	
	Director	4.06	0.30	
	Manager	4.07	0.34	
	Individual Contributor	3.94	0.39	
Developing Talent	President/CEO	4.13	0.30	.013
	Vice President	4.04	0.39	
	Director	3.98	0.35	
	Manager	4.01	0.35	
	Individual Contributor	4.12	0.40	

Participants do not differ systematically by Job Level when Core Competencies are considered
Table 5 displays the competency means and effect sizes for job level of the Core competencies Communication Skills and Integrity. As with the interpersonal competencies, less than 1% of differences in Communication Skills can be explained by job level. The Integrity competency does exhibit an effect slightly above .01, but a systematic pattern did not emerge with regards to job level.

Table 5. Effect sizes for Job Level on Core Competencies.

Core Competency	Job Level	Mean	SD	Effect Size
Communication	President/CEO	4.22	0.27	.008
	Vice President	4.23	0.29	
	Director	4.18	0.28	
	Manager	4.18	0.29	
	Individual Contributor	4.23	0.26	
Integrity	President/CEO	4.33	0.23	.011
	Vice President	4.22	0.33	
	Director	4.15	0.31	
	Manager	4.20	0.31	
	Individual Contributor	4.21	0.24	

National Sample Participant Characteristics – Functional Area

Functional Area

Functional area was determined by considering each participant's job title when job title was provided. Although approximately 36% of the participants' functional area could not be identified, 655 leaders were categorized into clearly defined functional areas. The participants included in this study work in a wide variety of functional areas. The functional area of each participant was determined to assess the breadth of respondents in the National Sample. Table 6 displays these percentages. The percentages from the 2003 National Sample are included for purposes of comparison. Some shifts in percentages are evident. For example, the 2005 norms include proportionally more Distribution/Logistics, Facilities, Field Operations, and Manufacturing managers than the 2003 sample. The 2003 sample included proportionally more HR, IT, and Marketing managers than the 2005 sample. Unspecified Manager/Supervisor and Unspecified Executive categories are listed as such due to participants not indicating their unique jobs/roles or there was a change in role during the administration of the 360º feedback survey. For both the 2003 and 2005 samples, the Unspecified Manager/Supervisor category included the greatest number of participants. Percentages add to more than 100 due to rounding.

Table 6. Percent of functional areas included in national sample of managers.

Functional Area	% of 2003 National Sample	% of 2005 National Sample
Customer Service	3%	1%
Distribution/Logistics	2%	6%
Facilities	4%	8%
Field Operations	5%	10%
Finance/Accounting	8%	6%
Human Resources/Training/OD	10%	7%
Information Technology	14%	6%
Legal	3%	1%
Manufacturing	1%	9%
Marketing	13%	2%
Purchasing	1%	1%
Health & Safety	2%	2%
Sales	1%	2%
Unspecified Executive/Officer	11%	6%
Unspecified Manager/Supervisor	24%	33%

National Sample Competency Means

Norms, or average ratings for participating leaders, provide a useful reference point for individuals processing their feedback reports. Analysis of responses began by computing the mean (average) and standard deviation of ratings for each survey item across all raters (excluding self ratings) for a particular Manager. This Manager mean was then used to calculate the 2005 National Sample item mean for an item by taking the average of all Managers' means for that item. The 2005 National Sample competency means were calculated by averaging all items within each competency for each Manager. Then the Managers' competency means were averaged to identify the overall competency norms. Normative averages for each competency are detailed in Table 7.

As a result of the addition of the new participants, the norms for the 2005 Corporate Leader competencies shifted slightly as compared to the 2003 norms, but not substantially. The greatest shift was for Business Focus, which moved down .16 points on a five-point scale. Four of the 8 competencies shifted less than .05 points. The ranking of competencies from highest to lowest average rating was nearly identical to the rankings in the 2003 National Sample. In both the 2003 and the 2005 National samples, the lowest average rating was found for Developing Talent and the highest average rating was found for Business Focus. The Developing Talent competency covers common supervisory behaviors such as coaching and providing feedback and the Business Focus competency covers behaviors such as sharing knowledge of the industry and paying attention to the goals and strategies of the organization. Further, both norm samples resulted in higher norms for the Work Process competencies (Business Focus, Results Orientation, and Customer Focus) than for the Interpersonal competencies (Team Leadership, Inclusiveness, Developing Talent).

While the rank order of the competency norms did not change, there was an overall reduction in the variability of the means. In the 2003 norms study, the competency averages ranged from 4.03 to 4.49 with a mean average of 4.23. The 2005 norm study resulted in a range of 4.01 to 4.33 with a mean average of 4.16.

Thus, there were no pronounced trends in the point shifts for the new norms. Although the new norms tend to be slightly lower than the old norms, they are not so different as to suggest a general tendency for lower scores. There was also a slight reduction in the range of means across competencies, but the difference is subtle and to be expected when a sample size is increased. Table 7 displays the competency National Sample norms from 2003 and 2005. Overall, results were fairly consistent from the 2003 to the 2005 study.

Table 7. Normative averages for Corporate Leader competencies from 2003 and 2005.

National Norm (Avg.)					
Competency	**2003 Norm**	**2005 Norm**	**Competency**	**2003 Norm**	**2005 Norm**
Business Focus	4.49	4.33	Developing Talent	4.03	4.01
Results Orientation	4.20	4.15	Inclusiveness	4.08	4.09
Customer Focus	4.43	4.21	Team Leadership	4.14	4.10
Communication	4.25	4.19	Integrity	4.24	4.21

Reliability Analysis of Competency Scales

Reliability refers to the consistency of measurement of an assessment. Reliability can be described using the analogy of the clock. A clock is reliable to the extent that it maintains time. Thus, a clock may be two

hours fast (not valid) but if it is always too hours fast, it is reliable. If the clock is sometimes two hours fast, sometimes 10 minutes behind, and occasionally an hour slow, it is not reliable or valid (and not much use for telling time.)

In most circumstances, competency scales composed of several individual behavior items are more reliable than single items. Competency ratings provide an indication of the leader's level of performance on a group of related, yet multi-faceted skills. For example, for a leader to understand his or her skill at communicating with colleagues, it is necessary to understand perceptions of speaking clearly, using correct grammar, and listening attentively, among other behaviors. Without knowing the nuances of communication, it is difficult for a leader to improve this skill. Therefore, it is necessary to collect ratings on each individual area of the communication competency in order to understand where specific skill gaps exist.

Reliability analyses of the ratings for this study were conducted using Cronbach's Alpha estimate of internal consistency. This estimate provides an index of the average inter-item correlation for the items of a scale. It is the most widely used index of reliability for assessment tools. Cronbach's Alpha estimates range from 0 to 1.0, with an estimate of at least .70 indicating acceptable levels of reliability for this type of assessment. Therefore, when the Alpha estimate is higher than .70, items within a scale are consistent with one another and are likely tapping into a common workplace characteristic. Reliability estimates are displayed along the diagonal in Table 8 below.

Table 8. Cronbach's reliability estimates and competency intercorrelations for Reliability studies 1 and 2.

Competency	1	2	3	4	5	6	7	8
1. Communication	.85							
2. Integrity	.16	.80						
3. Business Focus	.70	.64	.85					
4. Results Orientation	.78	.66	.78	.88				
5. Customer Focus	.70	.56	.77	.79	.87			
6. Team Leadership	.82	.29	.71	.83	.76	.87		
7. Developing Talent	.75	.33	.65	.78	.70	.84	.86	
8. Inclusiveness	.80	.70	.62	.73	.70	.81	.79	.88

Note: N=2596–6403. Correlations below the diagonal, in red, represent the intercorrelations for the current study. Values along the diagonal, in blue, represent Cronbach's Alpha 2005 norms. All correlations were significant ($p < .01$).

Overall, reliabilities were consistent with those found in the initial validation study for the Corporate Leader (Healy & Rose, 2003). The two noticeable changes were that the reliability for the Integrity scale decreased from .87 to .80 and the reliability for the Results Orientation scale increased from .81 to .88. All values were in the .80 reliability range, which exceeds the acceptable reliability level of .70.

Conclusion

The Leadership Navigator for Corporate Leaders again demonstrated strong levels of reliability for a wide range of leadership positions. The Chronbach's alpha for each of the instrument's competency scales surpassed acceptable levels of reliability. After tripling the sample size from the previous Corporate Leader validation study (2003), National Sample averages remained consistent. The 2005 National Norms tend to be slightly lower than the 2003 norms, but not substantially so. The appropriateness of the instrument for women and men was confirmed, as the competency norms do not differ by sex. Consequently, the 2005 National Norms will replace the 2003 norms in the Corporate Leader survey.

A slightly different pattern emerged when job level was considered. Among the Work Process competencies, a weak, but meaningful, relationship emerged between job level and competency score. Specifically, those holding more senior positions generally scored higher than those holding less senior positions. This pattern did not hold for the Interpersonal or Core competencies where no differences were found. Ratings on Interpersonal competencies showed no relationship with job level. The implication is that while Work Process competencies are somewhat related to job level, Interpersonal and Core competencies exhibit no such tendency.

The Leadership Navigator for Corporate Leaders is a valid, reliable, and practical method for gathering feedback on behaviors of managers across a wide range of industries and functions. The initial development of the instrument included a thorough review of relevant literature, followed by intense item and competency analysis. In the current study, this statistical analysis was repeated, along with several additional analyses which confirmed the appropriateness of the instrument for accurately assessing male and female managerial behavior across various jobs levels.

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