Research Briefing

2010 Normative Comparison, Reliability Analysis, Validity and Revisions Report for the Leadership Navigator® for Corporate Leaders

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February 2010

Executive Summary: 2010 Normative Comparison, Reliability Analysis, Validity and Revisions Report for the Leadership Navigator® for Corporate Leaders

Norms
The Leadership Navigator® Corporate Leader feedback reports contain both item-level and competency-level norms that provide managers with a reference to compare their 360-degree feedback ratings to other managers across the United States. The 2010 National Norms are based on a sample of 3270 ratings for 250 managers from 43 companies operating in numerous industries across the United States.

Demographic Comparisons
No meaningful differences in average competency ratings were found between men and women. Likewise, no significant differences were found between the job levels of managers and directors, providing evidence that the Corporate Leader is appropriate across varying levels of gender and management.

Reliability
As with the previous studies, all eight competency scales demonstrated reliability values exceeding acceptable levels.

Corporate Leader Validity
A study was conducted to re-examine the two-factor structure of the Corporate Leader. An examination of competency intercorrelations and the results of a factor analysis indicate that the eight competencies can be grouped into two global leadership factors: Work Process and Interpersonal Effectiveness competencies.

Corporate Leader Rating Scale Revision
A new scale, comprised of more positively worded scale point labels, was integrated into the Corporate Leader. This decision was made after completing a separate study focused on scale label effects (English, Rose & McLellan, 2009). Results of this study revealed significant psychometric improvements over the original rating scale.

Corporate Leader Survey Item Revision
The Corporate Leader Integrity competency originally contained one survey item that described a negative work behavior (negatively worded). The item was rewritten to describe a positive work behavior and results of our analysis indicated that the item revision improved the reliability of the Integrity competency.

Corporate Leader Report Format and Features Revisions
The report format for the Corporate Leader was revised to ensure that the graphical displays of data were both visually appealing and easy to interpret. Other updates included arrows indicating that the Overall score is at or above the 90th percentile or at or below the 20th percentile compared to the 2010 National Norm. Scores in the Breakout Ratings by Competency pages now appear in italics if one or more raters in a particular rater group rated the behavior as occurring less than “frequently” (<3 rating). Finally, a Blind Spots page can now be added to the Corporate Leader as an optional report feature. This page identifies both unexpected strengths and blind spots based upon Self and Overall score discrepancies.

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2010 Normative Comparison, Reliability Analysis, Validity and Revisions Report for the Leadership Navigator® ® for Corporate Leaders

The Leadership Navigator® for Corporate Leaders was originally 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. In 2005, a study was conducted to provide updated norms, reassess the reliability of the measure, and evaluate the appropriateness of the competency scales for different demographic groups. In continuing to improve the efficacy of our 360 assessments, this technical paper presents recent revisions made to the Leadership Navigator® for Corporate Leaders survey. Revisions include utilizing a new response scale, replacing one problematic item, updating the report format, adding new report features, and developing a new set of 2010 Corporate Leader Norms. Results support using the Corporate Leader across a wide range of leadership positions.

Background

The Leadership Navigator® Corporate Leader survey is a 360-degree feedback tool designed to assess mid-level managerial performance on eight critical leadership competencies. Earlier normative studies, conducted in 2003 and 2005, demonstrated the reliability of the eight competency scales included in the survey (Healy & Rose, 2003; Robinson, Rose & Wilkinson, 2005).

The Corporate Leader survey relies on a two-factor approach to leadership, based on extensive leadership work developed out of The Ohio State Leadership studies. This research separates leadership behavior into two primary factors: 1) Initiating Structure, and 2) Consideration. The eight Corporate Leader competencies are separated into Work Process competencies and Interpersonal Effectiveness competencies. Initiating structure or "Work Process" focuses on getting tasks accomplished and structuring work roles and organizational priorities. Consideration or "Interpersonal Effectiveness" focuses on meeting peoples 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:

- Reassess the reliability of the eight competencies
- Present updates to the normative comparison
- Assess the efficacy of a new survey rating scale
- Assess the effects of revising one survey item

Normative Comparison

Procedure

Participant information and rater responses from the previous Corporate Leader normative studies were not included in this analysis since the instrument underwent two significant changes: (1) Addition of a new response scale, and (2) Replacement of one negatively worded survey item. Survey responses used for this study were collected from 2007 to 2009 and administered over the internet. Demographic data was collected from each participant and included name, company, job title, and gender.

2010 National Sample Participant Characteristics

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 2010 Corporate Leader Norms statistics included 3270 surveys rating 250 Managers. These surveys included 250 self-surveys, 303 boss surveys, 1153 direct report surveys, and 1564 peer surveys. Sixty-seven percent of the participants rated in the current norm sample were male and 33% rated were female. Thirty-seven percent of the rated participants represented the job level of Directors and 63% represented the job level of Managers.

The current norm sample included data from 43 companies spanning over 11 industries. The industries most widely represented by the current sample were Consulting (18%), Federal Government (14%), Technology (13%), and Food and Beverage (12%) as illustrated in Table 1. It is important to note the wide range of industries represented and that no single industry was overrepresented in the sample.

Table 1. Industry Representation for 2010 National Norms Sample

Industry	% of 2010 National Sample
Consulting	18%
Federal Government	14%
Technology	13%
Food and Beverage	12%
Higher Education	8%
Public Agencies	8%
Retail	7%
Manufacturing	7%
Other services	6%
Non-profit	4%
Healthcare	3%

Descriptive Statistics

The descriptive statistics for the Corporate Leader Norm Sample can be found in Table 2. The range across competencies for each statistic follows: Minimum = 2.43 to 2.98, Maximum = 4.81 to 4.95, and Standard Deviation = .35 to .45.

Skewness provides a measure of the extent that a distribution of values deviates around the mean (i.e., lack of symmetry). A skewness value of zero represents perfect symmetry, and positive skewness values represent a greater number of smaller values, whereas negative skewness values represent a greater number of larger values. A skewness between +1 and -1 is considered excellent for most psychometric purposes. The skewness statistics for the current sample range from -0.98 to -0.63, and reflects an acceptable distribution skewed slightly with positive scores.

Kurtosis is a measure of whether the data are peaked or flat relative to a normal distribution. A kurtosis value of zero indicates a normal distribution, and positive kurtosis values indicate a shape more peaked than normal, whereas negative kurtosis values indicate a shape more flat than normal. A kurtosis between +1 and -1 is considered excellent for most psychometric purposes. The kurtosis statistics for the

current sample range from -0.12 to 1.33. While the kurtosis statistics for the competencies Business Focus and Results Orientation are not ideal, the other six competencies were excellent. For all competencies, skewness statistics were in the acceptable range and it is common to find that 360-degree feedback data is slightly skewed with positive scores.

Table 2. Descriptive Statistics for Corporate Leader Norm Sample

Competencies	Min.	Max.	Mean	Std. Deviation	Skewness	Kurtosis
Business Focus	2.83	4.95	4.23	0.37	-0.98	1.33
Results Orientation	2.55	4.85	4.11	0.38	-0.90	1.21
Customer Focus	2.98	4.93	4.26	0.35	-0.88	0.76
Communication	2.91	4.81	4.13	0.37	-0.63	-0.12
Developing Talent	2.43	4.85	3.95	0.44	-0.75	0.30
Inclusiveness	2.49	4.88	4.12	0.42	-0.88	0.70
Team Leadership	2.53	4.90	4.02	0.45	-0.67	-0.03
Integrity	2.64	4.90	4.15	0.41	-0.69	0.15

Demographic Comparisons

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 (e.g., gender, job level). Therefore, analyses were conducted to determine the extent to which Corporate Leader competency scores differed among two key demographic groups. Specifically, gender and job level were chosen. Results and conclusions derived from analyses of these data are presented in the subsequent sections.

Gender Comparisons

Gender was selected as a variable to consider for analysis because across several studies, differences in performance ratings with respect to gender are either small or inconsistent (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 genders. 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.

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

Results

The eta^2 statistic was used to gauge the extent to which gender was responsible for differences in competency means. 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 (i.e., 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.

Table 3 displays the competency means for women and men and the effect size attributed to gender for each competency. As the table indicates, gender explained between 2% and 11% of the variance in scores. The competencies Business Focus and Inclusiveness demonstrated the largest effect due to group membership and the competencies Team Leadership and Developing Talent demonstrated the

smallest effect. To further examine if gender differences in competency scores were significant, an independent samples t-test was conducted across the eight competencies. Table 3 also displays the mean differences between genders across the eight Corporate Leader competencies. No significant mean differences were found across all eight competencies between male and female participants.

Together these analyses provide support for the appropriateness of the Corporate Leader for use with both male and female managers.

Table 3. Mean Differences and Effect Sizes for Gender Across Competencies

Competency	Gender	Mean	SD	Mean Difference	Effect Size
Business Focus	**Women**	4.17	0.44	.086	.116
	Men	4.26	0.32		
Customer Focus	**Women**	4.21	0.40	.062	.095
	Men	4.28	0.33		
Results Orientation	**Women**	4.09	0.43	.025	.038
	Men	4.12	0.35		
Communication	**Women**	4.18	0.38	.066	.092
	Men	4.11	0.37		
Integrity	**Women**	4.19	0.43	.056	.072
	Men	4.13	0.40		
Team Leadership	**Women**	4.04	0.44	.019	.022
	Men	4.02	0.46		
Inclusiveness	**Women**	4.18	0.40	.097	.119
	Men	4.08	0.43		
Developing Talent	**Women**	3.96	0.45	.019	.022
	Men	3.94	0.44		

Job Level Comparisons

Job level was determined by reviewing the job title provided by participants. As expected, the most common job level was Managers (63%), with 37% of the sample represented by Directors. There were nine participants for whom job titles were not available, representing approximately 3% of all participants.

Results

Effect sizes were computed to gauge the extent to which job level accounted for the variance in scores. Table 4 displays the competency means for Managers and Directors and the effect size attributed to job level for each competency. As Table 4 indicates, job level explained between 1% and 12% of the variance in scores. The competencies Inclusiveness and Communication demonstrated the largest effect due to group membership and the competencies Integrity, Results Orientation and Customer Focus demonstrated the smallest effect. To further examine if job level differences in competency scores were

significant, an independent samples t-test was conducted across the eight competencies. Table 4 also displays the mean differences between job levels across the eight Corporate Leader competencies. No significant mean differences were found across all eight competencies between the Manager and Director participants. Together these analyses support the appropriateness of the Corporate Leader for use across varying levels of management.

Table 4. Mean Differences and Effect Sizes for Job Level Across Competencies

Competency	Job Level	Mean	SD	Mean Difference	Effect Size
Business Focus	**Managers**	4.23	0.36	.036	.058
	Directors	4.27	0.32		
Customer Focus	**Managers**	4.27	0.34	.024	.028
	Directors	4.25	0.36		
Results Orientation	**Managers**	4.11	0.39	.025	.026
	Directors	4.13	0.37		
Communication	**Managers**	4.11	0.39	.061	.081
	Directors	4.17	0.34		
Integrity	**Managers**	4.15	0.41	.016	.012
	Directors	4.14	0.41		
Team Leadership	**Managers**	4.02	0.46	.029	.033
	Directors	4.05	0.44		
Inclusiveness	**Managers**	4.08	0.44	.096	.120
	Directors	4.18	0.38		
Developing Talent	**Managers**	3.94	0.44	.028	.034
	Directors	3.97	0.43		

Leadership Navigator® Corporate Leader 2010 National Norms

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 2010 National Norm item mean for an item by taking the average of all Managers' means for that item. The 2010 National Norm competency means were calculated by averaging all items within each competency for each Manager. The Managers' competency means were then averaged to identify the overall competency norms. Table 5 contains the Normative averages for each competency for 2010 and 2005.

Table 5. Normative Averages for Corporate Leader Competencies from 2005 and 2010

	National Norm (Avg.)					
Competency	2005 Norm		2010 Norm	Competency	2005 Norm		2010 Norm
Business Focus	4.33	>	4.23	**Developing Talent**	4.01	>	3.95
Results Orientation	4.15	>	4.11	**Inclusiveness**	4.09	<	4.12
Customer Focus	4.21	<	4.26	**Team Leadership**	4.10	>	4.02
Communication	4.19	>	4.13	**Integrity**	4.21	>	4.15

Because the 2010 Corporate Leader content and rating scale underwent revisions, one should be cautious in drawing any conclusions made from direct comparisons between the two surveys. At a high level, we can look at any shifts or trends noted across the two surveys. The 2010 National Norms shifted slightly as compared to the 2005 norms. Across all of the competencies, excluding Customer Focus and Inclusiveness, the 2010 norms are lower. While the Customer Focus and Inclusiveness competencies showed higher 2010 means, the shift from the 2005 norms was minimal (.05 and .03 respectively). The most dramatic mean shift was for the Business Focus competency (.10). In general, the shifts in norm scores over 2005 and 2010 were not substantial. The average shift is .06 points.

In both the 2005 and 2010 National Norm samples, the lowest average rating was found for Developing Talent. The highest average rating shifted from Business Focus in 2005 to Customer Focus in 2010. There was an overall reduction in the variability of the means across competencies. In the 2005 norms study, the competency averages ranged from 4.01 to 4.33, and the 2010 norms resulted in a range of 3.95 to 4.26. The mean average is lower for the 2010 norms with a mean average of 4.12 compared to the mean average of 4.16 for the 2005 norms.

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 comprised 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 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 6 below.

Table 6. Cronbach's Reliability Estimates and Competency Intercorrelations for 2010 Norms

Competency	1	2	3	4	5	6	7	8
1. Communication	***.91***							
2. Integrity	0.84	***.86***						
3. Business Focus	0.70	0.63	***.89***					
4. Results Orientation	0.78	0.80	0.78	***.92***				
5. Customer Focus	0.63	0.63	0.82	0.78	***.88***			
6. Team Leadership	0.86	0.83	0.70	0.88	0.73	***.94***		
7. Developing Talent	0.86	0.78	0.70	0.83	0.66	0.91	***.92***	
8. Inclusiveness	0.85	0.81	0.61	0.64	0.59	0.81	0.80	***.91***

Note: N=249. Values along the diagonal, in ***bold italics***, represent Cronbach's Alpha for the 2010 norms. Correlations below the diagonal, represent the intercorrelations for the current study. All correlations were significant ($p < .01$).

Overall, the 2010 National Norm reliabilities exceeded acceptable levels as found in the two previous studies for the Corporate Leader ranging from .86 to .94 (Healy & Rose, 2003; Robinson, Rose & Wilkinson, 2005).

Corporate Leader Validity

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. Because multi-source ratings reflect people's perceptions of performance rather than provide an objective measure of performance, it is important to determine whether the participants themselves believe that the content is valid and provides useful information regarding their performance (Murphy, Cleveland & Mohler, 2001). Thus, content and construct validity become key indicators of a multi-rater assessment's validity.

Content Validity

The initial development of the Corporate Leader included a thorough review of relevant literature, followed by intense item and competency analysis for mid-manager jobs. The content is highly face valid and so the content should be very accessible to readers. The competencies assessed as part of the 360-degree feedback tool should be job-related and approved by upper-level management. To the extent that management views the competencies in the Corporate Leader as necessary components of the job, the competency model is valid.

David Bracken (Senior Editor, The Handbook of Multisource Feedback), when asked whether a competency model should be validated beyond content validation, replied, *"It is the right of the leaders of the organization to say we expect people to behave this way or go work somewhere else…as the visionaries of the organization that is what's going to make us successful, differentiate us from our competitors, and attract customers…that is sufficient validation"* (Rose, 2004).

Construct Validity

It is important to test not only whether an assessment tool is reliable, but also if it is measuring what it was designed to measure. A correlation is used to investigate the relationships between constructs. Correlations measure the degree to which two items are related. For example, a strong positive relationship would be expected between vocabulary and reading comprehension. If someone does well on a reading comprehension test, they would be expected to score well on a vocabulary test. No relationship would be expected between vocabulary and eye color. The values of a correlation range from -1 to 1. When there is a positive relationship between two variables, the values range from greater than 0 to 1.0, with 1.0 being the strongest relationship. When there is no relationship between the two variables, the correlation is zero.

The Corporate Leader's two-factor structure was also investigated. As mentioned in the background, the conceptual framework for the Corporate Leader survey is the Ohio State Leadership studies research which separates leadership behavior into two primary factors: Initiating Structure and Consideration. We call these factors Work Process and Interpersonal. The Work Process factor is comprised of the Business Focus, Results Orientation, and Customer Focus competencies. The Interpersonal factor is comprised of the Team Leadership, Developing Talent, Inclusiveness, Communication and Integrity competencies. Note that sometimes Communication and Integrity are referred to as "Base Competencies" because of their underlying core relationship to all of the competencies. In the present study, all competencies are expected to be somewhat related because they are measuring the related construct of Manager job performance. A review of Table 6 demonstrates support for this assumption because all eight competencies were positively correlated (r = .59 to .91).

Competencies in the Interpersonal factor are expected to be more strongly related to each other than to competencies in the Work Process factor and vice versa. To test this assumption, overall composite scores and competency-specific composite scores were created. The mean of the scores for each set of competencies served as the overall composite score. These scores were eventually correlated with the competencies from the other factor.

For each competency within a factor, the average of the other competencies in that factor was used as that competency's competency-specific composite score. Thus, each competency could be correlated with the competency-specific composite to gain an understanding of the relationship between that competency and the other competencies within that factor.

Once all composites were created, the correlation between each competency and its competency-specific composite was compared to the correlation between each competency and the overall composite from the other factor. Higher correlations between the competency and the competency-specific composite relative to the correlation between the competency and the overall composite indicate a stronger relationship between the competency and that factor relative to the competency and the other factor. As displayed in Table 7, all of the five Interpersonal competencies were more highly correlated with their competency-specific Interpersonal composite (average correlation of .90) than with the overall Work Process composite (average correlation of .75). As Table 8 depicts, all of the Work Process competencies were more highly correlated with the competency-specific Work Process composite (average correlation of .83) than with the overall Interpersonal composite (average correlation of .74). One exception is the Results Orientation competency. While the difference was minimal (.03), it did correlate more strongly with the Interpersonal composite. Overall, as expected, competencies within the same factor were more highly related that factor's composite score than to the competency composite score for the other factor.

Table 7. Interpersonal Competency Correlations with Composite Scores

Correlations with Composite Scores		
Interpersonal Competencies	**Interpersonal**	**Work Process**
1. Team Leadership	.91	.83
2. Developing Talent	.89	.79
3. Inclusiveness	.86	.66
4. Communication	.91	.76
5. Integrity	.94	.75
Average Correlation	.90	.75

Table 8. Work Process Competency Correlations with Composite Scores

Correlations with Composite Scores		
Work Process Competencies	**Interpersonal**	**Work Process**
1. Business Focus	.71	.84
2. Results Orientation	.84	.81
3. Customer Focus	.69	.84
Average Correlation	.74	.83

To further analyze the factor structure of the Corporate Leader, a factor analysis was conducted. Factor analysis takes a larger number of variables and identifies a smaller number of factors that can be used to explain those variables. Factor analysis begins with a measure of the total amount of variance observed across all of the variables. The first step involves selecting the combination of variables whose shared correlations explain the greatest amount of the total variance in the variables. The next step entails selecting the combination of variables whose shared correlations explain the greatest amount of the total variance in the variables remaining after the first step. The process continues until all of the desired variance is explained for by patterns of correlations among the variables (Darren & Mallery, 2005). The purpose of using factor analysis in this study is to provide evidence for the two-factor conceptual model of the Corporate Leader. There are four main steps in conducting a factor analysis:

1. Create a correlation matrix of all variables
2. Extract factors
3. Rotate the factors to create a parsimonious and more meaningful structure
4. Interpret the results

Step 1

The subjects-to-variables ratio was applied to determine if the sample size was appropriate to conduct the factor analysis. One rule of thumb suggests that the subjects-to-variables ratio should be five or greater (Grimm & Yarnold, 1995). The sample size for this study was 250 and there are 8 variables (competencies), thus the subjects-to-variables ratio is 31.25 and indicates an adequate sample size for the analysis.

A correlation matrix was constructed using all eight variables to identify if multicollinearity exists. Multicollinearity refers to data redundancies, and would suggest little independence between the variables. In examining Table 5, all intercorrelations are significant and fell between r = .59 and r = .91. The average correlation was .75 and suggests moderate relationships between variables. Given that all of the competencies measure manager job performance, this is expected.

Step 2

An unrotated solution was run to extract factors, suppressing absolute values less than .35. The Kaiser Meyer Olkin measure of sampling adequacy was .884 which is excellent. This measures whether the distribution of values is adequate for factor analysis and any Kaiser Meyer Olkin statistic less than .5 should not be factor analyzed. The Bartlett's Test of Sphericity measures the multivariate normality of the set of distributions and a significant value is desired for factor analysis. In this case, Bartlett's Test of Sphericity was significant (<.001).

Eigenvalues greater than 1 were extracted using Principal Axis Factoring, resulting in 1 factor accounting for 79% of the variance (See Table 9). Principal Axis Factoring was used, as there was a theoretical underpinning for which variables should load onto separate factors. While the eigenvalues greater than 1 examination suggests that one factor may be adequate, including a second factor increases the variance accounted for by 9% (total variance accounted for by two factors is 88%). Further examination of the scree plot slope revealed that a 1-2 factor solution may be suitable. Scree plots are more interpretable and reliable as the sample size increases.

Table 9. Eigenvalues and Total Variance Explained

Factor	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	6.331	79.141	79.141	6.169	77.114	77.114	5.885
2	.692	8.649	87.790	.505	6.312	83.426	5.083
3	.305	3.818	91.608				
4	.226	2.826	94.434				
5	.200	2.503	96.936				
6	.111	1.391	98.328				
7	.079	.983	99.311				
8	.055	.689	100.000				

Step 3

Based upon the data analyses above, it was determined that a rotated solution for two-factors should be run. A rotated solution using a varimax rotation was utilized. The goal is to obtain simple structure in examining the underlying dimensions.

Step 4

The rotated matrix for the two-factor solution is found in Table 10. In examining the rotated matrix, only loadings greater than .45 are considered meaningful. The greater factor loading is highlighted in gray for each competency across the two factors.

Table 10. Rotated Factor Matrix for Two Factors

	Factor	
	1	2
Business Focus	.402	.789
Developing Talent	.780	.487
Inclusiveness	.823	.327
Integrity	.794	.412
Results Orientation	.594	.701
Customer Focus	.353	.836
Team Leadership	.787	.535
Communication	.842	.418

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Table 10 provides support for the conclusion that the Corporate Leader measures two-factors of leadership: Work Process and Interpersonal Effectiveness. The competencies Business Focus, Results Orientation, and Customer Focus displayed stronger loadings on Factor 2 (Interpersonal Effectiveness), while the competencies Developing Talent, Inclusiveness, Integrity, Team Leadership and Communication displayed stronger loadings on Factor 1 (Work Process). This two-factor solution fits the data well and accounts for 88% of the total variance in the data.

Content Revisions

Rating Scale Revision

Inflated ratings and low variability are challenges common to 360-degree feedback ratings (LeBreton, Burgess, Kaiser, Atchley, and James, 2003). A study was recently conducted by 3D Group to examine the effects that a rating scale with more positive labels would have on 360 ratings (English, Rose & McLellan, 2009). Previous research on response scales has demonstrated that lower means and increased variation can be obtained when more positive labels are added to the scale (Lam & Klockars, 1982; Wyatt &Meyers, 1987). In theory, a response scale anchored more heavily with positive labels should more accurately represent a rater's natural response to the items they are rating. In other words, if managers must exhibit, at least to some extent, particular behaviors at work to retain their jobs then including a label such as "never" on the response scale will offer little to no utility. Also, if raters are concerned about the repercussions of their ratings on the participant, then using a more positive response scale should encourage raters to use the scale in a more balanced manner as well because they will not feel as if their feedback is extremely negative in nature.

In the English et al 2009 study, two samples were used to compare the efficacy of the survey scales. One sample used the original Corporate Leader rating scale from the 2003 and 2005 studies, and the second sample used an updated scale that included more positive rating labels (referred to as "2009 Scale"). See Table 11 for both scales used in this study. Analysis of the 2009 Scale revealed significant psychometric improvements over the original rating scale. The 2009 Scale used more positive response labels which yielded lower mean scores and higher standard deviations across most items and all of the competency scale scores excluding the Customer Focus competency. This study was recently presented at the 24th Annual Meeting of the Society for Industrial Organizational Psychologists in New Orleans, LA. Based upon the findings from English et al 2009, the new scale was adopted for the 2010 Corporate Leader.

Table 11: Scales Used in Rating Scale Comparison Study

Rating Scale	1	2	3	4	5
2009 Scale	*Almost Never*	*Sometimes*	*Frequently*	*Almost Always*	*Always*
2005 Scale	*Never*	*Infrequently*	*About Half the Time*	*Usually*	*Always*

Survey Item Revision

The Corporate Leader Integrity competency originally contained one survey item that described a negative work behavior. Feedback from clients indicated that this could cause confusion because it was the only survey item that described a negative behavior.

The item was rewritten to describe a positive work behavior and analyzed in the scale comparison study described above. Results indicated that the item revisions did not impact the reliability of the Integrity competency in a negative manner. In fact, the reliability of the Integrity competency increased from .80 in 2005 to .86 in 2010 with the revised item. See Table 12 for the 2010 revision to this survey item.

Table 12: Survey Item Revision for Integrity Competency

2010 Item	2005 Item
Does not take credit for others' work.	*Takes credit for others' work.*

Corporate Leader Report Format and Features Revisions

3D Group worked with a graphic artist to ensure that the graphical displays of data were both visually appealing "clean" and easy to understand "clear". The Overall Competency Ratings page and Breakout Ratings by Competency page layouts were both revised resulting in a more reader-friendly report. Labels, white space, fonts, colors and graphical displays were all considered in the revisions in order to guarantee that the 360-degree feedback results are communicated as clearly as possible.

Other updates include green, upward-pointing arrows indicating that the Overall score is at or above the 90th percentile compared to the 2010 National Norm, and red, downward-pointing arrows indicating that the Overall score is at or below the 20th percentile compared to the national norm. This feature allows leaders to benchmark their ratings against a National sample of other leaders. In addition, extreme scores in the Breakout Ratings by Competency pages are flagged. Also, a Blind Spots page can now be added to the Corporate Leader as an optional report feature. The Blind Spots page identifies both unexpected strengths and blind spots based upon Self and Overall Score discrepancies.

Conclusion

In continuing to improve the efficacy of 3D Group's 360 assessments, recent revisions were made to the Leadership Navigator® Corporate Leader survey. Revisions include utilizing a new response scale, replacing one problematic item, updating the report format, adding new report features, and developing a new set of 2010 Corporate Leader Norms. While making these revisions, the reliability and validity of the Corporate Leader were re-examined. In the current study, previous statistical analyses were 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. Once again, the Corporate Leader demonstrated strong levels of reliability for a wide range of leadership positions. The Cronbach's Alpha for each of the instrument's competency scales surpassed acceptable levels of reliability. In addition, a factor analysis confirmed the two-factor structure of the Corporate Leader. Consequently, the 2010 National Norms will replace the 2005 National Norms in the Corporate Leader report.

In summary, the *2010 Normative Comparison, Reliability Analysis, Validity and Revisions Report for the Leadership Navigator® for Corporate Leaders* Report addressed:

- The results from the 2010 Leadership Navigator® for Corporate Leaders Normative study provided further support for the reliability and validity of the assessment tool and its applicability across different demographic groups. Therefore, the new set of 2010 National Norms will replace the 2005 National Norms in the Corporate Leader report.
- A new scale with more positive labels replaced the original Corporate Leader rating scale. Research on the new scale found that it yields lower mean scores and greater response variation.

- One item from the Integrity competency was rewritten to reflect a positive work behavior versus a negative work behavior. This revision supports greater consistency across the survey items as all of the items now reflect positive work behaviors, and increased the reliability of the Integrity competency.
- The report format was updated to obtain a more "clean" and "clear" report layout. Additional features were added to the report that includes: Arrows indicating that the Overall score is at or above the 90th percentile or at or below the 20th percentile compared to the national norm. Scores in the Breakout Ratings by Competency pages now identify extreme scores and, finally, a Blind Spots page can now be added to the Corporate Leader as an optional report feature.

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Note: In referencing this report, please use the following reference:

English, A. & Rose, D.S. (2010). *2010 Normative Comparison, Reliability Analysis, Validity and Revisions Report for the Leadership Navigator® for Corporate Leaders.* 3D Group Technical Report #8321. Berkeley, CA: Data Driven Decisions, Inc.