

INVESTIGATING THE FACTOR STRUCTURE OF ADAPTABILITY: A MEASURE
OF ADAPTIVE PERFORMANCE

by:

Scott Lanthier Samale

A Thesis Submitted to the
Faculty of the Graduate School at
Middle Tennessee State University
in Partial Fulfillment
of the Requirements for the Degree of
Master of Arts
in Psychology

Murfreesboro, TN
August 2016

Thesis Committee:

Dr. Michael Hein, Committee Chair

Dr. Judy Van Hein

Dr. Aimee Holt

ACKNOWLEDGMENTS

I would like to thank the members of my thesis committee and Dr. Mark Frame for contributing their time and expertise to this undertaking. Without their sage advice and academic rigor, this research would not have been possible.

ABSTRACT

The modern organizational setting is rife with circumstances that burden employees with changes that necessitate adaptation. Adaptation in this context refers to an employee's ability to perform when new task demands are presented or current task demands are modified. Given the importance of adaptation in the workplace, the development of a robust measure of adaptive performance is prudent. This study's purpose was to further investigate the dimensionality of adaptive performance using a combination of: (a) Measure of Adaptive Performance (MAP) items that were created by Lillard et al. (2012), (b) items created for a newly hypothesized MAP sub-dimensions of interpersonal adaptability (i.e., Flexibility of Opinion, Openness to Criticism, Openness to Others, and Emotional Perceptiveness), and (c) the Individual Adaptability Theory (I-ADAPT) items developed by Ployhart and Bliese (2006). Results from the confirmatory factor analysis support the use of this model in future research on adaptive performance. The model has an acceptable fit with the data, and should be honed over time following subsequent studies.

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CHAPTER I

Introduction and Literature Review

The modern organizational setting is rife with circumstances that burden employees with changes that necessitate adaptation. Adaptation in this context refers to an employee's ability to perform when new task demands are presented or current task demands are modified. Of the multitude of changes that drive the need for adaptation in organizations today, there are several that stand out.

First, the advent of modern technological advances, particularly in regards to computer systems, was a massive change for workers in the second half of the 20th century (Cortada, 2003). Computers and their accompanying software applications are ubiquitous throughout most organizations today, and are a constant source of change as they continue to evolve. It logically follows that as technology continues to change, workers must adapt in order to stay relevant in today's organizations (Hollenbeck & McCall, 1999; Ilgen & Pulakos, 1999; Stokes, Scheider, & Lyons, 2010).

Another recent change, particularly in the United States, was the transition from a manufacturing-based economy to a knowledge-based economy (Ployhart & Bliese, 2006). This had a tremendous impact on organizations, and resulted in a working environment that is marked with numerous circumstances requiring adaptation. Knowledge-based work results in an environment where the continuous improvement of skills and expertise becomes necessary for workers to thrive (Ployhart & Bliese, 2006). Additionally, Ployhart and Bliese (2006) assert that such a focus on knowledge-based work leads to an increased need for specialization, which in turn contributes to an environment where

work groups must be formed in order to complete complex tasks. Adaptation becomes necessary due to the focus on effectively collaborating with coworkers who may differ in terms of knowledge, expertise, and background. (Hesketh & Neal, 1999; Ilgen & Pulakos, 1999; Pearlman & Barney, 2000; Ployhart & Bliese, 2006).

Other notable changes that result in an increased need for adaptation include the globalization of organizations (Cascio, 2003), organizational competition (Ployhart & Bliese, 2006), and temporary project teams (Ilgen & Pulakos, 1999). Ultimately, the introduction of such changes creates an unpredictable work environment where novel and complex situations are consistently presented to employees (Kozlowski, Gully, Nason & Smith, 1999). In order to succeed in such an environment, employees must adapt to changing job duties and tasks (Burke, Stagl, Salas, Pierce, & Kendall, 2006; Kozlowski et al., 1999).

Background and Definition

Research regarding adaptability has developed as the aforementioned changes have taken precedence in today's working environment. Given this, the research on adaptive performance is relatively new (Ployhart & Bliese, 2006; Pulakos, Arad, Donovan & Plamondon, 2000). Currently, there are a number of disparate lines of research regarding adaptive performance, which encumbers the process of integration and the guidance of future research (Stokes et al., 2010).

As Baard, Rench, and Kozlowski (2014) describe in their review of the adaptive performance literature, there are two general categories into which theories of adaptive performance fall: (a) domain general and (b) domain specific (Kozlowski & Rench,

2009). A domain in this context refers to broad categories such as physical or creative tasks. Baard et al. (2014) define adaptive performance as “cognitive, affective, motivational, and behavioral modification made in response to the demands of a new or changing environment, or situational demands” (p. 50).

Domain specific. As the name suggests, domain specific research emphasizes the specific knowledge, skills, and processes that relate to a particular domain. This research is founded on the idea that adaptive performance can be driven by the acquisition of specific skills for a given domain. The use of these skills is specific to the domain and is not generalizable across circumstances (Baard et al., 2014). That is to say, training an employee to be adaptable on a physical task is specific to that domain, and that situation will not be applicable to adaptability on a creative task. An example might be the use of a training program to teach construction workers new techniques for moving heavy loads. These skills can then be used to adapt to changing physical demands, such as moving a unique piece of equipment. Such skills could help a worker adapt to physical tasks, but would not be applicable for tasks regarding the use of social skills at work, for example. Baard et al. (2014) suggest that research in this domain focuses on two general conceptualizations: (a) domain specific performance changes; or (b) dynamic processes.

Domain specific performance change. In research based upon the domain specific performance change conceptualization of adaptive performance, adaptation is considered a reaction to changes in particular job tasks or environmental conditions (Baard et al., 2014). In these cases, the job tasks and environmental conditions require an extension and generalization of the knowledge, skill, ability, and other characteristics

(KSAO's) of the worker. Research in this area highlights changes in tasks or environments and studies how the acquisition of knowledge and skills relates to successful performance on the changing tasks or in the changing environments (Kozlowski et al., 2001). Research conducted by LePine, Colquitt, and Erez (2000) involved having participants make decisions based on specific rules that were essential for accomplishing a task. The decision rules were altered during the task, and participants were judged based on their responses to the new rules. When examining participants' performance following the rule change, the researchers found that cognitive ability, openness, and conscientiousness all had an increased impact on performance. This supports the notion that specific individual differences impact adaptive performance when examining performance longitudinally.

Domain specific dynamic process. The research on adaptive performance as a process is mostly theoretical in nature, and is largely focused on team performance. From this perspective, a worker identifies that a change to a task or the environment has taken place, and simultaneously realizes that a number of responses must be made in order to determine how the change impacts them and what steps can be taken to solve the resulting situation. The process perspective is predicated on the assertion that aspects of an adaptive process can be measured (Baard et al., 2014). To examine the individual performance level, Chan (2000) conceptualized adaptation as a process that individuals undertake to create a fit between their behaviors and the uncertain or unique circumstances they are presented with.

Domain general. The research area classified as domain general is based upon studies of individual differences in performance adaptation. This line of research rests upon the notion that one can measure adaptability as a relatively constant set of traits and performance paradigms that is generalizable across situations (Baard et al., 2014; Ployhart & Bliese, 2006; Pulakos et al., 2000). A hypothetical example could be a set of traits that includes a combination of cognitive ability and openness to experience that help a worker adapt to tasks across an array of situations. One such situation could require the use of social skills, while a different situation might require the use of creative problem solving. In both cases, this general set of traits would facilitate the worker's adaptive performance. Baard et al. (2014) suggest that research in this domain focuses on two distinct conceptualizations of adaptive performance. First as a performance construct (Pulakos et al., 2000), and second as an individual difference construct (Ployhart & Bliese, 2006).

Domain general performance construct. Research related to the performance construct viewpoint, as described by Baard et al. (2014), attempts to map the adaptive performance criterion space. This conceptualization is predicated on the view that adaptive performance is a distinct performance construct from other constructs such as task or contextual performance. That is, adaptive performance is categorized by a set of performance dimensions that allow individuals or work groups to successfully react to novel situations or changes. These dimensions are generalizable across a range of situations. Some of the most notable research in this area came from Pulakos et al. (2000), who offered an initial conceptualization of the construct of adaptive performance. Using

critical incidents, Pulakos et al. (2000) developed a measure they named the Job Adaptability Index (JAI). This resulted in an eight-dimension model that included the following eight subscales: (a) Handling Emergency or Crisis Situations; (b) Handling Work Stress; (c) Solving Problems Creatively; (d) Dealing with Uncertain and Unpredictable Work Situations; (e) Learning New Work Tasks, Technologies and Procedures; (f) Demonstrating Interpersonal Adaptability; (g) Demonstrating Cultural Adaptability; and (h) Demonstrating Physically Oriented Adaptability. In a similar line of research, Griffin and Hesketh (2003) proposed and tested a more parsimonious model of adaptive performance with three dimensions. They used a self-report survey consisting of items that they developed based on the Pulakos et al. (2000) dimensions. The dimensions of adaptive performance that they conceptualized were (a) Proactive Behavior, (b) Reactive Behavior, and (c) Tolerant Behavior. As a result of their study, Tolerant Behavior was not supported by the measure and the remaining dimensions were highly correlated with one another. Therefore, their results instead provided support for a one-factor model of adaptive performance. Thus, studies validating the dimensionality of adaptive performance are mixed and have yet to provide a definitive measure for the construct (Baard et al. 2014).

Domain general individual difference construct. Research focused on individual differences views adaptive performance as a set of individual difference characteristics that predispose workers to adapt successfully when tasks change. One approach to understanding adaptive performance in this way is to view it as a number of individual difference variables that are grouped into a compound trait (Baard et al. 2014). Some of

the most prominent research conducted on this perspective comes from Pulakos et al. (2002), who proposed three separate multi-dimensional individual difference measures for individual adaptability that were based on their eight-dimension adaptive performance construct model. These measures included (a) Past Adaptive Experience, (b) Interest in Working in Adaptive Situations, and (c) Adaptive Self-Efficacy. When tested, their eight-dimension adaptive performance construct model was confirmed separately for each of three individual difference measures. Thus, through their research on individual difference measures, Pulakos et al. (2002) provided increased support for an eight-dimension adaptive performance model.

A second approach to adaptive performance as individual differences is to view it as a metacompetency. This is a relatively stable set of knowledge, skills, and behaviors that workers use in response to changes requiring adaptation (Baard et al. 2014). Some noteworthy research in this area comes from Ployhart and Bliese (2006), who posited Individual Adaptability Theory (I-ADAPT). Their definition of individual adaptability is “Individual adaptability represents an individual’s ability, skill, disposition, willingness, and/or motivation, to change or fit different task, social, and environmental features” (p. 13). This theory asserts that knowledge, skills, abilities, and other characteristics (KSAO’s) are predictors of adaptive performance, as well as task performance, contextual performance, counter productive behavior, etc. Adaptive performance itself also predicts task performance, contextual performance, counter productive behavior, etc. This process is mediated by knowledge acquisition, coping, strategy selection, and situation appraisal. The entire model exists on a continuum that flows from the more

distal KSAO's to the more proximal measurements of performance (see Figure 1). They created a self-report measure called the I-ADAPT and confirmed an eight-dimension model based upon the research of Pulakos et al. (2002). Since the JAI is not publically available, Ployhart & Bliese (2006) developed this measure using the dimension definitions from Pulakos et al. (2002). Baard et al. (2014) suggests that future directions in this area of research should utilize the I-ADAPT measure as a basis for establishing criterion validity for adaptive performance, as well as construct validity.

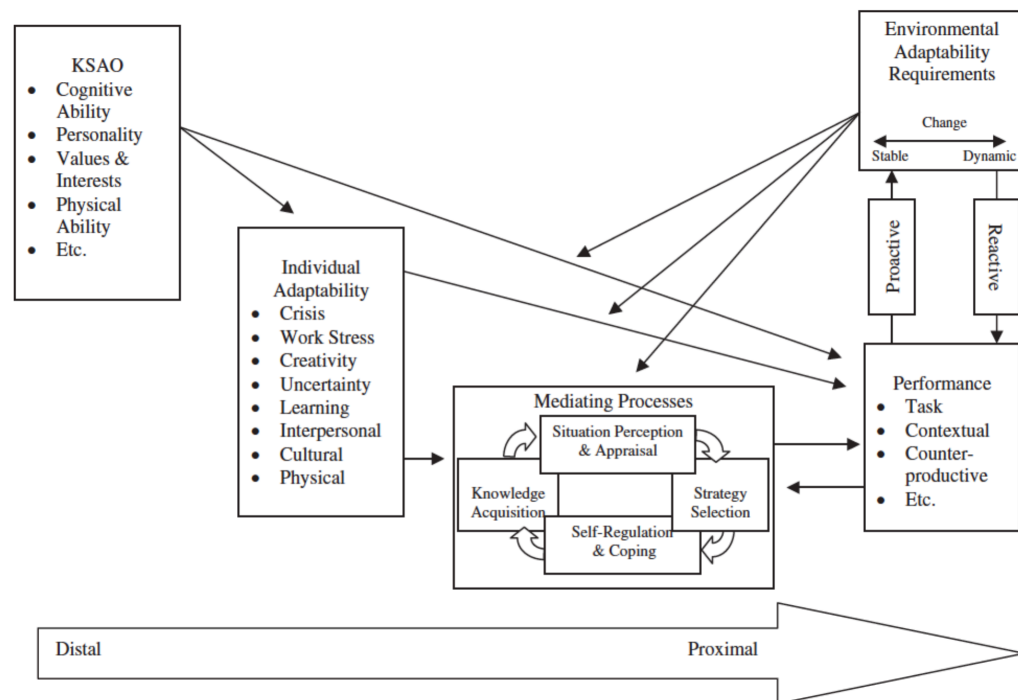


Figure 1. I-ADAPT model of Adaptive Performance from Ployhart & Bliese (2006)

In a study conducted by Lillard et al. (2012), the Measure of Adaptive Performance (MAP) was developed. This scale was developed because the Pulakos et al. (2000) scale was not publicly available, and little research regarding the I-ADAPT had

been conducted. The researchers sought to create a valid and readily available scale that others could use to study individual adaptability. It was comprised of 54 items derived, in part, from the factor definitions from Pulakos et al. (2000), as well as information from the assessments developed by Griffin & Hesketh (2003). The Physical Adaptability dimension was not included in this measure due its lack of applicability for many jobs. The Lillard et al. (2012) findings supported a six-factor adaptive performance construct that included: (a) Applied Creativity; (b) Adaptability in Crisis Situations; (c) Emotional Perceptiveness; (d) Openness to Others; (e) Openness to Criticism; and (f) Proactive Learning. Four of these factors corresponded well with dimensions from Pulakos et al. (2000). Specifically, Applied Creativity corresponded to Solving Problems Creatively; Proactive Learning corresponded to Learning Work Tasks, Technologies, and Procedures; Adaptability in Crisis Situations corresponded to Handling Emergencies or Crisis Situations; and Openness to Others corresponded to Demonstrating Interpersonal Adaptability (see Table 1). Two unique factors were found, which they labeled Emotional Perceptiveness and Openness to Criticism. Two factors that were too weak to include in the factor structure were Emotional Control and Flexibility of Opinion. They proposed that future research could focus on developing new items to test if these factors could be supported. Ultimately, they concluded that a difference in sample populations might have resulted in the distinctive factor structure and they determined that further research was necessary to develop a standardized measure of adaptive performance.

Table 1.

Comparisons Between the Adaptive Performance Models Across Studies

Lillard et al. (2012)	Pulakos et al. (2000); Ployhart & Bliese (2006)	Griffin & Hesketh (2003)
Applied Creativity	Solving Problems Creatively	Proactive Behaviors
Adaptability in Crisis Situations	Handling Emergencies or Crisis Situations	Proactive Behaviors
Emotional Perceptiveness	<i>No analog</i>	<i>No analog</i>
Openness to Others	Demonstrating Interpersonal Adaptability	Reactive Behavior
Openness to Criticism	<i>No analog</i>	<i>No analog</i>
Proactive Learning	Learning Work Tasks, Technologies, and Procedures	Reactive Behavior
<i>No analog</i>	Handling Work Stress	Tolerance Behavior
<i>No analog</i>	Displaying Cultural Adaptability	Reactive Behavior
<i>No analog</i>	Dealing with Unpredictable or Changing Work Situations	Tolerance Behavior
<i>No analog</i>	Demonstrating Physically Oriented Adaptability	<i>No analog</i>

*Adapted from Lillard et al. (2012)

*Does not include the weak factors (Emotional Control and Flexibility of Opinion) in Lillard et al. (2012)

Current Study

The present study is an extension of previous efforts by Lillard et al. (2012) to create a unified measure of individual adaptive performance. This work rests upon the notion that applying a wide-ranging conceptualization of adaptability is highly beneficial due to its applicability across a multitude of situations. This stance is rooted in pragmatism, as it is frequently unclear which KSAO's are most salient for specific kinds of changes that require adaptability (Ployhart & Bliese, 2006). Specifically, the impetus for this study was to explore whether Openness to Others, along with the two unique factors (Openness to Criticism and Emotional Perceptiveness) and one of the weak factors (Flexibility of Opinion) found in Lillard et al. (2012) might actually be sub-dimensions of the interpersonal adaptability dimension as defined by Pulakos et al. (2000).

Purpose. This study's purpose was to further investigate the dimensionality of adaptive performance using a combination of: (a) MAP items that were created by Lillard et al. (2012), (b) items created for the newly hypothesized MAP sub-dimensions of interpersonal adaptability (i.e., Flexibility of Opinion, Openness to Criticism, Openness to Others, and Emotional Perceptiveness), and (c) the I-ADAPT items developed by Ployhart and Bliese (2006).

Hypotheses. As an extension of the six-dimension factor structure found in Lillard et al. (2012), we have the following hypotheses:

Hypothesis 1. Using confirmatory factor analysis, the following dimensions for the Measure of Adaptive Performance (MAP) will be supported when using MAP items

only: (a) Applied Creativity; (b) Adaptability in Crisis Situations; (c) Emotional Control; (d) Emotional Perceptiveness; (e) Openness to Others; (f) Openness to Criticism; (g) Flexibility of Opinion; (h) Proactive Learning; (i) Cultural Adaptability; (j) Dealing with Uncertain and Unpredictable Work Situations.

This hypothesis reflects the notion that the interpersonal dimension from Pulakos et al. (2000) is really comprised of four sub-facets (Emotional Perceptiveness, Openness to Others, Openness to Criticism, and Flexibility of Opinion). The dimensions from Pulakos et al. (2000) that were not supported by Lillard et al. (2012) were also incorporated in this hypothesized factor structure, and include Dealing with Uncertain and Unpredictable Work Situations, Cultural Adaptability, and Handling Work Stress (subsumed by Emotional Control from Lillard et al. (2012)). Therefore, this hypothesis includes eight factors (including the two weak factors) from Lillard et al. (2012), and two factors from Pulakos et al. (2000).

Hypothesis 2. Using confirmatory factor analysis, the following dimensions for the I-ADAPT, using the MAP's response scale (see Appendix A), will be supported when using Ployhart and Bliese's (2006) items only: (a) Handling Emergency or Crisis Situations; (b) Handling Work Stress; (c) Solving Problems Creatively; (d) Dealing with Uncertain and Unpredictable Work Situations; (e) Learning New Work Tasks, Technologies and Procedures; (f) Demonstrating Interpersonal Adaptability; (g) Demonstrating Cultural Adaptability; and (h) Demonstrating Physically Oriented Adaptability. The MAP's response scale will be used because the primary purpose of this study is to use an amalgamation of items from Ployhart & Bliese (2006) and the MAP to

further research on the MAP. Therefore, it was deemed necessary to collect responses for all items on a single scale. This hypothesis serves to validate an extension of Ployhart and Bliese's (2006) eight-factor model, using the MAP's response scale.

Hypothesis 3. Using confirmatory factor analysis, the following dimensions will be validated when using both MAP items and Ployhart and Bliese's (2006) items only (with the MAP response scale): (a) Applied Creativity; (b) Adaptability in Crisis Situations; (c) Emotional Control; (d) Emotional Perceptiveness; (e) Openness to Others; (f) Openness to Criticism; (g) Flexibility of Opinion; (h) Proactive Learning; (i) Cultural Adaptability; (j) Dealing with Uncertain and Unpredictable Work Situations; and (h) Physical Adaptability. This hypothesized model reflects the ten factors from Hypothesis 1, with the addition of Physical Adaptability from Ployhart and Bliese (2006). The resulting model will be comprised of items from both scales and will have the best fit to the data.

Hypothesis 4. The MAP subscales and the I-ADAPT (using the MAP response scale) subscales will all have reliability of 0.80 or higher.

Hypothesis 5. The MAP subscales and the I-ADAPT (using the MAP response scale) subscales will have a moderate to high correlation between the analogous subscales. For example, the MAP subscale Adaptability in Crisis Situations will correlate with the Ployhart and Bliese (2006) subscale Handling Emergencies or Crisis Situations. The four subscales for the sub-dimensions of Interpersonal Adaptability in the MAP, when combined, will be correlated with the Ployhart and Bliese (2006) subscale of Demonstrating Interpersonal Adaptability. Given the likely influence of common method

variance, a correlation of 0.50 or higher was the cutoff for what was considered to have practical significance.

CHAPTER II

Method

Participants

The data used in this study was collected via online survey in the spring of 2015 using Amazon's Mechanical Turk service. Participation in the study was voluntary, and was rewarded with \$0.50. There were 410 participants who completed the survey and were included in the analysis. Participants were located across the United States and ranged in age from 19 to 86; the mean age was 39 years old ($N = 406$). The ethnicity of the participants was as follows: (a) White ($n = 319$); (b) African American/Black ($n = 38$); (c) Asian ($n = 16$); (d) Hispanic/Latino ($n = 16$); (e) Native American ($n = 3$); and (f) Other ($n = 18$). The study included 155 men and 251 women; four did not provide their gender. Participants were asked whether they were at least 18 years of age, 409 indicated that they were and one did not respond. A majority of the participants reported that they were currently employed ($n = 373$). The average hours worked per week by participants was 38 ($N = 373$). Participants were asked if they were currently enrolled in school, 66 indicated that they were and 340 indicated that they were not. Of the participants who were currently enrolled in school, 39 indicated that they were full-time students and 27 indicated that they were part-time students.

Measures

For the current study, two measures of adaptive performance were combined into a composite measure to investigate the hypothesized factor structure. Additionally, each measure was validated separately with its own items using factor analysis.

Measure of Adaptive Performance (MAP). The MAP was developed by Lillard et al. (2012), and consisted of 54 items developed primarily based on the factor definitions from Pulakos et al. (2000), as well as the adaptability definitions from Griffin and Hesketh (2003). For the present study, items that had weak factor loadings in Lillard et al. (2012) were reviewed and updated to see if poor wording had resulted in the weak factor loadings. Additionally, new items were developed for the hypothesized sub-dimensions of Interpersonal Adaptability (Flexibility of Opinion, Openness to Others, Openness to Criticism, and Emotional Perceptiveness). These items were created because there were not full sets of items written for these sub-dimensions prior to this study. The resulting measure consisted of 104 items. Participants were presented with each item, which was a statement relating to adaptability (i.e., I am hesitant when taking initiative in the group). They were then asked to rate how well they performed on the given adaptability statement using a Likert scale of 1-5 (*Poorly-Well*) (see Appendix A).

I-ADAPT. The I-ADAPT measure developed and validated by Ployhart and Bliese (2006) is based on the eight dimension definitions from Pulakos et al. (2000). Since the items from Pulakos et al. (2000) are not publically available, they developed items using the definitions of each dimension. (i.e., I make excellent decisions in times of crisis). All 55 items from the I-ADAPT scale were used in this study, including the items for the Physical Adaptability dimension. Participants were asked to rate these items using the same directions and Likert scale as the MAP (see Appendix B). It is important to note that the response scale used for this study is different than the response scale that Ployhart and Bliese (2006) used to validate the I-ADAPT (they used a *Strongly Disagree*

– *Strongly Agree* scale), although the items are the same. This means that the use of I-ADAPT items in this study serves as an extension of what Ployhart and Bliese (2006) validated in their study, this does not serve to further validate their measure.

Procedure

After obtaining IRB approval (see Appendix C) the survey was developed in Qualtrics. When participants opened the survey they were provided an informed consent page that confirmed that the participants were of the age for consent, and willing to proceed with the study. They were then asked to provide responses to the adaptive performance items. The I-ADAPT items were presented to participants first, followed by the MAP items. Both measures were given to participants in a random order. Quality assurance questions were used throughout in order to ensure that the participants completed the surveys responsibly. Lastly, participants were asked to provide information regarding demographic information including whether or not they were employed, what their job title was, how many hours they worked in a typical week, and general demographic information (e.g., age, gender, race).

CHAPTER III

Results

Confirmatory Factor Analysis

The hypothesized factor model with MAP items (Hypothesis 1) was tested using confirmatory factor analysis in AMOS. Multiple imputation was performed to estimate the missing data for this analysis, and all subsequent analyses. The resulting model had high factor loadings, but a great number of correlated errors. Given the inordinate number of correlated errors, the number of items in each subscale was reduced for parsimony and ease of analysis. The five items for each subscale that had the highest factor loadings were chosen to remain in the model, while the rest of the items were eliminated. This left 50 items spread across the 10 MAP subscales. The resulting model exhibited acceptable levels of fit (normed $\chi^2 = 2.53$, $df = 1,229$, CFI = .850, RMSEA = .061, 90% RMSEA C.I. [.058, .064]) (Covert & Craiger, 2000).

The I-ADAPT model was tested with the I-ADAPT items (Hypothesis 2) in the same manner, using confirmatory factor analysis in AMOS. All 55 items were retained across the 8 subscales. The resulting factor model exhibited acceptable levels of fit (normed $\chi^2 = 2.24$, $df = 1402$, CFI = .828, RMSEA = .055, 90% RMSEA C.I. [.052, .058]).

The hypothesized factor model with both the MAP and I-ADAPT items (Hypothesis 3) using the MAP response scale was then tested using confirmatory factor analysis in AMOS. Like the original MAP model, the resulting model had high factor loadings and a great number of correlated errors. Given the inordinate number of

correlated errors, the number of items in each subscale was reduced for parsimony and ease of analysis. The five items for each subscale that had the highest factor loadings were chosen to stay in the model, while the rest of the items were eliminated. This left 55 items spread across the 11 MAP subscales. The resulting model had acceptable levels of fit (normed $\chi^2 = 2.17$, $df = 1,375$, CFI = .876, RMSEA = .054, 90% RMSEA C.I. [.051, .056]).

Despite acceptable levels of fit, a second iteration of this model was deemed necessary for two reasons. First, for Applied Creativity subscale, none of the I-ADAPT items were included in the top five items. Because of this, a new model was tested that included a separate factor made up of the top five I-ADAPT subscale items for Applied Creativity in addition to the existing factor with the MAP subscale items for Applied Creativity. The purpose of this was to test if the I-ADAPT subscale of Applied Creativity held up as a distinct factor from the MAP subscale of Applied Creativity. Second, due to the high correlation between Flexibility of Opinion and Openness to Others, these two factors were collapsed into a single factor with the top five items. Therefore, this final model consisted of 11 subscales with a total of 55 items. The resulting model was a better fit for the data (normed $\chi^2 = 2.08$, $df = 1,375$, CFI = .884, RMSEA = .051, 90% RMSEA C.I. [.049, .054]). This indicated that the I-ADAPT's subscale (using the MAP's response scale) of Applied Creativity was a distinct factor that should be included in the model. This also indicated that Flexibility of Opinion and Openness to Others were not distinct subscales and should be measured as one factor. A majority of the items that loaded in

this model were from the MAP. Items from the I-ADAPT subscale were included on all subscales except for Emotional Control, which was not tested as a distinct factor.

Reliability Estimates and Correlations

As per hypothesis 4, reliability estimates for internal consistency were calculated for the subscales of both the MAP and the I-ADAPT (with the MAP response scale). This hypothesis was mostly supported, as the subscales had reliability coefficients above or just below the hypothesized threshold of 0.80 (see Table 2).

Table 2.

Subscale Reliability

MAP Subscale	Cronbach's Alpha	Ployhart Subscale	Cronbach's Alpha
Proactive Learning	0.80	Learning Work Tasks, Technologies, and Procedures	0.88
Applied Creativity	0.89	Applied Creativity	0.78
Emotional Control	0.86	Handling Work Stress	0.75
Cultural Adaptability	0.88	Displaying Cultural Adaptability	0.82
Dealing with Uncertain and Unpredictable Work Situations	0.79	Dealing with Unpredictable or Changing Work Situations	0.81
Adaptability in Crisis Situations	0.77	Handling Emergencies or Crisis Situations	0.89
Openness to Others	0.84	Demonstrating Interpersonal Adaptability	0.87
Openness to Criticism	0.82	Physical Adaptability	0.77
Flexibility of Opinion	0.82		
Emotional Perceptiveness	0.86		

As per hypothesis 5, all but one of the correlations between analogous subscales of the MAP and I-ADAPT were above the hypothesized correlation value of 0.50 (see Table 3). This supports the use of a measure using combined items for each subscale, although further research should delve into the moderate correlation found between Emotional Control and Handling Work Stress. While the items for Emotional Control were written to correspond with the definition of Handling Work Stress, further research should clarify

if this moderate correlation suggests independent factors should be tested. Correlations were performed using all items from each subscale from a dataset that handled missing data by using multiple imputation.

Table 3.

Correlations Between Analogous Subscales

MAP Subscale	Ployhart Subscale	Correlation Value (r)
Proactive Learning	Learning Work Tasks, Technologies, and Procedures	0.81
Applied Creativity	Applied Creativity	0.73
Emotional Control	Handling Work Stress	0.47
Cultural Adaptability	Displaying Cultural Adaptability	0.76
Dealing with Uncertain and Unpredictable Work Situations	Dealing with Unpredictable or Changing Work Situations	0.67
Adaptability in Crisis Situations	Handling Emergencies or Crisis Situations	0.65
Interpersonal Adaptability (Openness to Others, Openness to Criticism, Flexibility of Opinion, Emotional Perceptiveness)	Demonstrating Interpersonal Adaptability	0.76

*All correlations are statistically significant at $p = 0.001$

CHAPTER IV

Discussion

The results of the analyses indicate that the best model for measuring adaptive performance consists of items from both the MAP and I-ADAPT scales. The final model included the following 11 dimensions: (a) Applied Creativity (MAP items), (b) Applied Creativity (I-ADAPT items), (c) Adaptability in Crisis Situations, (d) Emotional Control, (e) Emotional Perceptiveness, (f) Openness to Others/Flexibility of Opinion, (g) Openness to Criticism, (h) Proactive Learning, (i) Cultural Adaptability, (j) Dealing with Uncertain and Unpredictable Work Situations, (k) Physical Adaptability. The results indicate that the items written for Openness to Others and Flexibility of Opinion did not measure distinct factors. This finding could be considered logical if one considers that perhaps people are open to others as a result of having flexible opinions. The items written for Emotional Perceptiveness and Openness to Criticism successfully resulted in distinct factors. Additionally, the results indicate that the subscale of Applied Creativity for both the MAP and I-ADAPT (with the response scale from the MAP) should be included as distinct factors in this measure of adaptive performance. It is possible that this finding is the result of differing levels of specificity in the wording of items, where the MAP items generally have more detail than the I-ADAPT items. This could have contributed to the variance observed between responses to the items in each subscale, although this should be examined further. While this model was the best fit, models using solely MAP items and solely I-ADAPT items with the MAP response scale were also validated in this study. However, these results suggest that the model using a combination

of MAP and I-ADAPT items is a better choice for future research given the better fit of the model.

All subscales had internal consistency at or near the hypothesized level of 0.80, indicating that the subscales are reliable. The only correlation between analogous subscales of the MAP and I-ADAPT to fall below the practical significance cutoff of 0.50 was Emotional Control and Handling Work Stress. At 0.47, the correlation was extremely close to the cutoff. This further supports the use of a combined measure because the analogous subscales appear to be measuring the same thing.

Limitations

A major limitation to this study is that the missing data in the dataset was Missing Not at Random (MNAR), which was resolved using multiple imputation. Data that is Missing Not at Random occurs when the missing observations are related to values of unobserved data (e.g. poorly worded items could lead to confusion that results in missing data). Exclusion of participants with missing data was also considered, but would have reduced the sample size to an unacceptable number for confirmatory factor analysis. It is possible that the use of multiple imputation contributed to the high number of correlated errors in the initial model. Additionally, there are several statements in the measures that appear to be poorly suited for the response scale that was used. One example is the statement “I am not a good person to rely on in life threatening, dangerous, or emergency situations”, when asked the question “To what extent is the description below required for your job?” The response scale ranges from “Poorly” to “Well”, which is not a good fit for the statement. It is possible that questions like this were a contributing factor to the

missing data being MNAR. This is a logical possibility because some participants may have read the poorly worded questions and noticed that they did not fit well with the response scale, resulting in their decision to skip the item. Future research should investigate whether or not the poorly worded items are correlated with missing data. Additionally, such research should address this issue by rewording the questions to have a better fit with the response scale. Another limitation that should be addressed is the low correlation between Emotional Control and Work Stress. Future models should be tested with separate Emotional Control and Work Stress factors to see if they are distinct factors. Lastly, this study was limited by the convenience sample that was used from Mechanical Turk.

Future Research

Future research should focus on cross validation of this factor model using a new sample. Since multiple imputation was used on this dataset, the new sample should be large enough to allow for casewise (listwise) deletion to handle missing data. This would eliminate the need to use multiple imputation, and therefore control for this possible limitation. Additionally, researchers should examine the two Applied Creativity factors to determine why they were found as distinct factors. It will be useful to determine if there are multiple facets of creativity that should be explored further, in which case new items may need to be written. If multiple facets of creativity are not supported, then it will be ideal to find a single measure of creativity that can be used for future research as opposed to the two factors in the current model. Additionally, the optimization of the subscales should be a focal point of future research given that several subscales were slightly below

the hypothesized cutoff of 0.80. Further research should also examine the relatively low correlation between the MAP subscale of Emotional Control and the Ployhart subscale of Handling Work Stress, given that the correlation was slightly below the cutoff for practical significance.

Conclusions

These results support the use of this model in future research on adaptive performance. The current model has an acceptable fit with the data, and should be honed over time following subsequent studies. The MAP and a model using I-ADAPT items with the MAP response scale were both validated individually, although the amalgamated model from hypothesis 3 with 11 subscales and a total of 55 items had the best fit. Given the superior fit, this is the recommended model to use in future research endeavors.

REFERENCES

- Baard, S. K., Rench, T. A., & Kozlowski, S. W. J. (2014). Performance adaptation: A theoretical integration and review. *Journal of Management*, *40*, 48–99.
doi:10.1177/0149206313488210.
- Burke, C. S., Stagl, K. C., Salas, E., Pierce, L., & Kendall, D. (2006). Understanding team adaptation: A conceptual analysis and model. *Journal of Applied Psychology*, *9*, 1189-1207. doi:10.1037/0021-9010.91.6.1189.
- Cascio, W. F. (2003). Changes in workers, work, and organizations. In R. J. Klimoski, W. C. Borman & D. R. Ilgen (Eds.), *Handbook of psychology* (Vol. 12, pp. 401–422). Hoboken, NJ: Wiley.
- Chan, D. (2000). Understanding adaptation to changes in the work environment: Integrating individual difference and learning perspectives. *Research in Personnel and Human Resources Management*, *18*, 1-42. Retrieved from http://ink.library.smu.edu.sg/sooss_research/216
- Coovert, M. D. & Craiger, P. (2000). An expert system for integrating multiple fit indices for structural equation models. *The New Review of Applied Expert Systems and Emerging Technologies*, *6*, 39-56. Retrieved from <http://eds.a.ebscohost.com.ezproxy.mtsu.edu/eds/pdfviewer/pdfviewer?sid=cbf21800-9407-4449-9fa9-86157fc1f7e7%40sessionmgr4004&vid=16&hid=4213>
- Cortada, J. W. (2003). *Digital hand: How computers changed the work of American manufacturing, transportation, and retail industries*. Cary, NC: Oxford University Press.

- Griffin, B., & Hesketh, B. (2003). Adaptable behaviors for successful work and career adjustment. *Australian Journal of Psychology, 55*, 65-73. Retrieved from <http://eds.a.ebscohost.com.ezproxy.mtsu.edu/eds/pdfviewer/pdfviewer?vid=12&sid=cbf21800-9407-4449-9fa9-86157fc1f7e7%40sessionmgr4004&hid=4213>.
- Hesketh, B. & Neal, A. (1999). Technology and performance. In D. R. Ilgen & E. D. Pulakos (Eds.), *The changing nature of work performance: Implications for staffing, personnel actions, and development* (pp. 21-51). San Francisco, CA: Jossey-Bass.
- Hollenbeck, G. P., & McCall, M. W. (1999). Leadership development: Contemporary practices. In A. I. Kraut & A. K. Korman (Eds.), *Evolving practices in human resource management* (pp. 172–200). San Francisco, CA: Jossey-Bass.
- Ilgen, D. R., & Pulakos, E. D. (1999). Employee performance in today's organizations. In D. R. Ilgen & E. D. Pulakos (Eds.), *The changing nature of work performance: Implications for staffing, personnel actions, and development* (pp. 1-18). San Francisco, CA: Jossey-Bass.
- Kozlowski, S. W. J., Gully, S. M., Nason, E. R., & Smith, E. M. (1999). Developing adaptive teams: A theory of compilation and performance across levels and time. In D. R. Ilgen & E. D. Pulakos (Eds.), *The changing nature of work performance: Implications for staffing, personnel actions, and development* (pp. 240-292). San Francisco, CA: Jossey-Bass.

- Kozlowski, S. W. J., & Rench, T. (2009). Individual differences, adaptability, and adaptive performance: A conceptual analysis and research summary (Tech. Rep. No. 08146). Research Triangle Park, NC: Battelle Scientific Services.
- Kozlowski, S. W. J., Toney, R. J., Mullins, M. E., Weissbein, D. A., Brown, K. G., & Bell, B. S. (2001). Developing adaptability: A theory for the design of integrated-embedded training systems. In E. Salas (Eds.), *Advances in human performance and cognitive engineering research* (Vol. 1, pp. 59-123). Amsterdam: JAI/Elsevier.
- LePine, J. A., Colquitt, J. A., & Erez, A. (2000). Adaptability to changing task contexts: Effects of general cognitive ability, conscientiousness, and openness to experience. *Personnel Psychology*, *53*, 563-593. Retrieved from <http://eds.a.ebscohost.com.ezproxy.mtsu.edu/eds/pdfviewer/pdfviewer?sid=cbf21800-9407-4449-9fa9-86157fc1f7e7%40sessionmgr4004&vid=16&hid=4213>
- Lillard, R. M., Watts, L. L., Frame, M. C., Hein, M. B., Rigdon, W. D., & Orsak-Robinson, K. (2012, April). *Initial development and validation of a measure of adaptive performance*. Poster presented at the 27th annual conference of the Society for Industrial/Organizational Psychology, San Diego, CA.
- Pearlman, K., & Barney, M. F. (2000). Selection for a changing workplace. In J. F. Kehoe (Eds.), *Managing selection in changing organizations* (pp. 3-72). San Francisco, CA: Jossey-Bass.
- Ployhart, R. E., & Bliese, P. D. (2006). Individual adaptability (I-ADAPT) theory: Conceptualizing the antecedents, consequences, and measurement of individual

differences in adaptability. In E. Salas (Series Ed.) & C. S. Burke, L. G. Pierce, & E. Salas (Vol. Eds.), *Advances in human performance and cognitive engineering research: Vol. 6. Understanding adaptability: A prerequisite for effective performance within complex environments* (pp. 3–39). Boston, MA: Elsevier.

Pulakos, E., Arad, S., Donovan, M., & Plamondon, K. (2000). Adaptability in the workplace: Development of a taxonomy of adaptive performance. *Journal of Applied Psychology, 85*, 612-624. doi:10.1037//0021-9010.85.4.612

Pulakos, E., Schmitt, N., Dorsey, D., Arad, S., Hedge, J., & Borman, W. (2002). Predicting adaptive performance: Further tests of a model of adaptability. *Human Performance, 15*, 299-323. Retrieved from <http://eds.a.ebscohost.com.ezproxy.mtsu.edu/eds/pdfviewer/pdfviewer?vid=18&sid=cbf21800-9407-4449-9fa9-86157fc1f7e7%40sessionmgr4004&hid=4213>

Stokes, C. K., Schneider, T. R., & Lyons, J. B. (2010). Adaptive performance: A criterion problem. *Team Performance Management, 16*, 212–230. Retrieved from <http://dx.doi.org/10.1108/13527591011053278>

APPENDICES

**APPENDIX A:
MAP**

Below are the directions and scales used in this study for the MAP items. The first response scale is not applicable for the present study, and was used to collect data for future research. It is displayed below to show exactly what was presented to the participants in this study:

Please read the statements below and respond with the extent to which each statement is required for your job. Then rate how well you perform the action described in the statement. If the statement is not applicable for your job, select Not Applicable for both sections.

To what extent is the description below required for your job?

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = Neither Agree nor Disagree
- 4 = Agree
- 5 = Strongly Agree
- 6 = Not Applicable

Followed by:

And how well do you perform?

- 1 = Poorly
- 2 = Somewhat Poorly
- 3 = Neutral
- 4 = Somewhat Well
- 5 = Well
- 6 = Not Applicable

MAP Items (Quality Assurance Items included):

1. I take effective action when necessary without having to know the total picture or have all the facts at hand
2. I readily and easily change gears in response to unpredictable or unexpected events and circumstances
3. I effectively adjust plans, goals, actions, or priorities to deal with changing situations
4. I provide structure for myself and others, which helps people to focus in dynamic situations

5. I deal with situations that are not black and white
6. I respect the culture of other people
7. For quality assurance purposes, please select "Not Applicable" and "Poorly" for this statement
8. I refuse to be paralyzed by uncertainty or ambiguity
9. I enjoy a variety of learning experiences
10. I enjoy working with people of different backgrounds
11. I learn about the needs and values of other people and cultures
12. I take action to understand other groups, organizations, and cultures
13. I am able to read the emotions of others well
14. I can understand how other people are feeling at any particular moment
15. I integrate well with people from different cultures
16. I am not a good person to rely on in life threatening, dangerous, or emergency situations
17. I am able to become comfortable with people with different values and customs
18. I would willingly alter my behavior to show respect for others' values and customs
19. I refuse to change my appearance in order to comply with others' values and customs
20. I remain flexible and open-minded when dealing with others
21. For quality assurance purposes, please select "Disagree" and "Neutral" for this statement
22. I listen to and consider others' viewpoints and opinions
23. I alter my own opinion when it is appropriate to do so
24. I can be open and accepting of negative or developmental feedback regarding my work
25. I work well in developing effective relationships with highly diverse personalities
26. I demonstrate keen insight of others' behavior
27. I tailor my behavior to persuade or influence others
28. I am unwilling to alter my behavior in order to work effectively with others
29. I react with appropriate and proper urgency in life threatening, dangerous, or emergency situations
30. I make split-second decisions based on clear and focused thinking
31. I quickly analyze options for dealing with danger or crises and their implications
32. I maintain emotional control and objectivity while keeping focused on the situation at hand
33. I step up to take action and handle danger or emergencies as necessary and appropriate
34. I remain composed when faced with difficult circumstances
35. For quality assurance purposes, please select "Neither Agree nor Disagree" and "Well" for this statement
36. I remain calm when faced with a highly demanding workload
37. I overreact to unexpected news or situations

38. I manage frustration by directing effort to constructive solutions
39. I blame others for problems when I become frustrated
40. I demonstrate resilience in stressful circumstances
41. I maintain high levels of professionalism in difficult situations
42. I act as a calming and settling influence to whom others look for guidance
43. I demonstrate enthusiasm for learning new approaches and technologies for conducting work
44. I do what is necessary to keep my knowledge and skills current
45. I quickly learn new methods to complete work tasks
46. For quality assurance purposes, please select "Not Applicable" and "Well" for this statement
47. It is difficult for me to learn how to perform new tasks or duties
48. I adjust to new work processes and procedures
49. I anticipate changes in the work demands
50. I actively participate in training that will prepare me for change
51. I seek out assignments that will prepare me for change
52. I take action to improve work performance deficiencies
53. I analyze information in unique ways
54. I generate new ideas in novel situations
55. I turn problems upside-down and inside-out to find fresh, new approaches
56. I integrate seemingly unrelated information and develop creative solutions
57. I entertain wide-ranging possibilities others may miss
58. For quality assurance purposes, please select "Disagree" and "Poorly" for this statement
59. I think outside the given parameters to see if there is a more effective approach
60. I develop innovative methods of obtaining resources when faced with insufficient resources
61. I create unique ways to use existing resources when the desired resources are unavailable
62. I maintain a sense of humor in emotionally challenging situations
63. I maintain control over my negative emotions
64. I accept that there are some emotions that others must express
65. I express appropriate emotions in any social situation
66. I hide my emotions easily
67. I understand others' points of view
68. I understand others' emotions quickly
69. I understand why people are upset with me
70. I know when people are frustrated with me
71. I see other people's criticism of my work as an opportunity to improve
72. I continuously ask for constructive criticism
73. I am open to feedback from others, even if they do not know as much as I do
74. I accept criticism from those who have not been around as long as I have been

75. I alter my own action when it is appropriate to do so based on the opinions of others
76. I willingly adjust my behavior as necessary to show respect for others
77. I willingly alter my appearance if necessary to comply with others' values and customs
78. I change my behavior when it is appropriate to the situation
79. I choose my use of language based on who I am with
80. I have the ability to determine other people's expectations
81. I get along with people from different countries
82. I get along with people of different religious beliefs
83. I alter my own opinion when it is appropriate to do so
84. I alter my own actions when it is appropriate to do so based on the opinions of others
85. I keep an open mind
86. I consider others' opinions when they are different from mine
87. I ask others for their opinions before I take action
88. I stick to my guns regardless of the situation
89. I make decisions and don't look back
90. I'd rather change someone's opinion than have mine changed
91. I make emotional decisions
92. I don't hesitate to express my feelings
93. For quality assurance purposes, please select "Neither Agree nor Disagree" and "Neutral" for this statement
94. When I am emotional I remain quiet rather than say something I'll regret
95. I sometimes wish I could take back something I said
96. There are some emotions that I cannot control
97. I'm easily embarrassed when people praise my work
98. I don't appreciate it when people praise my work
99. For quality assurance purposes, please select "Not Applicable" and "Neutral" for this statement
100. I am hesitant when taking initiative in the group
101. I make accurate decisions
102. For quality assurance purposes, please select "Agree" and "Neutral" for this statement
103. I become anxious when I cannot find out what is coming next
104. I am able to predict what is coming next
105. I decide what shall be done and how it shall be done
106. I am accurate in predicting the trend of events
107. I take full charge when emergencies arise
108. I drive hard when there is a job to be done
109. I can reduce a madhouse to system and order
110. I anticipate problems and plan for them

111. For quality assurance purposes, please select "Agree" and "Poorly" for this statement
112. I get confused when too many demands are made of me
113. I worry about the outcome of any new procedure

**APPENDIX B:
I-ADAPT**

Below are the directions and rating scales used in this study for the I-ADAPT items. The first response scale is not applicable for the present study, and was used to collect data for future research. It is displayed below to show exactly what was presented to the participants in this study:

Please read the statements below and respond with the extent to which each statement is required for your job. Then rate how well you perform the action described in the statement. If the statement is not applicable for your job, select Not Applicable for both sections.

To what extent is the description below required for your job?

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = Neither Agree nor Disagree
- 4 = Agree
- 5 = Strongly Agree
- 6 = Not Applicable

Followed by:

And how well do you perform?

- 1 = Poorly
- 2 = Somewhat Poorly
- 3 = Neutral
- 4 = Somewhat Well
- 5 = Well
- 6 = Not Applicable

Ployhart Items (Quality Assurance Items included):

1. I am able to maintain focus during emergencies
2. I enjoy learning about cultures other than my own
3. I usually over-react to stressful news
4. I believe it is important to be flexible in dealing with others
5. I take responsibility for acquiring new skills
6. I work well with diverse others
7. I tend to be able to read others and understand how they are feeling at any particular moment

8. I am adept at using my body to complete relevant tasks
9. In an emergency situation, I can put aside emotional feelings to handle important tasks
10. I see connections between seemingly unrelated information
11. I enjoy learning new approaches for conducting work
12. I think clearly in times of urgency
13. I utilize my muscular strength well
14. It is important to me that I respect others' culture
15. I feel unequipped to deal with too much stress
16. I am good at developing unique analyses for complex problems
17. I am able to be objective during emergencies
18. My insight helps me to work effectively with others
19. I enjoy the variety and learning experiences that come from working with people of different backgrounds
20. I can only work in an orderly environment
21. I am easily rattled when my schedule is too full
22. For quality assurance purposes, please select "Not Applicable" and "Well" for this statement
23. I usually step up and take action during a crisis
24. I need for things to be "black and white"
25. I am an innovative person
26. I feel comfortable interacting with others who have different values and customs
27. If my environment is not comfortable (e.g., cleanliness), I cannot perform well
28. I make excellent decisions in times of crisis
29. I become frustrated when things are unpredictable
30. I am able to make effective decisions without all relevant information
31. I am an open-minded person in dealing with others
32. I take action to improve work performance deficiencies
33. For quality assurance purposes, please select "Agree" and "Neutral" for this statement
34. I am usually stressed when I have a large workload
35. I am perceptive of others and use that knowledge in interactions
36. I often learn new information and skills to stay at the forefront of my profession
37. I often cry or get angry when I am under a great deal of stress
38. When resources are insufficient, I thrive on developing innovative solutions
39. I am able to look at problems from a multitude of angles
40. I quickly learn new methods to solve problems
41. I tend to perform best in stable situations and environments
42. When something unexpected happens, I readily change gears in response
43. I would quit my job if it required me to be physically stronger
44. I try to be flexible when dealing with others
45. I can adapt to changing situations
46. I train to keep my work skills and knowledge current

47. I physically push myself to complete important tasks
48. I am continually learning new skills for my job
49. I perform well in uncertain situations
50. I can work effectively even when I am tired
51. I take responsibility for staying current in my profession
52. I adapt my behavior to get along with others
53. I cannot work well if it is too hot or cold
54. For quality assurance purposes, please select "Neither Agree nor Disagree" and "Poorly" for this statement
55. I easily respond to changing conditions
56. I try to learn new skills for my job before they are needed
57. I can adjust my plans to changing conditions
58. I keep working even when I am physically exhausted

APPENDIX C: Dimension Definitions

Dimension Definitions from Pulakos et al. (2000)

Dimension	Definition
Handling Emergencies or Crisis Situations	Reacting with appropriate and proper urgency in life threatening, dangerous, or emergency situations; quickly analyzing options for dealing with danger or crises and their implications; making split-second decisions based on clear and focused thinking; maintaining emotional control and objectivity while keeping focused on the situation at hand; stepping up to take action and handle danger or emergencies as necessary and appropriate.
Handling Work Stress	Remaining composed and cool when faced with difficult circumstances or a highly demanding workload or schedule; not overreacting to unexpected news or situations; managing frustration well by directing effort to constructive solutions rather than blaming others; demonstrating resilience and the highest levels of professionalism in stressful circumstances; acting as a calming and settling influence to whom others look for guidance.
Solving Problems Creatively	Employing unique types of analyses and generating new, innovative ideas in complex areas; turning problems upside-down and inside-out to find fresh, new approaches; integrating seemingly unrelated information and developing creative solutions; entertaining wide-ranging possibilities others may miss, thinking outside the given parameters to see if there is a more effective approach; developing innovative methods of obtaining or using resources when insufficient resources are available to do the job.
Dealing Effectively with Unpredictable or Changing Work Situations	Taking effective action when necessary without having to know the total picture or have all the facts at hand; readily and easily changing gears in response to unpredictable or unexpected events and circumstances; effectively adjusting plans, goals, actions, or priorities to deal with changing situations; imposing structure for self and others that provide as much focus as possible in dynamic situations; not needing things to be black and white; refusing to be paralyzed by uncertainty or ambiguity.
Learning Work Tasks, Technologies, and Procedures	Demonstrating enthusiasm for learning new approaches and technologies for conducting work; doing what is necessary to keep knowledge and skills current; quickly and proficiently learning new methods or how to perform previously unlearned tasks; adjusting to new work processes and procedures; anticipating changes in the work demands and searching for and participating in assignments or training that will prepare self for these changes; taking action to improve work performance deficiencies.
Demonstrating Interpersonal Adaptability	Being flexible and open-minded when dealing with others; listening to and considering others' viewpoints and opinions and altering own opinion when it is appropriate to do so; being open and accepting of negative or developmental feedback regarding work; working well and developing effective relationships with highly diverse personalities; demonstrating keen insight of others' behavior and tailoring own behavior to persuade, influence, or work more effectively with them.
Displaying Cultural Adaptability	Taking action to learn about and understand the climate, orientation, needs, and values of other groups, organizations, or cultures; integrating well into and being comfortable with different values, customs, and cultures; willingly adjusting behavior or appearance as necessary to comply with or show respect for others' values and customs; understanding the implications of one's actions and adjusting approach to maintain positive relationships with other groups, organizations, or cultures.
Demonstrating Physically oriented Adaptability	Adjusting to challenging environmental states such as extreme heat, humidity, cold, or dirtiness; frequently pushing self physically to complete strenuous or demanding tasks; adjusting weight and muscular strength or becoming proficient in performing physical tasks as necessary for the job.

*Adapted from Pulakos et al. (2000)

**APPENDIX D:
Items Retained in Each Model**

Factors	Original Model	Best 5 Items per Factor Model	Final Model
Proactive Learning	P5, P11, P32, P36, P40, M43, M44, M45, M47, M48, M49, M50, M51, M52, P46, P48, P51, P56, M3, M9	P36, P56, M43, M50, M51	P36, P56, M43, M50, M51
Applied Creativity	P10, P16, P25, P38, P39, M54, M55, M56, M57, M53, M30, M59, M60, M61	M54, M56, M59, M60, M61	M54, M56, M59, M60, M61
Emotional Control	P15, P3, P21, P34, P37, M34, M36, M40, M41, M38, M39, M37, M62, M63, M66, M91, M32, M92, M94, M95, M96	M32, M34, M36, M40, M63	M32, M34, M36, M40, M63
Cultural Adaptability	P2, P6, P14, P19, P26, P79, P81, P82, M6, M10, M11, M12, M15, M17, M18, M19	P6, M10, M11, M15, M81	P6, M10, M11, M15, M81
Dealing with Uncertain and Unpredictable Work Situations	P24, P29, P30, P41, P42, P45, P49, P55, P57, M1, M2, M4, M5, M8, M100, M101, M103, M104, M106, M108, M109, M110, M112, M113	P42, M2, M4, M109, M110	P42, M2, M4, M109, M110
Adaptability in Crisis Situations	P1, P9, P12, P17, P23, M28, M16, M29, M31, M33, M107	P9, M29, M31, M33, M107	P9, M29, M31, M33, M107
Openness to Others	P31, P4, P44, M20, M22, M25, M28, M105	P44, M20, M22, M25, P4	NOT IN MODEL
Openness to Criticism	M71, M72, M73, M74, M75, M24, M97, M98	M24, M71, M72, M73, M74	M24, M71, M72, M73, M74
Flexibility of Opinion	M67, M76, M77, M78, M84, P52, M23, M85, M86, M87, M90, M89, M88	P52, M67, M78, M84, M86	NOT IN MODEL
Emotional Perceptiveness	P18, P7, P35, M42, M64, M65, M68, M69, M70, M13, M14, M26, M27, M80	P7, M13, M14, M26, M68	P7, M13, M14, M26, M68
Demonstrating Physically oriented Adaptability	P20, P13, P8, P27, P43, P47, P53, P58, P50	P13, P8, P43, P47, P58	P13, P8, P43, P47, P58
Applied Creativity (Ployhart)	NOT IN MODEL	NOT IN MODEL	P10, P16, P25, P38, P39
Flexibility of Opinion & Openness to Others - Combined	NOT IN MODEL	NOT IN MODEL	M20, M22, M25, M78, M67

*P = Ployhart Item

*M = MAP Item

**APPENDIX E:
Factor Loadings for the Final Model**

Items	Factor Loading	Standard Error
P9	.881	.058
P7	.853	.055
P13	1.386	.081
P8	1.274	.079
P36	.805	.055
P42	.720	.053
P43	.813	.088
P47	.765	.070
P56	.857	.056
P58	.623	.069
M2	.836	.052
M4	.935	.064
M6	.889	.055
M10	.964	.052
M11	.910	.061
M13	.986	.050
M14	.872	.053
M15	1.070	.052
M20	.745	.044
M22	.858	.044
M24	.868	.049
M25	.882	.052
M26	.988	.054
M29	1.253	.066
M31	1.149	.063
M32	.860	.053
M33	1.209	.063
M34	.889	.051
M36	.833	.050
M40	.822	.049
M43	.782	.053
M50	.920	.063
M51	.980	.062
M54	1.028	.054
M63	.926	.055
68	.981	.053
M71	.846	.051
M72	.773	.066
M73	.786	.053
M74	.827	.059
M109	.844	.066
M110	.756	.050
M60	1.125	.059
M61	1.020	.054
M81	1.081	.058
M107	1.217	.060
M59	.928	.048
M56	1.064	.058
P10	.792	.061
P16	.848	.063
P25	.819	.054
P38	.857	.063
P39	.683	.049
M78	.719	.054
M67	.853	.044

*P = Ployhart Item

*M = MAP Item

APPENDIX F:
Inter-Correlation Matrix for the Final Model

Factors	1	2	3	4	5	6	7	8	9	10	11
1	1.00										
2	.792	1.00									
3	.624	.580	1.00								
4	.565	.444	.491	1.00							
5	.796	.795	.870	.559	1.00						
6	.575	.575	.673	.395	.778	1.00					
7	.641	.573	.772	.505	.740	.501	1.00				
8	.600	.530	.562	.625	.718	.532	.600	1.00			
9	.412	.390	.385	.286	.479	.514	.326	.331	1.00		
10	.799	.869	.666	.501	.890	.607	.577	.625	.483	1.00	
11	.683	.554	.735	.765	.802	.549	.703	.861	.363	.717	1.00

* 1 = Proactive Learning

* 2 = Applied Creativity

* 3 = Emotional Control

* 4 = Cultural Adaptability

* 5 = Dealing with Uncertain and Unpredictable Work Situations

* 6 = Adaptability in Crisis Situations

* 7 = Openness to Criticism

* 8 = Emotional Perceptiveness

* 9 = Demonstrating Physically Oriented Adaptability

* 10 = Applied Creativity (Ployhart)

* 11 = Flexibility of Opinion & Openness to Others - Combined