

Technical Report For:

PMC – MANAGEMENT COACHING

**VALIDATION OF THE INDIVIDUAL COACHING
ASSESSMENT**

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Executive Summary

In the spring of 2013, PMC Management Coaching engaged the services of the Institute for Psychological Research and Application (IPRA) at Bowling Green State University to validate its Individual Coaching Assessment (IA). The goal was to ensure that its measure was psychometrically sound and provided valid assessments to its clients.

IPRA examined the psychometric properties of the performance indicators (Climate and Image) and coaching factors (Desire, Credibility, Skill, and Capacity) measured by the Individual Coaching Assessment (IA) created by Personalized Management Coaching (PMC). The data were collected over a 10 year period from managers, their direct reports, and senior managers at three time points with an initial sample size of 423 managers and a final sample size of 63 managers.

The results for the six coaching subscales showed that they were highly reliable with reliability coefficients ranging from .71 to .96 across all three raters. In addition, the IA scales were highly correlated with each other (i.e., the performance indicators and coaching factors were all highly correlated with each other) and with the PMC Coaching patterns (e.g., Engagement, Employee Development, Management Competencies). There was also a moderate level of consistency among raters, indicating that ratings were similar across sources but that each score also provided a unique perspective.

Most importantly, the subscales for the direct reports were correlated with promotion and turnover. Specifically, the Climate and Desire subscales were correlated with promotion, while the Credibility, Desire, and Skills subscales were correlated with turnover. In contrast, the self-reported coaching scores as well as the scores provided by senior managers did not correlate with any of the outcomes.

Therefore, our results clearly indicated that direct reports on the IA scales were better predictors of important work outcomes than either self-reports or scores provided by senior managers. In other words, direct reports of coaching effectiveness may be more useful for identifying successful managers. This is consistent with the research literature which shows that direct reports have a unique perspective on managers' performance and may be in a better position to evaluate their potential for future managerial/leadership positions than senior managers (London & Beatty, 1993; Moses, Hollenbeck, & Sorcher, 1993). Consequently, these findings may be particularly important when considering the use of IA scores for making promotion decisions or for succession planning.

In addition to the validity of the IA scales for predicting important work outcomes, the subscales also showed high test-retest reliabilities, suggesting that the responses were consistent over time. Despite this consistency, we also found that the self-reported scores and the scores provided by senior managers tended to increase significantly over time, suggesting that managers can become more effective coaches. No significant gender differences were observed, confirming that the six IA subscales were not related to the sex of the individual.

Our analyses also suggested that the IA scales were measuring a single underlying psychological characteristic. In other words, each of the IA items seems to assess a broader dimension of coaching effectiveness. Therefore, we examined the psychometric properties of a single overall composite score that combined the 45 items in the IA scale. The reliability coefficients for the composite scores were slightly higher than the subscales and ranged from .92 to .98 across all raters. In addition, the composite score provided by direct reports predicted both turnover and promotion, whereas the combined score based on self-reports predicted turnover. There were no significant results for the combined scores provided by senior managers. The implications of these results and recommendations based on these analyses are also discussed.

Background and Purpose

In the spring of 2013, PMC Management Coaching requested services from the Institute for Psychological Research and Application (IPRA) at Bowling Green State University to validate their Individual Coaching Assessment (IA). The goal was to ensure that their measure was psychometrically sound and provided valid assessments to their clients.

The Institute for Psychological Research and Application was selected because they have demonstrated excellence in past projects. The specific team members were an ideal fit because of their combined experience in psychometric issues and scale development. The team leader, Dr. Christopher Nye, has a Ph.D. in Industrial and Organizational psychology and has done extensive research on employee testing and measurement. He is the director of IPRA and has consulted with a broad range of public and private organizations. Rachel King and Julia Berger are both doctoral students, who focus on psychometric research. This team brought a unique and valuable set of qualifications to the project that allowed them to properly analyze and evaluate the data provided.

Results

Sample Demographics

The data used for this study consisted of 423 employees from nine different companies that completed the IA. Of these employees:

- 311 were men and 112 were women
- 2.6% worked in Customer Care, 2.6% worked in Information Technology, 13.5% worked in Operations, 61.2% worked in Sales, and 3.1% worked as Senior Managers

- A total of 15.8% (67 individuals) of the employees left the company that they were employed in during the data collection. Of those, 52.2% (35 employees) left their company voluntarily and 46.3% (31 employees) left their company involuntarily.
- 7.3% (31 individuals) of the employees were promoted.

Description of the Subscales

The first step in evaluating the PMC scales was to review the content and wording of the items. This subjective review of the items did not identify any wording problems or inconsistencies. Therefore, we next conducted a statistical analysis to explore the correlations between the six IA subscales and estimate the reliability of each. We also included the PMC Coaching Patterns in these analyses. However, because “management resources” is another name for the Capacity scale and “customer support” is another name for the Image scale, we did not examine these two Coaching Patterns separately from the corresponding subscales. Likewise, the management support coaching pattern was excluded from the reliability analysis because it was comprised of a single item. Tables 1-3 illustrate the reliabilities and intercorrelations among the six IA subscales for the scores provided by direct reports, managers, and senior managers, respectively. As shown in these tables, the PMC subscales were highly reliable with coefficients ranging from .71 to .96 across all three sources of reports.

Table 1. Correlations and Reliabilities for Scores Provided by Direct Reports

Subscale	Climate	Image	Credibility	Desire	Skills	Capacity	Engagement	Employee Development	Management Competencies	General Score
Climate	.92									
Image	.71	.86								
Credibility	.77	.54	.92							
Desire	.77	.58	.84	.87						
Skills	.83	.63	.91	.91	.95					
Capacity	.73	.66	.68	.76	.79	.90				
Engagement	.93	.67	.87	.88	.95	.80	.93			
Employee Development	.88	.68	.82	.88	.93	.88	.96	.94		
Management Competencies	.82	.62	.90	.93	.99	.79	.95	.93	.96	
General Score¹	.91	.74	.90	.92	.97	.86	.97	.96	.97	.98

All correlations are significant at the 0.05 level (2-tailed).

Note. The sample size for these analyses was 423. Cronbach's alpha reliabilities are reported on the diagonal.

¹ The general score was estimated by calculating a unit-weighted composite of the six IA scales.

Table 2. Correlations and Reliabilities for Self-Reported Scores

Subscale	Climate	Image	Credibility	Desire	Skills	Capacity	Engagement	Employee Development	Management Competencies	General Score
Climate	.78									
Image	.64	.71								
Credibility	.66	.59	.73							
Desire	.60	.52	.63	.74						
Skills	.73	.62	.71	.73	.85					
Capacity	.58	.45	.48	.47	.56	.76				
Engagement	.87	.60	.64	.63	.85	.54	.77			
Employee Development	.76	.52	.57	.65	.81	.73	.86	.79		
Management Competencies	.67	.55	.66	.77	.98	.50	.83	.81	.83	
General Score¹	.85	.72	.78	.76	.90	.70	.90	.88	.90	.92

All correlations are significant at the 0.05 level (2-tailed).

Note. The sample size for these analyses was 423. Cronbach's alpha reliabilities are reported on the diagonal.

¹ The general score was estimated by calculating a unit-weighted composite of the six IA scales.

Table 3. Correlations and Reliabilities for Scores Provided by Senior Managers

Subscale	Climate	Image	Credibility	Desire	Skills	Capacity	Engagement	Employee Development	Management Competencies	General Score
Climate	.87									
Image	.77	.79								
Credibility	.77	.66	.81							
Desire	.74	.70	.73	.76						
Skills	.84	.73	.81	.83	.90					
Capacity	.67	.60	.56	.61	.72	.82				
Engagement	.89	.69	.72	.72	.90	.60	.84			
Employee Development	.81	.64	.59	.70	.86	.78	.90	.84		
Management Competencies	.75	.63	.74	.83	.98	.59	.89	.85	.87	
General Score¹	.88	.76	.79	.82	.94	.70	.94	.91	.94	.95

All correlations are significant at the 0.05 level (2-tailed).

Note. The sample size for these analyses was 423. Cronbach's alpha reliabilities are reported on the diagonal.

¹ The general score was estimated by calculating a unit-weighted composite of the six IA scales.

Additional Analyses on the IA Subscale Correlations

The high intercorrelations among the six IA subscales suggest that each scale may be measuring the same underlying psychological characteristics. Therefore, we conducted additional analyses to determine how many psychological characteristics were assessed by these scales. Using a statistical technique known as confirmatory factor analysis (CFA), we were able to determine that the 45 items in the IA primarily assessed a single broad dimension of coaching effectiveness. This was determined by examining several “fit indices” that reflect the extent to which the statistical model fit the observed data (for direct reports, RMSEA = .14, SRMR = .07, CFI = .93; for self-reports, RMSEA = .07, SRMR = .08, CFI = .96; for senior manager reports, RMSEA = .09, SRMR = .06, CFI = .94). These results indicate that it may be useful to report an overall score on the IA in addition to the subscale scores. The bottom rows of Tables 1-3 contain the reliabilities and correlations of these general scores for each of the three sources examined here. The reliabilities in each of these groups ranged from .92 to .98, indicating that the combined scores were highly reliable. Given the evidence for a general dimension of coaching effectiveness, we examine both the general scores and the subscale scores in subsequent analyses.

Inter-Rater Agreement

Next we assessed the degree of consistency among the scores provided by each manager and his or her direct reports and senior managers. Understanding the level of agreement among different sources is important because it provides information about whether reports from the different sources are redundant or provide unique information. The results indicated that the subscales had an adequate inter-rater agreement, as indexed by the intra-class correlations in Table 4, which ranged from .47 to .57. This suggests that there was an acceptable level of

consistency between the raters, but it is clear that each rater also provided a unique perspective.

Table 4. Intra-Class Correlations for Each PMC Subscale

Subscales	ICC
Climate	.57
Image	.51
Credibility	.51
Desire	.47
Skill	.48
Capacity	.48

Relationships between Subscales and Important Work Criteria

Next we examined the relationships between the six IA subscales and both turnover (coded as Yes = 1, No = 0) and promotion (coded as Promoted = 1, Not Promoted = 0). Table 5 shows the correlation coefficients for the subscales completed by the direct reports. As can be seen from the table, Climate and Desire were significantly correlated with promotion. Additionally, Credibility, Desire, and Skills were significantly correlated with turnover. For the Coaching Patterns, both Engagement and Employee Development were correlated with the two outcomes. Management Competencies were correlated with turnover. In contrast, Management Support was not correlated with either of the outcomes. The general score provided by direct reports was significantly correlated with both turnover and promotion.

Table 5. Correlations between the Subscales Completed by Direct Reports and Outcomes

Subscale	Outcome	
	Promotion	Turnover
Climate	.19*	-.08
Image	.03	.03
Credibility	.15	-.23*
Desire	.19*	-.18*
Skills	.14	-.19*
Capacity	.14	-.12
Engagement	.18*	-.15*
Employee Development	.17*	-.17*
Management Competencies	.14	-.19*
Management Support	.13	-.06
General Score	.16*	-.16*

*Correlation is significant at the 0.05 level (2-tailed).
Note. The sample size for these analyses was 182.

As Table 6 shows, self-reported scores on the IA subscales and Coaching Patterns were not significantly correlated with either turnover or promotion. These results may be due to a socially desirable pattern of responding, defined as a tendency to respond to survey items in a socially acceptable (or appropriate) manner rather than answering honestly (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In other words, individual managers have an incentive to appear more effective at coaching than they may actually be and self-reported scores may be inflated as a result. This bias can reduce the validity of the measure. Similar results have been found for other measures when applied in operational settings (White, Young, Hunter, & Rumsey, 2008). However, despite this potential bias, the general score, which was derived by combining the six subscales, was significantly correlated with turnover.

Table 6. Correlations between Self-Reported Scores and Outcomes

Subscale	Outcome	
	Promotion	Turnover
Climate	.13	-.09
Image	.01	-.07
Credibility	.09	-.12
Desire	.10	-.06
Skills	.06	-.06
Capacity	.04	-.05
Engagement	.11	-.08
Employee Development	.06	-.08
Management Competencies	.04	-.12
Management Support	-.06	.07
General Score	.09	-.15*

*Correlation is significant at the 0.05 level (2-tailed).
Note. The sample size for these analyses was 182.

Table 7 shows the correlation coefficients for the scores provided by senior managers. Here, only Image was correlated with promotion. None of the other subscales or Coaching Patterns were correlated with turnover. Furthermore, the general score was not correlated with either of the outcomes. Although the reason for these non-significant findings is unclear, it is possible that senior managers are just not able to observe all of the aspects of their subordinates' job performance that may lead to either promotion or turnover. More broadly, different raters observe different aspects of the employee's performance. In fact, this is the main reason for the popularity of 360-degree performance appraisals (London & Smither, 1995) and may be a potential explanation for the validity of scores provided by direct reports even when the majority of self-reported and senior manager scores are non-significant.

Table 7. Correlations between the Subscales Completed by Senior Managers and Outcomes

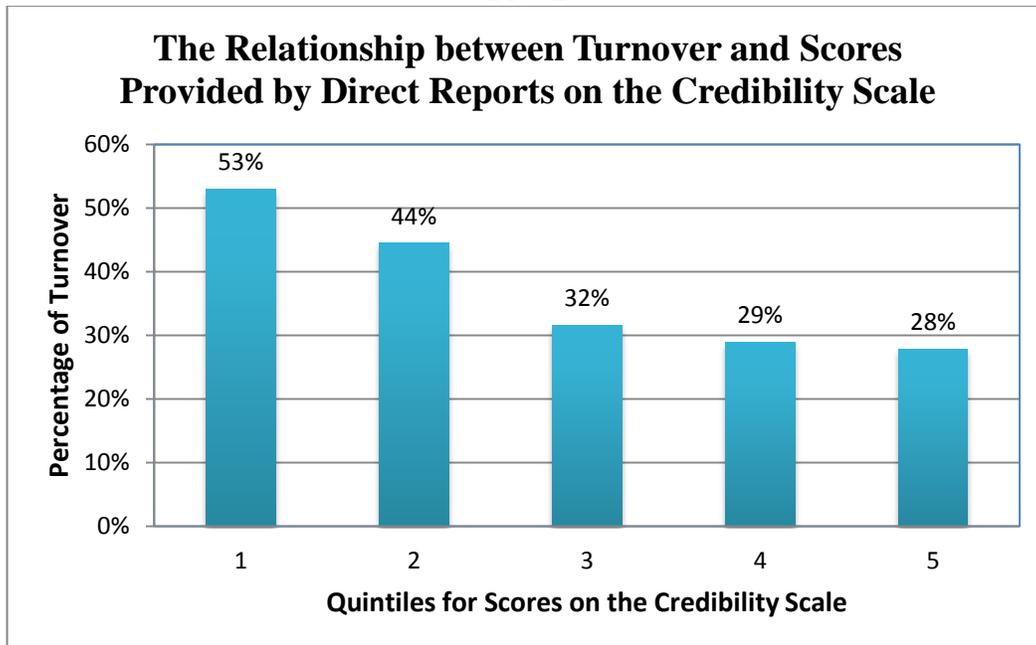
Subscale	Outcome	
	Promotion	Turnover
Climate	.15	-.09
Image	.15*	-.10
Credibility	.07	-.11
Desire	.14	-.13
Skills	.11	-.11
Capability	.08	-.14
Engagement	.15	-.10
Employee Development	.14	-.11
Management Competencies	.10	-.12
Management Support	.05	-.03
General Score	.13	-.14

*Correlation is significant at the 0.05 level (2-tailed).
Note. The sample size for these analyses was 182.

In sum, the IA scores provided by direct reports appear to be better predictors of important workplace outcomes like promotion and turnover than self-reports or scores from senior managers. This finding is important because it indicates that scores from direct reports may be more useful for identifying successful managers and, therefore, may also be useful for making employment decisions such as for promotions and succession planning. Bottom-up feedback is important for succession planning because direct reports have first-hand knowledge of how successful an individual is in his or her current role as a manager (London & Beatty, 1993). In contrast, senior managers may not witness many of the interactions between a manager and his or her subordinates. However, by collecting reports from subordinates it is possible to gain better insight into how a manager will perform in a new management role, and better predict his or her performance (Moses, Hollenbeck, & Sorcher, 1993). This gives senior managers another source of information as they consider future promotions.

The plots below illustrate the practical importance of several of the significant correlations identified in this dataset. Specifically, these plots show the turnover and promotion rates for each quintile of the scores on the IA. For example, on the horizontal axis of Plot 1 are the quintiles for the Credibility scale obtained from direct reports—each quintile contains 20% of the respondents. The percentage of individuals leaving their organization is represented on the vertical axis. For those in the lowest twenty percent (those who received the lowest ratings) the turnover rate was 53%, while for those in the highest twenty percent the turnover rate was only 28%. Thus, the turnover rate was 47% lower in the highest scoring group than for individuals scoring in the bottom 20%.

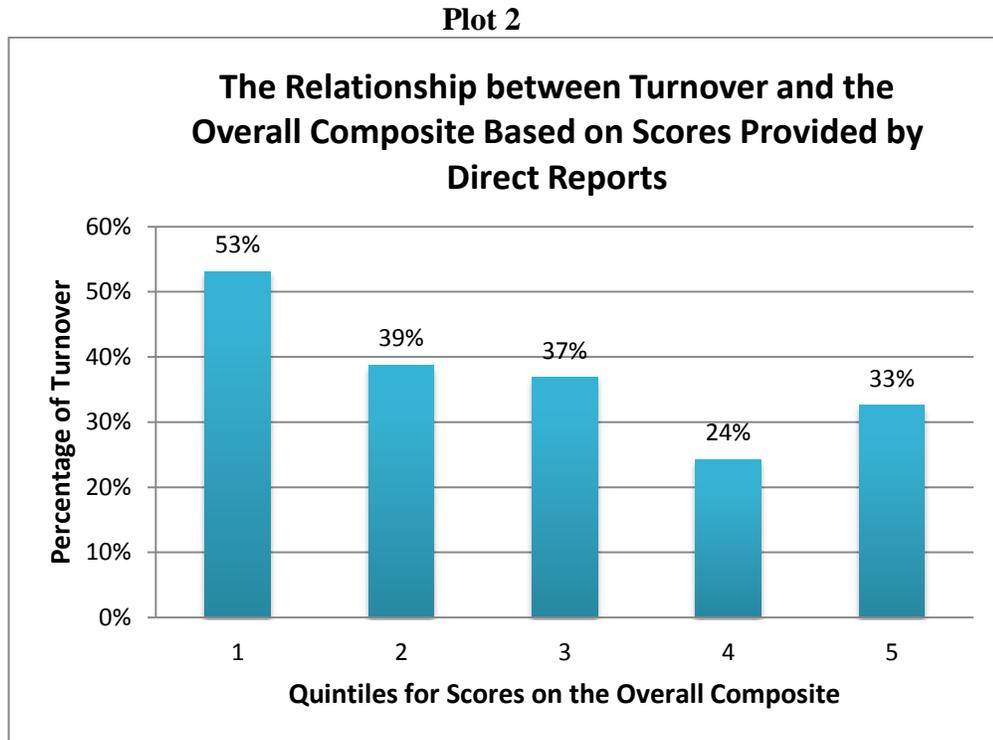
Plot 1



Note. The sample size for these analyses was 182.

The remaining plots illustrate the relationships between the overall composite scores on the IA and the outcomes that they predict. Plot 2 demonstrates that those who received low

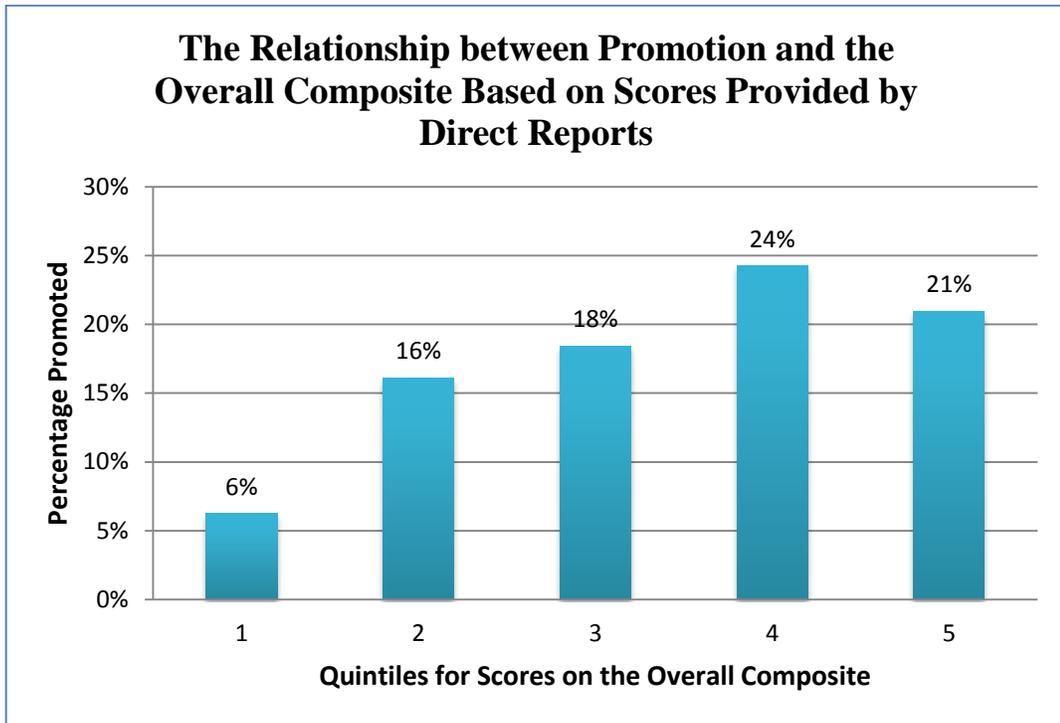
scores from their direct reports (bottom 20%) on the overall composite tended to leave the organization at a greater rate (53%) than those who received higher scores (33%).



Note. The sample size for these analyses was 182.

Plot 3 shows that those who received higher scores on the overall composite were promoted at greater rates (21%-24%) than those who received lower ratings (6% in the lowest quintile) from their direct reports.

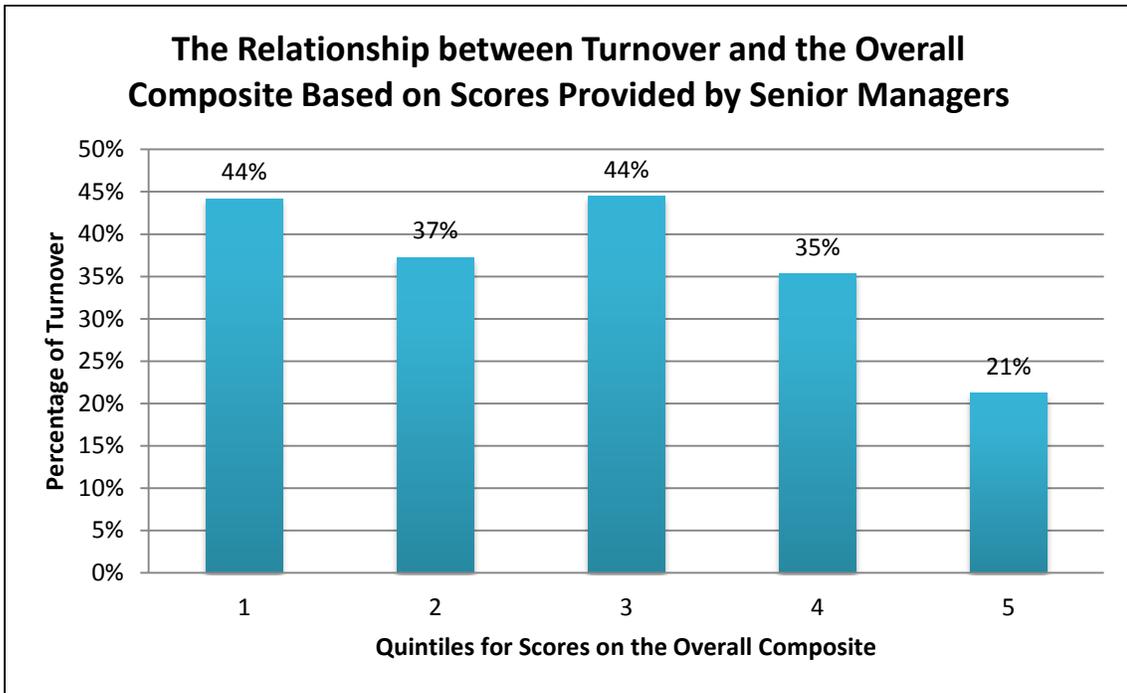
Plot 3



Note. The sample size for these analyses was 182.

Plot 4 shows that those who received lower scores from their senior managers on the overall composite tended to leave the organization at a higher rate (44%) than those who received the top scores (21%).

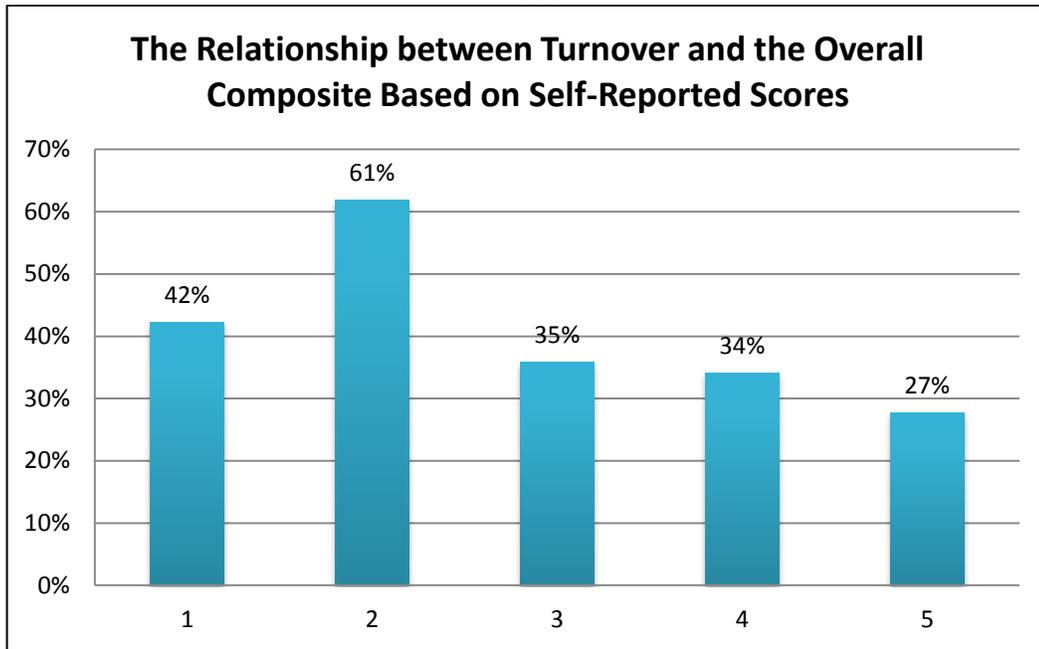
Plot 4



Note. The sample size for these analyses was 182.

Finally, Plot 5 shows that those who self-reported lower scores on the overall composite were more likely to leave the organization (42%-61%) than those who scored in the top 20% (27% of individuals in the highest quintile left the organization). Although the relationship was not strictly linear, this still represents a sizeable decrease in turnover as scores increase.

Plot 5



Note. The sample size for these analyses was 182.

Logistic Regression

Although the correlations described above provide preliminary information about the relationship between the scores obtained from the six IA subscales and important work outcomes, these correlations were attenuated because using dichotomous outcomes violates a statistical assumption of these analyses. Therefore, we next examined these relationships using logistic regression, which was specifically designed for these types of analyses. However, these analyses have other limitations. Specifically, we could not include all six subscales in these analyses because of their high intercorrelations. Including highly correlated variables in the same regression equation would bias the results and could cause significant predictors of turnover and promotion to appear as though they were not related to the outcomes. Consequently, we only examined the general coaching effectiveness score in these analyses.

Using the logistic regression technique, we found that the combined score provided by direct reports significantly predicted both turnover ($b = -.91$; $R^2 = .09$) and promotion ($b = 1.40$,

$R^2 = .25$). The self-reported coaching effectiveness score was also a significant predictor of turnover ($b = -1.04$, $R^2 = .09$). There were no significant results for the combined score provided by the senior managers. In other words, these results largely confirm the correlational results but may suggest a more substantial relationship between the IA scores and promotion or turnover.

Test-Retest Reliability

Table 8 illustrates the degree of consistency between ratings provided at two separate time points. As can be seen, there was an adequate degree of reliability across the two time points (as indexed by the correlations ranging from .56 to .85) for scores provided by direct reports. However, self-reported scores were less reliable over time and scores provided by Senior Managers were even less reliable than that. This suggests that self-reports and scores provided by senior managers tend to change more over time than scores provided by direct reports. This could occur if the individuals being rated are becoming more (or less) effective coaches over time.

Table 8. Correlations between the Six PMC subscales completed by Different Raters across Two Survey Administrations

Rating Source	Scale	Correlation (r)
Direct Report	Climate	.71*
	Image	.56*
	Credibility	.61*
	Desire	.60*
	Skill	.66*
	Capacity	.60*
Self-Reports	Climate	.46*
	Image	.54*
	Credibility	.63*
	Desire	.49*
	Skill	.60*
	Capacity	.49*
Senior Manager	Climate	.29*
	Image	.31*
	Credibility	.31*
	Desire	.14
	Skill	.20*
	Capacity	.16

*Correlation is significant at the 0.05 level (2-tailed).

Note. The sample size for these analyses was 182.

Mean Differences and Effect Sizes

Given the low test-retest reliability of the self-reported and senior manager scores, we next evaluated mean score differences across three time points to examine mean-level change. Table 9 shows the mean differences between each time point and the effect size (as indexed by Cohen's *d*) of these differences. By dividing mean differences by a pooled standard deviation, the effect size places the raw score differences in a standardized metric which makes them more comparable across rating sources and with future samples. In general, effect sizes below .20 are considered negligible, between .20 and .50 are considered small, between .50 and .80 are considered medium differences, and effect sizes greater than .80 reflect large differences over time. As seen in Table 9, the scores completed by direct reports across the three time points yielded nonsignificant mean score differences with predominantly negligible effect sizes. This

means that the scores provided by direct reports remain relatively stable over time and is consistent with the test-retest reliabilities reported in Table 8. Similarly, the mean score differences between the first (T1) and second (T2) time points for the self-reported scores were mostly nonsignificant with small effect sizes. However, it is noteworthy that when self-reported scores at Time 1 (T1) were compared to scores at Time 3 (T3), the mean differences were significant and the effect sizes were larger, ranging from .27 for Climate to .43 for Credibility. Similarly, for the subscales completed by the senior managers, the mean score differences between Time 1 and Time 2 were generally small. However, the Time 1 to Time 3 comparisons yielded significant mean changes with fairly large effect sizes for Climate, Image, Credibility, and Capacity. These results indicate that the managers themselves and their senior managers perceive larger changes in the levels of coaching effectiveness over time than do direct reports. It is unclear why these differences are observed, but it is possible that subordinates need more time to recognize changes in their supervisors. As such, comparisons over longer periods of time may result in significantly larger changes in subordinate's scores. However, it is important to note that these results should be interpreted with caution due to the small sample size for these comparisons (the sample size was only 63 at Time 3). Small sample sizes can create biased results and may be misleading without further confirmation. Therefore, future research should examine these differences in larger samples to clarify the results.

Table 9. Mean Score Differences and Effects Size for the Three Scale Administrations

Rating Source	Subscale	Mean Differences and Effect Sizes					
		T1-T2	Cohen's <i>d</i>	T2-T3	Cohen's <i>d</i>	T1-T3	Cohen's <i>d</i>
Direct Report	Climate	.02	-.06	-.04	-.12	.03	.09
	Image	.02	-.07	.00	.00	-.01	-.01
	Credibility	.10*	-.01	-.12*	-.31	.08	.17
	Desire	.03	-.09	-.08*	-.25	.07	.19
	Skill	.05	-.14	-.09	-.24	.09	.22
	Capacity	.05	-.15	-.06	-.19	.08	.19
Self-Reports	Climate	.05	-.13	-.05	-.15	.09*	.27
	Image	.06	-.13	-.07	-.16	.17*	.35
	Credibility	.11*	-.30	-.03	-.08	.17*	.43
	Desire	.11*	-.27	-.02	-.05	.12*	.32
	Skill	.11*	-.33	.04	.13	.11*	.35
	Capacity	.08*	-.17	-.08	-.18	.19*	.37
Senior Managers	Climate	.00	-.01	-.12	-.33	.14*	.33
	Image	.13*	-.08	-.02	-.04	.13*	.26
	Credibility	.08	-.02	.00	.00	.14*	.29
	Desire	.03	-.04	-.03	-.08	.04	.07
	Skill	.05	-.08	-.03	-.01	.06	.11
	Capacity	.05	-.07	-.03	-.06	.18*	.37

*The statistic is significant at the 0.05 level (2-tailed).

Note. T1, T2, and T3, stand for Time 1, Time 2, and Time 3, respectively.

Gender Effects

To confirm that the IA scales were not related to the sex of the individual we ran additional analyses, wherein females were coded as 0 and males were coded as 1. Table 10 shows the standardized mean differences (i.e., effect sizes as indexed by Cohen's d) between men and women and their corresponding Pearson correlation coefficients (as indicated by r 's) for the coaching measure completed by direct reports, senior managers, and the manager being evaluated. Again, effect sizes between .20 and .50 are considered small, between .50 and .80 reflect medium differences, and greater than .80 are considered large. As can be seen, the effect sizes were either negligible or small, which indicates that scores tend to be similar for both men and women. In addition, the correlations between the measures and sex ranged from .00 to .13, confirming that the IA scales are not related to the sex of the individual and that both men and women score equally well on this measure.

Table 10. Relationship Between the PMC Coaching Scales and the Sex of the Individual Being Evaluated

Raters	Measure	Standardized Mean Differences (Cohen's <i>d</i>)	Correlation with Sex (Pearson <i>r</i>'s)
Direct Report	Climate	0.01	0.00
	Image	0.10	0.05
	Credibility	0.12	0.06
	Desire	0.10	0.05
	Skills	0.16	0.08
	Capacity	0.07	0.04
Self	Climate	-0.12	-0.06
	Image	0.05	0.02
	Credibility	-0.10	-0.05
	Desire	-0.21	-0.10
	Skills	-0.15	-0.08
	Capacity	-0.26	-0.13
Senior Manager	Climate	-0.04	-0.02
	Image	-0.01	-0.01
	Credibility	-.10	-0.05
	Desire	-.14	-0.07
	Skills	-.14	-0.07
	Capacity	-.15	-0.07

Future Steps and Considerations

In our analyses, we found that the six IA subscales were highly correlated. In fact, correlations were high enough to suggest that both the performance indicators and the coaching factors were measuring the same underlying psychological characteristics. This conclusion was supported by additional psychometric analyses. The results indicated that combining the scores for each subscale into a single composite score provided reliable and valid information about employee coaching effectiveness. As such, it may be useful to report both the subscale scores and the broader score reflecting coaching effectiveness. In addition, although the results for the composite score were positive in this dataset, more research is needed to validate and explore the utility of this general score.

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Dr. Christopher Nye is an assistant professor of industrial-organizational psychology at Michigan State University. He specializes in employee selection, employment testing and measurement, and understanding employee performance.

Rachel T. King, B.A.

Rachel King is a second-year graduate student in industrial-organizational psychology at BGSU. Her research focuses on psychometrics, the aging workforce, and personnel selection. She has experience managing and analyzing longitudinal data, and has completed coursework related to scale validation and selection techniques.

Julia L. Berger, B.A.

Julia Berger is a third-year graduate student in industrial-organizational psychology at BGSU. Her research interests include psychometrics, personnel selection, and work-related attitudes. She has experience in scale validation and designing personnel selection instruments. She has completed coursework related to scale validation and selection techniques.