A Longitudinal Examination of Individual Adaptability as an Antecedent of Training and Transfer Outcomes

by

Edwin Daly Vaughn III

A dissertation submitted to the Graduate Faculty of
Auburn University
in partial fulfillment of the
requirements for the Degree of
Doctor of Philosophy

Auburn, Alabama
August 6, 2011

Keywords: individual adaptability, self-efficacy, training, transfer of training, performance

Copyright 2011 by Edwin Daly Vaughn

Approved by

Daniel J. Svyantek, Chair, Professor of Psychology
Jinyan Fan, Assistant Professor of Psychology
Malissa A. Clark, Assistant Professor of Psychology
Christopher J. Correia, Associate Professor of Psychology

Abstract

The current workforce faces increasingly complex work demands requiring high levels of individual adaptability. Utilizing Ployhart and Bliese's (2006) conceptual framework, the current investigation empirically examined individual adaptability (I-ADAPT) as a predictor of performance within a transfer of training context. I assessed 424 US Army infantry noncommissioned officers (NCOs) completing a leadership course emphasizing core competencies of an NCO squad leader. Within a proximal model, four dimensions of the I-ADAPT (i.e., creativity, interpersonal, learning, uncertainty) were hypothesized to positively relate to the mediating process of posttraining specific self-efficacy (SSE) after controlling for pretraining SSE and other experience variables. Furthermore, I-ADAPT was predicted to indirectly relate to reactions to the training and motivation to transfer through meditational processes. Reactions to training was posited to partially mediate the relationship between SSE improvement and motivation to transfer.

The overall fit of the revised proximal model provided a reasonable approximation to the data, χ^2 (1,764, N = 411) = 3,577.49, $p < .001$; $\chi^2/df = 2.03$. However, the majority of the substantive hypotheses were not supported. None of the I-ADAPT dimensions predicted SSE improvement. Furthermore, I-ADAPT dimensions did not demonstrate an indirect effect on reactions to training. Indirect effects were found between the learning and uncertainty dimensions of I-ADAPT and motivation to transfer providing partial support for Hypothesis 3. However, the directionality of the effect for the uncertainty dimension was in the reverse

direction from that hypothesized. Reactions to training was found to mediate the relationship between SSE improvement and motivation to transfer.

Lastly, ratings were gathered from a subset of NCOs, their peers, and leaders following a return to their units after a period of three to five months to assess transfer of training. Results from three path analyses demonstrated no significant direct or indirect (via posttraining SSE) relationship between I-ADAPT and transfer performance across the three rating sources. Taken together, these results provide evidence of boundary conditions by which I-ADAPT may not be predictive in certain environments and situations. Several unexpected relationships also provide potential insight within the current study. Further implications for research and practice are discussed.

Acknowledgments

There are many people deserving of thanks in supporting my completion of this project. I would like to thank my chair, Dan Svyantek, for his belief and support in both myself and the Auburn University industrial/organizational psychology program. I would also like to express my gratitude to the members of my dissertation committee, Jinyan Fan, Malissa Clark, and Chris Correia, for their quality feedback and gracious flexibility. In addition to the members of my academic committee, I would like to thank my ARI advisor, Robert (Bob) Pleban. I also would like to thank Marisa Miller, Jennifer Tucker, and all of the research scientists, external contractors, and staff at the Army Research Institute (ARI) at Fort Benning, GA that have had a direct or indirect influence toward the completion of this project. I am also indebted to Dr. Robert Ruskin for his encouragement in seeking out opportunities to conduct my dissertation project through this applied experience.

And most importantly, I am very grateful for the continuous love, support, and encouragement of my family and friends. To my friends and working colleagues, thanks for making this learning and development process an enjoyable experience. To my family, I am truly blessed to have such great foundational support in my life. Thanks to my parents, Eddie and Pam, my sister Katie, my brother Taylor, and by far the person most responsible for facilitating the accomplishment of my life goals, I dedicate this project to my grandmother, Georgie.

Table of Contents

List of Tables

List of Figures

List of Abbreviations

ACT	acceptance and commitment therapy
ALC	Advanced Leaders Course
ARI	Army Research Institute
BARS	behaviorally anchored rating scale
BCT	brigade combat team
BNCOC	Basic Noncommissioned Officer Course
DoD	Department of Defense
DSB	Defense Science Board
E-5	enlisted-5
E-6	enlisted-6
FFM	five factor model
GED	General Educational Development
GPA	grade point average
GSE	general self-efficacy
I-ADAPT	individual adaptability
KSAO	knowledge, skill, ability, and other characteristics
MI	measurement invariant/invariance
MTT	mobile training team
MOS	military occupational specialty

NCO	noncommissioned officer
OEF	Operation Enduring Freedom
OIF	Operation Iraqi Freedom
P-E	person-environment
P-G	person-group
P-O	person-organization
ROI	return-on-investment
ROTC	Reserve Officers' Training Corps
SE	self-efficacy
SGT	sergeant
SIOP	Society for Industrial and Organizational Psychology
SME	subject matter expert
SOP	standard operating procedure
SSE	specific self-efficacy
SSG	staff sergeant
U.S.	United States

Introduction

We must cut our coat according to our cloth, and adapt ourselves to changing circumstances.

- William Ralph Inge (1860 – 1954)
English religious leader and author

We talk of our mastery of nature, which sounds very grand; but the fact is we respectfully adapt ourselves, first, to her ways.

- Clarence Day (1874 – 1935)
American biographer and essayist

Across military, public, and private sector settings, the current workplace is often characterized by constant transition and ambiguity requiring individuals to perform in complex, changing environments (Nelson, Zaccaro, & Herman, 2010; Ployhart & Bliese, 2006; Tucker, Gunther, & Pleban, 2010). Within the private sector, adaptive performance is necessitated by work demands that are increasingly novel, complex, and dynamic as opposed to encountering work challenges resolved through the use of routine expertise (Nelson et al., 2010).

Within a military environment, soldiers must adjust rapidly across a wide variety of operations including humanitarian assistance, peacekeeping, peace enforcement, and low intensity conflict (U. S. Department of the Army, 2001). Salas, Milham, and Bowers (2003) discussed the noticeable shift in numerous military jobs from principally physical roles to roles necessitating rapid reactions based on changing situations. High operational tempo, increased uncertainty, cultural differences, a determined and resourceful enemy, and the need to constantly shift tactics and approaches are some of the key factors which have contributed to an environment where adaptability is required for mission success (Mueller-Hanson, White, Dorsey,

& Pulakos, 2005). Recently, the Department of Defense (DoD) has called to make adaptability a core value as represented in the culture of the organization through its processes and people (Defense Science Board [DSB], 2010).

The purpose of the current research is to empirically assess the tenability of applying individual adaptability (I-ADAPT) theory (Ployhart & Bliese, 2006) to predict proximal training outcomes such as improvement in pretraining to posttraining specific self-efficacy (SSE; i.e., judgments of confidence in one's capability to successfully perform specific tasks) and motivation to transfer (i.e., desire to use knowledge and skills acquired through training on the job). In addition, using a smaller subset of participants, as well as their peers and leaders, the current study examines long-term benefits of individual adaptability to the individual and organization such as generalization of training as conceptualized within the transfer of training literature (Baldwin & Ford, 1988; Blume, Ford, Baldwin, & Huang, 2010). Smith, Ford, and Kozlowski (1997) described that traditional industrial-organizational psychology studies investigating key inputs leading to effective transfer of training have more heavily examined maintenance of simple skills at transfer (e.g., exact reproduction of trained motor skills). Studying transfer from solely a maintenance perspective is incongruent with current work demands for a large number of jobs which require more complex and ill-defined applications of training once back in the work context necessitating application of learning principles to novel problem solving tasks and interpersonal encounters (Smith et al.). The current study addresses this need by evaluating the transfer of training from a United States army small unit leader career course (described in more detail within the methods section) which focuses more on training broad competencies needed to be a successful noncommissioned officer (NCO) small unit leader.

Although individual adaptability theory has shown initial promise in predicting training performance (Vaughn, Tucker, & Pleban, 2011, April), this is the first study in which the theory has been applied to a transfer of training context. A key scientific contribution provided within the design and implementation of this research includes the use of a longitudinal design (versus cross sectional) with substantial time lags between pretraining, posttraining, and transfer measurement. This design allowed for a more meaningful examination of the effects of individual adaptability on training outcomes than studies that may investigate only intentions to transfer (e.g., Machin & Fogarty, 2003) or cross-sectional studies in which a "near-transfer" task is used within the same context at the end of the training (e.g., Boot, Neider, & Kramer, 2009). Thus, utilizing the same measurement context is avoided within the present study (Blume et al., 2010). An additional contribution gained through the present study is the collection of transfer data from sources other than the primary participants for a smaller subset of participants at time 3 (transfer). The incorporation of different measurement contexts and different transfer performance data sources protects against overinflated predictor-criterion relationships due to common method variance (Blume et al., 2010; Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Investigating I-ADAPT theory within a training and transfer context is a worthwhile endeavor from both a practical and a theoretical perspective. Employers already list the competency of adaptability as a job requirement (e.g., Hogan Assessments Systems senior consultant job posting; retrieved from SIOP JobNet, 2011). However, to date, little research has been conducted which attempts to measure differences in whether individuals are high or low in propensity for adaptability. Furthermore, the boundary conditions by which individual differences in adaptability influence other organizational outcomes have only begun to be examined (e.g., Wang, Zhan, McCune, & Truxillo, 2011). No research to date has examined

whether individual adaptability accounts for variance in training transfer performance. If the current study is supported, identifying and selecting adaptive individuals could provide a powerful predictive tool for organizations to utilize provided the costs of sending high potential employees to developmental training programs. Prior to expanding upon the transfer of training literature, the next section describes in detail how adaptability has been defined and studied, specifically as pertains to I-ADAPT theory.

Overview of Adaptability

Within the psychological literature, adaptability has been investigated along three lines of research. These frameworks include focusing on adaptive performance (i.e., identifying specific job performance domains requiring adaptability), examining cognitive processes and strategies which facilitate adaptability, and most recently, studying adaptability as a trait-like individual difference variable (S. Zaccaro, personal communication, February 10, 2011). From an adaptive performance conceptualization, Pulakos, Arad, Donovan, and Plamondon (2000) developed and validated an 8-dimension taxonomy of adaptive job performance: handling emergencies, handling work stress, solving problems creatively, dealing with uncertain situations, learning, interpersonal adaptability, cultural adaptability, and physically-oriented adaptability. As an example of a cognitive processes approach, Zaccaro and Banks (2004) provided recommendations for leader development strategies and approaches (i.e., leader visioning and change management) believed to be most appropriate in developing leaders that are adaptive. In regard to the individual difference conceptualization of adaptability, Ployhart and Bliese (2006) have developed a framework in which adaptability is investigated from the perspective of a trait-like quality of the individual. From this framework, individual differences in adaptability may

be predictive across various performance contexts including task performance, contextual performance, and counterproductive work behaviors.

The current study adopts the dispositional view of adaptability. Provided the current work environment, embracing a trait-like conceptualization of adaptability is superior to a behavioral conceptualization of adaptability as the modern work environment does not always differentiate typical task requirements from an adaptive performance domain. By deemphasizing typical task behavior, the adaptive performance distinction alienates a key principal related to what it means to be adaptable (i.e., adjusting oneself to fit the requirements necessitated in a given environment). As an example, a corporation may undergo a restructuring of a class of jobs or implement a new technology in to a given workspace. Although one would posit that these environmental changes would be navigated more efficiently by individuals higher in adaptability, theoretically, the manifestation of these adaptive tendencies could still be observed in typical task performance ratings required of the incumbent's job. Ployhart and Bliese noted that although I-ADAPT theory is new to the adaptability domain, related constructs have been studied generally through other content domains such as coping (Sonnentag & Frese, 2003) and reacting to organizational change (Armenakis & Bedian, 1999).

Despite the intuitive appeal of examining a construct of individual adaptability, research assessing individual adaptability in organizational settings is still relatively scant. In part, the dearth of research specifically addressing individual differences in adaptability can be attributed to the absence of an overarching framework (Ployhart & Bliese, 2006). Without a broader framework, it is difficult to place dispositional differences in adaptability within a nomological network of existing constructs. I intend to address this current gap by providing empirical evidence in response to theoretically posited relationships between individual adaptability and

other more well established constructs within the industrial/organizational psychology literature. Before expounding upon the present research, individual adaptability must be clearly defined as used in the present context.

Defining and describing individual adaptability. Expanding upon the conceptualization of adaptive performance introduced by Pulakos and colleagues (Pulakos et al., 2000; Pulakos, Schmitt, Dorsey, Arad, Hedge, & Borman, 2002), Ployhart and Bliese (2006) introduced Individual ADAPTability (I-ADAPT) theory in an effort to (1) provide researchers with a framework to investigate determinants and consequences of individual differences in adaptability across a broad variety of contexts and settings and (2) create a broadly applicable scale of adaptability. Ployhart and Bliese (2006) defined individual adaptability as "an individual's ability, skill, disposition, willingness, and/or motivation, to change or fit different task, social, and environmental features" (p. 13). However, this definition is rather broad which could potentially dampen the utility of the I-ADAPT construct. The current study endorses Wang et al.'s (2011) more narrow definition of individual adaptability as "an individual's dispositional tendency to make active attempts to adjust him or herself to fit new tasks and new environments" (p. 165). More evidence in support of this circumscribed conceptualization will be provided in the subsequent section.

Individual adaptability is believed to influence both cognitive (e.g., through reframing) and behavioral (e.g., through active learning) tendencies (Wang et al., 2011). A key distinction of I-ADAPT is that the target of the shaping tendencies is directed inwardly toward oneself rather than outwardly toward one's novel environment (Wang et al., 2011). The eight dimensions of adaptive performance identified by Pulakos and colleagues were adapted as dispositional dimensions of overall individual adaptability under the I-ADAPT theory (i.e.,

Crisis, Work Stress, Creativity, Uncertainty, Learning, Interpersonal, Cultural, Physical). The model put forward by Ployhart and Bliese is demonstrated in Figure 1.

The current study assesses three components of the larger process model: dispositional standing on individual adaptability, mediating processes, and transfer task performance. Following the multidimensional conceptualization of individual adaptability, Ployhart and colleagues have provided support for distinct lower-order latent factors contributing to overall individual adaptability (Ployhart, 2005, November; Ployhart & Bliese, 2006). Although a scale is presented within Ployhart and Bliese (2006) displaying the items which are purported to assess individuals' placement on each of the latent dimensions, no clear definition for each of the factors is provided within the text of the book chapter. Instead, the authors defer to the original work done in identifying the pertinent dimensions of adaptive performance developed by Pulakos and colleagues (Pulakos et al., 2000; Pulakos et al., 2002). Therefore, I utilize descriptions provided by Pulakos et al. (2000) in describing the eight dimensions.

Crisis adaptability refers to being able to properly react to emergency situations including those which are life-threatening (Pulakos et al., 2000). This form of adaptability encompasses remaining calm while in danger, taking action when appropriate, and capability to make quick yet focused decisions. An example indicator of crisis adaptability from Ployhart and Bliese's (2006) I-ADAPT scale is "In an emergency situation, I can put aside emotional feelings to handle important tasks" (p. 37). The work stress dimension of I-ADAPT refers to remaining diligent, constructive, and composed when faced with high levels of work challenge and unanticipated new demands (Pulakos et al., 2000). There is also an element of serving as a calming agent for others whom you may influence within your work setting. An example of a

work stress item from the I-ADAPT scale (reverse-coded) is “I often cry or get angry when I am under a great deal of stress” (Ployhart & Bliese, 2006, p. 38).

The creativity dimension of adaptability refers to an individual’s predisposition to synthesize seemingly disparate information and produce innovative solutions or approaches when faced with challenges (Pulakos et al., 2000). An example item from the I-ADAPT scale is “I am good at developing unique analyses for complex problems” (Ployhart & Bliese, 2006, p. 37). The uncertainty dimension of I-ADAPT describes an individual’s disposition to effectively take action if necessary when handling unpredictable work situations (Pulakos et al., 2000). This disposition can be manifested through propensity to make decisions rather than freezing, particularly in situations in which it is not possible to have full information available. An example item from the I-ADAPT scale is “When something unexpected happens, I readily change gears in response” (Ployhart & Bliese, 2006, p. 39). The learning dimension of individual adaptability assesses the nature by which a person approaches demands for new work tasks, technologies, and procedures (Pulakos et al., 2000). The learning dimension disposition entails seeking out avenues to improve knowledge and skills, eagerly approaching a new learning task, and addressing deficiencies by acquiring appropriate knowledge quickly and efficiently. An example indicator of learning adaptability is “I take responsibility for acquiring new skills” (Ployhart & Bliese, 2006, p. 37).

Interpersonal adaptability covers a broad spectrum of interpersonal tendencies expressed by the following dispositional qualities: considering different viewpoints; altering own opinions when deemed appropriate; being receptive to constructive criticism and developmental feedback; working well and establishing rapport with individuals with a broad range of personalities; acute awareness of others’ behavioral tendencies; and ability to tailor one’s own behavioral tendencies

to align with others' when appropriate (Pulakos et al., 2000). An example item of interpersonal adaptability from Ployhart and Bliese's (2006) I-ADAPT scale is "I tend to be able to read others and understand how they are feeling at any particular moment" (p. 37). Cultural adaptability can be described as a propensity to take initiative in learning about various aspects (e.g., climate, needs, values) of other groups, organizations, or cultures (Pulakos et al., 2000). The cultural adaptability dimension also includes propensity to show respect for others' customs and a willingness to assimilate with the various groups through modification of behavior or appearance. An example item is "I enjoy learning about cultures other than my own" (Ployhart & Bliese, 2006, p. 37). Physical adaptability refers to propensity to push through a physically challenging task to complete an arduous task (Pulakos et al., 2000). This dispositional tendency also includes being able to adjust to difficult climate extremes (e.g., heat, humidity, cold, or dirtiness). It also encompasses confidence in capability to modify muscular composition and weight if necessary to complete a given job. An example indicator drawn from the I-ADAPT is "I am adept at using my body to complete relevant tasks" (p. 37).

For this study, only the four dimensions that were most relevant to the training and transfer of training process for the current sample and context were utilized. These dimensions are creativity adaptability, interpersonal adaptability, learning adaptability, and uncertainty adaptability. These dimensions were selected as small unit leaders completing a career course in an institutional training context are likely to benefit more from the training if they have the following dispositional characteristics: make attempts to draw connections between seemingly unrelated information; proactively seek new knowledge and skills to better equip themselves to perform their job; apply newly acquired information in the midst of constant change while often supplied with incomplete information and resources; and accept feedback, adjust behavior, and

establish rapport with instructors, peers, and subordinates. The choice to include only the most relevant dimensions of I-ADAPT when faced with constraints on total survey length is consistent with previous research assessing dimensions of the 55-item I-ADAPT scale (Cullen, Casper, Edwards, Gue, & Tubré, 2011, April; Vaughn, Tucker, & Pleban, 2011, April; Wang, Zhan, McCune, & Truxillo, 2011; Wessel, Ryan, & Oswald, 2008).

Due to constraints placed on the current applied army research study, four dimensions of the I-ADAPT were omitted. The omitted dimensions were crisis adaptability, work stress adaptability, cultural adaptability, and physical adaptability. These dimensions were considered less relevant for the sample used within the current training and transfer context. The training used in the current study is more similar in format and delivery to an abbreviated college classroom course. Although there is some time reserved for practicing shooting at the range and completing a land navigation course in the field, participants and instructors report that the vast majority of time is spent in a traditional classroom environment. Furthermore, the training, as currently delivered, does not include high-stress scenarios or exercises whereby the work stress and crisis dimensions may be more relevant. This structure is not the case for all training courses delivered within the U.S. army; however, it is more typical for courses taught under the umbrella of the NCO education system which was the case for this training. In other U.S. army training contexts, physical, work stress, or crisis adaptability dimensions may be more pertinent (e.g., ranger school). Additionally, although being an oversees ambassador is one of nine competencies trained to soldiers within the current study, given the constraints, the other four dimensions selected for inclusion in the current study were deemed more relevant *overall* for successful training and transfer which prevented inclusion of the cultural adaptability dimension. Further elaboration on the sample, the training context, and the link between the training context

and the dimensions selected will be elaborated in the hypothesis development and methods section.

I-ADAPT as narrow personality predictor. For the current examination, I am only concerned with investigating a portion of Ployhart and Bliese's (2006) I-ADAPT model. That is, I want to examination the trait-like influence of I-ADAPT on several more contextually based mediating processes. In addition, a smaller subset of the original sample will be utilized to assess the direct and indirect effect of I-ADAPT on transfer performance. Thus, in concordance with Wang et al. (2011), I-ADAPT dimensions were conceptualized as narrow personality predictors. Researchers have indicated that selecting more specific personality constructs given a targeted objective or context frequently provides for higher criterion-related validity estimates than do more broadly conceptualized personality constructs (Hough & Oswald, 2008).

Employing the conceptualization of I-ADAPT as a narrow personality trait, individual adaptability fits well within the personality framework provided by Funder (2001; 2006) which identifies the dynamic and interactive relationships between personality, environment, and behavior (i.e., the personality triad). Funder (2006) described that any one component within the triad could be predicted by the characteristics of the other two components and, in many cases, the interactional effect which they produce. Such a conceptualization directly links to Ployhart and Bliese's (2006) proposition that behavior (manifested in changes in performance) could be predicted by considering both a participant's standing on the latent factors subsumed under individual adaptability theory and situational requirements placed on the individual within a given environment and context. For example, the learning dimension of individual adaptability would likely be more related to performance in a traditional classroom training context than the physical adaptability dimension. However, the physical adaptability dimension may be more

pertinent in predicting performance on tasks that are physically demanding and strenuous such as engaging in a difficult mountaineering expedition.

At a more macro-level of analysis, I-ADAPT theory could be applied to Funder's (2001) framework in light of the current United States (U.S.) military landscape as a whole. A soldier's standing on the I-ADAPT construct would provide the personality anchor. As an example of environmental demands, the recent shift in U.S. military operations from high intensity conflict (i.e., known enemy with typically well-defined boundary conditions) to low intensity conflict (i.e., characterized by non-state actors and unconventional warfare) could provide an indication for the environmental demands anchor. These two combined components could then be theorized to predict the effectiveness of soldiers' behavior.

I-ADAPT may be predictive of performance in stable environments. However, I-ADAPT should generally be more strongly related to performance within a dynamic environment (Ployhart & Bliese, 2006). Provided the detailed description of what individual adaptability assesses, it is now necessary to delineate adaptability from pre-existing and conceptually related constructs.

Differentiation of I-ADAPT from related constructs. In an effort to advocate the scientific study of the psychological construct of individual adaptability, it is first necessary to distinguish adaptability from other related constructs within the psychological literature. This paper does not intend to provide an investigation of the discriminant validity of I-ADAPT from other related constructs. However, the purpose of this section is to provide conceptual, and where available, empirical evidence in support of individual adaptability as a distinct multidimensional construct. Due to the multidimensionality of the individual adaptability construct, it is not tractable to one particular theory within the psychological literature. This

multidimensionality component utilized to functionally assess dispositional tendencies to change self to fit work and environment demands provides the first, and perhaps most notable key distinction between overall adaptability and other constructs to which it has been compared (e.g., proactivity; Wang et al., 2011). In fact, in developing the taxonomy of adaptive performance from which I-ADAPT was based, Pulakos et al. (2000) conducted a broad review of disparate work-related literature to identify six of the initial dimensions. The two additional dimensions of adaptive performance which they subsequently added to the adaptive performance taxonomy were empirically derived using a deductive approach. That is, five industrial-organizational psychologists came to consensus based on the results of a content analysis of critical incidents that two additional adaptive performance dimensions needed to be added to the previously identified dimensions drawn from the literature. These dimensions were (a) handling work stress and (b) handling emergencies or crisis situations (Pulakos et al., 2000). In addition, Wang et al. (2011) provided empirical evidence of discriminant validity amongst the I-ADAPT subscales as elucidated by low intercorrelations amongst subscales and differential relationships with person-environment mediators and newcomer socialization outcome variables.

Psychologists have been in search of individual difference variables predictive of adjustment of self to environmental demands since the early years of the formal discipline. From a broader perspective than encompassed under I-ADAPT theory, Snow (1925) described environmental (e.g., nutrition, illness) and individual difference variables (e.g., intelligence, interests) which predispose individuals to be better suited or adapted for entering certain job classes. Drawing from the learning adaptability dimension within I-ADAPT, psychologists have examined factors which predict generalization of earlier learning to novel but related tasks since the turn of the 20th century (Thorndike, 1903). In relation to interpersonal adaptability,

researchers have provided evidence of linkages between dispositional tendencies in social intelligence and indicators of work success dating back to the discipline's formative years (e.g., Moss & Hunt, 1927). Creative adaptability also has roots in early psychology as researchers sought to describe and explain individual difference factors predictive of the capability to reorganize information and provide connections to invent seemingly novel outcomes (e.g., Whipple, 1915). Over the previous half-century, the study of creativity has expanded and developed within the psychological literature to the extent that in 1988, the first issue of a multidisciplinary journal, the *Creativity Research Journal*, was published with the specific intent to provide a singular outlet to better understand creativity (Runco, 1988).

In addition to being a functionally focused, multidimensional construct, conceptual and empirical evidence exists to provide additional distinctions between individual adaptability and other theoretically related constructs. Drawing again on the distinction made by Wang et al. (2011), the source of the predisposition for targeted change begins with the self rather than being directed toward changing the environment. As a result, there is an element of being a self-starter within both proactive personality and individual adaptability, the I-ADAPT construct differs with proactive personality which targets behavioral tendencies to change one's environment. This specification can be observed in the definition of proactive personality provided by Hirschfeld, Thomas, and Bernerth (2011) as "…being an independent and assertive agent of *environmental change* desired by an individual" (p. 237, italics added for emphasis). Wang et al. included proactive personality as a control variable within their study and found evidence of discriminant validity between the two constructs.

Individual adaptability can also be differentiated from the Openness to Experience dimension from the five factor model (FFM). McCrae and Costa (1990) define Openness to

Experience as "…*receptiveness* to new ideas, approaches, and experiences" (pp. 41-42, italics added for emphasis). As with proactive personality, one key distinction is the more abstract specification of the target object of the behavioral and cognitive tendencies (Wang et al., 2011). Openness to Experience also does not emphasize the initiative component found in individual adaptability (i.e., it can be either active or passive). Lastly, Wang et al. (2011) noted that the disposition of being high on Openness to Experience does not directly infer a need to change oneself to meet the novel environmental demands. As with proactive personality, Wang et al. included Openness to Experience as a control variable within their study and found empirical evidence in support of discriminant validity between I-ADAPT and Openness to Experience. In addition, Ployhart (2005, November) utilized a sample of 1,325 Reserve Officers' Training Corps (ROTC) candidates and demonstrated that while Openness to Experience, as well as the other four FFM dimensions, were significantly related to an I-ADAPT composite score, the I-ADAPT composite was incrementally predictive of leadership performance ratings.

Psychological flexibility has also garnered increased levels of attention within the psychological literature in recent years. This unidimensional construct has been introduced through an empirically based psychopathology theory, acceptance and commitment therapy (ACT; Hayes, Strosahl, & Wilson, 1999; cited in Bond et al., 2008). Masuda, Anderson, Wendell, Chou, Price, and Feinstein (2011) describe psychological flexibility as a more recent behavioral account of psychological health. In contrast, I-ADAPT theory has been explained in relation to its prediction of individuals' task, contextual, and counterproductive work performance. Psychological flexibility refers to "…an ability to focus on the present moment and, depending upon what the situation affords, persist with or change one's (even inflexible, stereotypical) behavior in the pursuit of goals and values" (Bond, Flaxman, & Bunce, 2008, p.

645). People displaying psychological flexibility are more adept at being completely open and nonjudgmental to both the positive and negative aspects of their internal events (e.g., prejudices, urges, and fears), thereby freeing up limited cognitive resources that would otherwise be used to suppress, alter, avoid, or otherwise control various psychological events (Bond et al., 2008). The theory follows that by accepting the present circumstances, individuals higher in psychological flexibility will be more likely to pool their available resources to take goal-directed action. Hence, the construct has been demonstrated to influence mental health, job performance, motivation, and absenteeism (Bond & Hayes, 2002). Psychological flexibility emphasizes being fully present and cognizant of one's internal and external environment while staying committed to value-directed activities (Masuda et al., 2011). Thus, another key distinction between the two theories is the explicit focus on commitment to values not present within I-ADAPT theory. Although values and interests are one of several antecedents theorized to predict individual adaptability, I-ADAPT theory emphasizes adjusting oneself to meet the current task, social, and environmental demands irrespective of an overarching internal value system.

Initial validity evidence for individual adaptability. As conceptualized, individual adaptability provides potential to be a robust predictor across a variety of contexts in the modern working environment and assesses different constructs than what has been captured in prior psychological research. However, the relationships posited by I-ADAPT theory have only begun to be tested. Limited empirical work has been conducted to assess the validity of individual differences in adaptability as a predictor for pertinent organizational outcomes. Ployhart (2005, November) presented initial scale development and validity evidence for the measure and theoretical model. Across three studies utilizing large samples of ROTC candidates, Ployhart

supported the factorial and construct validity of the scale, as well as predictive validity relating to leadership performance.

Wessel, Ryan, and Oswald (2008) employed the two I-ADAPT subscales, learning and uncertainty, and found that these subscales directly predicted a sample of 198 college students' perceived fit with major, but not objective fit[1]. These researchers also posited that individual adaptability would moderate the relationship between fit with major and objective outcomes (i.e., affective major commitment, grade point average [GPA], institutional satisfaction, probability of major change, avoidable absences). They tested for hypothesized moderating relationships using both perceived fit and objective fit indices as the primary independent variable across a series of separate hierarchical regression analyses. Wessel et al. did not find either of the two I-ADAPT subscales to have a moderating effect on objective outcomes with fit. These authors did, however, find evidence of direct significant positive relationships between the I-ADAPT dimensions and affective commitment, academic self-efficacy, and institutional satisfaction and a direct negative relationship between the I-ADAPT dimensions and probability of changing major.

In addition, Wang et al. (2011) tested and found partial support for a model of individual adaptability as a predictor of positive newcomer socialization outcomes such as supervisor-rated job performance, job satisfaction, and turnover intentions through the mediating processes of various dimensions of perceived person-environment (P-E) fit. Utilizing a sample of 671 Chinese newcomer employees in a two-wave design, Wang et al. found evidence of discriminant validity between the five I-ADAPT dimensions measured at time 1 and the various P-E fit

[1] For the interested reader, Wessel et al. (2008) used two separate indicators for objective fit with major: Brown and Gore's (1994) C-index and the World-of-Work Map (American College Testing Program, 1995) method. Both calculations are initially based upon weighted congruencies between individuals and majors using the dimensions assessed with the Strong Interest Inventory (see Wessel et al. for a more detailed description).

mediators examined as well as differential effects on newcomer socialization outcomes. For example, the study demonstrated cultural adaptability to have a positive and direct influence on improvements of perceptions of person-organization (P-O) fit, work stress adaptability had a positive and direct effect on improvements in perceived needs-supplies fit and perceived demands-abilities fit, and interpersonal adaptability had a positive and direct effect on improvements from baseline person-group (P-G) fit. Through these mediating processes, the various dimensions were found to have indirect effects to varying degrees on the three newcomer socialization outcome variables (i.e., job performance, job satisfaction, and turnover intentions). A direct positive relationship was supported between the learning dimension and supervisor-rated job performance. Lastly, uncertainty adaptability demonstrated a direct positive relationship with job satisfaction and a direct negative relationship with turnover intentions, but no relationship with job performance. Taken together, this study further substantiates a need for continued examination of the various dimensions of adaptability within industrial-organizational research, particularly within the content domain of selection, training, and employee development (Wang et al., 2011).

I-ADAPT Applied to Training and Transfer

As alluded to at the onset of this manuscript, a potential area for continued research is the investigation of the extent to which I-ADAPT predicts training outcomes and transfer performance. Using a sample of U.S. army lieutenants, Vaughn, Tucker, and Pleban (2011, April) provide initial support for the I-ADAPT as a predictor in a training context. Due to sample size limitations (n = 69), these researchers created a composite individual adaptability measure composed of the three I-ADAPT dimensions they believed would be most relevant to their training context: creativity, learning, and uncertainty. In addition, they assessed two of the

strongest traditional predictors of training performance, cognitive ability and general self-efficacy. For the study criterion, a training task performance composite was computed based on the aggregated ratings of task performance on four dimensions across three dynamic training tasks. That is, following the training administration, written materials produced by the lieutenants were rated by two subject matter experts (SMEs) with extensive military experience using a behaviorally anchored rating scale (BARS). These researchers found the I-ADAPT composite to be directly related to composite ratings of dynamic task performance (i.e., mission planning and adjustment). Furthermore, the I-ADAPT accounted for incremental variance, above the effects of intelligence and general self-efficacy, on the dynamic training task composite ratings.

Despite these initial indicators for optimism, to date, researchers have not assessed the predictive validity of I-ADAPT in a true transfer of training context. Blume, Ford, Baldwin, and Huang (2010) define transfer as "consisting of two major dimensions: (a) generalization–the extent to which the knowledge and skill acquired in a learning setting are applied to different settings, people, and/or situations from those trained, and (b) maintenance–the extent to which changes that result from a learning experience persist over time" (pp. 1067-1068). Failure to transfer learned knowledge, skills, and abilities to an operational environment can result from a multitude of situational and intervening variables in addition to training inputs such as characteristics of the trainee (Baldwin & Ford, 1988; Blume et al., 2010).

The costs incurred by organizations when individuals fail to transfer training are substantial. The American Society for Training and Development recently reported that U.S. organizations spend an estimated $134 billion annually on training and development programs (Paradise & Patel, 2009). Despite the massive expenditures, recent survey research indicates that

training programs do not always result in changes in behavior once trainees are placed back in to their work environment (Saks, 2002). The training literature would characterize this problem as a failure in transfer of training or transfer of learning (i.e., the transfer problem). Salas et al. (2003) noted that the United States military is one of the largest consumers of training, yet rarely is the training properly evaluated or is transfer of training assessed. The degree to which this spending results in a return-on-investment (ROI) for organizations through positive learning outcomes and on-the-job transfer is a concern to organizational leaders and stakeholders. Transfer of training assessment is particularly significant for the sample used within the current study as there exists very few working environments where the consequences of not transferring training to the job are as high as within a military setting (Salas et al., 2003).

Ployhart and Bliese (2006) noted that adaptability, broadly defined, has been studied in the training literature, particularly under conceptualizations which characterize adaptability as the ability to apply learning to novel situations and tasks and to transfer training to the workplace. I-ADAPT theory lends itself nicely to the most heavily cited transfer of training model originally presented in Baldwin and Ford's (1988) review of the transfer of training literature (see Figure 2). The critical focus of the current study will be the examination of linkages between trainee characteristics and learning and transfer outcomes.

As will be expanded upon in the sections that follow, there is now an adequate level of initial conceptual and empirical promise that individual adaptability will affect pretraining and posttraining motivation as well as the degree to which trained tasks will transfer from traditional institutional training settings back to the more dynamic field unit environment. The current study tested a process model of individual adaptability as an antecedent to proximal (see Figure 3) and distal (see Figure 4) training outcomes.

Self-Efficacy

One well established predictor of training and transfer outcomes is self-efficacy (Arthur, Bennett, Edens, & Bell, 2003; Blume et al., 2010; Sitzmann, Brown, Casper, Ely, & Zimmerman, 2008). Grounded in Bandura's Social Cognitive Theory (Bandura, 1982, 1986, 1997), self-efficacy is a cognitive factor which can have a proactive and reciprocal influence on the environment in which one lives and works. Bandura (1989) stated that self-efficacy is an individual's perception of how well he or she can perform a specific task. Through an individual's perceived competence, task-specific self-efficacy is believed to drive performance on that task through motivational processes. High self-efficacy leads to increased effort, persistence, and the setting of difficult and challenging goals during skill acquisition. Individuals high in self-efficacy are more likely to provide sustained effort in the face of disconfirming evidence (Bandura, 1997). Meta-analytic evidence suggests that self-efficacy predicts work performance more generally ($\rho = .38$; Stajkovic & Luthans, 1998) as well as transfer of training specifically (pretraining self-efficacy: $\rho = .22$; posttraining self-efficacy: $\rho = .22$; Blume et al., 2010). As an example, Chen, Thomas, and Wallace (2005), through the use of a flight simulator training task, provided evidence that an individual's posttraining specific self-efficacy (SSE) predicted goal striving activities which then influenced adaptive performance on a transfer task.

Beyond the obvious benefits of specific self-efficacy's predictive relationship to transfer of training and job performance, as a training outcome, posttraining SSE is important as it serves as an indicator or self-assessment of ability to perform the focal tasks instructed through the training (Morin & Latham, 2000). In fact, researchers suggest posttraining SSE measures be

included regularly following training interventions as they provide an economical measure of expected posttraining knowledge transfer (Sitzmann, Brown, Casper, Ely, & Zimmerman, 2008).

Due to the strong empirical and theoretical support of the specific self-efficacy construct, SSE was selected to include within the current study and is proposed to provide a key mediating function between individual differences in I-ADAPT and training outcomes. Incorporating the models presented in Figures 3 and 4 and building from the discussion above, I next detail specific hypotheses about the nature of the expected relationships between the constructs of interest.

Influence of I-ADAPT on SSE

Initial empirical evidence has supported a positive yet distinct relationship between I-ADAPT and self-efficacy. Wessel et al. (2008) reported moderate significant relationships between two I-ADAPT subscales and academic self-efficacy. Vaughn et al. (2011, April) found the learning dimension of I-ADAPT to be related to general self-efficacy (GSE). Ployhart (2005, November) found GSE to partially mediate the relationship between overall individual adaptability and leadership performance. Within the proximal model tested in the current study (see Figure 3), I propose that the various individual adaptability dimensions assessed will be positively related to *improvements* in specific self-efficacy (SSE) for noncommissioned officer (NCO) competencies following training. Note that I capture the relationship between I-ADAPT and SSE improvement following training by controlling for participants' level of SSE at baseline (i.e., pretraining). Because to date only limited empirical evidence has been provided to support these hypotheses, this section provides the rational for these expectations within the current study.

From a conceptual perspective, a relationship between adaptability and SSE improvement from pretraining to posttraining seems plausible on the basis that individuals high in adaptability will engage in more beneficial cognitive (e.g., reframing) and behavioral (e.g., active learning) tendencies which would then directly influence their level of SSE for the tasks and competencies trained. Through the training, individuals higher in adaptability are more likely to select relevant strategies, regulate behavior, engage in active coping styles, and seek out and acquire appropriate knowledge in adjusting to new environmental demands (Ployhart & Bliese, 2006). Individuals possessing dispositional tendencies to engage in such positive strategies in the face of dynamic and demanding situations are more likely to experience successes with the various tasks they attempt to perform. As posited by Gist and Mitchell (1992), following numerous task experiences, individuals rely heavily upon their attributional diagnosis based on previous performance in determining their level of self-efficacy. In fact, Bandura (1986, 1997) has argued that performance accomplishments comprise the most impactful source of efficacy information as individuals achieve mastery experiences.

However, mastery experiences are not the only antecedent to increases in self-efficacy. Additionally, one's SSE is more likely to increase within a learning environment due to opportunities for vicarious experiences (e.g., observing a peer succeed), verbal persuasion (as could be demonstrated by an effective teacher), and emotional state (via expressions of positive mood, low anxiety, and emotional stimulation which could be afforded in a classroom learning environment) (Bandura, 1997). Specific to the creativity adaptability dimension, individuals higher on this trait would be more likely to draw connections between seemingly unrelated information within their training environment (Ployhart & Bliese, 2006; Pulakos et al., 2000). This dispositional tendency is likely to influence frequency and depth of mastery experiences

and could maximize the advantages afforded to students exposed to opportunities for vicarious learning. Thus, I hypothesized that the creativity dimension of individual adaptability would be a direct determinant of improvement in posttraining SSE.

> *Hypothesis 1a*: *Creativity adaptability will positively relate to improvement in SSE from pretraining to posttraining.*

In addition to the enhanced facilitation afforded to participants higher in creative adaptability to draw connections from seemingly disparate information, interpersonal adaptability could lead to patterns of behavior and thought that could serve to increase one's SSE following a training intervention. Such an increase could occur due to an interpersonally adaptable individual's ability to accept feedback from others and establish rapport with leaders and peers. The ability to work well with a diverse group of others by adjusting oneself to the idiosyncratic tendencies of the various members of a learning environment could also influence emotional state or mood for the trainee which has been postulated to influence SSE (Bandura, 1997). Through being interpersonally adaptable, a trainee may be provided more opportunities for vicarious experiences via participation or observation of more informal discussions about course content from fellow peers and trainers which led to successes for these other individuals. This perspective is congruent with the learning perspective of social constructivism, a process of developing a shared social understanding and meaning making, which training and educational psychology researchers have more recently begun advocating as an emerging framework for learning (Kraiger, 2008). Moreover, the rapport enhancing qualities inherent in interpersonal adaptability could lead to increased levels of verbal persuasion regarding capabilities to perform the trained tasks and competencies as manifested through peer and leader support and

encouragement. All of these effects are believed to positively influence SSE. Thus, the following relationship is postulated.

> *Hypothesis 1b*: *Interpersonal adaptability will positively relate to improvement in SSE from pretraining to posttraining.*

Perhaps the most intuitive adaptability dimension to assess in a training and transfer of training context is learning adaptability. Individuals high in learning adaptability are more likely to seek out knowledge and learn the relevant information necessary to meet their environmental demands. These high learning adaptability individuals engage in active learning strategies and self-regulation of behavior (Ployhart & Bliese, 2006). Individuals engaging in active learning accept principal responsibility for their learning decisions including monitoring and evaluating their progress (Bell & Kozlowski, 2008). Furthermore, active learning allows experimentation with a learning task to enhance understanding of the underlying principles and strategies which will result in more effective performance on learning tasks (Bell & Kozlowski, 2008). Using a sample of 350 undergraduate students, Bell and Kozlowski (2008) evidenced that conducting training on a computer-based task facilitating an active learning approach resulted in better performance on a transfer task requiring adaptive performance. As noted in prior sections, having gained more mastery experiences through training is one method to increasing one's SSE on the tasks and competencies trained. Thus, I posit that learning adaptability will be related to increases in posttraining SSE.

> *Hypothesis 1c*: *Learning adaptability will positively relate to improvement in SSE from pretraining to posttraining.*

In order to capitalize on the training utilized in the current study, a beneficial dispositional characteristic will be an acceptance of incomplete, inconsistent, or unavailable full

information at the time of the training. This is because the U.S. army and the enemies which it faces are constantly changing and evolving. Trainees must navigate and allow a certain level of discrepancy between the methods and materials trained at their home unit with the doctrinal information trained in a noncommissioned officer (NCO) career course. It is inevitable within a large, military setting that there will be some level of incongruity between the doctrinal information trained at the NCO educational system level with the standard operating procedures (SOPs) used at the unit level. There will also be differences in the training environment and the field environment in relation to availability of resources, relevance of content emphasized, and accuracy/currency of content covered. A successful NCO will raise the level of confidence in capabilities to perform core competencies trained due, in part, to the degree to which the NCO is able to synthesize and glean the best available information provided through career course training. That is, the NCO must decide upon which information is most relevant for the job in that NCO's field unit, while also determining which information might be inconsistent with unit SOPs and resources. The end result should be the NCO's increase in confidence by maximizing the available information provided through training despite ambiguities available in the training and work environment. Thus, I hypothesized that uncertainty adaptability would lead to increased levels of SSE at posttraining.

> *Hypothesis 1d*: *Uncertainty adaptability will positively relate to improvement in SSE from pretraining to posttraining.*

Mediating Function of SSE in Predicting Proximal Training Outcomes

In the prior section, a conceptual rationale was presented and detailed for the four dimensions of individual adaptability assessed within the current study to be related to improvements in SSE before and after receiving training. Within this section, I further develop

the proximal model tested (see Figure 3) by proposing additional linkages, including the mediating role of SSE improvement which acts as a conduit between the four I-ADAPT dimensions assessed and additional training outcomes.

Mediation of SSE improvement: Reactions to training (perceived utility). Sitzmann et al. (2008) made a distinction between posttraining SSE and posttraining reactions in that reactions capture the degree to which the training experience resulted in a "satisfying, meaningful learning experience" (p. 282). It stands to reason that individuals with higher levels of improvement from pretraining to posttraining in SSE will be more likely to report positive assessments of the training program's utility (particularly to the degree to which SSE improvement is attributed to the training received). Sitzmann et al. empirically supported a positive relationship between posttraining SSE and training reactions ($\rho = .31$).

An individual more highly predisposed to adjust oneself to be in better alignment with the work environment (i.e., high in individual adaptability) will also be more likely to reframe, initiate self-change, and identify opportunities to use knowledge and skills acquired within a classroom environment with day-to-day job duties in the operational environment. These changes should first be processed through a heightened sense of posttraining SSE. Bolman and Deal (2006) discuss benefits of reframing on transitioning to new procedures, celebrating future opportunities, and embracing new ways to accomplish tasks. Thus, all other considerations equal, a soldier with a higher level of individual adaptability is expected to hold higher perceptions of training utility as mediated by increased posttraining SSE. Building off of the four previously posited relationships, I hypothesize that the four I-ADAPT dimensions will have an indirect effect on the perceived utility of training through the intervening process of enhanced SSE.

Hypothesis 2a: *SSE improvement will mediate the relationship between creativity adaptability and reactions to training (perceived utility).*

Hypothesis 2b: *SSE improvement will mediate the relationship between interpersonal adaptability and reactions to training (perceived utility).*

Hypothesis 2c: *SSE improvement will mediate the relationship between learning adaptability and reactions to training (perceived utility).*

Hypothesis 2d: *SSE improvement will mediate the relationship between uncertainty adaptability and reactions to training (perceived utility).*

Mediation of SSE improvement: Motivation to transfer. Sitzmann et al. (2008) noted that posttraining SSE and posttraining motivation are the two most commonly assessed affective learning outcomes in the training literature. They further distinguish that posttraining SSE captures confidence in successful use of training knowledge whereas posttraining motivation assesses the level to which individuals will strive to apply the knowledge gained through the training back to the job. Thus, although conceptually linked, they assess two different constructs. I have already described in detail the expectation of I-ADAPT to positively influence increases in SSE following training. As theoretically described, SSE is a cognitive factor which influences motivational processes (Bandura, 1997). Therefore, individuals with an increased level of SSE following training should also be more motivated to transfer the task-related training back to their job (Bandura, 1997). Thus, I hypothesized that SSE improvement will mediate the relationship between each of the four I-ADAPT dimensions and motivation to transfer.

Hypothesis 3a: *SSE improvement will mediate the relationship between creativity adaptability and motivation to transfer.*

Hypothesis 3b: *SSE improvement will mediate the relationship between interpersonal adaptability and motivation to transfer.*

Hypothesis 3c: *SSE improvement will mediate the relationship between learning adaptability and motivation to transfer.*

Hypothesis 3d: *SSE improvement will mediate the relationship between uncertainty adaptability and motivation to transfer.*

Mediating Process of Reactions to Training on Motivation to Transfer

Despite the positive influence of SSE on transfer of training, reactions to the training may provide a key intermediary process affecting the degree to which improvement in SSE following training relates to individuals' intentions to transfer the training received. Sitzmann et al. (2008) found a strong relationship between trainee reactions and motivation to transfer ($\rho = .68$). Therefore, the following partial mediator is proposed.

Hypothesis 4: *Reactions to training (perceived utility) will partially mediate the relationship between SSE improvement and motivation to transfer.*

Control Variables Included in the Proximal Model

Pretraining SSE is relevant to training because it indicates the degree to which trainees are ready to learn (via the confidence that he or she will be capable of performing the tasks trained; Morin & Latham, 2000). Prior research has demonstrated that although malleable through effective training interventions (e.g., Gist, Schwoerer, & Rosen, 1989), level of pretraining self-efficacy is moderately to strongly related to participants' level of posttraining self-efficacy ($\rho = .59$; Colquitt, Lepine, & Noe, 2000). For example, Dierdorff, Surface, and Brown (2010) assessed the task-specific self-efficacy of professionals working toward certification as language proficiency assessors whom completed a frame-of-reference training

program and found the pre- and post-training SSE measures to be moderately correlated. However, the analyses to be conducted with the larger time 1 and time 2 samples seek to examine the tenability of applying I-ADAPT theory to predict positive training outcomes due specifically to the interaction between the narrow personality predictor and the competency training provided. Therefore, soldiers' pretraining specific self-efficacy will be controlled for in the current study to better isolate the effect of I-ADAPT dimensions on predicting increases in SSE throughout the training. I am also interested in controlling for experience variables not directly pertinent to the current study. Tenure in U.S. army, educational attainment, and number of previous Operation Iraqi Freedom (OIF) or Operation Enduring Freedom (OEF) deployments were also controlled for in the proximal model.

Evaluating the Distal Model: Transfer of Training

I-ADAPT and transfer performance. Individuals high in adaptability are more likely to select relevant strategies, regulate behavior, engage in active coping styles, and seek out and acquire appropriate knowledge (Ployhart & Bliese, 2006). As previously detailed, early work with I-ADAPT theory has indicated that the corresponding I-ADAPT scale is predictive of performance (Ployhart, 2005, November; Vaughn et al., 2011, April; Wang et al., 2011). Ployhart (2005, November) reported that I-ADAPT predicted leader performance ratings. Ployhart and Bliese (2006) suggested that transfer of training, which requires generalization from the training environment to the work context, is one setting in which I-ADAPT should predict positive performance outcomes. Due to limited time 3 sample sizes, a composite measure of overall I-ADAPT was calculated by averaging the soldiers' four I-ADAPT dimension scores. For individuals working within a complex environment, higher levels of overall individual adaptability should be even more strongly related to performance. The current operational

environment within the Army is at an increased operational tempo due to the high level of deployments and other complex challenges facing today's NCOs (Leibrecht, Wampler, & Pleban, 2009; Salas et al., 2003). I predicted that individual differences in overall I-ADAPT would be positively related to transfer performance as rated by leaders, peers, and self (see Figure 4).

Hypothesis 5a: Overall individual adaptability will positively influence leader transfer of training performance ratings.

Hypothesis 5b: Overall individual adaptability will positively influence peer transfer of training performance ratings.

Hypothesis 5c: Overall individual adaptability will positively influence self transfer of training performance ratings.

Partial mediation of posttraining SSE. As postulated by Ployhart and Bliese (2006), the distal impact of individual adaptability on performance should be transmitted through more proximal mediating processes. One such potential proximal mediator measured within the current study is posttraining SSE. As previously detailed, the relationship between posttraining SSE and transfer performance is now well established within the psychological literature (Blume et al., 2010; Brown & Latham, 2000; Salas & Cannon-Bowers, 2001). Ployhart (2005, November) found evidence to support that the relationship between I-ADAPT and performance was partially mediated by self-efficacy. Consistent with the previous theory and research, posttraining SSE is hypothesized to have a direct influence on leader, peer, and self ratings of transfer performance. Furthermore, posttraining SSE is expected to serve as a partial mediator between I-ADAPT and leader, peer, and self ratings of transfer performance.

Hypothesis 6a: *Posttraining SSE will partially mediate the relationship between overall individual adaptability and leader ratings of transfer performance.*

Hypothesis 6b: *Posttraining SSE will partially mediate the relationship between overall individual adaptability and peer ratings of transfer performance.*

Hypothesis 6c: *Posttraining SSE will partially mediate the relationship between overall individual adaptability and self ratings of transfer performance.*

Method

Participants

The current study utilized archival data collected as part of a larger army research report. Four hundred twenty four (424) male Infantry U.S. army noncommissioned officers (NCOs) participated at time 1, pretraining. Of the time 1 participants, 111 (26.2%) held the rank of SGT (E-5) and 313 (73.8%) held the rank of SSG (E-6).

The study utilized a staggered, multiple cohort design ranging from April, 2010 to November, 2010. The study included four cohorts, each assessed at three different time points (see Table 1). Two of the Advanced Leaders Course (ALC) administrations occurred at traditional resident courses while two occurred at separate mobile training team (MTT) locations conducted at large U.S. army installations. At time 1, the first resident course contained 128 participants (30.2%); the second resident course had 118 participants (27.8%); the first MTT course contained 98 participants (23.1%); and the second MTT course contained 80 participants (18.9%).

Participants were drawn from the 11B (infantryman) military occupational specialty (MOS). Two hundred fifty participants (59.0%) reported primary infantry experience with a light unit, 132 (31.1%) reported a mechanized unit, and 42 (10.0%) reported wheeled (Stryker) unit primary experience. Participants had previous active duty army experience (M = 7.36 years, SD = 2.76 years). In addition, the vast majority of participants had multiple previous deployments for Operation Enduring Freedom or Operation Iraqi Freedom (M = 2.15, SD = 0.96). Participants varied in level of highest education acquired with the following breakdown:

one (0.2%) did not receive a high school diploma, 35 (8.3%) reported completing a General Educational Development (GED) test, 161 (38.8%) reported a high school diploma, 195 (46.0%) reported having some college (no degree), 22 (5.2%) reported an associate's degree, seven (1.7%) reported a bachelor's degree, and three (0.7%) reported a master's degree.

At time 2 (posttraining), of the 424 participants providing time 1 data, linkable time 2 data was reduced to 412 (97.2%). Person-level missingness at time 2 for the 12 participants not tracked was attributable to one of four explanations. First, primary participants may have academically dropped the ALC, thus precluding them from availability to complete the end of training survey on the last day of the training course[2]. Second, three end-of-course surveys associated with novel codenames were provided at time 2. Thus, assuming that one or more of these individuals participated in the time 1 survey, a plausible explanation is that the original codename was misreported at time 2. A third explanation is the potential for absence from the course on the last day of training. Fourth, although no cases of refusal to participate were explicitly observed by the study administrators, it is possible that one or more participants discreetly opted out of study participation at time 2 survey administration.

Due to practical resource constraints in addition to logistical and coordinating limitations, only four brigade combat teams (BCTs) from two installations were assessed for time 3 (transfer) data collection. Soldiers from these four BCTs were more easily tracked for time 3 because a large number of them completed training within an MTT course and remained intact at the same installation following the completion of ALC training. Lastly, for the purposes of the army report objectives, NCOs had to meet set criteria to be eligible as a potential participant at time 3.[3]

[2] Three time 1 participants were verified to be academic drops; however, the researchers were unable to obtain information regarding academic drop status of other cases with unlinkable data at time 2 which may have occurred.
[3] These criteria include that the participant had to list the name of a supervisor and at least one peer during the pretraining survey. In addition, the primary participant must have listed that they knew the contacts for more than

Thus, only 64 (15.8% from the original overall sample) of the primary participants could be surveyed at time 3. However, of all individuals from the initial pool of four BCTs tracked (*n* = 120), we followed up with collection from 53.3% of participants. In addition, 44 leaders and 71 peers were identified and provided data for primary participants at time 3.[4] This allowed a total of 70 primary participants receiving usable leader transfer performance ratings, 75 participants receiving peer transfer performance ratings, and a total of 64 providing self transfer performance ratings data. Provided the large reduction from posttraining (time 2) to transfer collection (time 3), different statistical procedures were used to assess the proximal outcomes and the distal transfer outcomes (detailed within the data analysis section).

The Current Study Training and Transfer Context

Blume et al. (2010) recently called attention to the limited information available in most published empirical studies on the amount of information available related to the specific training content and training objectives. In an effort to ameliorate that concern in the current study, a general description is provided pertaining to the background and context of the current study. The training course utilized within the current study was designed for noncommissioned officers (NCOs) as part of a schoolhouse training requirement necessary for career progression. The training delivered covers Phase 2 of the Advanced Leaders Course (ALC; formerly the Basic Noncommissioned Officer Course [BNCOC]). Phase 1 is now delivered in an online format that may be completed before or (often) after completion of Phase 2 within a specified amount of time from completion of Phase 2. The current rank of the vast majority of NCOs completing

---

two months prior to ALC training to be considered. Lastly, during the coordination of time three data collection, preliminary evidence must have been obtained that all three individuals (i.e., primary participant and at least one eligible peer and leader) would be available for time 3 data collection from the unit coordinators during the allotted travel periods for the transfer data collection.

Given the dynamic nature of the military with multiple training requirements across levels, fluidity in unit assignment, options for taking leave, and attrition from army service, it was difficult to meet all eligibility requirements for time 3 inclusion.

[4] Note: some peers rated multiple primary participants.

ALC training is either sergeant (SGT; grade enlisted-5 [E-5]) or staff sergeant (SSG; grade E-6). The training course is designed to enhance and refine the knowledge, skills, and abilities necessary to be an effective small unit NCO leader (i.e., a squad leader). The course instructors primarily delivered the training content utilizing a traditional lecture style format supplemented with Microsoft PowerPoint slideshows. However, NCOs completed some training in the field (e.g., completing a land navigation course) and on the ranges firing small arms weapons.

It is increasingly critical that NCOs receive high fidelity training which transfers from material learned in a schoolhouse environment to behavior in the field. As noted in the participants section, the soldiers completing ALC Phase 2 typically have multiple years of active duty experience with the U.S. army and often have been deployed multiple times to Iraq or Afghanistan. Furthermore, many of the NCOs attending ALC already have on-the-job experience serving in the role of active squad leader at their home installation, while deployed, or in both settings.

Procedure

Data were collected from the soldiers selected to complete ALC on the first and last days of training, and for a smaller subset of the initial pool of participants, back at the soldiers units 3.25-5 months following training. During the pretraining administration, the NCOs were briefed about the purpose of the research (i.e., to investigate a model of transfer of training and to evaluate the effectiveness of the ALC), provided a privacy act statement, and delivered an informed consent form. Following completion and return of the informed consent forms, the NCOs created a codename to assist with linking all self-report materials. Participants then completed a paper-and-pencil survey containing all of the pretraining constructs of interest. Survey administration lasted approximately 20-45 minutes.

Time 2 survey administration occurred on the last day of institutional training. Again, the administrators briefed the participants about the broad purpose of the research and reminded participants about guidelines used to create unidentifiable codenames. Data collection again lasted approximately 20-45 minutes. For the two resident courses, the end of training occurred approximately five weeks from the start of training date. For the two MTT courses, the end of training date was approximately four weeks after the start of training date.[5]

Time 3 data collection occurred between 3.25 to 5 months following the last day of ALC training. The follow up administrations were conducted at the BCT headquarters back at the location of the unit's home installation. Primary participants, supervisors, and peers identified and tracked for the purpose of this longitudinal effort were again informed of the general purpose of the study and presented with informed consent forms and privacy act statements. The primary participants completed the transfer survey while peers and supervisors provided initial demographic information and received brief explanations regarding the purpose of the competency ratings as they pertain to ALC transfer performance (i.e., observable performance on the core competencies listed and described since returning from ALC training). In addition, the administrators emphasized the significance of the thoughtful ratings to accomplishing the objectives of the current study and instructed that items should be considered individually based on the description of the competency listed. Leaders and peers then rated between one to five primary participants tracked from ALC training.

Materials

As previously noted, the current research question is drawn from data collected as part of a larger army training project. Therefore, not all data collected were used in the current study.

[5] The extra week provided within the resident course was used for a week long certification course in combatives level 1 training in addition to demolitions training. Because the two MTT courses did not receive this training, items assessing these competencies were not included within the present study.

Only items and scales used for the current project are described and provided in the appendices herein. For an overview of the measures collected across the three time periods for the current project, please see Table 2.

Preliminary Demographics and Tracking Information. The first section of the survey requested NCOs to report biographical and tracking information to be used to describe and test for differences within the sample in addition to helping track participants at time 3. Demographic information of interest for the current study included current rank, number of prior deployments, length of time of active duty, current unit and location, and highest level of education. See Appendix A for demographic information collected.

I-ADAPT. Four dimensions (30 items) from the eight dimension (55-item) I-ADAPT scale (Ployhart & Bliese, 2006) were measured in the current study given their relevance to the training context: (1) *learning* (9 items; $\alpha = .89$; "I enjoy learning new approaches for conducting work"), (2) *interpersonal* (7 items; $\alpha = .79$; "I believe it is important to be flexible in dealing with others"), (3) *creativity* (5 items; $\alpha = .81$; "I see connections between seemingly unrelated information"), (4) *uncertainty* (9 items; $\alpha = .65$; "I easily respond to changing situations"). The I-ADAPT measure follows a five-point Likert-type scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). See Appendix B for the I-ADAPT scale.

Specific Self-Efficacy. The items selected for the specific self-efficacy (SSE) scale were identified as assessing the core competencies required of an army NCO squad leader. For each core competency, three to five exemplar tasks were created for NCO rating. These competencies were identified by subject matter experts (SMEs; two high ranking retired NCOs) based on evidence drawn from field manuals, discussing content with ALC SMEs, and the current ALC course curriculum (Leibrecht et al., 2009). The nine competencies identified were (1)

critical/creative thinker; (2) military leadership; (3) warrior competencies; (4) counsel, coach, and mentor; (5) train subordinates; (6) shape unit performance; (7) manage resources; (8) expand own competencies; and (9) be an (international) ambassador. Participants rated their confidence (1 = not at all confident; 5 = extremely confident, could teach this to others) for each of the 37 items. These ratings were conducted on identical items at pretraining and posttraining.

This scale was created specifically to assess SSE for the competencies trained and emphasized in this particular career course for the position of squad leader. Ratings of SSE on accomplishing these nine core competencies required of an NCO squad leader are conceptually posited to compose first-order factors affected by a second-order latent variable: Overall squad leader SSE. The original scale indicators are provided in Appendix C.

Motivation to Transfer. Six items from the motivation to transfer scale used in Noe and Wilk (1993) were modified for the purposes of the current study (i.e., to make relevant to ALC). Participants rated the items on a Likert-type scale (1 = *strongly disagree*; 5 = *strongly agree*). An example item from the scale is "There are more problems than the trainers realize in using ALC content in my daily work activities" (reverse coded item). Within Noe et al., the original implementation of a seven item scale resulted in an internal consistency reliability coefficient of .68 within that sample. Within the present study, internal consistency was fairly low, $\alpha = .60$. See Appendix D for the motivation to transfer scale.

Reactions to Training (Perceived Utility). Blume et al. (2010) reported meta-analytic data which indicated participants' posttraining utility reactions had a small to moderate relationship with transfer. Blume et al. reported affective reactions and overall reactions (containing both affective and utility assessment) have been found to have only small correlations with transfer. Results from Sitzmann et al.'s (2008) reactions meta-analysis found

slightly more positive results regarding affective reactions and training outcomes. Nonetheless, I chose to focus on the influence of perceived utility reactions within the current study. To assess the perceived utility of ALC training, I developed a four item scale. Items were rated on a five point Likert-type scale (1 = *strongly disagree*; 5 = *strongly agree*). An example item is "I expect that what I learned in Phase II will be relevant to my job." Within the current sample, the internal consistency reliability estimate was high (Cronbach's $\alpha = .91$). See Appendix E for the reactions to training scale.

Supervisor, Peer, and Self Performance Ratings. A nine item rating form was developed and used to assess transfer performance on the core competencies identified as pertinent for effective NCO small unit leaders (i.e., squad leaders). The nine core competencies rated were the same competencies assessed by the primary participants with the SSE scale. However, these ratings were made on single items per competency rather than three to five item subscales. The rating scale utilized the following five point Likert-type response format: 1 = below average; 2 = average; 3 = slightly above average; 4 = well above average; 5 = excellent. Peers and supervisors were also given an option to indicate that they have not had the opportunity to observe the participant perform the listed competency since returning from ALC. Similarly, primary participants could select that they have not performed the competency since returning from ALC. The asymmetric anchor format was deliberately selected based on previous experience with rating scales in which ratings were bunched within the highest two points of the scale. Thus, in an effort to address the restriction of range I added more potential selection points within the positive end of the scale. An example item is "Thinking critically and creatively (adjusting [tactics, techniques and procedures] TTP, anticipating unexpected, etc.)." Internal consistency estimates for the scale within the current sample were: Leader $\alpha = .93$; peer

$\alpha = .95$; primary participant $\alpha = .92$. See Appendix F for the squad leader transfer performance rating scale and associated ratee demographic questionnaire. The supervisor form is used as a display; however, the form follows the same rating format for peers and incumbents.

Data Analyses

All analyses within the current investigation were carried out using the statistical software packages of PASW, Release Version 18.0.0 (© SPSS, Inc., 2009, Chicago, IL, www.spss.com) and Amos, Release Version 18.0.0 (Arbuckle, 2009). As a necessary initial step, all data were entered and screened for outliers. Next, several preliminary analyses were needed to arrive at substantive model testing for hypotheses posited. For each analysis conducted within the current study, I provide detailed reporting related to preliminary screening of participants, assessment of assumptions of multivariate normality, treatment of missing data, and documentation of estimation procedure chosen for running the associated model. Furthermore, to help organize the structure of the reporting, the writing of results are presented to first evaluate the proximal model; then, attention is turned to the less powerful series of path analyses conducted to test the distal (transfer) model.

As a preface to presenting results, the remainder of this section provides a more general description and overview of three common challenges which must be dealt with by applied longitudinal researchers utilizing structural equation modeling (SEM). For each challenge, I provide a general description of some of the best procedures currently available to the researcher to address the issue. Lastly, a brief overview of the specific analyses conducted within the current study is provided. For each specific analysis conducted throughout various stages of this research effort, different estimation procedures and participant screening decisions were utilized to maximize the availability of data while also seeking to best address the underlying research

question of interest. Although potential tradeoffs are made with any statistical decision compared to competing methods available, each decision was provided careful consideration, and limitations associated with analytical decisions were noted.

Issue 1: Multivariate normality. The topic of multivariate normality of data within an SEM context warrants discussion. The most general method of estimation currently utilized with SEM, maximum likelihood (ML), assumes multivariate normality (Kline, 2010). Furthermore, one of the most preferred and advanced current treatments of missing data in longitudinal data analysis involving SEM, full-information maximum likelihood (FIML), also relies upon this assumption within the available data (Newman, 2003; Raykov, 2005).

The first step in assessing the assumption of multivariate normality within the data is to examine univariate normality of the continuous indicators. Confirmation of univariate normality does not assure multivariate normality; however, severe departures from univariate normality within the data do assure multivariate nonnormality (Brown, 2006). Because statistical tests of skew index (SI) and kurtosis index (KI) are sensitive to sample size, Kline (2011) offered the following rules of thumb: Items with absolute values of SI greater than 3.0 are considered extremely skewed; KI with absolute values greater than 10.0 indicate a problem while values greater than 20.0 indicate extreme kurtosis.

The second step in the process is to evaluate a given model's level of multivariate normality. This procedure traditionally has involved examining joint distributions of all pairs of variables, as well as checking all bivariate scatterplots of model variables to ensure they are linear with homoscedastic residual distributions (Kline, 2011). However, researchers have developed statistical tests to enhance efficiency for detection of multivariate normality (e.g.,

Cox-Small test and Mardia's test). The disadvantage of using these tests is that they are sensitive to large sample sizes (Kline, 2011).

The consequences of severe departures from multivariate normality under common estimation techniques such as ML include potential for inflated χ^2 values, slight underestimation of certain fit indices (e.g., TLI and CFI), and moderate to severe underestimation of standard errors which could result in higher probability of Type I errors (Brown, 2006). Specialized estimation procedures can be utilized to handle more extreme departures from multivariate normality; however, it should be noted that ML is robust to mild departures from multivariate normality (Brown, 2006). One such approach is robust weighted least squares (WLS) estimation; however, this approach has been criticized because it requires very large sample sizes (Brown, 2006). Another common estimation procedure which performs particularly well with non-normal continuous data is the robust ML estimator (Satorra & Bentler, 1988, 1994). The goodness-of-fit indicator produced by this procedure (commonly referred to as the Satorra-Bentler [SB] scaled χ^2) takes in to account multivariate kurtosis within the sample data (Bryant & Satorra, in press). Unfortunately this treatment is not currently available within Amos modeling software (Bryant & Satorra, in press). The asymptotically distribution-free estimation procedure has also received some support (Browne, 1984).

Another option well-suited for addressing departures from normality is the use of nonparametric bootstrapping procedures (Brown, 2006; Kline, 2011). Nonparametric bootstraps treat one's sample as representative of the larger population under study, and create repeated samples with replacement to be utilized to create empirically derived confidence intervals of parameter estimates (Kline, 2011). An advantage provided the current proximal and distal model is that nonparametric bootstraps can be conducted to examine mediation (indirect) effects within

SEM (MacKinnon, Lockwood, & Williams, 2004). Thanks in large part to enhanced computing power and progressively capable statistical software, researchers are increasingly employing bootstrapping procedures to examine mediation as well as other estimated model parameters. Provided the overview of multivariate normality, it is now essential that missing data problems and remedies be addressed.

Issue 2: Missing data. Despite numerous advances in statistical techniques to handle missing data, the methods used in substantive organizational research still often rely on more traditional treatments. Furthermore, sufficient documentation regarding treatment of missing data is often not provided in published organizational science literature (Schafer & Graham, 2002). Although the advantages of conducting longitudinal research in the behavioral sciences have been acknowledged (Mitchell & James, 2001; Singer & Willett, 2003), missing data is a particularly prevalent statistical issue due to added potential for attrition across measurement time points (Newman, 2003).

One key to better understanding and managing the existence of missing data within one's data is to determine the mechanism(s) associated with the missing data. The researcher should also understand the potential implications missing data mechanisms have on analyses and conclusions drawn. Although multiple imputation and full information maximum likelihood estimation (FIML) have been shown to provide statistically superior treatment to missing data than traditional treatments (Newman, 2003), the applied researcher must balance the choice of treatment against model complexity (Newman, 2010, Spring). Where efforts provided to minimize missingness fall short, the researcher must decide in what manner to handle the variety of issues presented by missing data which have the potential to bias parameter estimates, distort item interrelations, and greatly reduce statistical power (Schafer & Graham, 2002). By

understanding the source of the missingness, as well as best practices in handling missingness, a researcher is best prepared to provide the least biased and most powerful test of the model under consideration.

Missing data mechanisms can be classified along three broad distinctions: missing completely at random (MCAR), missing at random (MAR), and missing not at random (MNAR; Rubin, 1976; Little & Rubin, 1987). For data to be considered MCAR, the missingness must be unrelated to all observed and unobserved variables (Newman, 2003). The less restrictive assumption of MAR allows for the missingness to be related to other observed variables within the model (Schafer & Graham, 2002). Lastly, under MNAR, the probability of missingness is related to the unobserved or missing variable. When data are MCAR, the only real detriment to the model is a loss of power (Newman, 2009). However, as discussed by Newman (2010, Spring), data are rarely MCAR within the behavioral sciences except within designs of planned missingness. In reality, data usually fall upon a continuum of MCAR and MAR. However, many traditional treatments rely upon the assumption that data are MCAR (e.g., listwise and pairwise deletion). Such procedures could result in biased estimates in situations in which the data are MAR. Multiple imputation and full information ML estimation offer advantages in that these missing data procedures do not result in a loss of power and they remain unbiased when only the assumption of MAR is maintained within the empirical data (Newman, 2009). Regrettably, no missing data treatment procedure produces unbiased estimates under the MNAR mechanism.

Fortunately for the researcher, in instances where sample size is sufficiently large and the relative level of missingness within the data is small (i.e., less than 5%), the method by which a researcher chooses to address the missing data may be of little practical concern (Kline, 2011).

However, it is still suggested that researchers document the method by which missingness is treated within the analyses and use more advanced treatments where feasible (Schafer & Graham, 2002).

Issue 3: Assessing goodness-of-fit. Overall model fit will be evaluated following the guidelines presented by Kline (2011) and deferring to the multiple-index strategy as promoted by Hu and Bentler (1999). Specifically, a model will be deemed as providing adequate fit to the data if the results indicate a normed chi-squared of less than 3, comparative fit index (CFI) greater than or equal to .95, standardized root mean squared residual (SRMR) less than .08, root-mean-square error of approximation (RMSEA) less than .06 with the upper limit of the 90% confidence interval (CI) not exceeding .10. The criteria will be applied to all CFAs and structural regression models analyzed in the current study.

Throughout the reporting of the various models examined, I will periodically report back to these important topics as they specifically relate to the model being evaluated; however, I now turn my attention to an overview of the specific models evaluated.

Preliminary CFA: Pretraining and Posttraining SSE. Analyzing more complex models in SEM necessitates larger sample sizes as the number of parameters to be estimated increases. As the ratio of sample size to estimated parameters decreases, so too does the confidence placed in the stability of the estimates obtained (Kline, 2011). Although often violated in the extant SEM literature (Shah & Goldstein, 2006), Kline (2011) suggested that an ideal ratio of sample size to parameters estimated is 20:1 with 10:1 being less than ideal but reasonable and below 10:1 becoming more suspect. Due to the complexity in the proximal model, and the large number of indicators in the specific self-efficacy (SSE) measure, it was necessary to reduce the number of SSE manifest indicators included in the proximal model. One

such available treatment is to create composite indicators based on averages of preselected groupings of items. As described in the materials section, SSE on the nine competencies assessed in the current investigation are purported to serve as first-order factors influenced by a higher-order factor of overall squad leader SSE.

An approach described and demonstrated by Johnson (2011, Spring) when modeling a hypothesized higher-order construct is to create first-order factor manifest composites based on the individual first-order factor indicators. These scale level manifest indicators can then be used to directly model the higher-order construct. This approach is the one I advance for the current study.

In addition to model simplification, creating composite manifest indicators to be used in later analyses has the secondary benefit of producing more continuous normal indicators than the raw data produced on indicators using a five-point Likert-type scale (Little, Cunningham, Shahar, & Widamen, 2002). Kline (2011) suggested that deviations from normality within the data also influence sample size requirements, with more drastic deviations from normality increasing sample size requirements to derive relatively stable estimates. Thus, by reducing the number of parameters to be estimated and enhancing the level of normality inherent in the use of composite indicators, the rationale for data reduction in the pretraining and posttraining SSE measurement model is sufficiently advanced.

Despite having a conceptual and practical rationale for combining the raw data to create a simplified higher-order factor measurement model, empirical evidence within the data must support the underlying factor structure prior to aggregation by first-order factor. Thus, as a preliminary step, using two separate series of confirmatory factor analysis comparisons (i.e., one

for time 1 data, one for time 2 data), I sought to confirm the specified underlying structure in the raw data.

Proximal model evaluation. The primary structural equation model tested in the current study is displayed visually in Figure 3 and contains both structural and measurement components. Additionally, a competing partial mediation model was discussed and compared with the full mediation model displayed in Figure 3. Model parsimony, conceptual defensibility, and improvement in fit to data were all simultaneously considered when selecting a final proximal model to endorse for continued hypothesis examination. Specific hypotheses were tested by examining the associated parameter estimates in the process model.

Distal model evaluation. The data provided from a smaller subset of NCOs, peers, and leaders at time 3 (transfer) were evaluated utilizing a much more simplified model and statistical approach out of necessity given the substantial decrease in power. To examine hypotheses associated with Time 3 data, three separate path analyses were conducted with only three key study variables included in the model for each of the analyses. These analyses utilized an aggregated overall adaptability measure computed by averaging the four dimensions of the I-ADAPT. In addition, an aggregated NCO posttraining SSE score was entered as a partial mediator between the distal predictor (i.e., I-ADAPT) and distal outcome variables of interest (i.e., leader, peer, or self rating of transfer performance).

Results

The means, standard deviations, correlations, and coefficient alphas of all variables included within the proximal and distal models examined herein are provided in Table 3. Prior to examining the proximal and distal models, the next section provides evidence of factorial validity for the 37 item SSE measure administered before and after training.

Confirmatory Factor Analyses: Pretraining and Posttraining SSE

Prior to conducting the structural regression portion of data analysis for testing the proximal model, I examined the measurement model of the SSE subscale at both pretraining and posttraining measurement occasions. All SSE data indicated mild negative skew and varying levels of kurtosis at time 1 and time 2. Because none of the distributional properties were extreme within the raw data, and to maximize the available data at both time points for estimation purposes, the full information maximum likelihood (FIML) estimation procedure was utilized to fit the preliminary SSE CFA models. Within the two series of CFAs (time 1 and time 2), overall model fit was first assessed across three model specifications. The first model, M1, proposed that the 37 SSE items loaded on to a single first-order factor (overall NCO SSE; see Figure 5). The second model, M2, examined the model fit of a five factor model from which the nine competencies identified were originally derived (see Figure 6). The third model investigated, M3, specified SSE indicators to load on to nine competencies identified prior to the study. This third classification treats each competency as a first-order factor (see Figure 7).

Time 1 SSE. Newman (2010, Spring) offers the advice to not remove any usable data when feasible. Therefore, when assessing SSE factor structure at time 1, all 424 participants

providing data were considered for modeling the factor structure. One participant provided no responses to any of the time 1 SSE items, and was subsequently removed from the series of time 1 CFAs. Univariate normality was assessed within the remaining participants' time 1 SSE data. Although all items evidenced negative skew, none were more severe on SI than absolute value 3.0 which would indicate a severely skewed underlying distribution. The SI values ranged from -0.95 to -0.23. Furthermore, examining KI values for the 37 items evidenced a range of -0.79 to 1.38. Thus, all KIs within the pretraining SSE data were well below the cutoff guideline of absolute value 10.0 (Kline, 2011). Given the indication that violations of normality were moderate, FIML was utilized to capitalize on all data including cases with partially missing values of time 1 SSE from the original sample.

Following these preliminary screening procedures, $M1_{pre}$ was estimated. Constraining all 37 indicators to load onto a single first-order factor resulted in extremely poor fit to the data, χ^2 (629, N = 423) = 3,808.80, $p < .001$; $\chi^2/df = 6.06$; CFI = .75, RMSEA = .11 (90% C.I. [.106, .113]). Therefore, on the basis of poor overall model fit, the tenability of a single first-order factor model of overall NCO SSE was eliminated from further consideration. Next, the five factor model, $M2_{pre}$, was examined. An evaluation across the various indices of overall model fit suggest that $M2_{pre}$ provides a closer approximation to the underlying factor structure, χ^2 (619, N = 423) = 2,412.26, $p < .001$; $\chi^2/df = 3.90$; CFI = .86, RMSEA = .08 (90% C.I. [.079, .086]). However, the indices of RMSEA, normed chi-square, and CFI all fall outside of general accepted ranges for acceptable fit (Hu & Bentler, 1999).

Lastly, the nine factor model, $M3_{pre}$ was evaluated using the time 1 data. Although less parsimonious than the prior two models, the nine factor model provided an acceptable level of fit to the data at pretraining, χ^2 (593, N = 423) = 1,302.99, $p < .001$; $\chi^2/df = 2.20$; CFI = .94,

RMSEA = .05 (90% C.I. [.049, .057]). Table 4 summarizes the fit indices for these three pretraining SSE models. Because the nine factor model provided the best overall fit to the data, the individual parameters associated with $M3_{pre}$ were further examined.

For each of the nine factors, the first regression weight in the associated set of indicators was set to one to scale the metric. All other item regression weights were freely estimated and all other assumptions of a typical oblique, congeneric model were maintained (e.g., indicator error terms were assumed independent, latent factors were allowed to freely covary). All freely estimated regression weights from the model significantly loaded on to the associated latent factor specified a priori at the $p < .001$ level of significance. Standardized regression weights for indicators across the nine latent factors ranged from .72 to .91. Furthermore, all latent factors were significantly interrelated within the time 1 data at the $p < .001$ level of significance. Correlations amongst the latent variables ranged from .56 to .91. The interfactor correlation matrix of the nine latent factors from $M3_{pre}$ is presented in Table 5.

Time 2 SSE. Within the set of completed time 2 (postraining) data, the same series of CFA SSE models were evaluated using the information provided from the 412 NCOs. Univariate normality across the 37 items composing the scale was again assessed prior to estimating the three models. As with the time 1 data, all items evidenced negative skewness, none higher than the proposed SI absolute value of 3.0 practical cutoff. The SI values in the time 2 SSE data ranged from -1.14 to -0.56 which evidenced a more severe degree of skew than in the time 1 data. The KI values across all items were positive in the time 2 data suggesting leptokurtic underlying distributions. The KI values ranged from 0.31 to 2.33 for the 37 items at time 2. Although the distributions were more pointed at time 2, the KIs were found to be again below the cutoff guideline of absolute value 10.0 (Kline, 2011). On the basis of only moderate

departures from normality, full information maximum likelihood (FIML) estimation was again chosen to examine the models.

The single first-order factor model, $M1_{post}$ again suggested extremely poor fit to the data, χ^2 (629, N = 412) = 5,361.82, $p < .001$; χ^2/df = 8.52; CFI = .74, RMSEA = .14 (90% C.I. [.132, .138]). Thus, $M1_{post}$ was rejected from further consideration. Consistent with time 1 modeling, the five factor first-order model ($M2_{post}$) showed improved, yet still insufficient overall model fit, χ^2 (619, N = 412) = 2,633.21, $p < .001$; χ^2/df = 4.25; CFI = .88, RMSEA = .09 (90% C.I. [.085, .092]). The nine factor model, $M3_{post}$, again showed good fit to the data at time 2, χ^2 (593, N = 412) = 1,528.96, $p < .001$; χ^2/df = 2.58; CFI = .95, RMSEA = .06 (90% C.I. [.058, .066]). Table 6 summarizes the fit indices for these three posttraining SSE models. Provided the good general fit of the nine first-order factor model, I again examined the individual parameters associated with $M3_{post}$.

As with the nine-factor model at time 1, all freely estimated regression weights significantly loaded on to their corresponding specified latent factor at the $p < .001$ level of significance. Standardized regression weights for indicators across the nine latent factors ranged from .81 to .94. All nine latent factors were again significantly interrelated within the time 2 data at the $p < .001$ level of significance. Correlations amongst the latent variables ranged from .66 to .92. The interfactor correlation matrix of the nine latent factors from $M3_{pre}$ is presented in Table 7. Thus, across time 1 and time 2, the conceptualized nine factor model evidenced reasonable fit to the data. Also in support of the a priori conceptualization of the individual factors being influenced by a higher-order latent construct, all factors were moderately to highly interrelated at time 1 and time 2. Therefore, in the next section I examine the feasibility of a higher-order construct specification on the nine-factor models assessed before and after training.

Higher-order factor SSE conceptualization. The previous section established that a nine factor structure fit the SSE data better than two competing models. In this section, I introduce a fourth model (M4), which specifies a higher-order latent construct on the nine-factor model (see Figure 8). I again chose FIML as the driver for estimating the model across both time points. Decisions regarding sample sizes and inclusion of all available data remained the same as the previously tested models. The variance of the higher-order factor was constrained to 1. Doing so allowed all of the unstandardized factor loadings from the second-order latent factor to be freely estimated rather than setting the scale metric to one particular first-order factor (refer to Figure 8). Although the models M3 and M4 are not nested, which would allow for a statistical test for significant changes in model fit, it is possible to examine all of the indices of fit presented in M4 and make an approximation as to whether the fit declines to a degree to warrant rejecting the higher-order factor conceptualization initially posited.

The results of the time 1 analysis indicated that $M4_{pre}$ provided reasonable overall model fit to the data, χ^2 (620, N = 423) = 1,499.36, $p < .001$; $\chi^2/df = 2.42$; CFI = .93, RMSEA = .06 (90% C.I. [.054, .062]). For a comparison across all SSE time 1 models, see Table 4. As with the oblique nine factor model, $M3_{pre}$, all indicators significantly ($p < .001$) and strongly loaded to their associated first-order factor with standardized regression weights ranging from .71 to .91. Furthermore, standardized regression weights between the second-order factor (i.e., overall NCO SSE at time 1) and the nine first-order factors all indicated strong and significant ($p < .001$) factor loadings (λs ranged from .76 to .96). A path diagram of M4 with standardized regression weights is provided in Figure 9.

In conducting the same analysis with the posttraining data, model fit indices again suggest that $M4_{post}$ provides an adequate approximation to the factor structure theorized to exist

within the SSE scale, χ^2 (620, N = 412) = 1,795.87, $p < .001$; χ^2/df = 2.90; CFI = .94, RMSEA = .07 (90% C.I. [.064, .072]). It should be noted that CFI and RMSEA values were slightly out of range from ideal approximations for good fit as suggested by Kline (2011). To compare the overall model fit indices across the four models examined at time 2, see Table 6. An examination of the individual model parameters at time 2 again suggested that all indicators loaded significantly and strongly with their associated first-order latent factor (λs ranged from .80 to .94). Additionally, regressing the first-order factors onto the higher-order factor resulted in significant and strongly loading standardized regression weights ranging between .80 and .95. Figure 10 presents the path diagram of the higher-order standardized regression weights on the nine first-order factors.

Examining the overall model fit across both time points between M3 and M4 suggested that the degree of fit was fairly comparable with a slight decline with the introduction of a higher-order factor. However, when combined with the theoretical and conceptual defense of a higher-order overall NCO SSE factor, M4 was chosen for continued investigation within this study. Allowing for this conceptualization justifies the creation of creating nine item aggregated first-order composites to directly model the second-order factor. The subsequent proximal and distal model analyses are both simplified and the ratio of parameters to cases is more reasonable provided existing guidelines for obtaining reliable model estimates (Kline, 2011).

In creating the nine composite scores, simple averages were calculated for each of the nine first-order factors using the indicators associated with the first-order factor as illustrated in Figure 7. A relatively small percentage of participants failed to respond to at least one of the 37 SSE items at time 1 (38/424; 9.0%) and time 2 (10/412; 2.4%). The majority of cases with missing responses on the SSE scale were only missing responses to one item (it is quite

reasonable to assume that in most cases these missing responses were due to oversight when completing the lengthy measure). In handling the composite score calculations for instances when item-level missingness occurred (e.g., only two of four scale items completed by a participant), I followed the practical guidelines suggested by Newman (2009, 2010, Spring). Newman suggested that for item-level missingness when testing a larger, fairly complex model including both measurement and structural components, scale-level mean imputation be utilized (2009, 2010, Spring). That is, the researcher computes an average based on the remaining items that a participant completed within a scale and imputes this average for the missing value(s). Where scale-level missingness occurred within the nine specified SSE scales (e.g., a respondent skipped a page containing all items to a particular first-order factor), composite indicator scores remained entered as system missing within the dataset. And of course, in instances where person-level missingness occurred (e.g., attrition at time 2), the composite indicators remained as system missing within the dataset to be analyzed. Having now provided detailed justification and explanation for creating the composite nine item pretraining and posttraining NCO small unit leader SSE scales, attention is turned to the examination of the proximal model and the investigation of the primary proximal model hypotheses of interest.

Proximal Model Testing

Normality diagnosis. It is now possible to report results from the examination of the proximal model (see Figure 3). Prior to estimating the model, I examined all indicators used within the model for univariate normality. Items composing the four I-ADAPT dimensions demonstrated SIs ranging from -0.97 to 0.27 with the vast majority of items being moderately negatively skewed. I-ADAPT items spanned the range of kurtosis with some items evidencing

significant platykurtic underlying distributions (e.g., creativity 1 KI = -0.93) to significant leptokurtic distributions (e.g., learning 9 KI = 1.66).

Next, I examined the underlying distributions of the newly created composite SSE indicators at pretraining and posttraining. At pretraining, the nine items displayed mild to moderate degrees of negative skewness (SIs ranged from -0.67 to -0.38) and varying levels of kurtosis (KIs ranged from -0.25 to 1.05). At posttraining, the nine SSE composite indicators were again found to be characterized as negatively skewed (SIs ranged from -1.20 to -0.64), with the level of negative skewness generally increasing from the time one SSE indicators. In addition, all nine posttraining SSE composite items were found to be consistently leptokurtic at a statistically significant level (KIs ranged from 0.70 to 2.80). Further examination of the item histograms and boxplots suggested the potential existence of a ceiling effect for some items at time 2.

The underlying distributions of the items composing the two outcome variables, perceived utility reactions and motivation to transfer, were next examined. All four items composing the perceived utility reactions scale evidenced significant negative skew (SIs ranged from -1.48 to -0.88). Furthermore, the underlying distributions of all four items were found to be moderately to largely leptokurtic (KIs ranged from 0.71 to 3.52). The motivation to transfer items indicted mild to nonsignificant degrees of negative skew (SIs ranged from -0.69 to -0.02) and only one item evidenced a statistically significant leptokurtic distribution (i.e., all other motivation to transfer items were not found to be significantly different from mesokurtic [normal peakedness]; KIs ranged from -0.25 to 0.60).

Lastly, the univariate normality of the remaining control variables assumed a priori to approximate an underlying continuous normal distribution were assessed (i.e., prior

deployments, education, active duty experience). All three variables were found to be significantly positively skewed (OIF/OEF deployments SI = 0.63; education SI = 1.13; active duty tenure SI = 0.81). Furthermore, these three control variables were significantly leptokurtic (OIF/OEF deployments KI = 1.50; education KI = 5.57; active duty tenure KI = 1.13). In summary, the majority of the items analyzed within the proximal model showed slight to moderate degrees of negative skewness and positive kurtosis. Overall, the motivation to transfer scale showed the most univariate normal underlying distribution across the six items associated with the scale (however, the worst internal consistency estimate; Cronbach's $\alpha = .60$). Although significant deviations from univariate normality were detected, the significance of the SI and KI statistics are sensitive to sample size. Provided Kline's (2011) guidelines (i.e., SI > |3.0| and KI > |10.0|), none of the items utilized in the current sample evidenced severe enough departures to warrant further treatment (e.g., transformation or item deletion). Nonetheless, provided concerns for the deviations from normality, I also include a nonparametric bootsrapping procedure (specifically, Bollen-Stine) in evaluating overall model fit to supplement the traditional results obtained through ML estimates. Attention is now turned to documentation of missing data treatment for the proximal model.

Proximal model missing data examination and treatment. Each measure utilized within the proximal model was examined for degree of data missingness. Missingness of time 1 data is detailed first. Across the four I-ADAPT dimensions, only seven of the 424 (1.7%) participants had any missing responses. Furthermore, all participants were missing responses to only one I-ADAPT item, and no item within the I-ADAPT was missed more than once across the seven participants. For the newly created nine-item indicators composing the overall SSE scale at time 1, only seven of the 424 (1.7%) participants had missing data on any of the composite

indicators.[6] One participant was missing responses on all nine composite indicators, one was missing responses on five composite indicators, two participants were missing responses on two composite indicators, and three participants were missing responses on one composite indicator. For the control variable of active duty tenure, three of 424 participants (0.7%) did not report tenure. All participants provided data on current rank, education level, and prior deployments at time 1.

For time two data, as previously noted, 12 participants from the time 1 administration provided no linkable data. Of the remaining 412 participants, only three (0.7%) were missing any data on any of the newly created nine-item indicators of time 2 overall NCO SSE. One participant was missing four composite indicators and the other two were missing one composite indicator. For the outcome variable of perceived utility, three (0.7%) of 412 participants were missing data. One participant was missing responses to two of the indicators and the other two participants both failed to respond to one indicator of the four-item scale. The final outcome variable within the proximal model, motivation to transfer, only contained a single item missing response from one participant (0.2%) of the 412 responding at time 2.

Amos requires missing data to be treated through imputation or listwise deletion prior to running any models which utilize bootstrapping procedures. For this reason, FIML estimation was not possible for examining the research questions of interest within the proximal model. In order to make the dataset "whole" for examining the tenability of the proximal model, the following series of treatments were conducted. First, all 12 participants only providing linkable data at time 1 were removed. Second, because only three participants failed to report the control

[6] As detailed in the previous section, missingness on the composite indicator variables to be used in the proximal model for the pretraining and posttraining SSE scale only occurred in instances where participants did not respond to any item within the composite scale. Otherwise, missing items represent scale-level missingness at the first-order factor level.

variable of tenure of active duty experience and because it is of peripheral concern to the current research investigation, mean tenure values were imputed for these three cases. Third, because one participant was missing all information on time 1 SSE, this participant's data was removed for the purposes of examining the proximal model. In all other cases where item-level missingness occurred as previously documented, scale-level mean imputation was utilized (Newman, 2010, Spring). The final dataset utilized to test the proximal model contained data from 411 participants.

Proximal model specification. Two models were initially examined prior to addressing specific hypotheses. In the first model, PM_{full}, I constrained direct effect beta weights (γs) linking I-ADAPT dimensions to the two outcome variables, reactions to training (i.e., perceived utility) and motivation to transfer, to be zero. By doing so, a full mediation model, as depicted in Figure 3, was specified. The second model, PM_{part}, specified only partial mediation of posttraining SSE on the two outcome variables. That is, all direct effects between I-ADAPT dimensions and the two outcome latent factors were allowed to be freely estimated.

For both models, direct effects were estimated from all of the control variables to the mediator and outcome variables. Furthermore, unanalyzed associations (i.e., covariances) between control variables and exogenous variables (i.e., I-ADAPT dimensions) were allowed to be freely estimated. The control variables were entered as followed: nine-item baseline (pretraining) SSE, rank (0 = SGT; 1 = SSG), previous deployments, education level (0 = no high school diploma; 1 = GED; 2 = high school diploma; 3 = some college [no degree]; 4 = Associate's degree; 5 = Bachelor's degree; 6 = some graduate [no degree]; 7 = Master's degree), and active duty tenure (in years). Because the uniqueness (δ) of an indicator is comprised of both random and systematic (i.e., indicator specific) variance (Brown, 2006), the error terms of

the nine indicators at time one were allowed to freely covary with the associated indicator error terms at time 2. That is, the expectation of autocorrelation of indicator errors was specified. Lastly, two indicators from the I-ADAPT uncertainty dimension and the motivation to transfer scale were reverse coded. Although the items were recoded to the positive direction by the researcher for analysis purposes, including reverse coded items within survey administration can result in a methodological artifact which would then produce correlated uniqueness terms for the reverse coded items. Therefore, prior to running the model, I specified covariance terms between the δs of the two reverse coded I-ADAPT uncertainty indicators and between the two δs of the reverse coded motivation to transfer indicators.

Evaluating proximal model. Both the partially mediated model (PM_{part}) and the fully mediated model (PM_{full}) resulted in reasonable, yet lower than desired overall model fit to the data. For PM_{part}, χ^2 (1,756, N = 411) = 3,558.19, $p < .001$; χ^2/df = 2.03; CFI = .89, RMSEA = .05 (90% C.I. [.048, .052]). For PM_{full}, χ^2 (1,764, N = 411) = 3,577.49, $p < .001$; χ^2/df = 2.03; CFI = .89, RMSEA = .05 (90% C.I. [.048, .052]). In comparing the nested models, the partially mediated model, PM_{part}, resulted in significantly better overall model fit, $\Delta\chi^2$ (8, N = 411) = 19.30, p = .013. Table 8 details the indices produced by the comparison of model fit across both models.

Closer inspection of the direct path estimates generated in PM_{part} evidenced significant direct effects between the interpersonal, learning, and uncertainty I-ADAPT dimensions with reactions to training (perceived utility), but not between creativity and reactions. Within the specified model, no significant direct effects were found between I-ADAPT dimensions and motivation to transfer. The following standardized direct path loadings were found between the I-ADAPT dimensions and reactions: interpersonal I-ADAPT γ = .40, p = .020; learning I-

ADAPT $\gamma = .38$, $p = .050$; uncertainty I-ADAPT $\gamma = -.53$, $p = .016$. Provided the strong evidence of direct effects of three I-ADAPT dimensions on reactions to training, the revised partial mediation model, PM_{part}, was selected and utilized in all subsequent proximal model analyses. Figure 11 presents the revised proximal model with standardized path coefficients displayed for the paths most germane to the current investigation. For interpretability, only the three significant direct paths between I-ADAPT latent factors and reactions to training were included of the eight new direct paths introduced by PM_{part}. In addition, direct effects from covariates to mediator and outcome variables were not included in Figure 11. However, control variable standardized path coefficients may be found in Table 9. Additionally, although not displayed in Figure 11, correlations between exogenous variables and covariates may be found in Table 10.

Examining posited direct effects. As evidenced in Figure 11, none of the I-ADAPT dimensions significantly loaded on to posttraining SSE after controlling for the effects of pretraining SSE and the covariates introduced. Thus, Hypotheses 1a-1d were not substantiated within the current sample and training context. The creativity dimension failed to significantly predict improvement in overall NCO SSE from beginning to end of training ($\gamma = .01$, $p = .947$). Likewise, interpersonal adaptability did not determine level of improvement in SSE ($\gamma = -.09$, $p = .499$). The standardized structural path coefficient from learning adaptability to posttraining SSE was also nonsignificant, evidencing a lack of support for Hypothesis 1c ($\gamma = .25$, $p = .116$). Uncertainty adaptability also did not evidence a significant direct path coefficient to posttraining SSE ($\gamma = .11$, $p = .532$). Thus, the results do not support that individuals higher on the four dimensions of adaptability exhibited enhanced improvement in overall NCO SSE at the end of training as posited in Hypotheses 1a-d.

I formally test Hypotheses 2-4 in the next subsection which introduces a bootstrapping procedure to inspect the existence of indirect effects. However, initial evidence of the viability of mediating relationships can be investigated by examining direct effects between remaining pertinent model variables within the proximal model. A direct effect was found between posttraining SSE and perceived utility reactions to training ($\gamma = .28$, $p < .001$). Furthermore, a strong positive effect was found between perceived utility of training and motivation to transfer proving preliminary support for Hypothesis 4 ($\gamma = .94$, $p < .001$). The path coefficient between posttraining SSE and motivation to transfer was nonsignificant providing an early indication that Hypothesis 3 will not garner support ($\gamma = -.02$, $p = .572$).

Examining indirect effects. When testing for mediation, the bootstrapping method has desirable qualities when compared to more traditional techniques such as the Sobel test as it does not require the more stringent assumption of normality to be met within the data (Cheung & Lau, 2008). Research has indicated that indirect effects do not follow the normal distribution assumption. Provided the recommendations of Hayes (2009), parameter estimates of indirect effects were empirically derived by rerunning the model with 5000 bootstraps. Using bias-corrected bootstrap (BCB) derived estimates, 95% confidence intervals (CIs) were estimated for each of the indirect effects posited. For an overview of all indirect effects of interest provided the research hypotheses, see Table 11.

Hypothesis 2a, which posited that overall SSE improvement mediated the relationship between creativity adaptability and perceived utility reactions to training was not supported (95% unstandardized indirect effect estimate [-0.236, 0.209]). Likewise, the 95% CI produced for the indirect effect of interpersonal adaptability through the transmitting process of posttraining SSE to perceived utility was not supported, thus failing to support Hypothesis 2b (95%

unstandardized BCB indirect effect C.I. [-0.320, 0.139]. For hypothesis 2c, examination of the indirect effect of learning adaptability on perceived utility of training resulted in a failure to reject conclusion (95% CI [-0.059, 0.484]). Lastly, for Hypothesis 2d, the null hypothesis was retained as uncertainty adaptability did not indicate evidence of a statistically significant indirect effect on perceived utility of training (95% CI [-0.184, 0.441]).

Hypotheses 3a-d posited mediating relationships between the four I-ADAPT dimensions assessed and motivation to transfer training. Utilizing the same approach previously described, 95% confidence intervals were produced. The indirect effects of I-ADAPT dimensions on motivation to transfer were all postulated to be positive. Posttraining SSE did not mediate the relationship between creativity adaptability and motivation to transfer, thus Hypothesis 3a was not supported (95% unstandardized BCB CI [-1.307, 0.548]). Additionally, the total indirect effect of interpersonal adaptability on motivation to transfer did not produce indications of statistical significance, thus Hypothesis 3b was not supported [-0.075, 2.237]. Hypothesis 3c, that learning adaptability would indirectly influence participants' motivation to transfer training, did receive support as evidenced by the 95% BCB CI [0.053, 2.226]. Those higher on the learning dimension of adaptability were likely to be more motivated to transfer the training received through the transmitting function of overall SSE improvement and perceived utility of the training. Uncertainty adaptability had a significant indirect effect on motivation to transfer in the reverse direction than hypothesized [-2.734, -0.054]. Within this sample and training context, participants higher on uncertainty adaptability were actually less motivated to transfer the training as transmitted through the mediating effects of posttraining SSE and perceived utility of training.

Hypothesis 4 was supported within the current study as an indirect effect was found between overall NCO SSE and motivation to transfer through the mediating process of perceived utility of training [0.186, 0.529]. See Table 11 for a summary of all indirect effects examined. In summary, while the majority of hypotheses postulated within the proximal model did not evidence convincing support, Hypothesis 3 received partial support as learning adaptability did have a positive indirect effect on motivation to transfer and Hypothesis 4 was supported as posttraining SSE did have a positive effect on motivation to transfer through the mediating function of perceived utility of training. Attention is now turned to the more simplified distal model.

Distal Model Testing

The distal model estimated three separate path analyses while examining the same three constructs, an adaptability composite, a postraining SSE composite, and a composite rating of transfer performance. As conducted in the proximal model data preparation, item-level data missingness was handled through scale-level mean imputation (Newman, 2009; Newman, 2010, Spring). The adaptability composite was developed by averaging the four subscale composites into a single composite scale. The posttraining SSE composite was computed by averaging the nine competency-based composites utilized in the proximal model. Transfer performance rating composites were computed by averaging the available responses from the nine item ratings collected at time 3. Across the three separate path analyses, the time 3 performance rating data source changed (i.e., leaders, peers, and self ratings). The three separate path analyses were limited to the number of completed performance ratings provided from the three sources. Thus, from the original 411 participants composing the sample examined in the proximal model, the distal models had the following number of cases: DM_{ldr} n = 72, DM_{peer} n = 78, DM_{self} n = 64.

Because Hypothesis 6a-c again posited a mediating relationship, the bias-corrected bootstrapping (BCB) procedure was again utilized with 5,000 bootstrap samples generated for each of the three distal model analyses.

Hypothesis 5a-c predicted direct effects between I-ADAPT and ratings of transfer performance. To view the path diagrams of DM_{ldr}, DM_{peer}, and DM_{self} containing the estimates of standardized structural path coefficients, see Figures 12, 13, and 14, respectively. Inspection of DM_{ldr} indicated that the I-ADAPT composite did not demonstrate a significant direct effect in predicting leader ratings of transfer performance, thus hypothesis 5a was not supported ($\gamma = .15$, $p = .283$). Model DM_{peer} also found no direct effect of I-ADAPT on ratings of peer performance; therefore, Hypothesis 5b was not supported ($\gamma = .22$, $p = .151$). Hypothesis 5c also was not supported as the I-ADAPT composite did not exhibit a direct effect on self ratings of transfer performance ($\gamma = .18$, $p = .416$).

Hypothesis 6a-c suggested that I-ADAPT would also have an indirect effect on transfer performance as transmitted through posttraining SSE. Hypothesis 6a was not supported as I-ADAPT composite did not demonstrate an indirect effect on leader ratings of transfer performance (95% unstandardized indirect effect estimate [-0.407, 0.479]). Furthermore, Hypothesis 6b was unsubstantiated as I-ADAPT was not found to have an indirect effect through the mediating process of posttraining SSE (95% unstandardized BCB CI [-0.563, 0.296]). Lastly, self composite I-ADAPT ratings did not exert an indirect influence on self ratings of performance through the mediating process of posttraining SSE as posited in Hypothesis 6c (95% unstandardized indirect effect estimate [-0.200, 0.936]).

Discussion

Adaptability is posited to enable enhanced performance in modern environments through the capacity of highly adaptive individuals to more readily change themselves to fit the demands of their task and situation. In addition to dynamic training task performance (Vaughn et al., 2010, April), leadership performance (Ployhart, 2005, November), and newcomer socialization (Wang et al., 2011), individual adaptability has been postulated to predict distal training outcomes such as transfer of training (Ployhart & Bliese, 2006). The current work was the first effort to empirically examine the tenability of this proposition. In addition, the present study contributes to the transfer of training literature by separating sources of information both by administration context (i.e., three separate and distinct data collection points in time) and, for time 3 assessment, by different data sources. In doing so, this project addresses Blume et al.'s (2010) call for more research within the transfer of training domain which avoids spuriously inflated relationships due to common method variance (Podsakoff et al., 2003).

Although this research provided several unique contributions to the literature, unfortunately, hypotheses went generally unsupported. Within the proximal model tested, the first major revision involved modifying the specification from a fully mediated model to a partially mediated model. That is, the effects of I-ADAPT were originally modeled to be transmitted completely through SSE improvement which was subsequently specified to influence the two outcome variables of perceived utility and motivation to transfer. Within the better fitting partially mediated model, three I-ADAPT dimensions exerted a direct influence on perceived utility (i.e., interpersonal, learning, uncertainty). While the directionality of the direct

effect was positive for the interpersonal and learning dimensions as would be consistent with the fully mediated hypotheses posited in Hypotheses 2b and 2c, the uncertainty dimension asserted a direct *negative* effect on perceived utility. One plausible interpretation of this finding is that those individuals better equipped to handle indeterminacy may also have been discouraged by the regimented, doctrinal nature of the ALC training and subsequently viewed the training as less useful than their peers whom rated lower in capacity to manage and adjust to unstructured environments. High uncertainty adaptability was also linked indirectly to lower motivation to transfer. Both of these findings may be indicative of the potential staleness within the training that may have led to null results within the current sample and context provided the construct.

Within the proximal model, I-ADAPT failed to predict changes or enhancements in SSE from pretraining to posttraining. After controlling for the effects of NCOs level of pretraining SSE, no shared variance remained between the predictor and proposed mediator. It is interesting to note that when examining the bivariate relationships presented in Table 3, all four dimensions of the I-ADAPT were related to posttraining SSE. Should pretraining SSE have been omitted within the current study as a control variable, conclusions regarding Hypothesis1a-d may have differed. However, the model would have been misspecified and it may have been falsely assumed that the correlation of posttraining SSE at end of training was a function of both the individual difference characteristic and the training received. On the contrary, it appears that within the current sample and training context, the relationship between I-ADAPT and overall NCO SSE was already moderate to high prior to receiving any additional NCO competency training.

This finding becomes less surprising provided anecdotal evidence from NCOs describing this particular career course as “check the box” training necessary for promotion. Furthermore,

within the current high operational tempo and heavy deployment schedule, by the time that many of the NCOs can be slated to take the ALC, many have already had moderate to extensive field time serving as NCO squad leaders while on deployments or conducting garrison duties at their home installation. It might be interesting to investigate if the present null result findings would be replicated provided a training task that were truly novel to the trainee, as well as more rigorously designed, controlled, and better evaluated.

Using the smaller subsamples of peers, leaders, and primary NCOs providing ratings of transfer performance at time 3, the distal effects of I-ADAPT on transfer performance as well as a partially mediating effect of transfer performance through posttraining SSE to transfer performance were assessed. Within the current study, these expected relationships were again not suggested by the data. Ployhart and Bliese (2006) suggested that I-ADAPT should be predictive of both dynamic and stable performance; however, they do acknowledge that the strength of the relationship will be moderated by the characteristics of the environment. This presumption may need to be tailored back as it appears that within the current study which provided a relatively fixed training and transfer environment, I-ADAPT failed to predict task performance. Although it is generally acknowledged that the U.S. military now necessitates higher degrees of adaptability as job and task complexity has increased from times of traditional high-intensity conflict (DSB, 2010; Salas, Milham, & Bowers, 2003), the particular training and transfer context used within this study remained relatively consistent throughout the duration of the three assessment points utilized. That is, the multi-week training environment consisted principally of more traditional classroom lecture-based instruction with delivery of doctrinal knowledge. Furthermore, due to the logistical concerns with being capable of practically tracking and assessing time 3 performance following the training, brigade combat teams (BCTs)

were chosen that were returning to their home installation following training rather than choosing BCTs that may have been involved in more dynamic situations such as active deployments. Drawing again on the personality triad conceptualization of person, environment, and behavior (Funder, 2001, 2006), the use of a training and transfer context with more stable characteristics may reduce the predictive capacity of the I-ADAPT to the degree to which it is a nonfactor in many organizational settings.

Practical Implications

The I-ADAPT and the eight underlying dimensions provide a nice taxonomy by which practitioners could discuss, organize, and categorize qualities and characteristics by which employees can be grouped in terms of readiness to handle different types of organizational and situational uncertainty. Currently, provided the null results, any use of the I-ADAPT for selection, promotion, or advancement opportunities would clearly not be warranted. Other, more well established and validated measures could still be selected for human capital management purposes such as assessing which employees would most benefit the company if selected for costly higher-level leader development and training. However, the measure could potentially benefit organizations in a number of other ways such as serving as a potential self-diagnostic and self-development tool as part of a team building exercise for an organization undergoing or soon to begin a potentially stressful change such as a merger or new technology implementation. Such an exercise might allow profile development to be shared with each employees compared against an aggregated peer group which could highlight strengths and areas to be cognizant of if engaging in a dynamic environment (e.g., percentile standing on each of the eight dimensions).

Future Research

Within a training context, future research should examine whether the effects of individual differences in adaptability on training performance differ as a function of instructional method (e.g., lecture, modeling, active participation) and/or instructional factors (e.g., materials, feedback, group size). Callahan, Kiker, and Cross (2003) demonstrated that unique variance was accounted for in the training performance of older learners due to many of these design features. The I-ADAPT model posited by Ployhart and Bliese (2006) identified that the environmental adaptability requirements would have a moderating effect on the adaptability-performance relationship as well as the KSAO-performance relationship (Propositions 19 and 20). Thus, I-ADAPT theory could be advanced by experimentally manipulating the level of dynamism in the training environment to explicitly test for these moderating effects on performance presumed to be attenuating relationships within the current investigation.

Furthermore, provided that Ployhart and Bliese (2006) and subsequent researchers (Vaughn et al., 2011, April; Wang et al., 2011) have conceptualized I-ADAPT to be a trait-like construct, future work should empirically assess the level of stability in I-ADAPT dimension scores over time. To date no research has examined whether the dimensions exhibit transient properties. Furthermore, if these dimension scores do change over different contexts and times, what drives these changes?

Limitations

The current study has several limitations which should be addressed. Some researchers might question whether one can accurately assess their own adaptive capabilities. It may be beneficial to supplement the individual adaptability literature by adding different sources of adaptability assessment or data collection techniques as it may be valuable to have multiple

estimates. Another limitation regarding the current sample, in addition to the stagnant training and transfer context as previously discussed, is that the participants in the current study were relatively homogenous (all males, US Army NCOs, fairly similar in age). Therefore, there may be limitations on the generalizability of the findings from the current study to civilian and female populations.

Another methodological concern provided the use of measurement model components were employed is that lower than preferable levels of preexisting validity evidence exists for both the SSE scale and the perceived utility of training scale created specifically for use within this study. In regard to the SSE scale, although evidence documented the feasibility and superiority of a nine competency model relative to another conceptually based and more parsimonious five factor model, without previous scale development work using separate samples such as item evaluation and exploratory factor analyses (EFAs; see, e.g., DeVillis, 2003), it is possible that this scale was misspecified within the current investigation (Brown, 2006). This misspecification may have been detrimental to fit of the overall model.

That point addresses another limitation which was the reasonable, but less than preferred fit found within the proximal model. However, it is important to note that statistical hypothesis testing alone can serve as a poor indication of fit as any model can be rejected provided a large enough sample size (Jöreskog, 1967). Furthermore, all models within the behavioral sciences serve as approximations of naturally occurring phenomena and can still serve as useful framing tools despite not being “true” (Arbuckle, 2009).

Conclusion

As with any incipient research theory, there are still many tenable research questions to be explored under I-ADAPT theory. The current investigation only begins to accumulate evidence regarding the boundary conditions of the proposed relationships posited by Ployhart and Bliese (2006). Further delineation of the individual adaptability construct could help researchers understand the necessary processes leading to improvement in individual performance within a complex, changing environment.

References

Alliger, G. M., Tannenbaum, S. I., Bennett, W., Jr., & Traver, H. (1997). A meta-analysis of the relations among training criteria. *Personnel Psychology, 50,* 341-358. doi:10.1111/j.1744-6570.1997.tb00911.x

Arbuckle, J. L. (2009). Amos (Version 18.0.0) [Computer Program]. Crawfordville, FL: Amos Development Corporation.

Arbuckle, J. L. (2009). *Amos™ 18 User's Guide.* Crawfordville, FL: Amos Development Corporation.

Armenakis, A. A., & Bedian, A. G. (1999). Organizational change: A review of theory and research in the 1990s. *Journal of Management, 25,* 293-315.

Arthur, W., Jr., Bennett, W., Jr., Edens, P. S., & Bell, S. T. (2003). Effectiveness of training in organizations: A meta-analysis of design and evaluation features. *Journal of Applied Psychology, 88,* 234-245. doi:10.1037/0021-9010.88.2.234

Baldwin, T. T., & Ford, J. K. (1988). Transfer of training: A review and directions for future research. *Personnel Psychology, 41,* 63-105. doi:10.1111/j.1744-6570.1988.tb00632.x

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist,* 37, 122-147. doi:10.1037/0003-066X.37.2.122

Bandura, A. (1986). The explanatory and predictive scope of self-efficacy theory. *Journal of Social and Clinical Psychology, 4,* 359-373.

Bandura, A. (1989). Human agency in social cognitive theory. *American Psychologist, 44,* 1175-1184. doi:10.1037/0003-066X.44.9.1175

Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W H Freeman/Times Books/ Henry Holt & Co.

Bell, B. S., & Kozlowski, S. W. J. (2008). Active learning: Effects of core training design elements on self-regulatory processes, learning, and adaptability. *Journal of Applied Psychology*, *93*, 296-316. doi:10.1037/0021-9010.93.2.296.

Blume, B. D., Ford, J. K., Baldwin, T. T., & Huang, J. L. (2010). Transfer of training: A meta-analytic review. *Journal of Management*, *36*, 1065-1105. doi:10.1177/0149206309352880.

Bolman, L. G., & Deal, T. E. (2006). Reframing change: Training, realigning, negotiating, grieving, and moving on. In J. V. Gallos (Ed.), *Organization development: A Jossey-Bass reader* (pp. 447-469). San Francisco, CA US: Jossey-Bass.

Bond, F. W., & Hayes, S. C. (2002). ACT at work. In F. W. Bond & W. Dryden (Eds.), *Handbook of brief cognitive behavior therapy*. Chichester, England: Wiley.

Bond, F. W., Flaxman, P. E., & Bunce, D. (2008). The influence of psychological flexibility on work redesign: Mediated moderation of a work reorganization intervention. *Journal of Applied Psychology*, *93*, 645-654. doi:10.1037/0021-9010.93.3.645

Boot, W. R., Neider, M. B., & Kramer, A. F. (2009). Training and transfer of training in the search for camouflaged targets. *Attention, Perception, & Psychophysics*, *71*, 950-963. doi:10.3758/APP.71.4.950

Brown, T. A. (2006). *Confirmatory factor analysis for applied research.* New York, NY: The Guilford Press.

Browne, M. W. (1984). Asymptotically distribution-free methods for the analysis of covariance structures. *British Journal of Mathematical and Statistical Psychology, 37*, 62-83.

Bryant, F. B., & Satorra, A. (in press). Principles and practice of scaled difference chi-square testing. *Structural Equation Modeling.*

Callahan, J. S., Kiker, D. S., & Cross, T. (2003). Does method matter? A meta-analysis of the effects of training method on older learner training performance. *Journal of Management, 29*, 663-680. doi:10.1016/S0149-2063(03)00029-1.

Cheung, G. W., & Lau, R. S. (2008). Testing mediation and suppression effects of latent variables: Bootstrapping with structural equation models. *Organizational Research Methods, 11*, 296-325. doi:10.1177/1094428107300343

Colquitt, J. A., LePine, J. A., & Noe, R. A. (2000). Toward an integrative theory of training motivation: A meta-analytic path analysis of 20 years of research. *Journal of Applied Psychology, 85*, 678-707. doi:10.1037/0021-9010.85.5.678

Cullen, K. L., Casper, W. C., Edwards, B. D., Gue, K., & Tubré, T. (2011, April). *Organizational Support Mediates Effects of Employee Adaptability in the Workplace*. Poster presented at the 26th Annual Meeting of the Society for Industrial and Organizational Psychology, Chicago, IL.

Defense Science Board (2011). *Enhancing Adaptability of U.S. Military Forces: Part A. Main Report*. Office of the Under Secretary of Defense: Washington, D.C.

DeVellis, R. F. (2003). *Scale development: Theory and applications* (2nd ed.). Thousand Oaks, CA: Sage Publications.

Dierdorff, E. C., Surface, E. A., & Brown, K. G. (2010). Frame-of-reference training effectiveness: Effects of goal orientation and self-efficacy on affective, cognitive, skill-based, and transfer outcomes. *Journal of Applied Psychology, 95*, 1181-1191. doi:10.1037/a0020856

Funder, D. C. (2001). Personality. *Annual Review of Psychology, 52*, 197-221. doi:10.1146/annurev.psych.52.1.197

Funder, D. C. (2006). Towards a resolution of the personality triad: Persons, situations, and behaviors. *Journal of Research in Personality, 40*, 21-34. doi:10.1016/j.jrp.2005.08.003

Gist, M. E., & Mitchell, T. R. (1992). Self-efficacy: A theoretical analysis of its determinants and malleability. *Academy of Management Review, 17*, 183-211. doi:10.2307/258770

Gist, M. E., Schwoerer, C., & Rosen, B. (1989). Effects of alternative training methods on self-efficacy and performance in computer software training. *Journal of Applied Psychology, 74*, 884-891. doi:10.1037/0021-9010.74.6.884

Hayes, A. F. (2009). Beyond Baron and Kenny: Statistical mediation analysis in the new millennium. Communication Monographs, 76, 408-420. doi:10.1080/03637750903310360

Hirschfeld, R. R., Thomas, C. H., & Bernerth, J. B. (2011). Consequences of autonomous and team-oriented forms of dispositional proactivity for demonstrating advancement potential. *Journal of Vocational Behavior, 78*, 237-247. doi:10.1016/j.jvb.2010.09.001

Hough, L. M., & Oswald, F. L. (2008). Personality testing and I-O psychology: Asking questions, offering answers, discussing unknowns, and providing direction. *Industrial and Organizational Psychology: Perpectives on Science and Practice, 1*, 272-290.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1-55.

Johnson, R. E. (2011, Spring). *Assessing the validity of higher-order multidimensional constructs*. Presented at the Center for the Advancement of Research Methods and Analysis (CARMA) webcast. Detroit, MI: Wayne State University.

Jöreskog, K. G. (1967). Some contributions to maximum likelihood factor analysis. *Psychometrika, 32,* 443-482.

Kline, R. B. (2011). *Principles and practice of structural equation modeling* (3rd ed.). New York, NY: The Guilford Press.

Kraiger, K. (2008). Transforming our models of learning and development: Web-based instruction as enabler of third-generation instruction. *Industrial and Organizational Psychology: Perspectives on Science and Practice, 1,* 454-467. doi:10.1111/j.1754-9434.2008.00086.x

Leibrecht, B. C., Wampler, R. L., & Pleban, R. J. (2009). *Methodology for evaluating transfer of learning from the U.S. Army's Advanced Leaders Course* (Research Product 2009-05). Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

Little, R. J. A., & Rubin, D. B. (1987). *Statistical analysis with missing data.* New York: Wiley.

Machin, M. A., & Fogarty, G. J. (2003). Perceptions of training-related factors and personal variables as predictors of transfer implementation intentions. *Journal of Business and Psychology, 18,* 51-71. doi:10.1023/A:1025082920860

Masuda, A., Anderson, P. L., Wendell, J. W., Chou, Y., Price, M., & Feinstein, A. B. (2011). Psychological flexibility mediates the relations between self-concealment and negative psychological outcomes. *Personality and Individual Differences, 50,* 243-247. doi:10.1016/j.paid.2010.09.037

McCrae, R. R., & Costa, P. T., Jr. (1990). *Personality in adulthood*. New York, NY: Guilford Press.

Morin, L., & Latham, G. P. (2000). The effect of mental practice and goal setting as a transfer of training intervention on supervisors' self-efficacy and communication skills: An

exploratory study. *Applied Psychology: An International Review*, *49*, 566-578. doi:10.1111/1464-0597.00032

Moss, F. A., & Hunt, T. T. (1927). Are you socially intelligent? *Scientific American*, 108-110.

Mueller-Hanson, R. A., White, S. S., Dorsey, D. W., & Pulakos, E. D. (2005). *Training adaptable leaders: Lessons from research and practice* (Research Report 1844). Arlington, VA: U. S. Army Research Institute for the Behavioral and Social Sciences.

Nelson, J. K., Zaccaro, S. J., & Herman, J. L. (2010). Strategic information provision and experiential variety as tools for developing adaptive leadership skills. *Consulting Psychology Journal: Practice and Research*, *62*, 131-142. doi:10.1037/a0019989.

Newman, D. A. (2009). *Missing data techniques and low response rates: The role of systematic nonresponse parameters*. In C. E. Lance & R. J. Vandenberg (Eds.), Statistical and methodological myths and urban legends: Doctrine, verity, and fable in the organizational and social sciences, pp. 7-36. New York, NY: Routledge.

Newman, D. A. (2010, Spring). *Missing data: Problems and prospects*. Presented at the Center for the Advancement of Research Methods and Analysis (CARMA) webcast. Detroit, MI: Wayne State University.

Noe, R. A., & Wilk, S. L. (1993). Investigation of the factors that influence employees' participation in development activities. *Journal of Applied Psychology*, *78*, 291-302. doi:10.1037/0021-9010.78.2.291

Paradise, A., & Patel, L. (2009). *State of the Industry: ASTD's Annual Review of Trends in Workplace Learning and Performance*. Alexandria, VA: ASTD.

Ployhart, R. E. (2005, November). *Leadership adaptability for 21st century warfare.* Paper presented at the 47th annual meeting of the International Military Testing Association, Singapore.

Ployhart, R. E., & Bliese, P. D. (2006). Individual adaptability (I-ADAPT) theory: Conceptualizing the antecedents, consequences, and measurement of individual differences in adaptability. In S. Burke, L. Pierce, & E. Salas (Eds.), *Understanding adaptability: A prerequisite for effective performance within complex environments.* Oxford, UK: Elsevier.

Podsakoff, P. M., MacKenzie, S. B., Lee, J., & Podsakoff, N. P. (2003). Common method biases in behavioral research: A critical review of the literature and recommended remedies. *Journal of Applied Psychology, 88,* 879-903. doi:10.1037/0021-9010.88.5.879

Pulakos, E. D., Arad, S., Donovan, M. A., & Plamondon, K. E. (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. D., Dorsey, D. W., & White, S. S. (2006). Adaptability in the workplace: Selecting an adaptive workforce. In C. S. Burke, L. G. Pierce, & E. Salas (Eds.), *Understanding adaptability: A prerequisite for effective performance within complex environments* (pp. 41-71). Amsterdam Netherlands: Elsevier.

Pulakos, E. D., Schmitt, N., Dorsey, D. W., Arad, S., Hedge, J. W., & Borman, W. C. (2002). Predicting adaptive performance: Further tests of a model of adaptability. *Human Performance, 15,* 299-324. doi:10.1207/S15327043HUP1504_01.

Rubin, D. B. (1976). Inference and missing data. *Biometrika, 63,* 581-592.

Runco, M. A. (1988). Creativity research: Originality, utility, and integration. *Creativity Research Journal, 1,* 1-7. doi:10.1080/10400418809534283

Saks, A. M. (2002). So what is a good transfer of training estimate? A reply to Fitzpatrick. *The Industrial-Organizational Psychologist, 40*, 29-30.

Salas, E., Milham, L. M., & Bowers, C. A. (2003). Training evaluation in the military: Misconceptions, opportunities, and challenges. *Military Psychology, 15*, 3-16. doi:10.1207/S15327876MP1501_01

Satorra, A., & Bentler, P. M. (1988). Scaling corrections for chi-square statistics in covariance structure analysis. *ASA 1988 Proceedings of the Business and Economic Statistics, Section* (308-313). Alexandria, VA: American Statistical Association.

Satorra, A., & Bentler, P. M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye & C. C. Clogg (Eds.), *Latent variables analysis: Applications for developmental research* (pp. 399-419). Thousand Oaks, CA: Sage.

Shah, R., & Goldstein, S. M. (2006). Use of structural equation modeling in operations management research: Looking back and forward. *Journal of Operations Management, 24*, 148-169. doi:10.1016/j.jom.2005.05.001

SIOP JobNet (2011). *Hogan Assessments Systems: Senior consultant – direct practice* (Originally posted December 12, 2010). Retrieved February 13, 2011, from http://siop.org/jobnet/job.aspx?job=463&bSearch=1

Sitzmann, T., Brown, K. G., Casper, W. J., Ely, K., & Zimmerman, R. D. (2008). A review and meta-analysis of the nomological network of trainee reactions. *Journal of Applied Psychology, 93,* 280-295. doi:10.1037/0021-9010.93.2.280

Smith, E. M., Ford, J., & Kozlowski, S. J. (1997). Building adaptive expertise: Implications for training design strategies. In M. A. Quiñones, A. Ehrenstein, M. A. Quiñones, A. Ehrenstein (Eds.), *Training for a rapidly changing workplace: Applications of psychological research* (pp. 89-118). Washington, DC US: American Psychological Association. doi:10.1037/10260-004

Snow, A. J. (1925). Individual adaptability to occupation and profession. In A. J. Snow (Ed.), *Psychology in business relations* (pp. 465-484). A W Shaw Co. doi:10.1037/10815-027

Sonnentag, S., & Frese, M. (2003). Stress in organizations. *Handbook of psychology: Industrial and organizational psychology, Vol. 12* (pp. 453-491). Hoboken, NJ US: John Wiley & Sons Inc.

Strahan, R., & Gerbasi, K. C. (1972). Short, homogeneous versions of the Marlowe-Crowne Social Desirability Scale. *Journal of Clinical Psychology, 28,* 191-193.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics* (4th ed.). Boston: Allyn & Bacon.

Thorndike, E. L. (1903). The influence of special forms of training upon more general abilities. In E. L. Thorndike (Ed.), *Educational Psychology* (pp. 80-93). New York, NY: Lemcke & Buechner. doi:10.1037/10528-008

Tucker, J. S., Gunther, K. M., & Pleban, R. J. (2010). The mediating effects of adaptive skill on values-performance relationships. *Human Performance, 23*, 81-99. doi:10.1080/08959280903400275.

U. S. Department of the Army (2001). *Objective force capability* (TRADOC Pamphlet 525-66). Washington, DC: Author.

Vaughn, E. D., Tucker, J. S., & Pleban, R. J. (2011, April). *Individual adaptability incrementally predicts performance in a dynamic training environment*. Poster presented at the 26th annual meeting of the Society for Industrial and Organizational Psychology, Chicago, IL.

Wang, M., Zhan, Y., Mccune, E., & Truxillo, D. (2011). Understanding newcomers' adaptability and work-related outcomes: Testing the mediating roles of perceived P–E fit variables. *Personnel Psychology, 64,* 163-189. doi:10.1111/j.1744-6570.2010.01205.x

Wessel, J. L., Ryan, A. M., & Oswald, F. L. (2008). The relationship between objective and perceived fit with academic major, adaptability, and major-related outcomes. *Journal of Vocational Behavior, 72,* 363-376. doi:10.1016/j.jvb.2007.11.003.

Whipple, G. (1915). Tests of Imagination and Invention. In G. Whipple (Ed.), *Manual of mental and physical tests in two parts, Part II: Complex Processes, A book of directions compiled with special reference to the experimental study of school children in the laboratory or classroom (2nd ed., rev. and enl.)* (pp. 253-307). Baltimore, MD: Warwick & York. doi:10.1037/10869-004

Zaccaro, S. J., & Banks, D. (2004). Leader visioning and adaptability: Bridging the gap between research and practice on developing the ability to manage change. *Human Resource Management, 43,* 367-380.

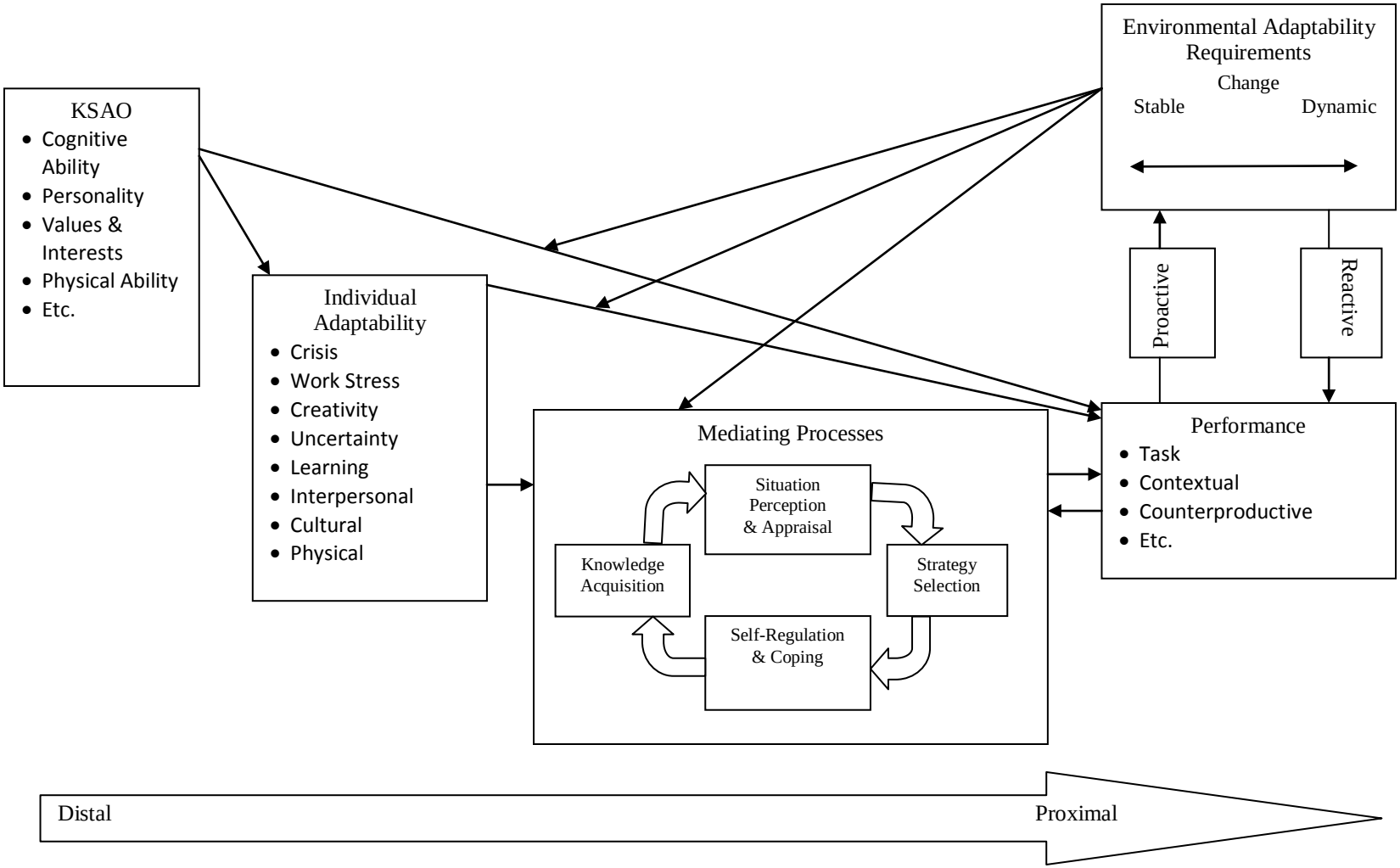

Figure 1. Ployhart and Bliese's (2006) I-ADAPT model. The model is reprinted with permission from Elsevier.

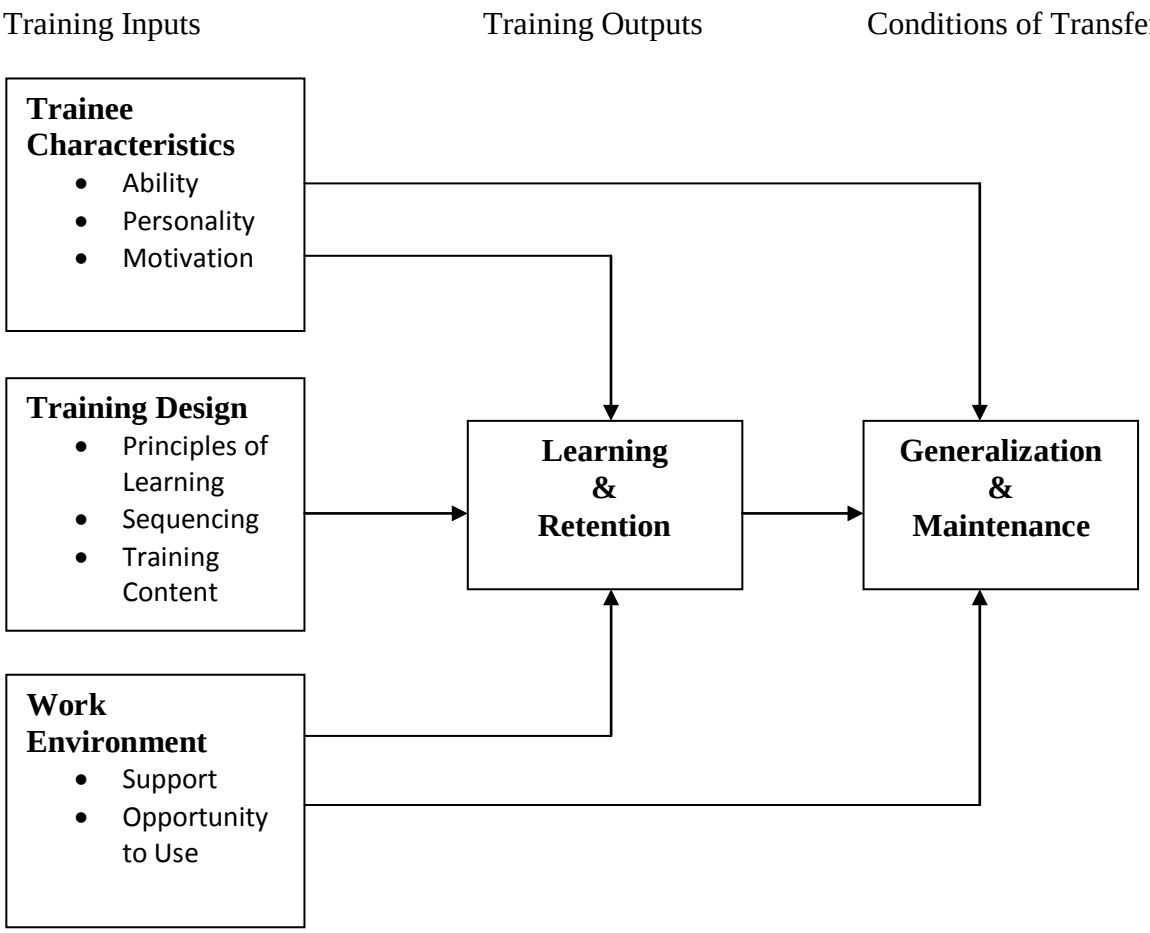

Figure 2. Baldwin and Ford's (1988) training transfer model. The model is reprinted with permission from John Wiley and Sons.

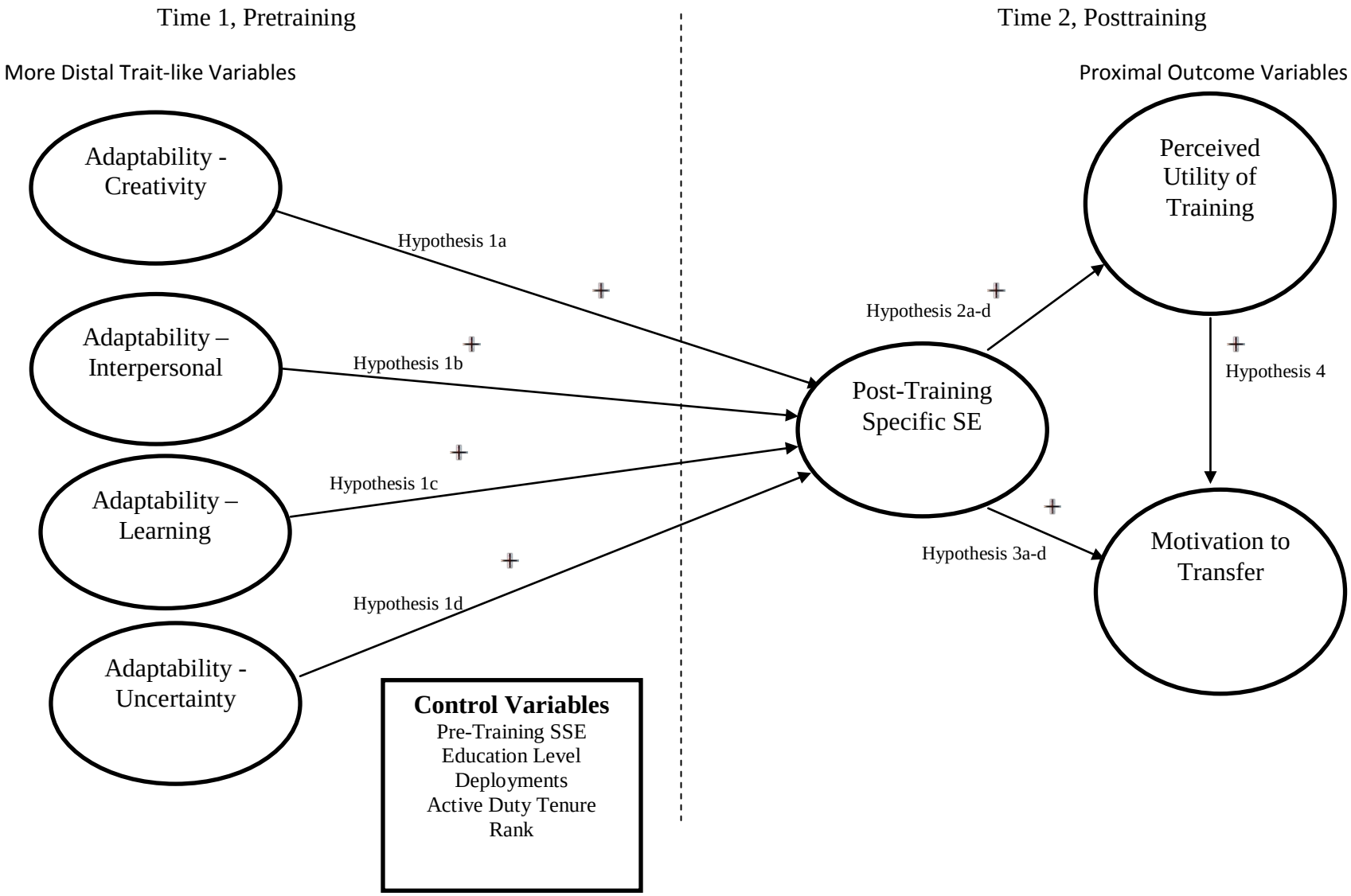

Figure 3. Proximal model tested using structural equation modeling. *Note.* Although not modeled herein to enhance model clarity, within the analyses direct effects were modeled from each control variable to study mediator and outcome variables.

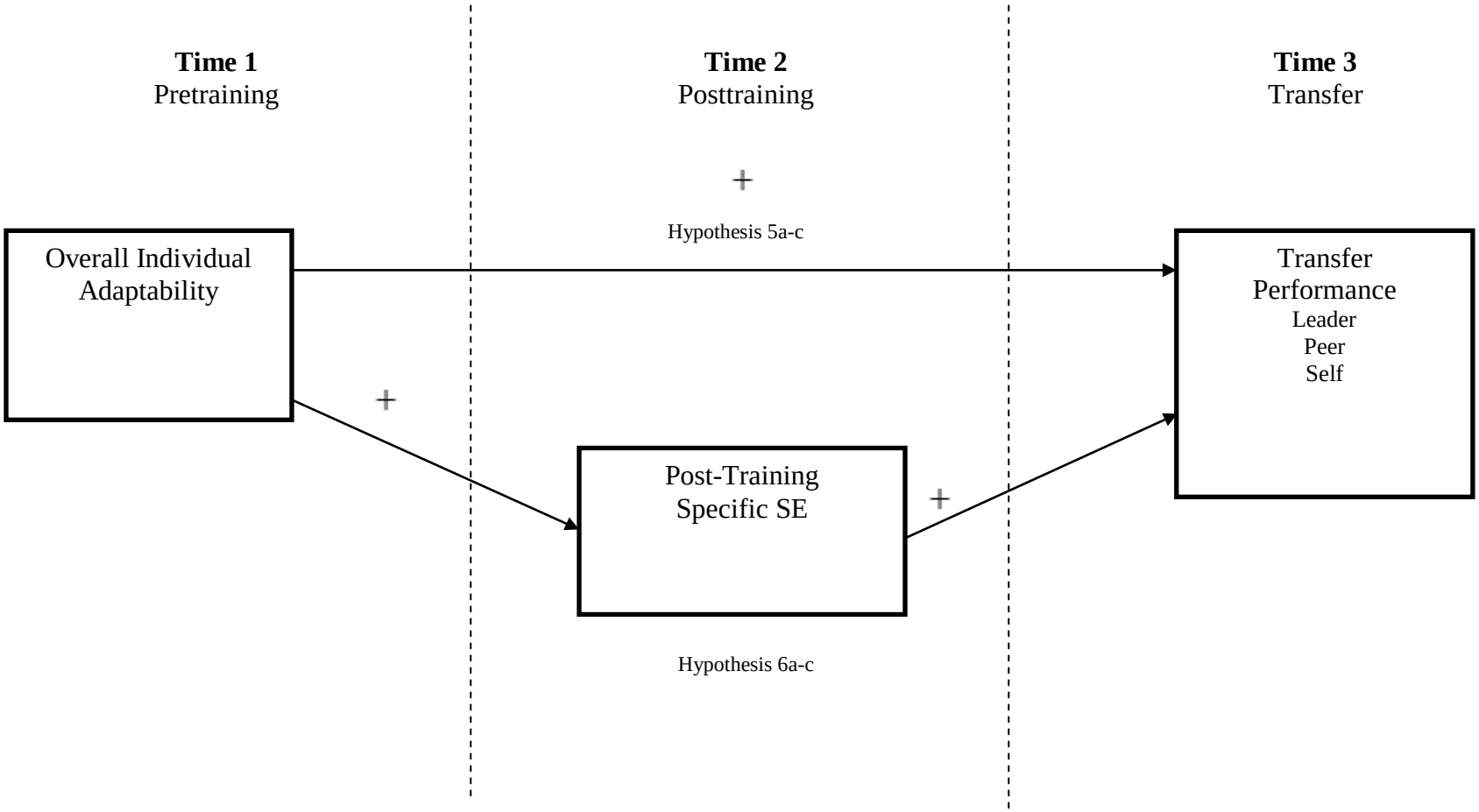

Figure 4. Distal model tested using path analysis. This figure represents three separate path analyses (i.e., one for each of the three performance rating sources). Consistent with structural equation model notation (Kline, 2011), rectangles as opposed to ellipses were used to enclose constructs within the second model to indicate that these analyses will be assessed by analyzing observed scores as opposed to latent variables.

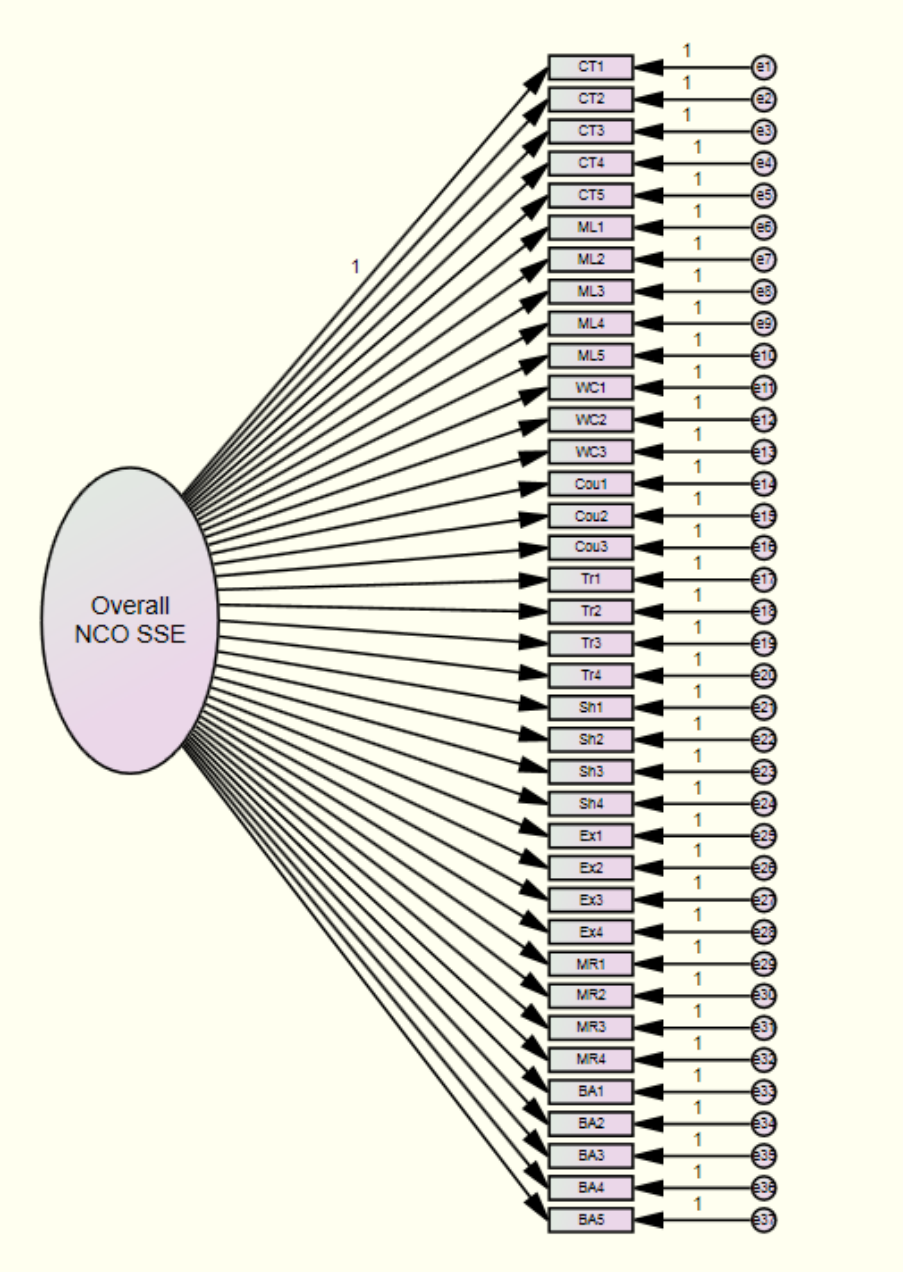

Figure 5. Path diagram of a single factor model of Overall NCO SSE. Within this most constrained and parsimonious model, all indicators are assumed to load on to a single latent factor. CT = Critical/Creative Thinking; ML = Military Leadership; WC = Warrior Competencies; Cou = Counseling, Coaching and Mentoring; Tr = Training Subordinates; Sh = Shaping Unit Performance; Ex = Expanding Own Competencies; MR = Managing Resources; BA = Being an (Overseas) Ambassador.

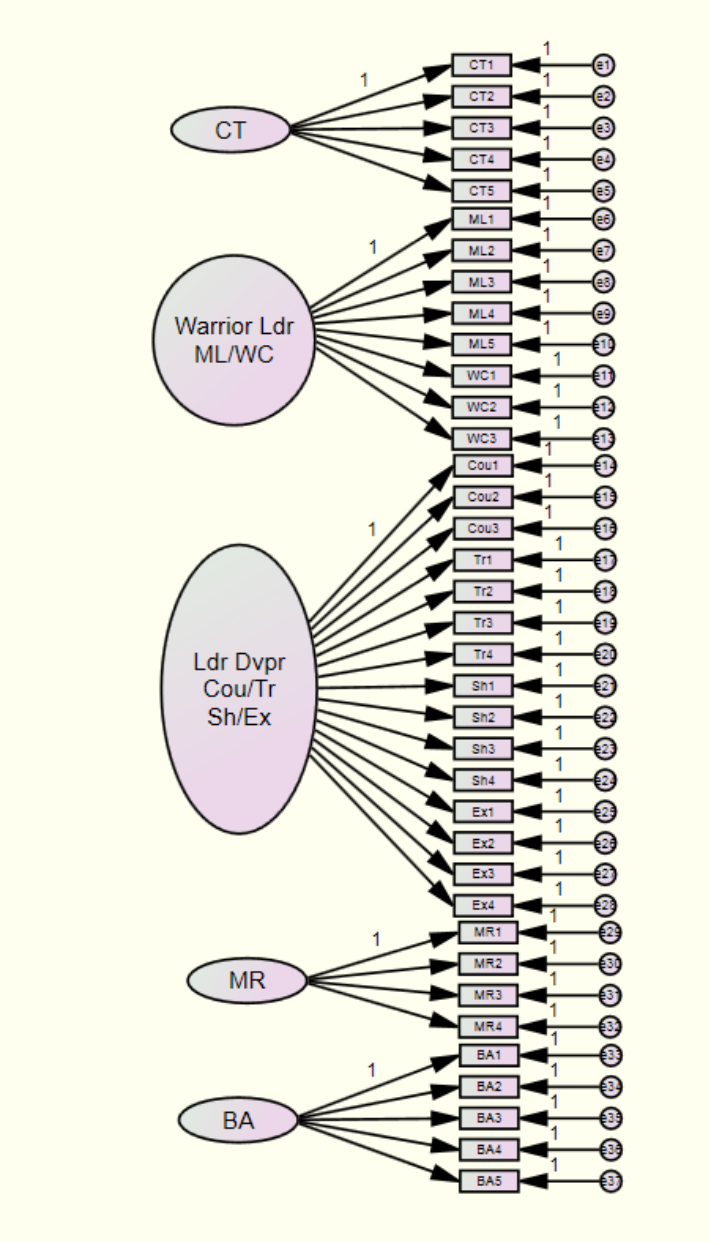

Figure 6. Path diagram of five-factor competency model. Covariances not depicted but five latent competencies allowed to covary freely. CT = Critical/Creative Thinking; Warrior Ldr = Warrior Leader (contained both ML and WC items from nine factor model); Ldr Dvpr = Leader Developer (contained items from Cou, Tr, Sh, and Ex competencies in nine factor model); MR = Managing Resources; BA = Being an (Overseas) Ambassador.

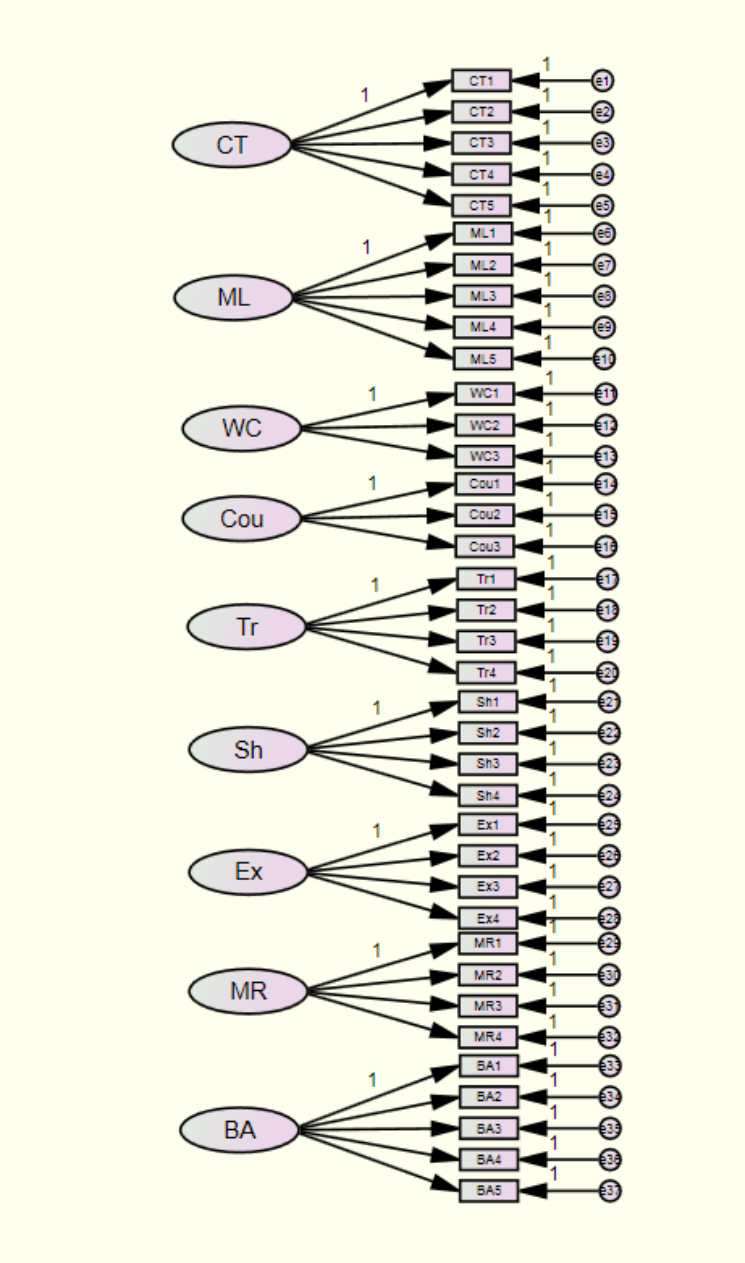

Figure 7. Path diagram of nine factor model of NCO competency SSE. Covariances not depicted; nine latent competencies allowed to covary freely. CT = Critical/Creative Thinking; ML = Military Leadership; WC = Warrior Competencies; Cou = Counseling, Coaching and Mentoring; Tr = Training Subordinates; Sh = Shaping Unit Performance; Ex = Expanding Own Competencies; MR = Managing Resources; BA = Being an (Overseas) Ambassador.

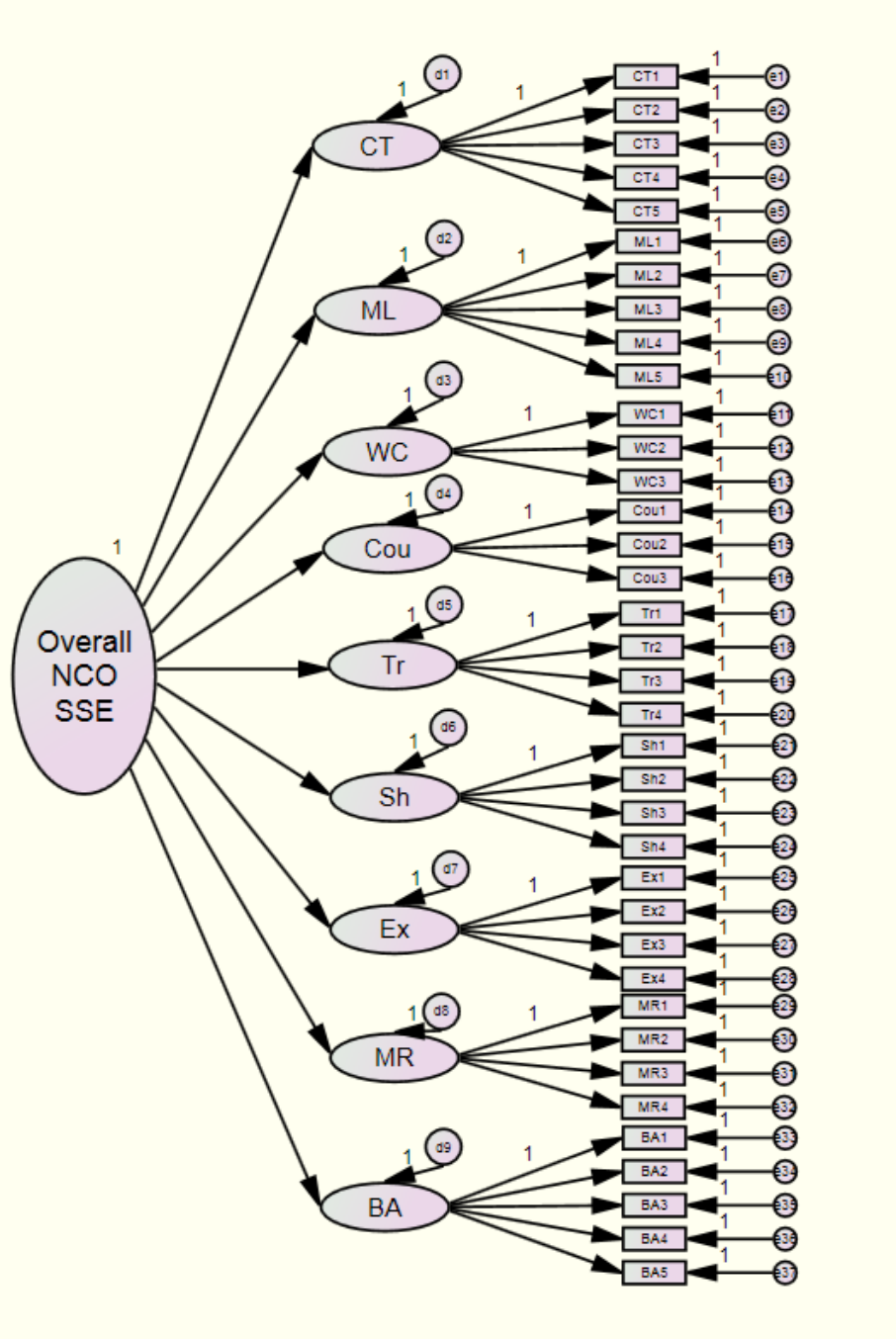

Figure 8. Second-order model with nine underlying first-order competencies. CT = Critical/Creative Thinking; ML = Military Leadership; WC = Warrior Competencies; Cou = Counseling, Coaching and Mentoring; Tr = Training Subordinates; Sh = Shaping Unit Performance; Ex = Expanding Own Competencies; MR = Managing Resources; BA = Being an (Overseas) Ambassador.

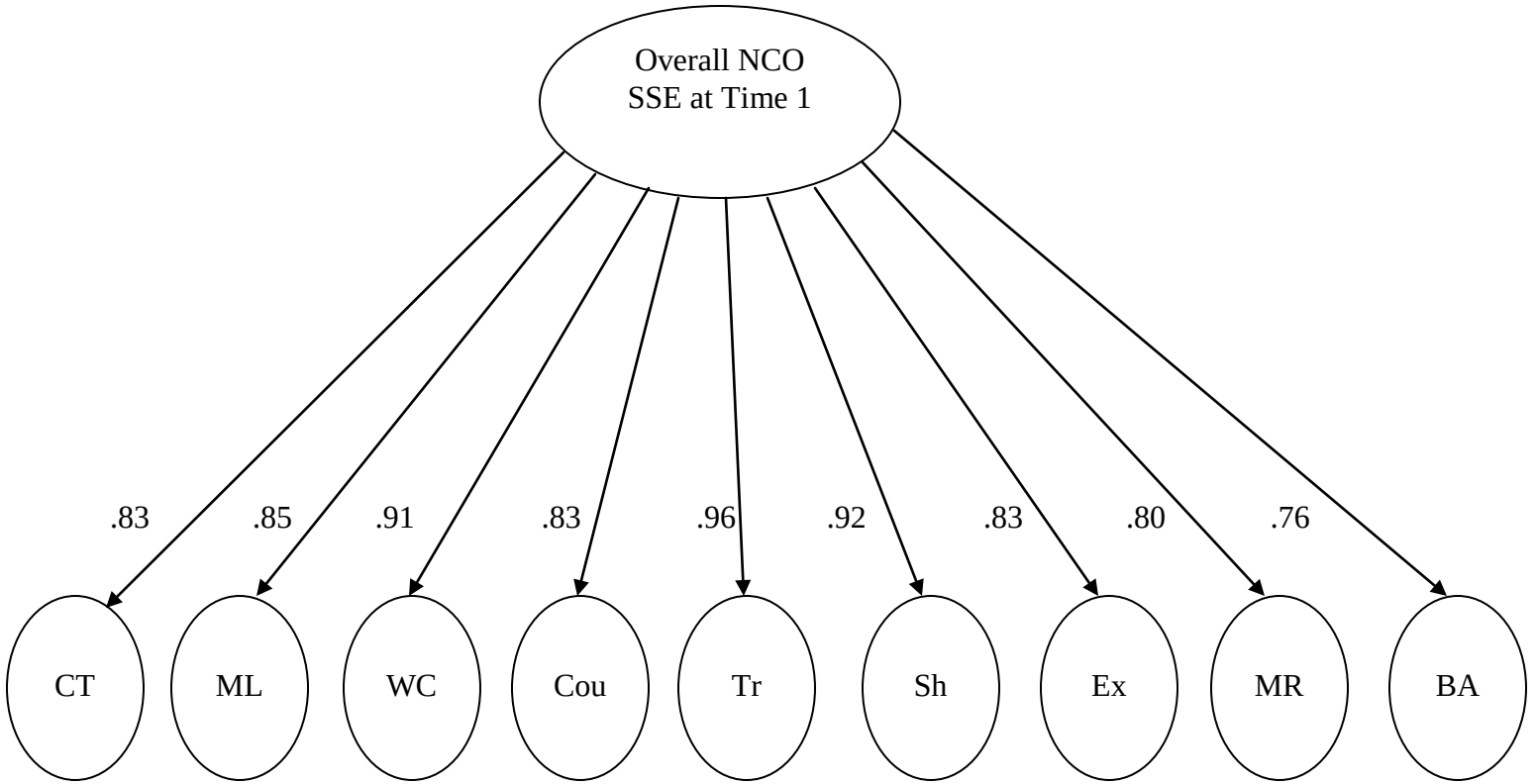

Figure 9. Path diagram at time 1 with standardized regression coefficients (*N* = 423). For brevity, disturbances and underlying indicators not included in path diagram. CT = Critical/Creative Thinking; ML = Military Leadership; WC = Warrior Competencies; Cou = Counseling, Coaching and Mentoring; Tr = Training Subordinates; Sh = Shaping Unit Performance; Ex = Expanding Own Competencies; MR = Managing Resources; BA = Being an (Overseas) Ambassador.

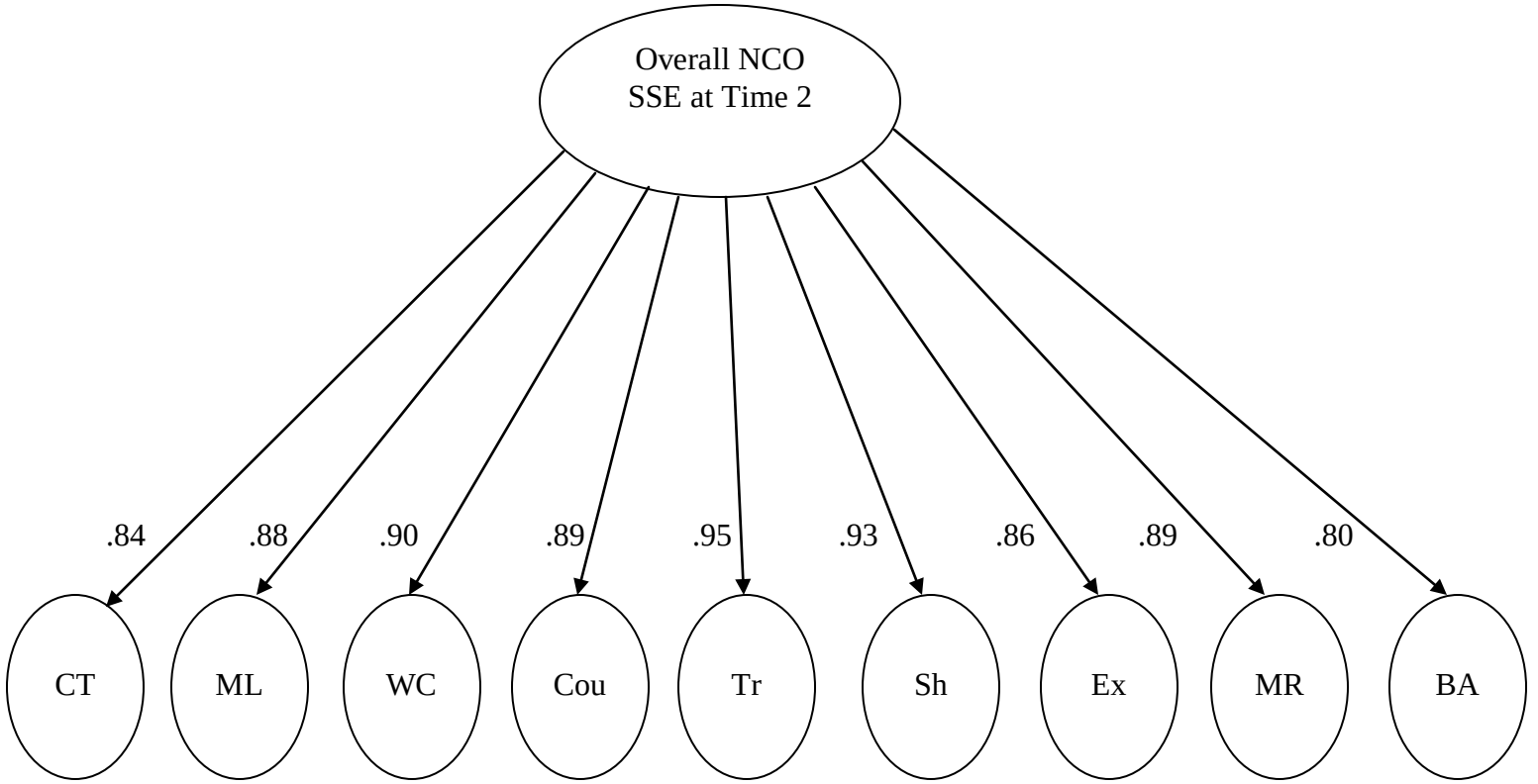

Figure 10. Path diagram at time 2 with standardized regression coefficients (*N* = 412). For brevity, disturbances and underlying indicators not included in path diagram. CT = Critical/Creative Thinking; ML = Military Leadership; WC = Warrior Competencies; Cou = Counseling, Coaching and Mentoring; Tr = Training Subordinates; Sh = Shaping Unit Performance; Ex = Expanding Own Competencies; MR = Managing Resources; BA = Being an (Overseas) Ambassador.

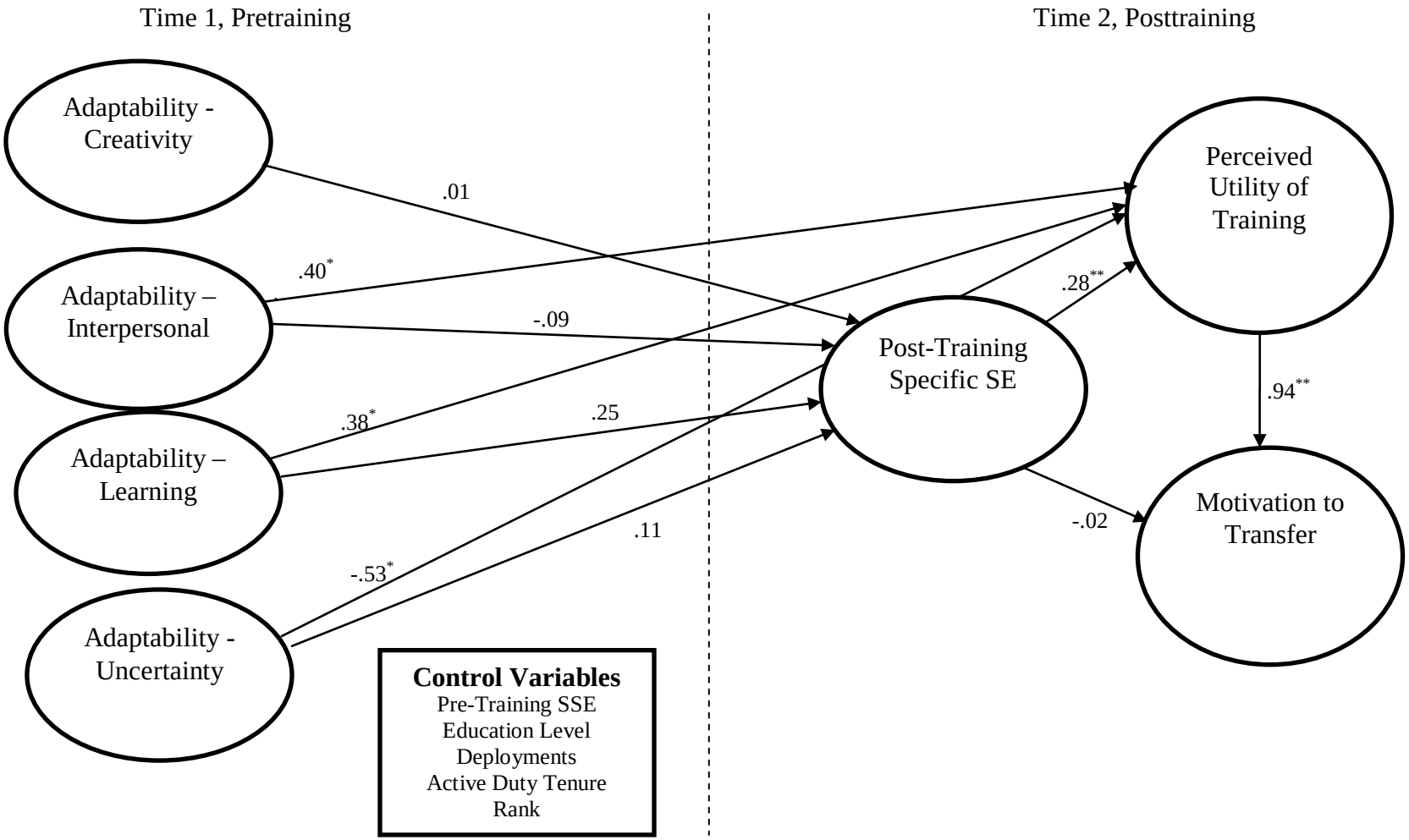

Figure 11. Path diagram of partially mediated proximal model (PM_{part}) with standardized structural path coefficients (N = 411). For better interpretability, only direct effects most pertinent to research questions displayed herein. † $p < .10$; * $p < .05$; ** $p < .01$.

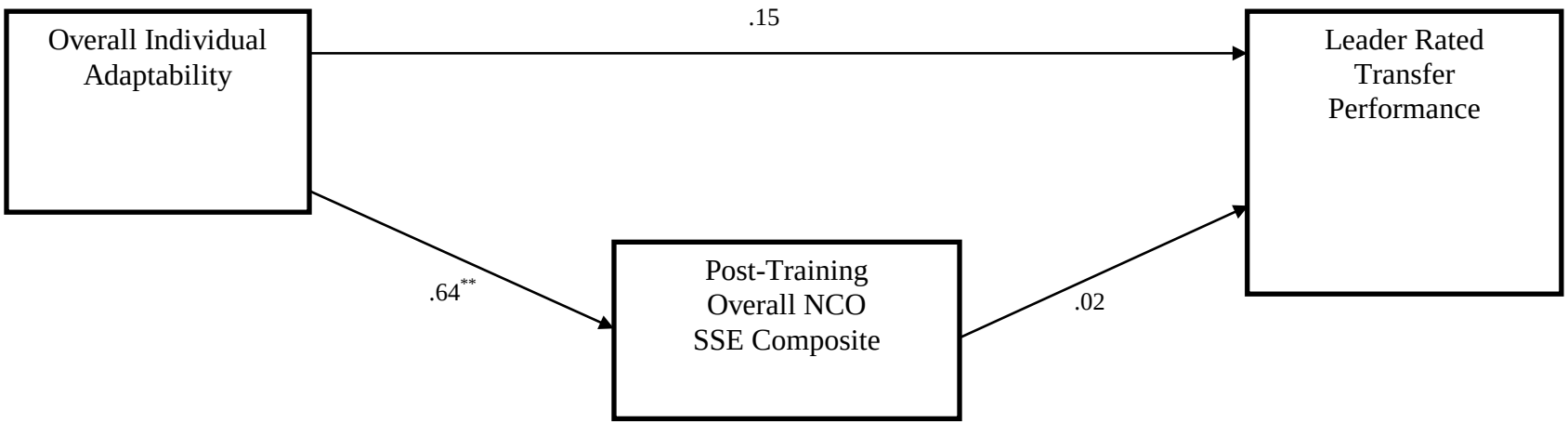

Figure 12. Path diagram of the leader rated distal model (DM_{ldr}) with standardized structural path coefficients (N = 72).

† $p < .10$

* $p < .05$

** $p < .01$

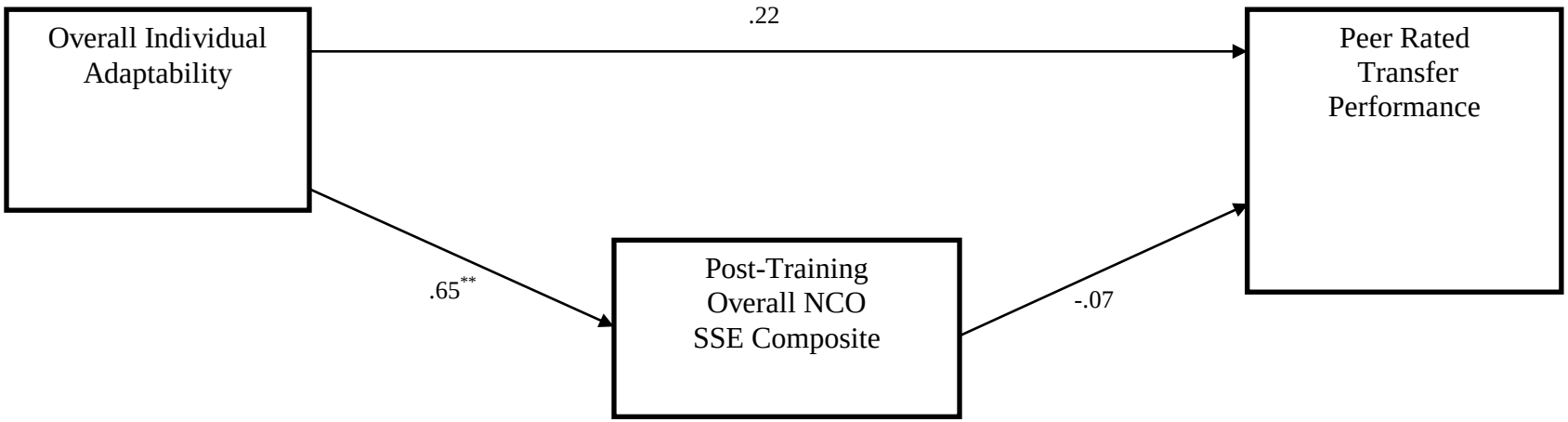

Figure 13. Path diagram of the peer rated distal model (DM_{peer}) with standardized structural path coefficients (N = 78).

† $p < .10$

* $p < .05$

** $p < .01$

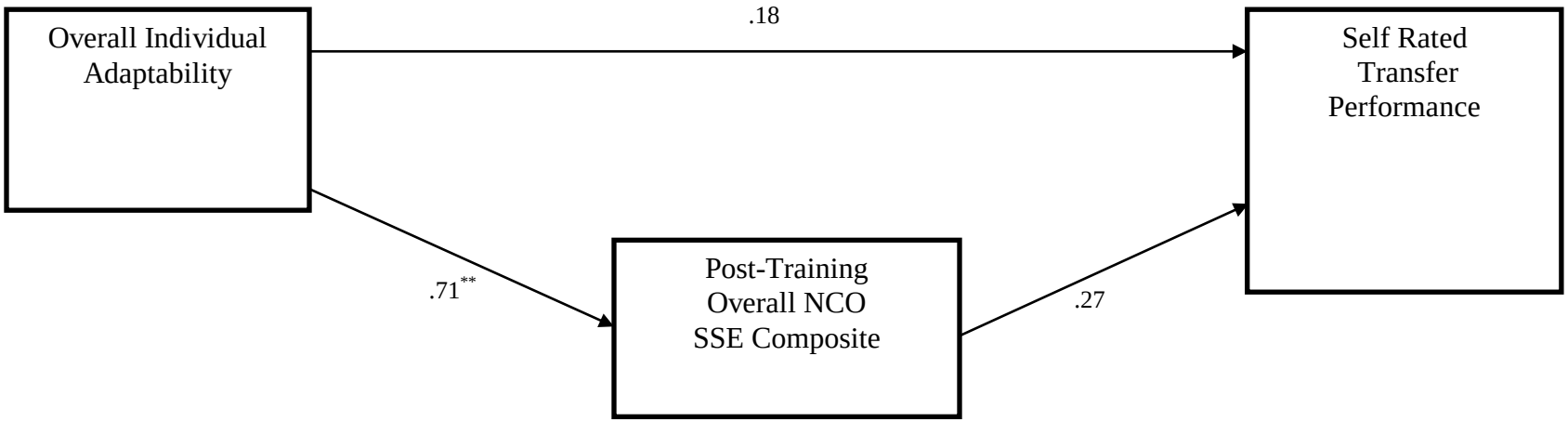

Figure 14. Path diagram of the self rated distal model (DM_{self}) with standardized structural path coefficients (N = 64).

† $p < .10$

* $p < .05$

** $p < .01$

Table 1

Visual of Data Collection Assessment Periods

Class	T1 *n*	Training and Transfer Collection Times: Month 1	Month 2	Month 3	Month 4	Month 5	Month 6	Month 7	Month 8
Resident Course 1	128								
MTT Course 1	98								
MTT Course 2	80								
Resident Course 2	118								

Note. T1 *n* = number of primary participants surveyed at time 1. Patterned boxes indicate relative time at which ALC Phase II training was conducted across the four course administrations. Solid boxes indicate times at which transfer data were collected from selected primary participants, peers, and supervisors at home installation.

Table 2

Overview of Measures Administered across Three Collection Points

Time Assessed		
Pre ALC Training	Post ALC Training	Transfer
Specific Self -Efficacy Demographics and Vital Tracking Info (Deployments, Rank, Active Duty Tenure, Education, Names of Supervisors/Peers) Individual Adaptability -Creativity -Interpersonal -Learning -Uncertainty	Specific Self -Efficacy Motivation to Transfer Reactions: Perceived Utility	Ratings of Squad Leader Job Performance -Supervisor -Peer -Self

Table 3

Means, Standard Deviations, Correlations, and Internal Consistency Estimates

Variables	*M*	*SD*	1	2	3	4	5	6	7	8	9
Time 1											
1. Rank (0 = *SGT* and 1 = *SSG*)	0.74	0.44	-								
2. Prior OIF or OEF Deployments	2.15	0.96	.18**	-							
3. Education$_a$	2.57	0.87	.06	-.13**	-						
4. Active duty experience (years)	7.33	2.75	.17**	.31**	.02	-					
5. Baseline Overall NCO SSE	4.03	0.56	.06	.10*	.03	-.10*	(.94)				
6. Adaptability – creativity	3.95	0.54	-.02	.00	.09	-.15**	.52**	(.81)			
7. Adaptability – interpersonal	4.15	0.46	.06	.05	.06	-.05	.41**	.63**	(.79)		
8. Adaptability – learning	4.18	0.49	-.00	.08	.04	-.10	.54**	.75**	.64**	(.90)	
9. Adaptability – uncertainty	3.87	0.39	.00	.08	.03	-.16**	.56**	.65**	.59**	.69**	(.65)

continued

Table 3 (continued)

Variables	*M*	*SD*	1	2	3	4	5	6	7	8	9
Time 2											
10. Overall NCO SSE	4.26	0.57	.05	.10	-.01	-.11*	.52**	.41**	.32**	.47**	.40**
11. Reactions (Perceived Utility)	3.89	0.81	-.10*	-.02	-.07	-.05	.06	.12*	.14**	.18**	.04
12. Motivation to Transfer	3.28	0.53	-.11*	-.02	-.03	-.05	.08	.12*	.20**	.19**	.04
Time 3											
13. Transfer performance (supervisor rating; *n* = 72)	3.39	0.87	.25*	.21	.07	.05	.20	.07	.13	.21	.16
14. Transfer performance (peer rating; *n* = 78)	3.39	0.91	.02	-.08	-.00	-.24*	.09	.14	.10	.23*	.09
15. Transfer performance (self rating; *n* = 64)	3.67	0.72	.05	.10	.02	-.03	.52**	.40**	.23	.37**	.24

continued

Table 3 (continued)

Variables	10	11	12	13	14	15
Time 2						
10. Overall NCO SSE	(.96)					
11. Reactions (Perceived Utility)	.23**	(.91)				
12. Motivation to Transfer	.21**	.75**	(.60)			
Time 3						
13. Transfer performance (supervisor rating; *n* = 72)	.12	.00	-.03	(.94)		
14. Transfer performance (peer rating; *n* = 78)	.07	.05	-.03	.14[b]	(.95)	
15. Transfer performance (self rating; *n* = 64)	.40**	.12	.04	.22[c]	-.05[d]	(.92)

Note. Except as noted by time 3 (transfer) variables, *N* = 411 for all correlations. Cronbach's alpha listed upon the diagonal. All internal consistency estimates computed prior to conducting any data imputations. OIF = Operation Iraqi Freedom, OEF = Operation Enduring Freedom (Afghanistan). [a]Education: 0 = no high school diploma; 1 = GED; 2 = high school diploma; 3 = some college [no degree]; 4 = Associate's degree; 5 = Bachelor's degree; 6 = some graduate [no degree]; 7 = Master's degree. [b] *n* = 54. [c] *n* = 50. [d] *n* = 50.

*$p < .05$. **$p < .01$.

Table 4

Fit Indices for the Pretraining SSE CFA Models (N = 423)

Model		χ^2	*df*	χ^2/df	CFI	RMSEA [90% C. I.]
$M1_{pre}$	One first-order factor	3,808.80	629	6.06	.75	.11 [.106, .113]
$M2_{pre}$	Five first-order factors	2,412.26	619	3.90	.86	.08 [.079, .086]
$M3_{pre}$	Nine first-order factors	1,302.99	593	2.20	.94	.05 [.049, .057]
$M4_{pre}$	One higher-order factor with nine first-order factors	1,499.36	620	2.42	.93	.06 [.054, .062]

Table 5

Interfactor Correlation Matrix of Nine First-Order SSE Latent Factors at Time 1

Factor	CT	ML	WC	Cou	Tr	Sh	Ex	MR	BA
CT	(.86)								
ML	.69	(.90)							
WC	.83	.75	(.87)						
Cou	.61	.84	.75	(.88)					
Tr	.82	.78	.87	.77	(.89)				
Sh	.73	.78	.84	.73	.91	(.92)			
Ex	.75	.65	.77	.66	.80	.74	(.85)		
MR	.56	.71	.70	.70	.74	.79	.63	(.90)	
BA	.64	.64	.65	.66	.72	.65	.71	.65	(.92)

Note. Cronbach's alpha listed upon the diagonal. CT = Critical/Creative Thinking; ML = Military Leadership; WC = Warrior Competencies; Cou = Counseling, Coaching and Mentoring; Tr = Training Subordinates; Sh = Shaping Unit Performance; Ex = Expanding Own Competencies; MR = Managing Resources; BA = Being an (Overseas) Ambassador. All correlations significant at $p < .001$ level of significance.

Table 6

Fit Indices for the Posttraining SSE CFA Models (N = 412)

Model		χ^2	*df*	χ^2/df	CFI	RMSEA [90% C. I.]
$M1_{post}$	One first-order factor	5,361.82	629	8.52	.74	.14 [.132, .138]
$M2_{post}$	Five first-order factors	2,633.21	619	4.25	.88	.09 [.085, .092]
$M3_{post}$	Nine first-order factors	1,528.96	593	2.58	.95	.06 [.058, .066]
$M4_{post}$	One higher-order factor with nine first-order factors	1,795.87	620	2.90	.94	.07 [.064, .072]

Table 7

Interfactor Correlation Matrix of Nine First-Order SSE Latent Factors at Time 2

Factor	CT	ML	WC	Cou	Tr	Sh	Ex	MR	BA
CT	(.94)								
ML	.80	(.95)							
WC	.84	.86	(.91)						
Cou	.71	.79	.81	(.91)					
Tr	.80	.78	.83	.87	(.93)				
Sh	.73	.80	.83	.83	.92	(.95)			
Ex	.75	.73	.74	.76	.82	.78	(.90)		
MR	.69	.78	.79	.78	.83	.87	.75	(.95)	
BA	.66	.68	.66	.73	.75	.74	.84	.71	(.95)

Note. Cronbach's alpha listed upon the diagonal. CT = Critical/Creative Thinking; ML = Military Leadership; WC = Warrior Competencies; Cou = Counseling, Coaching and Mentoring; Tr = Training Subordinates; Sh = Shaping Unit Performance; Ex = Expanding Own Competencies; MR = Managing Resources; BA = Being an (Overseas) Ambassador. All correlations significant at $p < .001$ level of significance.

Table 8

Overall Model Fit Comparison of Nested Proximal Models (N = 411)

Model		χ^2	*df*	χ^2/df	$\Delta\chi^2$	Δdf	Sign. level	CFI	RMSEA [90% C. I.]
PM_{full}	Full mediation model	3,577.49	1,764	2.03	--	--	--	.89	.05 [.048, .052]
PM_{part}	Partial mediation model	3,558.19	1,756	2.03	19.30	8	.013	.89	.05 [.048, .052]

Table 9

Standardized Structural Path Coefficients for Control Variables on Mediator and Outcome Variables within the Partial Mediation Proximal Model (PM_{part})

	Mediator	Outcome Variables	
Control Variable	End-of-Training Overall NCO SSE	Reactions – Perceived Utility	Motivation to Transfer
Rank (0 = *SGT* and 1 = *SSG*)	.03	-.11*	-.05†
Prior OIF or OEF Deployments	.04	.00	.03
Education[a]	-.02	-.09†	.02
Active duty experience (years)	-.05	-.06	.00
Baseline Overall NCO SSE	.35**	-.09	-.05

Note. OIF = Operation Iraqi Freedom, OEF = Operation Enduring Freedom (Afghanistan). [a]Education: 0 = no high school diploma; 1 = GED; 2 = high school diploma; 3 = some college [no degree]; 4 = Associate's degree; 5 = Bachelor's degree; 6 = some graduate [no degree]; 7 = Master's degree.

† $p < .10$. * $p < .05$. ** $p < .01$.

Table 10

Unanalyzed Associations – Correlations between Exogenous and Control Variables

	Exogenous Variables			
Control Variables	Adaptability creativity	Adaptability interpersonal	Adaptability learning	Adaptability uncertainty
Rank (0 = *SGT* and 1 = *SSG*)	-.02	.06	.00	.02
Prior OIF or OEF Deployments	.01	.06	.08	.11*
Education[a]	.09†	.07	.04	-.00
Active duty experience (years)	-.16**	-.07	-.10†	-.17**
Baseline Overall NCO SSE	.59**	.48**	.59**	.64**

Note. OIF = Operation Iraqi Freedom, OEF = Operation Enduring Freedom (Afghanistan).

[a]Education: 0 = no high school diploma; 1 = GED; 2 = high school diploma; 3 = some college [no degree]; 4 = Associate's degree; 5 = Bachelor's degree; 6 = some graduate [no degree]; 7 = Master's degree.

† $p < .10$. * $p < .05$. ** $p < .01$.

Table 11

Unstandardized Bias-Corrected Bootstrap Confidence Intervals to Test for Indirect Effects

		Reactions (Perceived Utility)	Motivation to transfer
		95% bias-corrected bootstrap	95% bias-corrected bootstrap
Predictor	Mediator	(BCB)	(BCB)
		Hypothesis 2a-d	Hypothesis 3a-d
Adaptability – creativity	Overall NCO SSE (improvement)	[-0.236, 0.209]	[-1.307, 0.548]
Adaptability – interpersonal	Overall NCO SSE (improvement)	[-0.320, 0.139]	[-0.075, 2.237]
Adaptability – learning	Overall NCO SSE (improvement)	[-0.059, 0.484]	[0.053, 2.226]
Adaptability – uncertainty	Overall NCO SSE (improvement)	[-0.184, 0.441]	[-2.734, -0.054]
			Hypothesis 4
Overall NCO SSE (improvement)	Reactions (Perceived Utility)	--	[0.186, 0.529]

Appendix A

Pretraining Demographics and Tracking Questionnaire

ALC Student Survey

Start-of-Course Version

Create a USER ID

We will use your USER ID to match your responses now with your responses following the training. After this link is made, random number IDs will be assigned to your data and all personal identification information will be shredded. You are encouraged to respond to all questions, but there will be no effect on you for not providing any part of the requested information.

STEP 1

To create a USER ID, use the following guideline:

Use the first two letters of the <u>City</u> in which you were <u>Born</u>	**Use the last four digits of your phone number**	USER ID
Cleveland = CL	XXX-6789	CL6789

Enter your USER ID here:_____(6 characters, e.g., CL6789)

STEP 2

Write your code on the card provided – You will need to enter this code on papers following the training.

General Instructions:

This survey uses a circle the correct response system and write-in. Please do the following:

- **Read** each question carefully
- **Write-in** your answers when asked
- **Circle** the appropriate response when requested

CONTINUE TO NEXT PAGE

Section I: *Student Demographic Inventory*

Directions: Please fill in the blank [print] or mark the appropriate response(s) for each question.

1. Rank _____

2. Number of continuous years and months of active military service _____

3. Time in current grade (*months*) _____

4. Primary Infantry experience: (Check one)

   Light _____ Wheeled (Stryker) _____ Mechanized _____

5. How many months have you served as a *Team Leader*? _____

6. How many months have you served as a *Squad Leader*? _____

7. How many months have you served as a *Section* Leader? _____

8. Your current unit (include parent Bn and Bde)

_____

9. Combat deployments since 9/11/01. Please check all operations that apply and note your duty position for each operation.

Operation	Check all that apply	Duty Position
Iraqi Freedom (May 03 – present)		
1st deployment	□	
2nd deployment	□	
3rd deployment	□	
4th Deployment	□	
5th Deployment	□	
Enduring Freedom (Oct 01 – present)		
1st deployment	□	
2nd deployment	□	
3rd deployment	□	
4th Deployment	□	
5th Deployment	□	

10. What level of civilian education have you completed? (Check highest level)

No HS Diploma _____ GED _____ HS Diploma _____
Some College (no degree) _____ Assoc Degree _____ Bachelors Degree _____
Graduate Work (no degree) _____ Masters Degree _____

11. What was your GT (General Technical) score from the ASVAB? _____

12. Your current Platoon Sgt _____ # months known _____
Full Name

13. Your current Platoon Ldr _____ # months known _____
Full Name

14. Your current First Sgt _____ # months known _____
Full Name

15. Fellow Squad Leaders in your company who know you:

15a. _____ # months known _____
Full Name

15b. _____ # months known _____
Full Name

15c. _____ # months known _____
Full Name

Appendix B

I-ADAPT Scale

(Creativity, Interpersonal, Learning, and Uncertainty Dimensions)

I-ADAPT Scale (Creativity, Interpersonal, Learning, and Uncertainty Dimensions)

To what extent do you agree or disagree with the statements in the table?

Select ONE response for each statement.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I believe it is important to be flexible in dealing with others. (Interpersonal)	1	2	3	4	5
2. I take responsibility for acquiring new skills. (Learning)	1	2	3	4	5
3. I tend to be able to read others and understand how they are feeling at any particular moment. (Interpersonal)	1	2	3	4	5
4. I see connections between seemingly unrelated information. (Creativity)	1	2	3	4	5
5. I enjoy learning new approaches for conducting work. (Learning)	1	2	3	4	5
6. I am good at developing unique analyses for complex problems. (Creativity)	1	2	3	4	5
7. My insight helps me to work effectively with others. (Interpersonal)	1	2	3	4	5
8. I need for things to be “black and white”. (Uncertainty – Reverse)	1	2	3	4	5
9. I am an innovative person. (Creativity)	1	2	3	4	5
10. I become frustrated when things are unpredictable. (Uncertainty – Reverse)	1	2	3	4	5

I-ADAPT Scale (Cont.)

To what extent do you agree or disagree with the statements in the table?

Select ONE response for each statement.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
11. I am able to make effective decisions without all relevant information. (Uncertainty)	1	2	3	4	5
12. I am an open-minded person in dealing with others. (Interpersonal)	1	2	3	4	5
13. I take action to improve work performance deficiencies. (Learning)	1	2	3	4	5
14. I am perceptive of others and use that knowledge in interactions. (Interpersonal)	1	2	3	4	5
15. I often learn new information and skills to stay at the forefront of my profession. (Learning)	1	2	3	4	5
16. When resources are insufficient, I thrive on developing innovative solutions. (Creativity)	1	2	3	4	5
17. I am able to look at problems from a multitude of angles. (Creativity)	1	2	3	4	5
18. I quickly learn new methods to solve problems. (Learning)	1	2	3	4	5
19. I tend to perform best in stable situations and environments. (Uncertainty)	1	2	3	4	5
20. When something unexpected happens, I readily change gears in response. (Uncertainty)	1	2	3	4	5

I-ADAPT Scale (Cont.)

To what extent do you agree or disagree with the statements in the table?

Select ONE response for each statement.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
21. I try to be flexible when dealing with others. (Interpersonal)	1	2	3	4	5
22. I can adapt to changing situations. (Uncertainty)	1	2	3	4	5
23. I train to keep my work skills and knowledge current. (Learning)	1	2	3	4	5
24. I am continually learning new skills for my job. (Learning)	1	2	3	4	5
25. I perform well in uncertain situations. (Uncertainty)	1	2	3	4	5
26. I take responsibility for staying current in my profession. (Learning)	1	2	3	4	5
27. I adapt my behavior to get along with others. (Interpersonal)	1	2	3	4	5
28. I easily respond to changing conditions. (Uncertainty)	1	2	3	4	5
29. I try to learn new skills for my job before they are needed. (Learning)	1	2	3	4	5
30. I can adjust my plans to changing conditions. (Uncertainty)	1	2	3	4	5

Appendix C

NCO Squad Leader Task Specific Self-Efficacy Scale

Section II: *Execution of NCO Competencies*

Using the scale below, please **circle the appropriate response** to indicate how confident you are in your ability to perform each task.

A completed example item is provided below:

For each item, indicate your confidence in your own ability to perform the task.	Confidence				
	Not at All Confident	Slightly Confident	Moderately Confident	Very Confident	Completely Confident — Could Teach This to Others
A. Example competency A					
1. Example task 1	(1)	2	3	4	5

For each item, indicate your confidence in your own ability to perform the task.	Confidence				
	Not at All Confident	Slightly Confident	Moderately Confident	Very Confident	Completely Confident — Could Teach This to Others
A. Critical/Creative Thinking					
1. Adjust TTP execution to fit current METT-TC	1	2	3	4	5
2. Manage time to meet mission milestones	1	2	3	4	5
3. Anticipate and plan for the unexpected by thinking ahead	1	2	3	4	5
4. Formulate lessons learned based on own/unit experiences	1	2	3	4	5
5. Realistically work new TTP and equipment into unit operations	1	2	3	4	5

NCO Squad Leader Task Specific Self-Efficacy (Cont.)

Circle the appropriate responses.

For each item, indicate your confidence in your own ability to perform the task.	Confidence				
	Not at All Confident	Slightly Confident	Moderately Confident	Very Confident	Completely Confident — Could Teach This to Others
B. Military Leadership					
1. Foster teamwork and positive climate within the squad	1	2	3	4	5
2. Explain everyday duties and responsibilities to subordinates	1	2	3	4	5
3. Give clear guidance to subordinates regarding task performance	1	2	3	4	5
4. Convey mission orders to Soldiers clearly, correctly, completely	1	2	3	4	5
5. Ensure subordinates treat others with respect	1	2	3	4	5
C. Warrior Competencies					
1. Apply proper TTP in executing collective tasks	1	2	3	4	5
2. Properly employ all assigned and available equipment	1	2	3	4	5
3. Achieve acceptable proficiency for individual tasks/skills	1	2	3	4	5

NCO Squad Leader Task Specific Self-Efficacy (Cont.)

Circle the appropriate responses.

For each item, indicate your confidence in your own ability to perform the task.	Confidence				
	Not at All Confident	Slightly Confident	Moderately Confident	Very Confident	Completely Confident — Could Teach This to Others
D. Counseling, Coaching and Mentoring					
1. Answer Soldiers' questions and share knowledge and experiences	1	2	3	4	5
2. Guide and develop subordinates by coaching, counseling, etc.	1	2	3	4	5
3. Reinforce ethical standards of behavior among subordinates	1	2	3	4	5
E. Training Subordinates					
1. Develop, prepare, and execute realistic training plans	1	2	3	4	5
2. Manage training events to optimize participation and safety	1	2	3	4	5
3. Explain and demonstrate Soldier tasks	1	2	3	4	5
4. Properly evaluate performance of Soldiers and provide feedback	1	2	3	4	5

NCO Squad Leader Task Specific Self-Efficacy (Cont.)

Circle the appropriate responses.

For each item, indicate your confidence in your own ability to perform the task.	Confidence				
	Not at All Confident	Slightly Confident	Moderately Confident	Very Confident	Completely Confident — Could Teach This to Others
F. Shaping Unit Performance					
1. Ensure Soldiers perform individual and common tasks to standard	1	2	3	4	5
2. Ensure squad executes collective tasks to standard	1	2	3	4	5
3. Ensure subordinates pass APFT and weapons qualification tests	1	2	3	4	5
4. Ensure subordinates properly employ assigned equipment	1	2	3	4	5
G. Managing Resources					
1. Properly account for all personnel, equipment, and supplies	1	2	3	4	5
2. Act to fix problems with personnel, equipment, and supplies	1	2	3	4	5
3. Ensure all assigned equipment is maintained properly	1	2	3	4	5
4. Ensure subordinates execute and document proper maintenance	1	2	3	4	5

NCO Squad Leader Task Specific Self-Efficacy (Cont.)

Using the scale below, please **circle the appropriate response** to indicate how confident you are in your **ability to model** the task.

For each item, indicate your confidence in your own ability to perform the task.	Confidence				
	Not at All Confident	Slightly Confident	Moderately Confident	Very Confident	Completely Confident — Could Teach This to Others
H. Expanding Own Competencies					
1. Seeking to improve technical, tactical, and leadership skills	1	2	3	4	5
2. Seeking mentoring from your Platoon Sergeant and other leaders	1	2	3	4	5
3. Leading and/or participating in professional development sessions	1	2	3	4	5
4. Assisting or standing in for your Platoon Sergeant	1	2	3	4	5
I. Being an (Overseas) Ambassador					
1. Showing respect for the standards of the community within the mission area	1	2	3	4	5
2. Ensuring subordinates favorably represent both the unit and the Army	1	2	3	4	5
3. Broadening your understanding of joint and unified activities	1	2	3	4	5
4. Developing and applying cultural awareness in combat operations	1	2	3	4	5
5. Considering the impact of planning and leading combat ops in the community within the mission area	1	2	3	4	5

Appendix D

Motivation to Transfer Scale

Motivation to Transfer Scale

To what extent do you agree or disagree with the statements in the table?

Select ONE response for each statement.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. The skills and knowledge I have obtained by attending ALC will be helpful in solving work related problems	1	2	3	4	5
2. Before I attended ALC I considered how I would use the content of the program	1	2	3	4	5
3. I believe my performance will likely improve if I use the knowledge and skills acquired in ALC	1	2	3	4	5
4. It is unrealistic to believe that mastering the content of ALC can improve my work performance (R)	1	2	3	4	5
5. There are more problems than the trainers realize in using ALC content in my daily work activities (R)	1	2	3	4	5
6. Before I attended ALC I identified particular problems or projects that I would like the training to help me with	1	2	3	4	5

Note. R – reverse coded item.

Appendix E

Reactions (Perceived Utility) Scale

Reactions (Perceived Utility) Scale

To what extent do you agree or disagree with the statements in the table?

Select ONE response for each statement.	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I expect that what I learned in Phase II will be relevant to my job	1	2	3	4	5
2. I expect that my ALC training will make me a better NCO	1	2	3	4	5
3. I expect that completing ALC will be good for my Army career	1	2	3	4	5
4. The training I received from ALC will be useful	1	2	3	4	5

Appendix F

Supervisor (and Peer) Transfer Performance Rating Questionnaire

Supervisor (and Peer) Transfer Performance Rating Questionnaire

Note. Same format administered to supervisors and peers with wording changed as appropriate.

Supervisor (or Peer) Ratings of ALC Student(s)

End State Version

Create a USER ID

We will use your USER ID to help ensure confidentiality of your ratings following collection and entry. After ratings are linked to student participants, random number IDs will be assigned to your data and all personal identification information will be shredded. You are encouraged to respond to all questions, but there will be no effect on you for not providing any part of the requested information.

STEP 1

To create a USER ID, use the following guideline:

Use the first two letters of the City in which you were Born	**Use the last four digits of your phone number**	USER ID
Cleveland = CL	XXX-6789	CL6789

Enter your USER ID here:_____(6 characters, e.g., CL6789)

STEP 2

General Instructions:

After completing the next demographic page, you will be asked to rate a squad or section leader named on the top right-hand portion of the following sheet(s) on the competencies of a squad or section leader listed. All responses are completely confidential and will be used solely for research and group-level evaluation purposes. That is, individual ratings will not be shared with anyone outside of the research team. In addition, these ratings will not be shared with the Soldiers being rated and will not impact in any way an individual Soldier's career outcomes. Your honest and thoughtful ratings on each competency assessed will be essential in accomplishing the objectives of the current investigation.

CONTINUE TO NEXT PAGE

SECTION I: *Supervisor (or Peer) Demographic Inventory*

Directions: Please fill in the blank [print] or mark the appropriate response(s) for each question.

1. Your Current Rank _____
2. Number of continuous years and months of active military service _____
3. Time in current grade (*months*) _____
4. Your current duty position _____

SECTION II: *Primary Participant(s) Performance Ratings*

Important: General Instructions for the Sheets that Follow

Please rate the squad or section leader named on the top right-hand portion of the following sheet(s) on the competencies of a squad or section leader listed. *Please consider the Soldier's performance on each dimension separately.* All responses are completely confidential and will be used solely for research and group-level evaluation purposes. That is, individual ratings will not be shared with anyone outside of the research team. In addition, these ratings will not be shared with the Soldiers being rated and will not impact in any way an individual Soldier's career outcomes. Your honest and thoughtful ratings on each competency assessed will be essential in accomplishing the objectives of the current investigation.

CONTINUE TO NEXT PAGE

Soldier to be Rated: _____

Supervisor (Peer) Ratings of Squad or Section Leader Performance

Please rate the performance of the named subordinate on the following competencies of a Squad/Section Leader over the course of the past 4-5 months (since completing ALC, Phase II Training).

For each item, indicate the level of performance you have observed of the listed squad/section leader over the past 4-5 months (since completing ALC Phase II Training).	Level of Performance					
	N/A; Have not observed in prior 4-6 months	Below Average	Average	Slightly Above Average	Well Above Average	Excellent
1. Thinking critically and creatively (adjusting TTP, anticipating unexpected, etc.)	NA	1	2	3	4	5
2. Performing leadership duties (issuing orders, building teamwork, etc.)	NA	1	2	3	4	5
3. Executing Warrior competencies (properly employ equipment, achieve proficiency at individual tasks, etc.)	NA	1	2	3	4	5
4. Counseling/coaching/ mentoring Soldiers (share knowledge and experience with subordinates, reinforce ethical behavior, etc.)	NA	1	2	3	4	5
5. Training subordinates (preparing/managing training plans, demonstrating, explaining, evaluating, etc.)	NA	1	2	3	4	5
6. Shaping unit performance (ensure squad executes collective tasks to standard, subordinates pass APFT, etc.)	NA	1	2	3	4	5
7. Managing unit resources (maintaining and accounting for personnel, equipment, and supplies, etc.)	NA	1	2	3	4	5
8. Expanding own competencies (improving skills, seeking mentoring, professional development, etc.)	NA	1	2	3	4	5
9. Being an (overseas) ambassador (working with the community within the mission area, cultural awareness, etc.)	NA	1	2	3	4	5

THANK YOU!