INSIGHTMirror 360 Survey Analysis

Prepared for:

Bookman Resources, Inc. / InsightMirror 360

Date Delivered: May 14, 2011

Overview:

Reliability and Validity Study for Bookman Resources, Inc. / INSIGHTMirror 360 is comprised from the following data:

- **Reliability and validity is based on 1,915 Ratee Final Feedback Reports from April, 2010 to April 2011.**
- **The data from five thousand Raters are part of the 2010 - 20011 data. Here are the Rater's professional titles: direct reports, peers, Supervisor A, and or, B, upper management, and others. *Others* could include any category you designate. For example, outside clients, inside clients, people who don't fit in any of categories, etcetera.**

360-degree feedback sometime referred to as *multi-rater feedback* is a method of systematically collecting opinions about a leader's performance from a wide range of people who know this leader from a work environment, and putting this feedback in a feedback report format. The 360 titled: *INSIGHTMirror 360* collects both numerical scores and written comments from the co-workers of the person being rated. The INSIGHTMirror 360 specifically uses feedback from Self, Direct Reports, Peers, Boss A, and, or, Boss B, Upper Management and "Others." The category called "Others" can be designated as: outside clients, inside clients, suppliers, or just people who know the leader's work well but don't neatly fit into any of the professional categories stated above. Not all professional categories mentioned above

need to be used by Raters (people who rate the leader) for an assessment feedback report to be generated for the Ratee (person being rated).

The INSIGHTMirror 360 has 64 questions, and thirteen areas for (optional) written comments. The 360 INSIGHTMirror 360 Assessment began operations in 2000.

The INSIGHTMirror 360 feedback is anonymous, and assessment forms are delivered to people who know the Ratee's professional work rather well. The Ratee doesn't know how any individual rated him/her with the exception of Boss A, and, or, Boss B's numerical scores, that are readily available to the Ratee.

The main purpose of a 360 assessment is to help the Ratee see how other people perceive him/her, and as such is often quite open to make positive changes regarding both managing their weaknesses and utilizing their strengths more effectively.

Critical Results from The Study:

- **The results of the statistical analysis showed that the INSIGHTMirror 360 survey instrument exhibited excellent reliability and validity based on the provided datasets.**

- **The survey was valid and reliable both on the sample of raters and on the sample of rated individuals.**

- **Cronbach's alpha for the subscales ranged from .74 to .89 (indicating excellent reliability), and the CFA revealed that all items were strongly related to their scales, providing support for the proposed factor structure.**

Introduction

This chapter discusses reliability and validity statistics for both the 5000-person and 1915-person samples. First, Cronbach's alpha statistics were calculated to the test the reliability of the data. Correlations for the aggregate scores for each section were calculated next to determine if it would be a good idea for sections to be consolidated. Correlation matrices for all 64 questions of the survey follow that, along with factor analyses for both data sets, testing validity to determine if the factors that emerge from the survey are similar to the sections that appeared on the original survey.

Analysis of Data

Internal Consistency Reliability Analysis

Table 1 displays Cronbach's alpha statistics for the 5000-person sample measuring the raters of an individual to test the reliability of the data. Cronbach's alpha scores ranged from .744 for the Working Relationships scale to .892 for the Coaching Skills scale. All reliability measures are quite solid except for Working Relationships, which has more questionable reliability, as generally Cronbach's alpha values of .8 or greater are considered preferable. However, values higher than .7 fall within the 'acceptable' range. Therefore, these results suggest that the subscales exhibit more than adequate internal consistency reliability.

Table 1: Cronbach's Alpha Statistics for Scales for Raters of Individual

Scale	Cronbach's Alpha	N of items
Communication Skills	**.822**	**11**
Decision Making	**.825**	**7**
Promotes Innovation and Change	**.837**	**8**
Working Relationships	**.744**	**8**
Leadership Skills	**.878**	**11**
Coaching Skills	**.892**	**7**
Utilizes the Strengths of Others and Self	**.888**	**6**
Team Development	**.826**	**6**

Similarly, Table 2 displays Cronbach's alpha statistics for the 1915-person sample for the results of those being rated to test the reliability of the data. Cronbach's alpha scores ranged from .805 for the Team Development scale to .860 for the Utilizes the Strengths of Others and Self scale. All reliability measures are acceptable for these respondents.

Table 2: Cronbach's Alpha Statistics for Scales for Results of Those Being Rated

Scale	Cronbach's Alpha	N of items
Section 1. Communication Skills	**.823**	**11**
Section 2. Decision Making	**.834**	**7**
Section 3. Promotes Innovation and Change	**.809**	**8**
Section 4. Working Relationships	**.812**	**8**
Section 5. Leadership Skills	**.847**	**11**
Section 6. Coaching Skills	**.847**	**7**
Section 7. Utilizes the Strengths of Others and Self	**.860**	**6**
Section 8. Team Development	**.805**	**6**

Results of the analysis showed that the scales exhibit excellent internal consistency reliability. This suggests that all items within each scale (e.g., items 1-11, items 12-18, etc.) are highly inter-correlated, and thus can be assumed to measure the same underlying construct.

Correlation Analysis

In this section we present the results of the correlation analysis among the 8 constructs defined by the survey. All the variables in each section of the test were aggregated, with the variables from Section 1 through Section 8 of the survey being set equal to the average of the answers to all the questions on that section of the original test. These eight aggregated section scale scores were then examined to determine the correlation structure. As indicated by Table 3, there are moderate to strong statistically significant correlations among all pairs of factors, with p-values less than .001 in every single case. All correlation coefficients were positive, suggesting that individuals scoring high in one of the scales also tended to score high on the other ones.

These results indicate that it is likely that consolidating some of these factors may be beneficial in forming a more concise and accurate model. For example, some pairs with very strong correlations (higher than .7) were *Leadership Skills* and *Coaching Skills*, *Leadership Skills* and *Utilizes the Strengths of Others and Self*, and *Coaching Skills* and *Utilizes the Strengths of Others and Self*.

Table 3: Section Correlations for Raters of Individual (N = 5000)

	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8
Section 1	**1**	**.647****	**.595****	**.606****	**.531****	**.415****	**.416****	**.610****
Section 2	**.647****	**1**	**.617****	**.524****	**.591****	**.476****	**.467****	**.553****

Section 3	**.595****	**.617****	**1**	**.558****	**.658****	**.595****	**.584****	**.569****
Section 4	**.606****	**.524****	**.558****	**1**	**.604****	**.513****	**.489****	**.613****
Section 5	**.531****	**.591****	**.658****	**.604****	**1**	**.768****	**.700****	**.504****
Section 6	**.415****	**.476****	**.595****	**.513****	**.768****	**1**	**.728****	**.424****
Section 7	**.416****	**.467****	**.584****	**.489****	**.700****	**.728****	**1**	**.447****
Section 8	**.610****	**.553****	**.569****	**.613****	**.504****	**.424****	**.447****	**1**

***** Significant at the .01 level***

We repeated the same analysis on the 1918-person sample. Once again, the variables in each section of the test were aggregated, with the variables from Section 1 through Section 8 being set equal to the average of the answers to all the questions on that section of the original test. Table 4, like Table 3, demonstrates that there are moderate to strong statistically significant correlations among all pairs of factors, with p-values less than .001 in every single case. Therefore, the same consolidation suggestion as the one mentioned previously applies to this sample too.

Table 4: Section Correlations for Results of Those Being Rated (N = 1918)

	Section 1	**Section 2**	**Section 3**	**Section 4**	**Section 5**	**Section 6**	**Section 7**	**Section 8**
Section 1	**1**	**.690****	**.625****	**.647****	**.540****	**.484****	**.454****	**.596****
Section 2	**.690****	**1**	**.650****	**.574****	**.570****	**.473****	**.526****	**.570****
Section 3	**.625****	**.650****	**1**	**.573****	**.672****	**.608****	**.562****	**.619****
Section 4	**.647****	**.574****	**.573****	**1**	**.589****	**.549****	**.480****	**.633****
Section 5	**.540****	**.570****	**.672****	**.589****	**1**	**.762****	**.628****	**.558****
Section 6	**.484****	**.473****	**.608****	**.549****	**.762****	**1**	**.618****	**.575****
Section 7	**.454****	**.526****	**.562****	**.480****	**.628****	**.618****	**1**	**.567****

Section 8	**.596****	**.570****	**.619****	**.633****	**.558****	**.575****	**.567****	**1**

***** Significant at the .01 level***

Test of Factor Structure Validity: Confirmatory Factor Analysis

In order to test whether the proposed factor structure fitted the collected data, a confirmatory factor analysis (CFA) was conducted through the use of Structural Equation Modeling (SEM). The 'proposed factor structure' represents the idea that questions 1 through 11 measure the same construct, questions 12 through 18 measure the same construct (and it is different from the one measured by questions 1-11), etc. It provides much richer information than the reliability analysis, which also measures whether a set of questions measure the same underlying construct.

CFA has the important advantage that it allows to explicitly model the existence of unobserved variables. In this case, the unobserved variables are Communication Skills, Decision Making, Promotes Innovation and Change, Working Relationships, Leadership Skills, Coaching Skills, Utilizes the Strengths of Others and Self, and Team Development. They are unobserved in that they are not measured directly, but through a set of specific questions, such as "Responds to other's opinions in a constructive manner."

A standard CFA produces several outputs that are very useful in evaluating the validity of the theoretical factor structure. The values that are most relevant to the present analysis are:

1. **Standardized Factor Loadings. These values represent the strength of the relationship between the survey questions and the unobserved variables. For example, one of them would assess the relationship between the answers to "Responds to other's opinions in a constructive manner" and the unobserved variable "Communication Skills." If the factor structure is valid, then these**

factor loadings should be high (higher than .4 or .5). A low factor loading would indicate that the question is not related to the construct it should be measuring, and that that question should be removed from the survey, or reworded to better fit the concept of the unobserved variable.

2. **Overall model fit. These values show how well the proposed factor structure fit the data. They are given mainly by two statistics: Comparative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA). When CFI is higher than .9 and RMSEA is lower than .08, this provides evidence that the model fit is excellent (Byrne, 2001)**
3. **Modification Indices. These values provide information about the relationship among individual questions, and suggest ways in which the overall model fit could be improved. For example, the modification indices may reveal an abnormally high correlation between two questions. This could suggest that the two questions are essentially one and the same, and that one of them could be removed without losing information. This can be used to simplify the survey removing redundant items.**
4. **Correlations among the observed variables. This information is similar to the one presented in Tables 3 and 4, but it is based on a sounder statistical technique, because it does not assume that the underlying variables are defined as an average of the questions. This information can also be used to simplify the survey as it may show that two or more sections are actually measuring the same construct.**

We first conducted a CFA examining the factor structure validity using all questions in the survey on the 5000-person sample of raters. As explained previously, the assumed factor structure was that questions 1-11 measured one construct (*Communication Skills*),

questions 12-18 measured another one (*Decision Making*), etc. The results suggested that the proposed factor structure was indeed valid, although the model fit was slightly below the optimal one. The CFI of the model was .868 (very close to the cutoff value of 0.9), and the RMSEA was .053, indicating that the model fit was good. The standardized factor loadings were all positive and significant, and they also were relatively high, ranging from 0.543 through 0.841. This result suggests that the questions were indeed strongly associated to the underlying constructs they were supposed to measure.

The same analysis was repeated on the sample of rated individuals (N = 1918). The results were similar, although the model fit was slightly worse. Specifically, CFI was 0.802, and RMSEA was at 0.055. While the RMSEA was well within acceptable levels, the CFI suggests that model fit was inadequate. Therefore, this would suggest that for the sample of rated individuals, the proposed factor structure is not valid. On the positive side, all factor loadings were positive and significant at the 0.001. They were also and relatively high (ranging from 0.429 through 0.747), which suggests that the questions were significantly and strongly related to their underlying constructs.

An inspection of the modification indices revealed that many of the questions had high correlations. This problem affected the following pairs of items (see Table 5).

Table 5: Pairs of Questions with High Correlations

3-5	**38-40**
6-7	**39-40**
9-10	**41-42**
19-20	**41-43**
21-22	**42-43**
23-24	**42-44**

24-25	**43-45**
28-29	**50-51**
29-30	**51-52**
36-37	**59-60**
38-39	**62-63**

These results suggested that many of the items were not adding useful information to the model, and that the removal of those items could improve model fit (and this would also have the added benefit of a shorter and simpler survey that provides the same information as the current one). Based on these findings, we re-ran the model eliminating the following questions: 5, 7, 10, 20, 22, 24, 26, 29, 37, 39, 40, 42, 43, 51, 69, and 63 (i.e., a total of 16 of the 64 questions).

The results for the sample of raters (N = 5000) showed some improvement from those of the original model. The standardized factor loadings were adequate for all questions. They ranged from .556 through .878, indicating a strong relationship between the underlying constructs and their indicator questions. All of them were positive and significant at the .001 level (see complete list of factor loadings in the Appendix). The overall model fit was very good, with a CFI of .899, and a RMSEA of .052. The correlations among the constructs were still very strong, suggesting that some sections could be merged, as they are not measuring distinct constructs (such as *Communication Skills* and *Working Relationships*).

Table 6: Correlation Coefficients among the Eight Factors, based on CFA (N = 5000)

	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8
Section 1	**1**							

	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8
Section 2	**.79**	**1**						
Section 3	**.86**	**.82**	**1**					
Section 4	**.90**	**.73**	**.82**	**1**				
Section 5	**.89**	**.87**	**.89**	**.88**	**1**			
Section 6	**.86**	**.79**	**.86**	**.88**	**.89**	**1**		
Section 7	**.74**	**.72**	**.80**	**.75**	**.90**	**.89**	**1**	
Section 8	**.88**	**.77**	**.85**	**.89**	**.89**	**.88**	**.81**	**1**

All correlations were significant at the .001 level

Overall, the model experienced some improvement after the removal of the 16 aforementioned questions, and exhibited adequate factor structure validity. Since the removal of these questions would make the survey considerably simpler (25% shorter, without a clear loss of information), the possibility of removing these items should be considered. Further research with more data could be used to inform this decision. For example, if the survey scores are supposed to be associated with 'success rate' or other outcome variable, the predictive power of the survey with and without those questions could be examined to make a final decision of whether to remove them.

Once again, the analysis was repeated for the sample of rated individuals (N = 1918). In terms of model fit, the CFI was 0.846 and the RMSEA was 0.054. Notice that the CFI is still below the cutoff value of 0.90, but there is a clear improvement from the original model, which had a CFI of 0.802. Moreover, as in the previous case, factor loadings were positively and significantly related to their proposed underlying constructs, with standardized loadings ranging from 0.438 to 0.792 (see the Appendix for a complete list).

Given this improvement in model fit, the same suggestion of removing the highly correlated items applies to the sample of rated individuals.

Table 7 shows the implied correlations among the factors for this model. Once again, the high correlations suggest that merging some of the sections may be more appropriate.

Table 7: Correlation Coefficients among the Eight Factors, based on CFA (N = 1918)

	Section 1	Section 2	Section 3	Section 4	Section 5	Section 6	Section 7	Section 8
Section 1	**1**							
Section 2	**.80**	**1**						
Section 3	**.79**	**.78**	**1**					
Section 4	**.82**	**.64**	**.68**	**1**				
Section 5	**.87**	**.86**	**.91**	**.78**	**1**			
Section 6	**.77**	**.65**	**.74**	**.79**	**.82**	**1**		
Section 7	**.66**	**.63**	**.69**	**.61**	**.79**	**.74**	**1**	
Section 8	**.78**	**.65**	**.72**	**.80**	**.73**	**.73**	**.77**	**1**

All correlations were significant at the .001 level

Supplementary Results: Exploratory Factor Analysis

In contrast with the methodologies used in the previous sections of this report, for this section we used a purely exploratory approach. We did not assume any specific factor structure. Instead, we used a technique called principal factor analysis to examine the relationships among the items, and let that correlation structure suggest (a) the optimal number of underlying constructs and (b) the questions that are associated with those constructs. While this type of analysis is not as useful in assessing the reliability and

validity of the survey, its results can be used to inform potential modifications to the survey. However, any such modifications should be also supported by the theoretical framework behind the design of the survey. The following statistical results do not provide enough support on their own to make those changes.

A principal components matrix with varimax rotation was run on all 64 Likert-scale questions for the larger raters of individuals sample. Factor loadings of .5 or higher satisfy Nunnally's threshold of acceptable reliabilities and were listed in Table 8, and were sorted from largest to smallest by component.

Variables were assigned names based on subjective common themes underlying the questions, particularly based on the wording of the questions with higher factor loadings. For instance, the first component's highest-scoring four factor loadings were on the questions "Delegates tasks to help a subordinate's professional growth and/or increase office efficiency", "Delegates decision making to the lowest proper employee level to give that employee a true sense of empowerment and/or a chance for professional development", "When delegating, teaches others to think ahead about potential problems", and "When delegating a new task to an employee, sees to it that employee is given extra attention in successfully performing new task". A clear common theme that results from looking at these questions is "delegation of tasks to employees". The other factors were defined similarly based on some combination of the most common questions and highest-scoring factor loadings.

The components were defined as follows:

Component 1 – delegation of tasks to employees

Component 2 – makes the best decisions

Component 3 – strong communication skills

Component 4 – in support of new initiatives and changes

Component 5 – able to disagree but understand the other point of view

Component 6 – ability to focus on strengths

Component 7 – working together and celebrating accomplishments as a team

Component 8 – able to find common ground

Component 9 – accepts responsibility for mistakes

Component 10 – good relationship with supervisor

Component 11 – ability to help team members develop new abilities

Several components are similar to actual scales in the original survey. For example, Component 3 seems to correspond to the "Communication Skills" section. Half of the questions that were associated with Component 3 were within the Communication Skills section (such as "Fosters an atmosphere of open communication" and "Responds to other's opinions in a constructive manner"). Component 4 roughly corresponds to "Promotes Innovation and Change", and all six of its associated questions are in that section (such as "Helps others see what changes need to be made"). Component 2 seems to correspond to "Decision Making," and all six of its questions (such as "Makes decisions in a timely manner") are among the seven questions in this section. No other clear correspondences were identified.

Table 8: Principal Components Matrix with Varimax Rotation for Raters of Individual (N = 5000)

	Component										
	1	2	3	4	5	6	7	8	9	10	11
Delegates tasks to help a subordinate's professional growth and/or increase office efficiency	.850										
Delegates decision making to the lowest proper employee level to give that employee a true sense of empowerment and/or a chance for professional development	.849										
When delegating, teaches others to think ahead about potential problems	.824										

	Component										
	1	2	3	4	5	6	7	8	9	10	11
When delegating a new task to an employee, sees to it that employee is given extra attention in successfully performing new task	.806										
Gives subordinates the sense of being an integral part of something important	.766										
Develops effective working relationships with subordinates	.735										
Actively looks for assignments for subordinates that will provide avenues for career enhancement	.721										
Collaboratively develops measurable, specific, and achievable objectives with each subordinate	.700										
Has successfully separated self from prior position within the organization, and therefore is at ease delegating those tasks he/she used to perform	.668										
Designs each person's role based on his/her strengths as that person's job description allows	.660										
Encourages direct reports to ask tough questions that may challenge the status quo	.638										
Is very comfortable discussing strategies with employees that would enhance their career goals	.597										
Helps people identify their own professional strengths so that they could spend more time using these strengths in their work environment	.592					.584					
Encourages people to strengthen an existing strength	.573					.561					
Gives constructive feedback in a timely manner	.567										
Adapts to the learning style and experience level of each employee	.543										
Models and teaches political savvy by identifying the internal and external factors that impact the work of the organization											
Makes decisions in a timely manner		.742									
Follows through on decisions made		.708									
Can make the tough decision when necessary		.586									
Gets to the heart of a problem by identifying the elements of the problem effectively		.579									

	Component										
	1	2	3	4	5	6	7	8	9	10	11
Makes the best decisions possible under pressure of having incomplete information		.559									
Has an effective system of ensuring that actions decided at meetings are carried through		.539									
Disseminates information in a timely manner											
Expresses facts and ideas in writing in a clear and organized manner											
Is outstanding in his or her professional specialty											
Structures meetings in ways that maximize the possibility for concrete results											
Communicates the vision of desired results in ways that build commitment among team members											
Makes clear oral presentations to groups											
Is a good listener			.716								
Fosters an atmosphere of open communication			.665								
Responds to others' opinions in a constructive manner			.649								
Makes time for others who seek ideas or help			.611								
Maintains level-headedness in the face of frustrating obstacles											
Creates climate where others can offer new ideas and take risks without fear of criticism or punishment											
Has a "can do" attitude when faced with setbacks											
Is sensitive to cultural differences/makes appropriate accommodations											
Gives others recognition for good work											
Helps others see what changes need to be made				.694							
Creates buy-in and enthusiasm for change				.652							
Introduces change, even though there is a very likely chance that this change may antagonize an important voice or voices within the organization				.643							
Very supportive to people with new initiatives that s/he is in agreement with				.562							
Encourages creative thinking and innovation				.536							

	Component										
	1	2	3	4	5	6	7	8	9	10	11
Modifies plans suitably in response to changing conditions				.503							
When in conflict with others wants to understand their point of view					.774						
Resolves conflicts and disagreements in a constructive manner					.752						
Is good at defending own point of view to resistant audience					.644						
Handles criticism from others in the organization with poise											
Encourages others to focus on their strengths						.674					
Sees focusing on people's strengths as equally (if not more) important than assisting people in their areas of weakness						.629					
Designs own professional work around personal strengths						.580					
Motivates people to want to accomplish results as a team							.718				
Sets a climate where a group of people working as a team accept mutual responsibility for their final product							.707				
Celebrates team accomplishments							.696				
Collaborates across boundaries and finds common ground with stakeholders								.700			
Consistently develops and sustains cooperative working relationships throughout the organization								.657			
Possesses the skills to influence the group dynamics so consensus can be more easily achieved even when s/he has little or no "positional" power								.582			
Does not try to cover up mistakes									.799		
Accepts responsibility for own mistakes									.786		
Tells the truth									.596		
Develops an effective working relationship with supervisor										.839	
Develops an effective working relationships with upper management										.795	

	Component										
	1	2	3	4	5	6	7	8	9	10	11
Develops effective working relationships with peers										.549	
Is patient and encouraging when helping team members develop new abilities											.527

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 8 iterations.

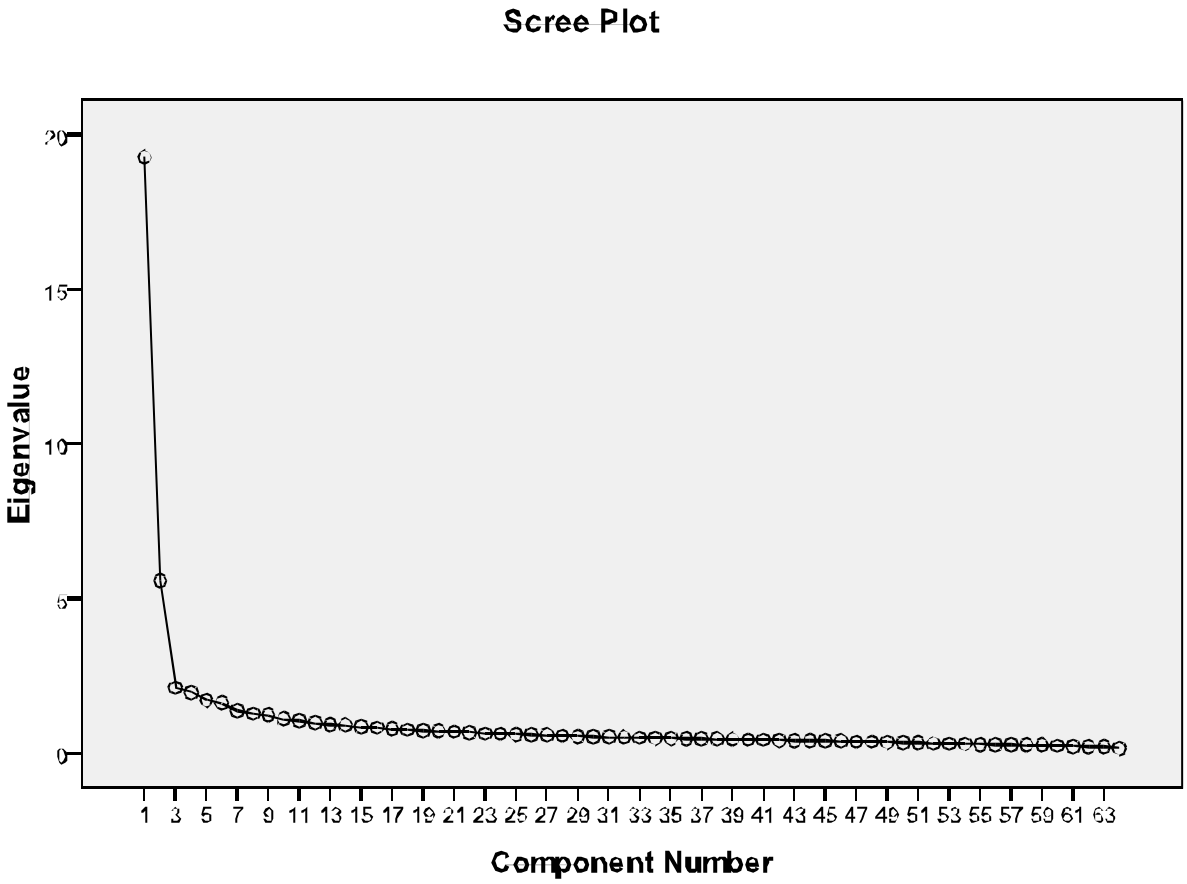
Table 9 lists the rotation sums of squared loadings for the principal components analysis in Table 8, which explain what percentage of the variance in the overall responses is explained by each factor. The factors, or components (as they are called in the table) are sorted by percentage of variance explained, and some of the later components (particularly components 7 through 11) play a minimal role in explaining the variance structure of the model.

Table 9: Rotation Sums of Squared Loadings for Raters of Individual

	Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %
1	9.946	15.540	15.540
2	4.603	7.192	22.732
3	4.077	6.371	29.103
4	3.353	5.239	34.342
5	2.813	4.395	38.737
6	2.797	4.371	43.108
7	2.512	3.926	47.034
8	2.270	3.547	50.581
9	2.226	3.479	54.060
10	2.189	3.421	57.481
11	1.508	2.356	59.837

Figure 1 displays the screen plot roughly corresponding to Table 6, which displays the proportion of total variance explained by each component. It is based on the initial eigenvalues, not the rotation sums of squared loadings, which are of more use for interpretation of a varimax-rotation matrix. The point where the difference in eigenvalues between two components becomes difficult to determine on the graph marks the last component that plays a significant role in the factor analysis. It is very difficult to distinguish between the eigenvalues for component number 7 and 8, so it can be concluded that components 8 through 11 are most relevant on the principal components analysis. This suggests that a 7-factor solution may be appropriate (whereas the current survey is based on 8 factors)

Figure 1: Scree Plot for Raters of Individual



Additionally, another principal components matrix with varimax rotation was run on all sixty-four Likert-scale questions for the results of those being rated. Once again, correlations with a coefficient of .5 or greater satisfy Nunnally's threshold of acceptable reliabilities and were listed in the table, and were sorted from largest to smallest by component. As before, variables were assigned names based on subjective common themes underlying the questions, particularly the higher factor loadings.

The components were defined as follows:

Component 1 – delegation of tasks to employees

Component 2 – makes the best decisions

Component 3 – in support of new initiatives and changes

Component 4 – good relationship with supervisor and peers

Component 5 – ability to focus on strengths

Component 6 – strong communication skills

Component 7 – able to disagree but understand the other point of view

Component 8 – accepts responsibility for mistakes

Component 9 – handles criticism with poise

Component 10 – adapts to the learning style of each employee

Component 11 – makes clear oral presentations

Several components are similar to actual scales in the original survey. Component 6 corresponds to the "Communication Skills" section, although those questions in Component 6 are questions 31-34, so it does not match up. Component 3 roughly corresponds to "Promotes Innovation and Change", and indeed all four questions are between questions 19-26 (as that section is defined in the survey). Component 2 corresponds to "Decision Making", and five of the six questions in that component do fall in that section between questions 12 and 18. Component 4 roughly relates to "Working Relationships", and half of its questions are in the "Working Relationships" section, while the other half is found in the "Team Development Section." Overall, the relationship between the extracted factors and the proposed sections does not seem very clear on this dataset.

Table 11 lists the rotation sums of squared loadings for the principal components analysis in Table 10, which explain what percentage of the variance is explained by each factor. The factors, or components (as they are called in the table) are sorted by percentage of variance explained, and as before, some of the later components (particularly components 8 through 11) play a minimal role in explaining the variance structure of the model.

Table 10: Principal Components Matrix with Varimax Rotation for Results of Those Being Rated (N = 1918)

	Component										
	1	2	3	4	5	6	7	8	9	10	11
Delegates tasks to help a subordinate's professional growth and/or increase office efficiency	.778										
Delegates decision making to the lowest proper employee level to give that employee a true sense of empowerment and/or a chance for professional development	.771										
Actively looks for assignments for subordinates that will provide avenues for career enhancement	.716										
When delegating, teaches others to think ahead about potential problems	.698										
Gives subordinates the sense of being an integral part of something important	.695										
When delegating a new task to an employee, sees to it that employee is given extra attention in successfully performing new task	.665										
Develops effective working relationships with subordinates	.659										
Collaboratively develops measurable, specific, and achievable objectives with each subordinate	.640										
Has successfully separated self from prior position within the organization, and therefore is at ease delegating those tasks he/she used to perform	.625										
Encourages direct reports to ask tough questions that may challenge the status quo	.561										
Is very comfortable discussing strategies with employees that would enhance their career goals	.539										
Makes decisions in a timely manner		.719									
Follows through on decisions made		.667									
Has an effective system of ensuring that actions decided at meetings are carried through		.615									
Disseminates information in a timely manner		.554									
Can make the tough decision when necessary		.533									
Gets to the heart of a problem by identifying the elements of the problem effectively		.521									

	Component										
	1	2	3	4	5	6	7	8	9	10	11
Expresses facts and ideas in writing in a clear and organized manner											
Structures meetings in ways that maximize the possibility for concrete results											
Helps others see what changes need to be made											
Makes the best decisions possible under pressure of having incomplete information											
Is good at defending own point of view to resistant audience											
Modifies plans suitably in response to changing conditions											
Encourages creative thinking and innovation			.644								
Very supportive to people with new initiatives that s/he is in agreement with			.600								
Introduces change, even though there is a very likely chance that this change may antagonize an important voice or voices within the organization			.567								
Creates buy-in and enthusiasm for change			.509								
Communicates the vision of desired results in ways that build commitment among team members											
Creates climate where others can offer new ideas and take risks without fear of criticism or punishment											
Is outstanding in his or her professional specialty											
Develops an effective working relationships with upper management				.616							
Consistently develops and sustains cooperative working relationships throughout the organization				.592							
Develops an effective working relationship with supervisor				.564							
Celebrates team accomplishments				.548							
Develops effective working relationships with peers				.540							
Sets a climate where a group of people working as a team accept mutual responsibility for their final product				.508							
Motivates people to want to accomplish results as a team											

	Component										
	1	2	3	4	5	6	7	8	9	10	11
Encourages people to strengthen an existing strength					.722						
Helps people identify their own professional strengths so that they could spend more time using these strengths in their work environment					.693						
Encourages others to focus on their strengths					.675						
Sees focusing on people's strengths as equally (if not more) important than assisting people in their areas of weakness					.616						
Designs each person's role based on his/her strengths as that person's job description allows					.586						
Designs own professional work around personal strengths					.540						
Makes time for others who seek ideas or help						.644					
Is a good listener						.583					
Is sensitive to cultural differences/makes appropriate accommodations						.576					
Gives others recognition for good work						.534					
When in conflict with others wants to understand their point of view							.669				
Resolves conflicts and disagreements in a constructive manner							.635				
Responds to others' opinions in a constructive manner							.592				
Fosters an atmosphere of open communication											
Does not try to cover up mistakes								.712			
Accepts responsibility for own mistakes								.672			
Tells the truth								.663			
Maintains level-headedness in the face of frustrating obstacles									.703		
Has a "can do" attitude when faced with setbacks									.697		
Handles criticism from others in the organization with poise									.501		
Is patient and encouraging when helping team members develop new abilities										.592	
Adapts to the learning style and experience level of each employee										.588	

	Component										
	1	2	3	4	5	6	7	8	9	10	11
Gives constructive feedback in a timely manner										.549	
Makes clear oral presentations to groups											.508
Collaborates across boundaries and finds common ground with stakeholders											
Models and teaches political savvy by identifying the internal and external factors that impact the work of the organization											
Possesses the skills to influence the group dynamics so consensus can be more easily achieved even when s/he has little or no "positional" power											

Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

Rotation converged in 12 iterations.

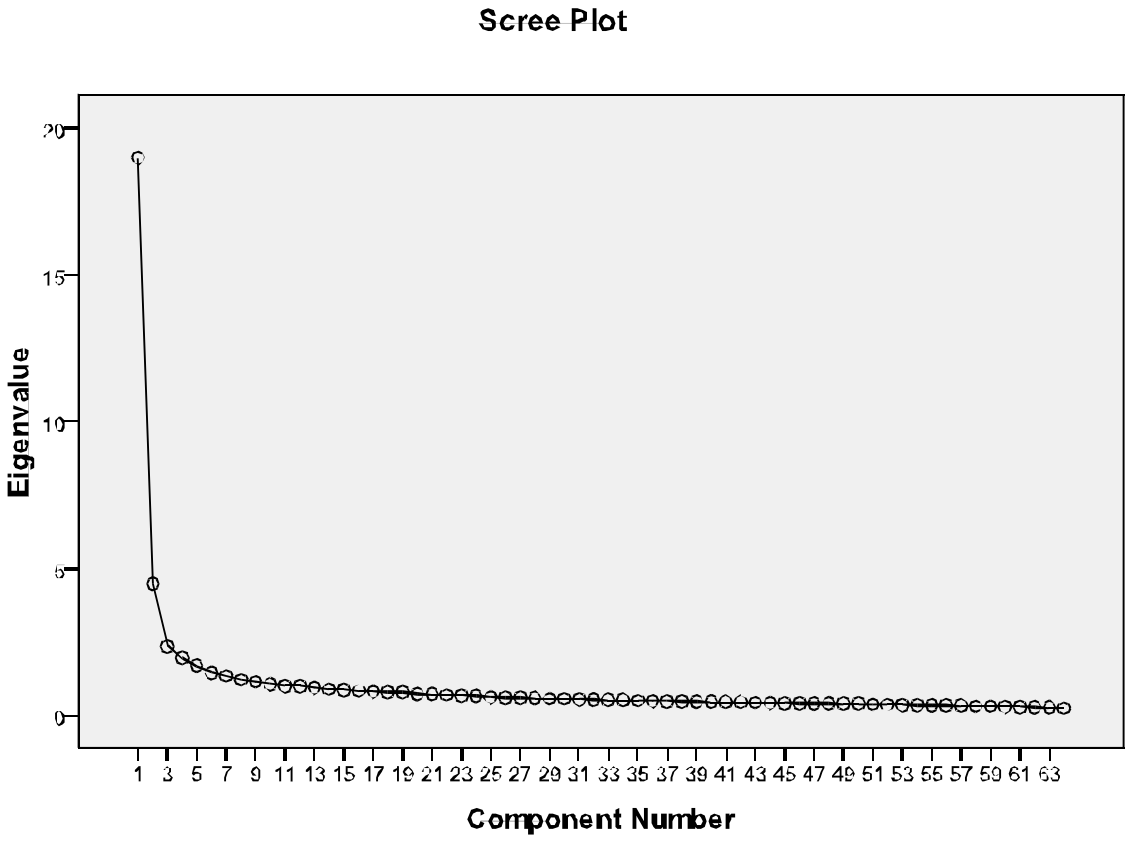
Table 11: Rotation Sums of Squared Loadings for Results of Those Being Rated

	Rotation Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %
1	7.202	11.253	11.253
2	4.694	7.334	18.588
3	3.848	6.013	24.601
4	3.690	5.765	30.365
5	3.604	5.631	35.996
6	2.951	4.612	40.608
7	2.605	4.071	44.679
8	2.303	3.598	48.277
9	1.961	3.064	51.341
10	1.948	3.044	54.385
11	1.841	2.876	57.261

Figure 2 displays the scree plot roughly corresponding to Table 8, which displays the proportion of total variance explained by each component. The results are similar to

those of the 5000-person sample, suggesting that components 8-11 do not explain much of the variability in the responses, thus implying a 7-factor solution.

Figure 2: Scree Plot for Results of Those Being Rated



Summary

The results of the statistical analysis showed that the INSIGHTMirror 360 survey instrument exhibited excellent reliability and validity based on the provided datasets. The survey was valid and reliable both on the sample of raters and on the sample of rated individuals. Cronbach's alpha for the subscales ranged from .74 to .89 (indicating excellent reliability), and the CFA revealed that all items were strongly related to their scales, providing support for the proposed factor structure.

Appendix

Factor Loadings for Reduced Model, on Raters Sample (N = 5000)

Relationship			Factor Loading
question1	<---	COMMUNICATION SKILLS	.777
question2	<---	COMMUNICATION SKILLS	.620
question3	<---	COMMUNICATION SKILLS	.604
question4	<---	COMMUNICATION SKILLS	.779
question6	<---	COMMUNICATION SKILLS	.757
question8	<---	COMMUNICATION SKILLS	.556
question9	<---	COMMUNICATION SKILLS	.755
question11	<---	COMMUNICATION SKILLS	.720
question12	<---	DECISION MAKING	.718
question13	<---	DECISION MAKING	.755
question14	<---	DECISION MAKING	.735
question15	<---	DECISION MAKING	.741
question16	<---	DECISION MAKING	.772
question17	<---	DECISION MAKING	.781
question18	<---	DECISION MAKING	.749
question19	<---	PROMOTES INNOVATION AND CHANGE	.732
question21	<---	PROMOTES INNOVATION AND CHANGE	.742
question23	<---	PROMOTES INNOVATION AND CHANGE	.661
question25	<---	PROMOTES INNOVATION AND CHANGE	.770
question26	<---	PROMOTES INNOVATION AND CHANGE	.818

Relationship			Factor Loading
question34	<---	WORKING RELATIONSHIPS	.804
question33	<---	WORKING RELATIONSHIPS	.748
question32	<---	WORKING RELATIONSHIPS	.759
question31	<---	WORKING RELATIONSHIPS	.728
question30	<---	WORKING RELATIONSHIPS	.693
question28	<---	WORKING RELATIONSHIPS	.798
question27	<---	WORKING RELATIONSHIPS	.810
question44	<---	LEADERSHIP SKILLS	.675
question41	<---	LEADERSHIP SKILLS	.694
question39	<---	LEADERSHIP SKILLS	.657
question38	<---	LEADERSHIP SKILLS	.722
question36	<---	LEADERSHIP SKILLS	.790
question35	<---	LEADERSHIP SKILLS	.717
question52	<---	COACHING SKILLIS	.745
question50	<---	COACHING SKILLIS	.758
question49	<---	COACHING SKILLIS	.797
question48	<---	COACHING SKILLIS	.789
question47	<---	COACHING SKILLIS	.787
question46	<---	COACHING SKILLIS	.799
question53	<---	UTILIZES THE STRENGTH...	.828
question54	<---	UTILIZES THE STRENGTH...	.878
question55	<---	UTILIZES THE STRENGTH...	.863
question56	<---	UTILIZES THE STRENGTH...	.871

Relationship			Factor Loading
question57	<---	UTILIZES THE STRENGTH...	.713
question58	<---	UTILIZES THE STRENGTH...	.845
question64	<---	TEAM DEVELOPMENT	.783
question62	<---	TEAM DEVELOPMENT	.816
question61	<---	TEAM DEVELOPMENT	.737
question60	<---	TEAM DEVELOPMENT	.820

Factor Loadings for Reduced Model, on Rated Individuals Sample (N = 1918)

Relationship			Factor Loading
question1	<---	COMMUNICATION SKILLS	.589
question2	<---	COMMUNICATION SKILLS	.521
question3	<---	COMMUNICATION SKILLS	.498
question4	<---	COMMUNICATION SKILLS	.614
question6	<---	COMMUNICATION SKILLS	.501
question8	<---	COMMUNICATION SKILLS	.470
question9	<---	COMMUNICATION SKILLS	.524
question11	<---	COMMUNICATION SKILLS	.518
question12	<---	DECISION MAKING	.665
question13	<---	DECISION MAKING	.700
question14	<---	DECISION MAKING	.700
question15	<---	DECISION MAKING	.679
question16	<---	DECISION MAKING	.668

Relationship			Factor Loading
question17	<---	DECISION MAKING	.646
question18	<---	DECISION MAKING	.660
question19	<---	PROMOTES INNOVATION AND CHANGE	.684
question21	<---	PROMOTES INNOVATION AND CHANGE	.590
question23	<---	PROMOTES INNOVATION AND CHANGE	.568
question25	<---	PROMOTES INNOVATION AND CHANGE	.634
question26	<---	PROMOTES INNOVATION AND CHANGE	.700
question34	<---	WORKING RELATIONSHIPS	.606
question33	<---	WORKING RELATIONSHIPS	.664
question32	<---	WORKING RELATIONSHIPS	.663
question31	<---	WORKING RELATIONSHIPS	.629
question30	<---	WORKING RELATIONSHIPS	.625
question28	<---	WORKING RELATIONSHIPS	.703
question27	<---	WORKING RELATIONSHIPS	.688
question44	<---	LEADERSHIP SKILLS	.560
question41	<---	LEADERSHIP SKILLS	.508
question39	<---	LEADERSHIP SKILLS	.438
question38	<---	LEADERSHIP SKILLS	.561
question36	<---	LEADERSHIP SKILLS	.710
question35	<---	LEADERSHIP SKILLS	.581
question52	<---	COACHING SKILLIS	.593
question50	<---	COACHING SKILLIS	.661
question49	<---	COACHING SKILLIS	.676

Relationship			Factor Loading
question48	**<---**	**COACHING SKILLIS**	**.696**
question47	**<---**	**COACHING SKILLIS**	**.670**
question46	**<---**	**COACHING SKILLIS**	**.659**
question53	**<---**	**UTILIZES THE STRENGTH...**	**.721**
question54	**<---**	**UTILIZES THE STRENGTH...**	**.756**
question55	**<---**	**UTILIZES THE STRENGTH...**	**.763**
question56	**<---**	**UTILIZES THE STRENGTH...**	**.792**
question57	**<---**	**UTILIZES THE STRENGTH...**	**.654**
question58	**<---**	**UTILIZES THE STRENGTH...**	**.695**
question64	**<---**	**TEAM DEVELOPMENT**	**.624**
question62	**<---**	**TEAM DEVELOPMENT**	**.644**
question61	**<---**	**TEAM DEVELOPMENT**	**.700**
question60	**<---**	**TEAM DEVELOPMENT**	**.722**