A MINDSET FOR STRATEGIC THINKING: DEVELOPING A CONCEPT AND MEASURE

by

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B.S., Baker University, 2007
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AN ABSTRACT OF A DISSERTATION

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Abstract

Developing effective strategic thinkers in an organization requires a dedication to early identification, selection, development, and practice, along with the conceptual understanding and measurement tools to make it happen. In support of this, the current research focused on three objectives: 1) establishing theoretical support across multiple disciplines for the concept of a strategic thinking mindset, 2) developing the Strategic Thinking Mindset Test (STMT) using situational judgment test methodology for the U.S. Army, and 3) evaluating the results of a pilot test of the STMT for reliability and construct validity.

The STMT focuses on three characteristics of a strategic mindset: Flexibility, Humility, and Inclusiveness. These characteristics were derived from themes found common to strategic thinking literature across the disciplines of psychology, management, and military science.

In all stages of this research, officers and non-commissioned officers of the U.S. Army served as participants. The first three stages involve the development and keying of content for the STMT. A sample of 125 participants provided scenarios in Stage 1. In Stage 2, 75 participants gave feedback on the scenarios and provided realistic response options. In Stage 3, 224 participants rated the response options according to expression of the characteristic and effectiveness. In Stage 4, the pilot version of the STMT was administered to 229 participants, along with several other measures used to establish construct validity evidence.

The results of the pilot test revealed that, although there is some evidence supporting the construct validity of the STMT as a three-factor test of flexibility, humility, and inclusiveness, the overall profile of evidence suggests that the construct(s) being measured are unclear. Low inter-item correlations contribute to a low internal consistency in the measure, which further limits the STMT's use as a predictor. The pilot test revealed interesting results related to

cognitive ability, specifically a negative relationship between the mindset and cognitive ability under best/worst response instructions, rather than a positive relationship or no relationship, as was the case under most/least likely response instructions. Future research recommendations are discussed in the areas of SJT development, scoring, format, and the further refinement and measurement of the strategic thinking mindset.

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Chapter 1 - Problem Statement

Over the past several decades, organizations have evolved their structures and processes in response to increased complexity and environmental unpredictability (Huber, 2011). Common organizational structures in the past were highly bureaucratic, characterized by clear hierarchical levels and functional divisions. In contrast, many organizations today are better characterized as being "adhocracies" (cf., Toffler, 1970), often under pressure to become increasingly agile and responsive to the environment, with many developing structures and processes that are more decentralized and flexible (Huber, 2004).

In many industries, the current organizational context can be seen as a complex adaptive system (Cunha & Cunha, 2006), or a system that feature a large number of individual agents continuously interacting and adapting to each other in unique ways, producing system-wide effects that are largely unpredictable and constantly evolving (Anderson, 1999). The environmental context of an organization is critical to determining how it can best go about conducting strategic planning. Stieglitz, Knudsen, and Becker (2015) describe how the importance of strategic exploration and flexibility vary depending on the environment's dynamism. Environments characterized by persistent trends and few structural shifts require different strategic choices than those characterized by dynamic changes in the direction, magnitude, and frequency of relevant environmental forces.

Such dynamic environments represent complex adaptive systems. To the extent that an organization exists within this type of environment, executing strategy to ensure organizational prosperity becomes an increasingly difficult task and requires a greater investment in developing competence in strategic thinking throughout the organization, particularly among its leaders. As such, strategic thinking has become an imperative for modern businesses (Duhaime, Stimpert, &

Chesley, 2012) and a crucial research focus, not only because of the importance of strategic thinking to ensuring long-term organizational success, but also because there is evidence that leaders across industries lack highly developed strategic thinking skills (Bethel, Prupas, Ruby, & Smith, 2010; Bonn, 2001; Krepinevich & Watts, 2009).

Research on strategic thinking has focused not only on the conceptualization of what strategic thinking entails (Graetz, 2002; Liedtka, 1998a), but also how it is developed (Bonn, 2001, 2005; Goldman & Casey 2010; Eifler, 2012), and how strategic managers struggle with it (Moldoveanu, 2009). Among the scholars in the area, there seems to be a consensus that time and certain experiences are needed to develop strategic thinking (Dragoni, Oh, Vankatwyk, & Tesluk, 2011; Goldman, 2008). For example, Goldman (2008) described the importance of spearheading a growth initiative or doing strategic planning activities in order to develop strategic thinking. This trend has also been noted by military scholars as a necessary evolution for the armed forces (Alberts & Hayes, 2003). The Army Research Institute for the Behavioral and Social Sciences has recently conducted a line of research exploring the needs for better strategic thinking development in the U.S. Army (e.g., Wolters, Grome, & Hinds, 2013; Sackett, Karrasch, Weyhrauch, & Goldman, 2016). Similar to the process described by Goldman, Army officers with high potential are often rotated through a variety of broadening experiences as they rise in rank, in part to gain the perspective and knowledge necessary to be effective at strategic levels of command (U.S. Army Training and Doctrine Command, 2009).

If certain experiences are necessary to develop strategic thinking, a practical problem quickly emerges in that it becomes essential for organizational decision makers to know how to assign such activities. That is, in order to optimize the development of strategic thinkers for an organization, leaders must make informed decisions about who has *potential* for positions at

higher organizational levels so that they can be properly mentored and subsequently promoted to positions that will help them further develop and utilize their strategic thinking skills.

There are a variety of constructs that could be used to predict one's potential for strategic thinking. For example, general and technical knowledge, intelligence, creativity, adaptability, and personality have been proposed as predictors of strategic cognitive readiness in the military (Grier, 2012). A similar list from the management literature includes cognitive ability, personality, and work experience (Dragoni et al., 2011).

The purpose of the current research is to contribute to this literature on the understanding and development of strategic thinking by conceptualizing a new construct with the potential to predict and forecast strategic thinking ability: the strategic thinking mindset. Furthermore, this research will aim to develop a measure of strategic thinking mindset for use in the military. Broadly speaking, the strategic thinking mindset reflects the tendency for an individual to approach problems in a manner that is consistent with the elements of strategic thinking, specifically in terms of flexibility, humility, and inclusiveness. Whereas others have referenced a strategic thinking mindset (Pisapia, Reyes-Guerra, & Coukos-Semmel, 2005; Yorks & Nicolaides, 2012), their conceptualizations and operationalizations are limited. Pisapia et al. (2005) developed a three-dimensional self-report measure of a strategic leader's thinking mindset, focusing on systems-thinking, reflecting, and reframing. However, more work is needed in measurement development in the area of strategic thinking mindset.

Developing a Situational Judgment Test of Strategic Thinking Mindset

To become a successful strategic thinker, having a mindset for strategic thinking is crucial, in combination with cognitive ability and extensive knowledge. The ability to assess that mindset has clear practical and theoretical benefits for academics and practitioners concerned

with strategic thinking as a competency. This research seeks to access strategic thinking mindset more directly through a situational judgment test (SJT).

One previous attempt has been made to measure a similar concept, but faces certain limitations that the current measure is designed to overcome. The Pisapia et al. (2005) Strategic Thinking Questionnaire, which reflects the first author's theory on strategic leadership (see also Pisapia, 2009), faces a limitation common among behavioral self-report measures. Specifically, the measure results in high means and small variance, suggesting the presence of social desirability bias by respondents confirming their tendency to exhibit the behaviors described. For example, Pisapia et al. report a mean of 4.20 (out of 5) and a standard deviation of 0.72 for the item "Evaluate a situation using many different viewpoints."

Using an SJT format, respondents' mindsets are measured by their choices regarding specified problem scenarios, in which their tendency to adopt a strategic mindset in response to those problems are inferred from the courses of action they endorse. This approach provides superior validity by making it more difficult for respondents to perceive the desirable response and to tailor their responding accordingly. Instead, the respondent's mindset is accessed more directly through concrete scenarios, rather than abstract and generic self-assessments. This approach should also provide higher face validity for its users. While this is not a necessary condition for assessment, it is an important consideration in organizational applications, resulting in more positive reactions among test takers and greater investment in assessment-related feedback (Hausknecht, Day, & Thomas, 2004).

Another practical advantage for using an SJT format to assess the strategic thinking mindset includes the opportunity to assess a wider candidate pool in searching for future strategic thinkers in an organization. Compared to assessment centers or work simulations requiring

trained assessors and simulation environments, paper-and-pencil SJTs are simpler and cheaper to administer. Therefore SJTs could be used to assess more personnel than would likely be feasible with assessment centers or simulation exercises. Furthermore, assessing strategic thinking mindset apart from ability permits earlier identification of potential, prior to a point in that person's career when he or she will have had the opportunity to demonstrate strategic thinking skills. With earlier identification of potential, mentorship and development can occur for a longer period prior to placement in a strategic-level position.

There are also practical benefits of a strategic thinking mindset assessment that uses an SJT methodology. From the test takers' perspective, they can learn from the results of the SJT about the ways in which their thought processes deviate from what theory says about dealing with strategic problems, allowing them to seek out development on their own and raise their metacognitive awareness, a key element of strategic thinking.

SJTs are typically produced using scenarios from a certain domain of work performance. The U.S. Army was available as a supporting organization available for this research and interested in the assessment of strategic thinking competencies. To balance applicability to the Army and rooting scenarios in a specified work domain, the problem scenarios forming the basis of the item content were collected from Company-grade Army officers and designed to reflect that general work domain, independent of military occupational specialty (MOS). This allows the developed instrument to be used widely throughout military organizations.

This research makes three primary contributions. First, this project contributes substantially to conceptual work in understanding strategic thinking, by integrating theories of strategic thought and identifying the non-cognitive aspects of strategic thinking, covering the disciplines of psychology, management, and military doctrine and theory. Secondly, in

developing an instrument capable of assessing the strategic thinking mindset, this research makes a contribution to the selection, promotion, development, and mentoring of young officers in the military. Given the extensive work required to produce SJT items and collect sufficient response data to assess item and scale functioning, this is an important contribution. Finally, the conceptualization, development, and outcomes of this effort may serve as a guide to other researchers in their own efforts to construct similar tests of strategic thinking mindset in other jobs and industries.

Chapter 2 - Academic Background

The Meaning of Strategy

The English word strategy is rooted in the Greek term *strategos* meaning "army leader." Within this context, the U.S. military defines strategy as "a prudent idea or set of ideas for employing the instruments of national power in a synchronized and integrated fashion to achieve theater, national, and/or multinational objectives" (U.S. Department of Defense, 2013, p. 294). Despite its origins in war, however, the term is now frequently employed in other contexts. For example, managerial scholars have defined strategy in terms of outmaneuvering competitors by "finding alternative ways of competing and providing customer value" (Abraham, 2005, p. 5). In game theory, strategy is a mathematical concept, specified by a functional equation which determines an action given the sequence of previous actions (Pelc & Pelc, 2009). In human cognitive development, strategies are "non-obligatory, goal-directed activities designed to enhance task performance that are potentially available to conscious awareness" (Schwenk, Bjorklund, & Schneider, 2009, p. 1034). Regardless of the specific discipline defining the concept, it is clear that a constant theme underlying strategy concepts is the notion of a carefully developed plan meant to guide the actions of a party in seeking an objective.

In Freedman's (2013) work on summarizing the history of the study of strategy, he provides a broad definition of strategy as "the art of creating power" (2013, p. xii). Power can be conceived of in many ways. Freedman structures his history according to three domains in which strategy has evolved: military strategies of force, social-political revolutions operating "from below," (p. 245) and business management strategies as viewed "from above" (p. 457). Freedman makes a substantial contribution to the field of strategy by describing how leaders and revolutionaries across history, up to the present, have sought a rational understanding of how to

be a successful strategist, despite the inescapable problem that problems of a strategic nature do not lend themselves to complete understanding and control by a single individual. For Freedman, the "master strategist," (p. 237) who is able to foresee the future and execute a planned strategic victory, is a myth. The best a strategist can do is identify ways to improve the group's position in relation to environmental objectives, step by step, rather than through a pre-determined sequence of moves. The idea of positioning is central to an important paper by Porter (1996). Porter emphasized that operational effectiveness is necessary, but not sufficient, for strategic success. One's positioning in relation to others in the environment is crucial.

For the current research, strategy (and thus strategic thinking) should be understood in the same context as Freedman (2013), with a broader scope than the private sector, competitive consumer market context of Porter (1996), or the national security context of Yarger (2008) and the U.S. Department of Defense. The purpose of strategy is the positioning of an organization effectively in a highly complex, dynamically adaptive environment. Put another way, "it is future oriented behavior concerned with [the] dynamic and complex relationship of the organization with its environment. It is a continuous process…which should produce an improved future state for the organization" (Wheatley, Anthony, & Maddox, 1991; p. 52).

What is Strategic Thinking?

Extensive scholarship within the military, private sector, and other academic disciplines has been conducted on strategy development, strategic planning, and a wide assortment of related concepts. More recently, researchers have focused on strategic thinking at the organizational culture level (Goldman & Casey, 2010), the individual level (Liedtka, 1998a), and both (Bonn, 2001; 2005).

As alluded to earlier, disciplines vary in their concept of strategy. The same applies to strategic thinking, primarily discussed in military and organizational science. Yet, the differences are largely outweighed by points of agreement. Two broad schools of thought exist on how strategy is developed and what sort of thinking is required. These schools mirror the general question of whether strategy is deliberate or emergent.

The first school of thought, which suggests that strategy development and strategic thinking are highly analytical and focus on deliberate processes to frame the environment and determine the most effective strategy, can be described as the strategic planning school. An example of strategic thinking viewed from this perspective is that of Porter (1987), who asserts that developing strategy should be a deliberate process of employing analytical techniques. For example, he proposed a five forces framework for analyzing a system (e.g., an industry) and developing strategies during long-range planning. Others in this school often advocate their own unique process approach to strategic thinking, such as the highly systematic six-step process of Zabriskie and Huellmantel (1991) or the similarly deliberate cognitive mapping approach of Eden (1990).

The strategic planning approach was updated by Mintzberg (1994a, 1994b), who described a new approach that replaces the focus on analysis with one of synthesis and allows for strategy to emerge over time through a process of learning. This second school of thought, a new learning school approach, emphasized the artistry of strategy by introducing the distinction between strategic *planning* and strategic *thinking*. According to Mintzberg, strategic planning tools are valuable in informing and implementing strategy, but can hinder strategic thinking if inflexible planning processes dominate strategy creation and limit creativity. Thus, in essence, these two primary schools of thought differ on the point of strategy being deliberate or emergent.

Mintzberg and contemporary scholars now tend to advocate positions that combine both schools, wherein strategy is seen as being created deliberately through strategic planning, as well as through the continuous learning and adaptation of strategic thinking (Graetz, 2002; Heracleous, 1998). This balanced view of strategy making emphasizes strategic planning and strategic thinking as "distinct, but interrelated and complementary processes" (Heracleous, 1998, p. 482).

Models of Strategic Thinking

Currently, models of strategic thinking tend to align with the learning school, emphasizing learning and emergent strategy. However, many models have expanded strategic thinking to include both the synthetic elements from the learning school and the deliberate, intentional elements of the planning school. Below, I describe some of the notable individual models of strategic thinking, as identified from military and management scholars. From these, the shared elements underlying strategic thinking become clear, which then inform the question of the strategic thinking mindset.

The first model, one that is commonly cited within the management literature, is that proposed by Liedtka (1998a). In this model, she described strategic thinking as (a) requiring a systems perspective, (b) thinking in time, (c) intelligently opportunistic, (d) hypothesis-driven, and (e) being intent-focused. To contrast this with a military perspective, Yarger (2008) proposed a similar five-component model of thinking competencies, including (a) systems thinking, (b) thinking in time, (c) creative thinking, (d) critical thinking, and (e) ethical thinking. These two models clearly align in certain ways, e.g., the focus on systems and thinking in time. Yarger's (2008) inclusion of ethical thinking and Liedtka's (1998a) inclusion of intent-focus, however, are unique aspects. Yarger's creative thinking can be mapped onto both Liedtka's

intelligent opportunism and hypothesis-driven elements. The hypothesis-driven concept also aligns with Yarger's critical thinking. To map each model of strategic thinking onto all others in this way is beyond the scope of what is needed. However, it is clear the different models need not be seen as competing, but complementary and supplementary of each other.

Going further, in defining strategic thinking as a core competency for organizations, Bonn (2001) noted that strategic thinking exists at the individual and collective level. Focusing on the individual, the essence of her model includes (a) holistic understanding, (b) creativity, and (c) vision for the future. Bonn's work (2001; 2005) has been widely cited, along with Liedtka (1998a; 1998b). Heracleous (1998) is commonly cited in distinguishing strategic thinking and strategic planning, comparing strategic thinking to double-loop learning (Argyris, 1992). Double-loop learning involves the questioning of rules and assumptions governing decision making, as opposed to single-loop learning wherein critical thinking can take place, but does not question the broader framework by which options for a decision are determined. Heracleous also discussed synthetic, divergent, and creative thought processes underlying strategic thinking.

More recently, Duhaime, Stimpert, and Chesley (2012) devoted an entire textbook to understanding the importance of strategic thinking in modern business. They described three key themes of effective business leaders engaged in strategic thinking: (a) "effective leaders are experts … [who] link disparate strands of information and … consider a broad array of scenarios and outcomes" (p. 69), (b) "effective leaders must be able to think dynamically … and be able to anticipate the future" (p. 70), and (c) "managers (and their firms and businesses) must be good learners" (p. 70).

In contrast to the models depicted thus far, which focus on characteristics describing the type of thinking, others scholars have focused on certain thinking activities that form the basis of

strategic thinking. Casey and Goldman (2010), for example, identified four continuous and iterative activities that encompass strategic thinking: (a) scanning, (b) questioning, (c) conceptualizing, and (d) testing. Casey and Goldman also noted that their model is based on a definition of strategic thinking as (a) conceptual, (b) systems-oriented, (c) directional, and (d) opportunistic.

Graetz (2002) also attempted to distinguish strategic thinking from strategic planning, proposing five attributes for strategic thinking: (a) synthetic, (b) divergent, (c) creative, (d) intuitive, and (e) innovative. These are contrasted with five attributes of strategic planning: (a) logical, (b) systematic, (c) conventional, (d) prescriptive, and (e) convergent. Graetz emphasized that both deliberate (planning) and emergent (thinking) approaches to strategy making must coexist, despite the differing attributes. Likewise, a framework from the U.S. Army's War College, as described by Waters (2011), advocates a balanced approach in which strategy making is an art and science. Waters' framework includes a diverse model of elements and activities, including (a) critical thinking, (b) thinking in time, (c) synthesis, (d) systems thinking, (e) creative thinking, and (f) futuring. The Waters framework also acknowledges the role of both divergent and convergent thinking, environmental scanning, judgment of risk and reward, and having a strategic thinking foundation (including self-awareness of one's biases and assumptions and openness to discourse and reflection).

Yet another model from the military domain includes four elements: (a) systems thinking, (b) visioning, (c) scanning the environment, and (d) scenario planning (McCauley, 2012). This model combines characteristics and types of thinking, as with Liedtka (1998a) and Yarger (2008), respectively, but also thinking activities, similar to Casey and Goldman (2010). While not explicitly discussing strategic thinking, Salmoni, Hart, McPherson, and Winn (2010)

summarize the cognitive characteristics needed of military strategic leaders in the future, including (a) emphasis on how to think rather than what to think (i.e., metacognition), (b) flexibility and openness to many disciplines, and (c) tolerance of iterative problem solving and lacking perfect solutions the first time. Finally, Yorks and Nicolaides (2012) developed a conceptual model for how to develop mindsets for strategic insight. They define strategic insight as resulting from (a) engaging with diverse perspectives, (b) assessing trends in divergent domains, (c) making assumptions explicit, and d) challenging those assumptions.

Some models of strategic thinking are embedded in measurement approaches. The Leader's Strategic Mindset assessment (Pisapia et al., 2005) was developed around three dimensions: (a) systems thinking, (b) reframing, and (c) reflecting. In another study, focused on the antecedents of strategic thinking competency, strategic thinking was operationalized as (a) articulating a vision, (b) demonstrating sound business judgment, and (c) attending to global business issues. These criteria were assessed through an assessment center (Dragoni et al., 2011). Finally, a recent report by Grier (2012) discussed what constructs should be considered in assessing military cognitive readiness at operational and strategic levels of command: (a) general knowledge and abilities, (b) cognitive capabilities, (c) creativity, (d) adaptability, and (e) personality (including traits such as hardiness, self-control, and need for certainty).

Integrating Themes Among Strategic Thinking Models

In integrating and synthesizing the aforementioned models into a broader understanding of strategic thinking, I identified nine themes underlying these models: (a) Systems and Synthesis, (b) Directionality, (c) Creativity, (d) Criticality, (e) Awareness of Time, (f) Adaptability and Opportunism, (g) Action Learning, (h) Breadth and Inclusion, and (i) Self-awareness and Self-control. The themes are presented below, in descending order of their

prevalence across the models. This is not meant to imply, however, that any one theme has

greater priority or importance than another. These themes provide the basis for the current

concept of strategic thinking mindset. A summary of the relation of each model to the

integrating themes is provided in Table 1.

Systems and Synthesis

The most pervasive theme present in the theoretical models reviewed is that of systems

and synthesis. This theme refers to the process of gaining new awareness by combining parts to

perceive a whole with unique properties emerging from the combination of parts. This theme is

present in 10 of the 14 models summarized and includes elements such as systems orientation

(Casey & Goldman, 2010), synthetic (Heracleous, 1998), holistic understanding (Bonn, 2001),

and attending to global issues (Dragoni et al., 2011).

The ideas of both systems thinking and synthetic thinking emphasize the seeking of a

broader understanding of how a collection of parts interact with each other and their environment

to produce a collective effect or pattern. For most organizations, the primary system of interest

would be the organization itself, made up of all its agents (e.g., employees). However, systems

thinking also requires the consideration of other systems in the environment, particularly those

that subsume the organization and exist within it. Furthermore, the characteristics of an

environment play a role in systems thinking. Synthesis is a similar concept to systems thinking,

but tends to focus more on the combination of processes and concepts, rather than the systems

perspective which tends to emphasize the interaction and combination of tangible entities.

Creativity

The second integrating theme, creativity, is readily apparent in eight of the models. The

creativity theme subsumes concepts such as innovative (Graetz, 2002), reframing (Pisapia et al.,

2005), and conceptual (Casey & Goldman, 2010). For Casey and Goldman, conceptual refers to theorizing new abstract ideas, which are then tested in the strategic environment. The references to creativity throughout the models are grounded in the creation of something new, whether it is a new process, technique, idea, or narrative of a problem. Creativity and synthesis are closely related concepts, therefore these themes overlap to some degree. Synthesis is placed alongside systems as its own theme, rather than under this theme, due to its added emphasis on the joining together of existing system or organizational elements for added value. The creativity theme is meant to describe the generation of an idea from a less tangible source, such as subconscious processing or a connection made with something previously thought to be irrelevant to the organization.

Directionality

Directionality, the third theme, consists of a dedicated focus on seeking a desired future condition for the organization. Present in six of the models, this theme might also be described using terms such as intent-driven (Liedtka, 1998a) or vision for the future (Bonn, 2001). Directionality is an element clearly seen in almost every definition of strategy. Military organizations often refer to this as seeking an end-state; organizations encapsulate it in a vision statement. Whether the strategy-making is occurring in geo-politics, war, industry, games, or individual life, there is always a goal in mind, a point toward which thinking is oriented. An aspect of strategic thinking would include determining what the point of direction is or should be, but also how best to get there.

Criticality

Criticality is present in six of the models, including elements such as questioning (Casey & Goldman, 2010), challenging assumptions (Yorks & Nicolaides, 2012), and double-loop

learning (Heracleous, 1998). This theme addresses the issue of being willing and able to challenge and question ideas or assumptions, as a means of affirming or disconfirming their validity. For an argument or assumption to be critically evaluated does not necessarily require it to be fundamentally changed or abandoned. Rather, criticality is about explicitly acknowledging and evaluating ideas on their merits.

Awareness of Time

The next integrating theme is awareness of time, a concept that may be less intuitive, but no less important as an aspect of strategic thinking. Included in six models, this theme incorporates elements such as thinking in time (Yarger, 2008), anticipating the future (Duhaime et al., 2012), futuring (Waters, 2011), and assessing trends (Yorks & Nicolaides, 2012). Awareness of time refers to the consideration of how an issue is situated in past events, present contexts, and anticipated or potential futures. Having an awareness of time is highly important in dealing with complex adaptive systems, as the passing of time is inherently associated with changes in that system. With changes in any system come the need to check and adapt one's understanding and approach in dealing with problems in that system.

Adaptability and Opportunism

Related closely to the previous theme, adaptability and opportunism refers to changing one's approach or creating a new approach when key conditions in the environment change or are revealed to be different than was thought. This theme is present in six of the models summarized, based in elements such as adaptability (Grier, 2012), thinking dynamically (Duhaime et al., 2012), and intelligent opportunism (Liedtka, 1998a). The learning school of strategy, discussed at length by Mintzberg (1994a) and Senge (1990), is centered almost entirely on this point. Complex adaptive systems are so ambiguous and dynamic that it is thought to be

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impossible to fully understand them and predict what will happen with any kind of certainty. Therefore, strategy-making must include room for adapting to unforeseen problems or taking advantage of unexpected opportunities.

Breadth and Inclusion

The next theme, breadth and inclusion, refers to an openness to and equitable consideration of many, diverse viewpoints. Present in five of the models, this theme covers both the intentional inclusion of new viewpoints and disciplines (e.g., engaging with diverse perspectives, Yorks & Nicolaides, 2012) not obviously related to the problem, but also comprehensively searching the environment for knowledge of factors that may have some influence on a problem (e.g., environmental scanning, McCauley, 2012).

Self-Awareness and Self-Control

The theme of self-awareness and self-control is present in four of the models. This theme overlaps with that of criticality (particularly the aspect of self-criticism), but is more specifically about one's willingness and ability to maintain self-awareness, not only of weaknesses, but also basic assumptions. Good strategic thinkers understand how their thinking is limited and intentionally counteract those limitations. This theme includes elements such as metacognition (Salmoni et al., 2010) and making assumptions explicit (Yorks & Nicolaides, 2012).

Action Learning

The final theme, action learning, links closely to the adaptability and opportunism theme, as learning takes place as new information is incorporated, creating or changing one's knowledge of a strategic situation. However, the action learning theme covers the extension of this idea seen in three of the models: Liedtka's (1998a) concept of hypothesis-driven, Duhaime et al.'s organizational learning, and Casey and Goldman's (2010) concept of testing. These concepts

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emphasize the role of generating strategies by continuously developing concepts about the environment, implementing them, studying their impact on the environment, and using the results to learn and improve the strategy. In short, action learning is about putting a plan or idea in action and evaluating the results in order to revise the plan or idea. This is the essence of the scientific method, that of developing a hypothesis, testing it, and interpreting the results as evidence in favor of the hypothesis or as disconfirming the hypothesis. In a sense, strategic thinkers must be applied scientists in their strategic environment.

Chapter 3 - The Strategic Thinking Mindset

Few would argue that successful strategic thinking does not require a high level of cognitive ability. For example, both fluid and crystallized intelligence, memory, pattern recognition, and rapid information processing are likely all important aspects of being able to understand a strategic environment well enough to develop and implement an effective strategy. However, it is also clear from the models and themes described above that cognitive ability alone is not sufficient for successful strategic thinking. Other characteristics of thought are required which are not necessarily held by those with the greatest intelligence. I refer to this as the *strategic thinking mindset*.

The distinction between the *ability* related to a thinking competency (strategic thinking) and the *mindset* for the same competency is a subtle, but crucial one. A recent conceptual piece by Yorks and Nicolaides (2012) conveys this distinction in a simple, multiplicative equation:

$$\text{Generative Strategic Insight} = f(\text{Competency x Capacity}).$$

In other words, the generation of strategic insights is a function of one's combination of capacity for strategic insights and competency. In this framework, competency refers to the ability component (e.g., reasoning, knowledge, processes, and other cognitive tools). Capacity refers to a meaning-making mindset or epistemological viewpoint. To state this more simply, effective strategy development requires both the ability and proper tools for strategic thinking (which most of the strategic thinking literature focuses on) and the proper mindset, the focus of the current research.

Conceptually, this mindset would be distinct from cognitive ability. Rather, holding a strategic mindset would reflect an epistemological viewpoint consistent with addressing problems under conditions of complexity and ambiguity. This mindset, while still in the realm

of thinking, is distinct from the information processing involved in the execution of strategic thinking. However, it would likely predict an individual's chances of being an effective strategic thinker in the future, alongside other cognitive capabilities and personality traits that are less malleable.

The proposed distinction between ability and mindset calls to mind the extensive literature on emotional intelligence (EI; Van Rooy & Viswesvaran, 2004). Many have extolled the virtues of this alternative view of intelligence (Goleman, 1995; Mayer, Salovey, & Caruso, 2000), while others have criticized the lack of substantive scholarly work supporting the existence of the concept as defined and its proposed relationship to job performance (Zeidner, Matthews, & Roberts, 2004).

Broadly speaking, there are two types of models discussed in the EI literature: ability models, based largely on the work of Mayer et al. (2000) and mixed models, represented by the work of Goleman (1995). Ability models focus primarily on the cognitive processing of emotional information, oriented around four competencies: identification, understanding, usage, and self-regulation (Salovey, Bedell, Detweiler, & Mayer, 2000). Conversely, mixed models are looser in structure and include a wider variety of competencies, such as motivation, temperament, and social skills. Cherniss and Goleman (2001) cite four core competencies in their mixed model of EI: self-awareness, self-regulation/management, social awareness, and relationship management/social skills.

The competencies associated with the mixed model of EI are closer to what I refer to as mindset, rather than the more strictly cognitive, information-processing perspective of the ability model.   However, there may be components in these models that are unrelated to strategic thinking. As noted by Zeidner et al. (2004), the question of "whether placing all such

competencies under the EI banner confuses, rather than clarifies, the role of emotional competencies in the workplace would seem a contentious point" (pp. 378-379). Zeidner et al. further argue that "dealing with distinct but possibly interrelated competencies may be more tractable for research and practical purposes" (p. 379). Although understanding the emotional aspects of job performance is important, for the sake of clarity, the strategic thinking mindset is not conceptualized as a form or subset of EI. Rather, it is a set of interrelated characteristics which form the foundation of an important work-related competency.

Characteristics of a Strategic Thinking Mindset

Having gathered and synthesized the themes common to strategic thinking models, attention can now be turned to the mindset characteristics that underlie strategic thinking. The process of identifying these characteristics was one of synthesis among the themes, extracting their shared foundations, as well as returning to the specific model elements that contribute to each theme and analyzing the content and definitions of each. As detailed below, three mindset characteristics can be found underlying the common themes of strategic thinking: (a) flexibility, (b) inclusiveness, and (c) humility. These characteristics are malleable, in the sense that they can be developed over time with the proper intent, but not transient, meaning they are not so superficial as mood or states of emotion, but, rather, are deeply ingrained in a person's behavioral and cognitive habits.

According to the existing literature, the ideal strategic thinker would have a mindset consistent with these characteristics, along with substantial cognitive ability, and the knowledge and skills developed through experience, education, and training in the field. As discussed in the sections that follow, each of these characteristics could be taken beyond a certain threshold and begin to hinder performance, depending on the nature of the job (Le, Oh, Robbins, Ilies, &

Holland, 2011). Finally, these are characteristics of a person's thought, internal to an individual, rather than merely characteristics of that person's actions. In other words, the apparent expression of these traits in action, without truly thinking and feeling in these ways, would not constitute a strategic mindset.

In the sections that follow, I provide descriptions of each of the three characteristics that comprise strategic mindset and how each characteristic forms the foundation of the various certain strategic thinking themes. It is worthy to note that not all of the strategic thinking themes are accounted for by, or likely influenced by, a strategic mindset. For example, as indicated in Figure 1, there is no obvious direct link between any of the strategic mindset characteristics and the strategic thinking themes of directionality (i.e., a focus on seeking a desired future condition for the organization) and awareness of time (i.e., the consideration of how an issue is situated in past, present, and future contexts). Nevertheless, I do not argue that a strategic mindset is the only factor in determining the potential for strategic thinking. Rather, I simply note that it is one way to determine potential, acknowledging that there are other antecedents that can reflect the capacity and/or competency for strategic insight.

Flexibility

The first mindset characteristic is that of flexibility. A mindset of flexibility is characterized by a willingness and proclivity to adjust one's understanding, opinions, or approach when conditions change or new information is presented. In essence, a flexible individual does not resist necessary or optimal change. The psychological bias of escalating commitment (also referred to as sunk cost fallacy) refers to a tendency to continue with a course of action when that action is no longer rational (Sleesman, Conlon, McNamara, & Miles, 2012;

Staw, 1976). Having a flexible mindset is crucial to the ability to avoid making errors of escalating commitment in the execution of strategy.

The importance of a mindset favoring flexibility can be seen in three of the integrating themes: (a) adaptability and opportunism, (b) action learning, and (c) creativity. Being willing and comfortable to deal with change, major or minor in nature, is crucial to being adaptive and taking advantage of opportunities. Specific model elements of reframing (Pisapia et al., 2005), flexibility (Salmoni et al., 2010), and adaptability (Grier, 2012) clearly reference the ability to change or adjust when necessary. Additionally, the elements of opportunism (Casey & Goldman, 2010) and intelligent opportunism (Liedtka, 1998a) emphasize the need to be actively looking for beneficial change. This is a crucial distinction, as change can be forced upon a strategist, by force or circumstances. Changing course in the face of an obvious need for change does not necessarily indicate flexibility, rather the truly flexible strategic thinker is opportunistic, always aware of where potential changes may prove beneficial.

Flexibility also underlies action learning; an inflexible orientation might cause one to hesitate to look fairly at the results of an action, for fear that they might indicate changes are necessary. The specific model elements contributing to the theme of action learning include testing (Casey & Goldman, 2010) and hypothesis-driven (Liedtka, 1998a). As noted earlier, action learning is essentially a process of applying the scientific method. Flexibility and openness to new concepts and new methods is critical to any scientist who wishes to remain current in his or her field. The same applies to an iterative strategic thinker who must test strategies and fairly evaluate them constantly.

Finally, the theme of creativity is directly referenced in several models of strategic thinking (Bonn, 2001; Graetz, 2002; Grier, 2012; Heracleous, 1998; Waters, 2011; Yarger,

2008). The process of creation is inherently incompatible with inflexibility. New ideas and

associations cannot be formed without some degree of flexibility. Moreover, the willingness to

embrace the changes to one's understanding and processes that comes from implementing

creative ideas requires an even greater level of flexibility.

As with any characteristic, there is a threshold beyond which flexibility is problematic.

The execution of strategy requires long-term consistency, so long as the strategy is still the right

approach. The key is to think of this characteristic as *flex*ibility, rather than *break*ability. Put

another way: bend, but don't break from a long-term strategy, unless adhering to that strategy is

only justified by escalated commitment. *Bending* a strategy allows for adaptation and adjustment

of a strategy and its implementation in the face of changing conditions, without abandoning the

long-term effort and developing another strategy from scratch.

Inclusiveness

The next mindset characteristic is *inclusiveness*, referring to the welcoming of

information and opinion from a broad range of sources. Sources here could refer to individuals,

groups, disciplines, or other relevant constituents. Inclusiveness is conceptually similar to the

openness to experience element of the Five Factor Model of personality (Costa & McCrae,

1992). A mindset favoring exclusion would result in one being hesitant to consider new or

unusual sources of information or fearful of having too many voices involved in a discussion.

Conversely, maintaining an inclusive mindset allows one to value the holistic understanding that

can come from examining an issue from many directions. As with flexibility, inclusiveness

could lead to a point of diminishing returns, at which point information overload might lead to a

feeling of analysis paralysis (Sugerman, Scullard, & Wilhelm, 2011). However, an inclusive

mindset values the potential benefit of a broad perspective, while relying on other processes and judgment to eliminate or ignore information that does not contribute to understanding.

Inclusiveness primarily underlies the themes of (a) breadth and inclusion and (b) systems and synthesis. Specific model elements generating the theme of breadth and inclusion include engaging with diverse perspectives (Yorks & Nicolaides, 2012), assessing trends in divergent domains (Yorks & Nicolaides, 2012), openness to discourse (Waters, 2011), scanning (Casey & Goldman, 2010; McCauley, 2012; Waters, 2011), and openness to many disciplines (Salmoni et al., 2010). Engaging in a broad and inclusive information search requires a welcoming of this kind of search.

Inclusiveness is also critical to systems thinking and synthesis, which differs from traditional analytical processes in that system factors are gathered together for holistic understanding, rather than segmented into divisions handled separately. Specific model elements for this theme are quite tightly clustered around the idea of systems thinking (Casey & Goldman, 2010; Pisapia et al., 2005; Waters, 2011; Yarger, 2008;) and synthesis (Graetz, 2002; Heracleous, 1998; Waters, 2011). Without an inclusive mindset, attempts to synthesize new understanding will clearly be hindered and likely result in nothing new, but rather "old wine in new bottles." Likewise, one's view of a problem's context (i.e., the system) will be limited to the range of perspective and information already considered relevant.

The need for selecting strategic thinkers with an inclusive and flexible mindset is supported not only by analysis of the existing models of strategic thinking, but also by a foundational theory underlying organizational behavior: the behavioral theory of the firm, as presented by Cyert and March (1963). This theory introduced the concept of bounded rationality in the decision making of organizations. Bounded rationality means that managers are faced

with information search and processing limits and will not always make decisions that maximize profit perfectly. Instead, they will rely on closed search processes and decision-making heuristics or established rules that allow them to "satisfice" or reach an acceptable level of performance. Strategic thinking requires going beyond heuristics and the habits of the past to create new strategies for accomplishing different objectives or new levels of performance.

Humility

The final mindset characteristic is humility. This characteristic refers, generally, to a comfort level with being wrong or having an incomplete understanding. Furthermore, comfort with being wrong must be accompanied by the tendency to check oneself, examining issues as if one's understanding is wrong in some way. The importance of humility in leadership is an area in need of greater theory and research (Barling, Christie, & Hoption, 2011). However, Morris, Brotheridge, and Urbanski (2005) laid out a strong review of the concept of humility and its role in leadership, defining humility as "a personal orientation founded on a willingness to see the self accurately and a propensity to put oneself in perspective" and emphasizing that humility "involves neither self-abasement nor overly positive self-regard" (p. 1331).

Humility enables objectivity about the self, which is clearly necessary for many of the competencies associated with strategic thinking. Specifically, humility is a necessary pre-condition to the self-criticism and objectivity required for self-awareness/self-control and criticality. The literature suggests that strategic thinkers must have/engage in self-awareness of biases and assumptions (Waters, 2011), self-control (Grier, 2012), meta-cognition (Salmoni et al. 2010), questioning (Casey & Goldman, 2010), and reflecting (Pisapia et al., 2005). Humility is a crucial component to these competencies, at least as they relate to criticality and awareness of

oneself and any group with which one identifies (e.g., specific functional area, organization, industry).

Humility alone does not ensure objective self-awareness, self-control, or criticality, but it is a necessary pre-condition to accepting that one may be biased or clinging to faulty assumptions. Without humility, any change in understanding or alternative viewpoint poses a threat to self-esteem, opening the door to defensiveness and bias in favor of maintaining old beliefs or assumptions. Once open to and comfortable with the position of reasonable self-doubt, behaviors and positions can be examined and, with effort, improved.

Other Examples of Mindsets

The separation of a mindset (or orientation) from its enactment, either behaviorally or cognitively, can be found in other scientific literature. Lumpkin and Dess (1996) conceptualized a variable called entrepreneurial orientation, noting that it is distinct from entrepreneurship itself (that being the act of starting a new business or business venture) and has to do with individual characteristics that predict acting entrepreneurially. In the field of motivation, plenty has been written on goal orientation (Payne, Youngcourt, & Beaubien, 2007). In this literature, the act of setting effective goals is differentiated from one's orientation toward what kinds of goals to set (e.g., learning vs. performance goals). Dweck (2006) described a body of research on mindsets related to the self, specifically on the malleability of one's talents and abilities. She argued convincingly that much of success has to do with interpreting a challenge as an opportunity to develop, rather than a threat to reveal one's limitations. Finally, Story and Barbuto (2011) examined the concept of global mindset, describing it as a combination of cultural intelligence and global orientation.

Research on the strategic thinking mindset is in a very nascent stage and is in great need of further refinement, from a definitional, developmental, and measurement perspective. There are some models of strategic thinking that reference the importance of a person's mindset, independent of their thinking competencies. A behavioral self-report measure of strategic thinking mindset was developed by Pisapia et al. (2005), around three dimensions: (a) systems thinking, (b) reframing, and (c) reflecting. Likewise, Waters' (2011) framework notes the importance of having a strategic thinking foundation (i.e., something beyond cognitive skills and intelligence), which he describes as having self-awareness of one's own biases and assumptions, including the influence of one's culture, being considerate of ethical and value-related issues, and having an openness to discourse and reflection. Yorks and Nicolaides (2012) focus on differentiating the idea of a mindset for strategic thinking, apart from the ability, but do not discuss the exact nature of the mindset in much detail.

Yorks and Nicolaides (2012) reference a useful theoretical framework to illustrate how a strategic thinking mindset might differ from other mindsets. The framework comes from the theory of developmental action inquiry (Torbert, 2004). The theory details a progression of "action logics" that guide how a leader generally thinks and acts at a series of stages of organizational maturity. Each stage is represented by its own guiding principle. The progression begins with an "opportunist" mindset which is guided by a principle of self-interest and winning as the only concern. The penultimate stage is the "strategist" mindset, in which the focus is on linking valued theories and principles with action in dynamic systems.

The Torbert (2004) theory presents these mindsets as developmental stages which are passed through over time as a manager matures. Torbert's framework was not developed as a theory on strategic thinking specifically or how it is best developed. Rather, Torbert's stages are

an attempt to depict how the mindset of a leader evolves over time, adopting new guiding principles. Therefore, Torbert's theory supports the current research by the notion that there are managerial mindsets that vary and can be developed over time.

In the military domain, Yarger (2008) focused on the importance of understanding the differences between operational planning, national strategy, and national policy, noting that there are subtle, but important, distinctions and that "each also has a different mindset" (p. 8). However, his explanation of the strategic thinking mindset consisted of the five thinking competencies described earlier. It is important to note the conceptual difference with what I refer to as strategic thinking mindset. My view of strategic thinking mindset reflects a construct in line with the capacity element in Yorks and Nicolaides (2012), while Yarger's work reflects more of the competency element.

Changing One's Mindset

Separating the concepts of strategic thinking skills/ability and strategic thinking mindset raises the question of the malleability of strategic thinking mindset, that is, whether the variable is more state-like (i.e., changing over time, transient) or trait-like (i.e., resistant to change, stable). The concept of mindset here is more trait-like than state-like, but still malleable over time. The general domain knowledge concept described by Lievens and Motowidlo (2016) as resulting from "fundamental socialization processes (parenting, schooling, etc.)" (p. 8) reflects how the mindset might also develop. Lievens and Motowidlo also discuss the ways in which the implicit trait policies people hold, the degree to which people perceive traits to be effective in a social situation (see Motowidlo, Hooper, & Jackson, 2006), result in general domain knowledge when a job's requirements align with those traits. This is similar to the way in which the mindset might be considered a type of trait-based knowledge of the job of a strategic thinker.

Torbert's (2004) developmental action inquiry theory describes the developmental and generally sequential stages a leader moves through as they mature. A strategic mindset is something that could be similarly developed over time, as one matures and incorporates experiences into a certain worldview. There are other examples of attributes that function between the extremes of state-like (transient) variables and trait-like (stable, unchanging) variables. For example, research on psychological capital (self-efficacy, hope, optimism, and resilience) has demonstrated developmental capacity, while still being relatively stable over short periods of time (Luthans, 2002). However, there may be individual differences in how early or naturally this mindset is adopted. Established constructs such as the openness to experience component of the Five Factor Model (Costa & McCrae, 1992) or tolerance for ambiguity (Budner, 1962) may present a hindrance to strategic thinking for those who are low in these traits or, on the other hand, facilitate it for those who are exemplify these traits.

A great deal of literature argues that strategic thinking skills must be developed through participation in the generation of strategy (Casey & Goldman, 2010; Mintzberg, 1994a). This research draws on experiential learning theory (Kolb, 1984), which describes the importance of experiencing a process in order to learn it in the context of adult education. While the thinking competencies for strategic thinking may not develop to maturity until one has a wealth of experience and subject matter knowledge, the *mindset* for strategic thinking may be present without the developed skills. If this is the case, assessing a thinker's mindset may be a key addition to assessments of cognitive ability and other individual difference variables in the prediction of future strategic thinking ability.

Developing a Measure

In order to supplement the literature on strategic thinking, in particular the relevant mindset, as well as to provide the Army with a more context-relevant assessment product, this research was designed to develop a Strategic Thinking Mindset Test (STMT) using a situational judgment test (SJT) format. SJTs are characterized by a situation and response-choice format in which realistic situations from a designated job or work role are presented. Respondents are instructed to select a response option that represents the best/worst (or most/least likely) way to address the situation.

SJTs have grown in popularity among Industrial and Organizational Psychologists (Ployhart & MacKenzie, 2011), particularly in selection and assessment contexts, thanks to a few particular strengths of SJTs. First, they tend to result in strong criterion-related validity for job performance (McDaniel, Hartman, Whetzel, & Grubb, 2007); although, the magnitude of this evidence is tied to the constructs measured. Additionally, there is evidence that SJTs result in smaller subgroup differences than traditional cognitive predictors (Ployhart & Holz, 2008), resulting in reduced adverse impact.

Additionally, SJTs typically demonstrate high face validity (Ployhart & Mackenzie, 2011). By incorporating situations relevant to the work of the respondent, rather than generic interpersonal situations, SJTs stand a better chance of appearing valid and relevant to respondents and other stakeholders, compared to non-work context or context-free assessments common in psychological research. For example, a generic personality inventory might inquire about how one acts at social gatherings, an item which may raise concerns or appear to lack relevance to a respondent expecting to see items relevant to the workplace. While from a purely measurement perspective face validity has no real value, in organizational contexts, pragmatic concerns such as acceptability are important. The strategic thinking mindset assessment would,

ideally, be used to guide self-reflection, self-development, and mentorship among military officers. However, without substantial face validity, as well as supportive construct validity evidence, the assessment would be less effective in this regard.

The first instruments designed to measure situational judgment appeared in the late 19th and early 20th centuries (DuBois, 1970; Moss, 1931). Research on SJT methods picked up after this form of testing was re-conceptualized as low-fidelity work simulation by Motowidlo, Dunnette, and Carter (1990). At first, SJTs were developed around critical job tasks identified from a job analysis, rather than a specific construct. Scientific investigations of the utility of job performance predictors revealed SJTs to be fairly strong predictors of performance (Schmidt & Hunter, 1998). More attention has since been paid to the idea that SJTs reflect a method of testing constructs, rather than a construct itself (Arthur & Villado, 2008; Schmitt & Chan, 2006). Therefore, an SJT's ability to predict performance or any other criterion depends on the construct it is designed to measure and that construct's relationship with the criterion.

Along that line, the use of SJTs has expanded into trait-based testing, with instruments being developed around a specific construct, other than the vaguely-defined situational judgment (Motowidlo, Hooper, & Jackson, 2006). Ployhart and Mackenzie (2011) note that a consistent method for developing SJTs around a single homogenous construct without variance related to cognitive ability or personality has yet to be developed. Therefore, SJTs typically correlate to some degree either with measures of cognitive ability or personality. However, there is evidence that choices in SJT development have a predictable effect on whether SJT scores correlate more with cognitive ability or personality (McDaniel et al., 2007). For example, response instructions (e.g., what *would* you do vs. what *should* you do) can cause an SJT to correlate more with personality and cognitive ability, respectively.

The SJT format enables the instrument to more directly assess the respondent's mindset by presenting a situation designed to evoke elements of the mindset. Relying on the critical incident technique to generate the scenarios ensures that the test benefits from a fidelity and experience of realism that would be difficult to replicate without the involvement of actual Army personnel. Their input on the types of scenarios that evoke the characteristics, the language that would be used to describe those scenarios, and the realistic range of response options are all critical reasons to use a critical incident technique and an Army sample. By presenting response alternatives reflecting levels of flexibility, inclusiveness, and humility within realistic Army officer responses, the SJT data provide information about a respondent that is more context-bound than a behavioral self-report measure.

Research Questions and Hypotheses

The current research seeks to address two broad research questions. First, given the need and potential benefit of an assessment of a young military officer's mindset for strategic thinking, can an SJT be designed to assess this mindset through *flexibility*, *inclusiveness*, and *humility* characteristics? Secondly, will this test exhibit evidence of construct validity and measurement reliability?

The first research question relates to the structural characteristics of the instrument as it is developed. The instrument was developed to measure three mindset characteristics underlying the strategic mindset. As noted in the preceding literature review, these characteristics are slightly overlapping and will likely correlate with each other. Two other structural models are also plausible, one in which the factors do not correlate and another in which there is only a single underlying factor. In accordance with the reviewed literature on the underlying facets of strategic thinking, I hypothesize the following:

Hypothesis 1: An oblique, three-factor model will result in a better fit than competing

orthogonal and single-factor models.

Construct-related validity is demonstrated by triangulating the STMT score for each

mindset characteristic with measures of conceptually-related constructs (convergent validity) and

conceptually unrelated constructs (discriminant validity). Hypotheses 2a-c summarize the

evidence regarding convergent validity:

Hypothesis 2a: There will be an inverse relationship between strategic mindset flexibility

and resistance to change.

Hypothesis 2b: There will be a positive relationship between strategic mindset

inclusiveness and work-related openness.

Hypothesis 2c: There will be a positive relationship between strategic mindset humility

and dispositional humility.

It should be noted that, in the case of Hypothesis 2a, the evidence of convergence is

demonstrated by an inverse (negative) relationship, due to the framing of the resistance to change

variable. Discriminant validity evidence will be gathered from the relationship between each

mindset characteristic and a measure of cognitive ability. Meta-analytic estimates of the

relationship between SJT scores and scores from cognitive ability tests showed a mean

correlation of .29 (corrected .32; McDaniel et al., 2007). Conceptually, strategic thinking

mindset should be less related to cognitive ability than a traditional SJT construct that is closer to

true judgment or job knowledge. Therefore, discriminant validity will be inferred from a small

or non-significant relationship, given adequate measurement reliability (coefficient alpha).

Given the problems associated with hypothesizing the null (Cortina & Folger, 1998), no formal

hypotheses are associated with this test of validity.

As demonstrated in other SJT research, the cognitive content of an SJT score can be influenced by the nature of the response instructions. To explore this issue, data were gathered using both types of response instructions (most/least likely response and worst/best response). In line with previous meta-analytic evidence regarding the impact of response instructions (McDaniel, Hartman, Whetzel, & Grubb, 2007), I hypothesize the following:

Hypothesis 3: Instructions to pick the best/worst response will result in stronger SJT score relationships with cognitive ability than response instructions to pick their most/least likely response.

Chapter 4 - Method and Results

Choices in Situational Judgment Test Development

There are a variety of alternatives available when developing an SJT, each of which affects the way the SJT functions and what constructs it is likely to measure. There are five main issues to be dealt with in developing an SJT: (1) item stem content, (2) response option content, (3) response instructions, (4) response keying, and (5) scoring methods (McDaniel & Whetzel, 2007; Weekley, Ployhart, & Holtz, 2006). Discussion of each as it relates to the current research follows.

Item Stem Content

The situation presented to the respondent, referred to as the item stem, is typically generated either by the researcher, based on theory, or by subject matter experts (SMEs) through the critical incident technique (Flanagan, 1954). A hybrid approach is used in this study, by collecting critical incidents related to a specific context, which were then used to develop items for each mindset characteristic.

Stem complexity (e.g., detail, length, reading level) may also hinder or enhance criterion-related validity (McDaniel, Morgeson, Finnegan, Campion, & Braverman, 2001; Reynolds, Sydell, Scott, & Winter, 2000) and subgroup differences (Sacco, Schmidt, & Rogg, 2000). A strength of the critical incident approach used in this study, wherein the target population writes the initial incident description, is that the reading level for all scenarios begins at the level of the target population.

Stem fidelity (i.e., the extent to which the focal task is truly recreated) is another issue. Multimedia-based SJTs have taken advantage of this to eliminate reading requirements, and

enhance validity and respondent reactions (Olson-Buchanan & Drasgow, 2006). While

multimedia SJTs have their advantages, development and implementation costs are high.

Finally, stem content can vary from interpersonal, *judgment*-based situations to more

factual, procedural knowledge formats. This test is decidedly judgment-based, seeking to access

the way the respondent deals with ambiguous situations, in regard to flexibility, inclusiveness,

and humility. The development of item stem content is discussed further in the Stage 1 section

of this chapter.

Response Option Content and Instructions

Paired with each item stem is a set of response options. The same issues of source,

complexity, and fidelity (discussed in regard to item stem) also apply to response options. As

with the item stem, the response options are construct-oriented, meaning each item focuses on

either flexibility, inclusiveness, or humility. Following the example of Ployhart and Ryan

(2000), a behavioral continuum approach is employed, in which the response options reflect

varying levels of the focal construct. The development of response option content is discussed

further in the Stage 2 section of this chapter.

In regard to the instructions given for the SJT (i.e., framing of the question), there are

typically two (or four) alternatives: which option is your *most/least likely* response and which

option is *the best/worst* (or *most/least effective*) response. SJTs based on likelihood instructions

tend to correlate more with personality, while best/worst instructions tend to correlate more with

cognitive ability (McDaniel et al, 2007). Data using both approaches were collected in this

research, to examine the question of how the response instructions influence the scale's

relationships with other variables. The results of this examination are described in the Stage 4

section of this chapter.

Response Keying

Once a set of items has been developed with stems and response options, a decision must be made about how to key each response in relation to the measured construct. In other words, each response must be identified as correct/incorrect or as an expression of some particular level of the construct. The keying scheme can be (a) empirically derived (e.g., based on each option's correlation with a criterion), (b) based on subject matter expert (SME) judgment, (c) rationally derived from theory, or (d) based on a hybrid of these approaches (Bergman, 2006; McDaniel & Whetzel, 2007). Empirical keying is ideal for situations with a clear performance criterion, which does not apply to this case. Purely following theory without any expert input would lack fidelity to real-world response tendencies. Therefore, a hybrid approach relying primarily on SME ratings, though informed by theory-based rationality, was used for this instrument. The development of the response keying system is described in the Stage 3 section of this chapter.

Scoring

Finally, there are options related to how the SJT will be scored overall, translating the key into an item score. A forced-choice strategy involves a dichotomization of correct and incorrect responses, wherein a point is scored if a correct item response is endorsed. An expansion on this scoring approach is to tie a negative score to incorrect response options. As demonstrated by Motowidlo et al. (1990), the variance in a forced-choice item can be enhanced by scoring an item on a scale of -2 (best answer identified as worst and vice versa) to +2 (best and worst answers both correctly identified). Rather than a forced-choice strategy, others have adopted a continuous scale approach (e.g., Mumford, Van Iddekinge, Morgeson, & Campion, 2008), wherein respondents rate each response option on a scale of best/worst or most/least

likely. The continuous rating method, however, complicates data analysis by shifting the level of analysis down, such that each stem becomes a testlet with items nested within it.

For this instrument, scoring was done with a forced-choice approach similar to the example provided by Motowidlo et al. (1990) to simplify scoring and reduce test length and respondent fatigue. The scoring system is described further in the Stage 4 section of this chapter.

Overview of Method

As described above, the development and testing of the STMT items occurred in four main stages: Stage 1 - Critical Incidents, Stage 2 - Feedback and Response Options, Stage 3 – Response Option Scoring, and Stage 4 – Pilot Testing and Construct Validation. In Stage 1, critical incidents were gathered and selected for relevance to the content area of the instrument (i.e., complex, ambiguous problem scenarios at the Army Company-grade officer level). In Stage 2, Army personnel served as subject matter experts (SMEs) providing feedback on the quality of the scenarios (e.g., fidelity, detail, complexity, and ambiguity), determining which of the mindset characteristics (flexibility, humility, or inclusiveness) were most relevant for each scenario, and generating a range of possible response options. In Stage 3, a new sample of SMEs rated a set of candidate response options for each scenario on effectiveness and level of mindset expression. Finally, in Stage 4, two final groups of Army personnel completed the instrument and a set of additional measures for construct validity evidence.

U.S. Army Research Participant Recruitment Procedures

Before describing each stage of the development process, it is important to clarify the process by which participants are recruited in the U.S. Army. Participants for research by approved agencies of the Department of Defense (DoD) are recruited by filing an Army Research Support Request (RSR). Requests are sent to individual schools and/or commands

within U.S. Army Training and Doctrine Command (TRADOC) and U.S. Army Forces Command (FORSCOM). Each RSR is evaluated by the garrison commander and his or her staff to determine whether it will be supported. Tasking orders are then sent out to individual units or course groups according to the type of personnel requested, the priority level of the request (as submitted by each requesting agency), and the personnel resources available to support the request.

Researchers are then given the opportunity to explain the research to the requested personnel, including specifics about the general objectives, procedures, risks/benefits of participation, and their rights as research participants. At this point, all participants are clearly informed that they have fulfilled their tasking and are free to voluntarily participate or not. If anyone in a participant's chain of command is present in the research session, that individual is asked to leave or move to a different testing space in order to prevent any coercive influence they might have on the participation of their subordinate. This is a rare occurrence as participant groups are typically peers of the same rank and from a variety of individual units. The recruitment procedure and steps for ensuring voluntary participation apply across all stages of this research and for all participants. In the vast majority of sessions across all research stages, the author administered the procedures. However, in a few cases, sessions were scheduled concurrently, in which case a co-researcher (PhD Research Psychologist with ARI) conducted the session. The co-researcher was fully trained in human-subjects research and identified on all IRB documentation.

Stage 1: Critical Incidents

Stage 1 Method

Sample

A sample of 125 Soldiers participated in this stage, from eight U.S. Army installations across the country. The sample consisted of 104 males and 21 females, very closely matching the gender breakdown across the Active Army (17% female, Maxfield, 2015). The vast majority were Army Captains (85.6%), and represented a wide range of Army functional branches, with no more than 18% of the sample coming from a single branch. A large majority (82.4%) had deployment experience. The most recent deployment was predominately to Afghanistan (45.6%) or Iraq (29.6%). Additional detail on the make-up of the sample including the branch representation is provided in Table 2.

Materials and Procedure

Participants received three documents: a demographic questionnaire, instructions packet, and a worksheet. The demographics sheet was completed and returned independently. The instructions packet, provided in Appendix A – Stage 1 Materials as *Instructions for Reporting Critical Incidents* provided detailed explanations, tips, and examples for writing the critical incident(s). The participants were briefed on the content of this packet and were given time to review it while they thought of their incident(s). Participants were free to ask clarifying questions throughout the session.

The participants used the worksheet, provided in Appendix A as *Incident 1* and *Incident 2*, to write their critical incident(s). Space was provided for two incidents, in case an individual had multiple to provide. In most cases, only one was provided. Participants reported their incidents in three sections: Situation, Problem-Solving Approach, and Outcome. Participants

were instructed to speak in third-person narrative using false names of people and specific places (e.g., a particular base) and only broad time frames, if necessary.

In addition to writing the incident, participants were asked to provide two additional pieces of information, the type of thinking required by the incident, using Yarger's (2008) model, and a rating of the degree to which the problem had been effectively addressed (1 = *Very Ineffective/Detrimental* to 5 = *Highly Effective/Successful*). This was done to provide further contextual information on how the participant viewed the incident and whether/how to use each incident as a scenario.

Stage 1 Results

Although the initial data collection target was 60, upon review during data collection, it was determined that a larger target would be necessary to gather a sufficient number of usable incidents. Upon initial review, incidents needed to describe a clearly-stated ambiguous problem, with a decision-making context for a single Company-grade officer. A total of 144 critical incidents were collected, at which point 59 were deemed initially usable, constituting a sufficient sample to proceed.

The incident descriptions were converted into open-ended scenarios by removing the Problem-Solving Approach and Outcome sections, leaving only the Situation section, which formed the basis of the scenario. Occasionally, content from the Approach and Outcome sections was brought into the scenario, either because it provided more information about the situation than the problem-solving approach or because it served to extend the complexity or ambiguity of the situation. The author also edited the scenarios as needed for grammar, spelling, clarity, and removal of any potentially identifying information that was not censored by the original writer of the incident.

The author and an additional PhD research psychologist reviewed each of the 59 scenarios more carefully for usability. An ideal incident had the following characteristics: a clearly stated problem depicted with contextual detail, ambiguity with regard to the correct way to address the problem, opportunity for a Company-grade officer to make choices varying in flexibility, inclusiveness, and/or humility. After this extensive incident and scenario review process, 32 scenarios were identified for further development as items in the scale.

Stage 2: Feedback and Response Options

Stage 2 Method

Sample

A total sample of 75 Soldiers with Company-grade deployment experience were surveyed as subject matter experts (SMEs) in this stage, from four participating installations. The status of the Soldiers as an "expert" sample refers to their familiarity and knowledge of realistic and feasible options that a Soldier might have in a given scenario. The sample consisted of 69 males, 5 females (with one non-respondent), predominately Captains (74.7%), representing a range of Army functional areas, although a large proportion came from the infantry branch (41.3%). Additional detail on the make-up of the sample is provided in Table 3.

It should be noted that not all participants reviewed each of the scenarios. A significant amount of time was required, per scenario, to read and consider the scenario and provide feedback and response options. A unique set of scenarios was provided to participants in each data collection session. Due to varying participation rates, and the relative need (or lack thereof) for additional response options on certain scenarios, the number of participants for each scenario ranged from 17 to 25.

Materials and Procedure

SMEs were again given three documents: a brief demographic questionnaire, a construct definition handout, and the scenario review and feedback packet. The demographics sheet was completed and returned independently. The SMEs then reviewed and listened to the researcher explain the nature of the research and the meaning of the three mindset characteristics. SMEs were instructed to familiarize themselves with the definitions of flexibility, humility, and inclusiveness as indicated on the definitions sheet, provided in Appendix B – Stage 2 Materials as *Definitions*. The researcher reviewed the content of the definitions sheet with participants and elaborated on the meaning and derivation of each characteristic. SMEs were free to ask clarifying questions throughout the session.

Finally, participants reviewed their assigned scenarios in the *Scenario Review and Feedback Packet*, provided in Appendix B. Each packet consisted of approximately 10 scenarios for review. The exact number, group, and ordering of the scenarios changed for each session, to avoid order effects as well as to ensure sufficient feedback was gathered for each scenario.

The researcher explained to the participants the need for their contextual familiarity with military procedures and problem solving to evaluate the scenarios. They were instructed to write whatever feedback occurred to them, with particular emphasis on the degree to which the scenario reflected a sufficiently ambiguous and complex problem scenario, the realism of any details provided (e.g., a newly-promoted Captain being placed in a certain type of position), and the need for any additional clarifying details (although in some cases, the lack of such details is the root of the scenario's ambiguity).

Participants were also asked to consider each of the three mindset characteristics and select the one that was the most relevant to the scenario, thereby voting for it as the appropriate mindset characteristic to assess with that scenario. After providing the scenario feedback,

participants then provided up to ten feasible response options, with instructions to vary their options by the mindset characteristics (i.e., providing a highly flexible response, a highly inflexible response, and a neutrally flexible response). It was emphasized that they need not restrain themselves to responses that would fully address the problem or that they would even consider to be good responses. Rather, they were instructed to describe as many *feasible* responses as they could (i.e., responses that someone in the Army might realistically make). Finally, they were instructed that their responses might and ought to include cognitive responses, or ways in which the person depicted in the scenario might think about the scenario, as well as act.

The initial data collection session for this stage was conducted in a small group discussion format. After reviewing the scenarios, the researcher facilitated a group discussion among all participants about each scenario for the final 15 minutes of the session. This approach was abandoned for the remaining data collections. The primary reason was the need by many participants to use the available time to get through all the scenarios. Furthermore, the group discussions tended to result in very little new insight through cross-talk.

Stage 2 Results

The first step in analyzing the data for this stage was to tally the mindset characteristic votes for each scenario. In several cases, respondents selected two characteristics for a scenario. In this case, both were counted as a vote. The winning characteristic was documented and, in cases where there was a tie or close vote, a back-up characteristic was also noted. Initially, the voting process resulted in 17 scenarios assigned to flexibility, 5 scenarios assigned to humility, and 9 scenarios assigned to inclusiveness. One of the 32 scenarios, having to do with the threat of improvised explosive devices (IEDs) on a convoy route, was eliminated due to feedback that it

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was not only insufficiently ambiguous, but also in consideration of the stress-inducing potential of such an item.

The goal of this process was to have an even number of scenarios (approximately 10) assigned to each of the three mindset characteristics. Therefore, the process of assigning the characteristic for each scenario proceeded iteratively. First, all scenarios with a tied (or nearly tied) vote that included flexibility were assigned to the other characteristic. Likewise, the 10 scenarios that were most convincingly voted for flexibility retained that assignment. The remainder were assigned according to the number of votes between the two remaining characteristics. When necessary, scenarios were altered in order to heighten the potential for varying inclusiveness or humility in responses. In one particular case, although the vote was narrowly in favor of flexibility, the scenario was assigned to inclusiveness, based on the quality of the response options available for that scenario. Therefore, the culmination of this process was 10 scenarios for flexibility, 10 for humility, and 11 for inclusiveness.

The next step was to review, edit, and assign the response options for each scenario. The generation of these response options relied heavily on the content provided by the SMEs in Stage 2, particularly when it was indicated that a response option was meant to reflect a high or low level of a certain characteristic. There were many responses options provided by the participants from Stage 2. The number ranged from 24 to 74, with an average of 40. Although they were not all appropriate or usable for various reasons (e.g., options that were illegal, immoral, clearly against policy, beyond an individual's realistic control, or otherwise obviously bad responses), the range of responses provided a clear sense of the types of responses Army personnel would find realistic. Unsurprisingly, many of the response options were similar, giving a further sense of what "common sense" among Army officers might dictate.

In selecting and producing a quality set of response options for rating in Stage 3, several factors were considered. The first consideration was whether a response option clearly indicated a high or low level of the characteristic assigned to that scenario, without being explicit (e.g., "remain flexible when talking with the host national"). A second consideration was whether the response option stood a reasonable, but not certain, chance of resolving the problem. A third consideration was whether the option was a realistic/feasible way for someone to respond. A final consideration was whether the response option matched the level of specificity of other options for that scenario, regarding scope of action and time. All these factors were considered in selecting response options for each scenario. The author also used the provided response options as a base from which to judge the appropriateness of newly written or heavily-revised responses that would fill in the necessary number and type of responses needed for Stage 3. On average, no more than one option per scenario needed to be newly composed or heavily revised by the author. In certain cases, scenario details were tweaked to allow for a wider range of possible responses.

For each scenario, six (in a few cases, seven) response options were selected or written, two positive indicators, written to form a clear expression of the characteristic, two neutral indicators that are not inconsistent with the positive indicator, and two negative indicators that demonstrate a lack of the characteristic. The neutral and negative indicator primarily rely on their juxtaposition with the positive indicator. A different approach to the negative indicator might have been to select response options that are more transparently indicative of an opposing characteristic (e.g., flexibility vs. rigidity, inclusiveness vs. isolation or exclusion, and humility vs. arrogance or condescension). This approach, however, tends to produce rather transparently ineffective or undesirable responses to the scenario. Although they might be endorsed by some

(e.g., those who would proudly reject the value of flexibility, inclusiveness, or humility), these response options would most likely exacerbate the restriction of range in the item score distribution.

This process occurred through multiple iterations of revision between the author and other PhD Research Psychologists employed by the Army who brought insight into Army leadership doctrine, training, and practice. This marked the end of Stage 2, with a collection of 31 scenarios, each accompanied now by a set of six response options to be evaluated for effectiveness and level of the assigned characteristic in Stage 3.

Stage 3: Response Option Scoring

Stage 3 Method

Sample

A total sample of 224 Army personnel (primarily 1LTs and CPTs, some enlisted Non-Commissioned Officers, see Table 4) with deployment experience were sampled as SMEs for this stage). As with the previous stage, the SMEs status as expert is in relation to their understanding of Army Soldier behavior and problem-solving in context. As with Stage 2, each participant evaluated a subset of the total scenario pool, in this case about half. Individual scenario rating samples ranged in size from 68-90 ($M = 83.8$). On an individual scenario basis, two exclusion criteria were applied: a) a correlation $\geq$ .95 between ratings of effectiveness and the mindset characteristic (< 1% of ratings removed), and b) zero variance in ratings of the mindset characteristic (3.3% of ratings removed). Extremely high correlations between effectiveness and mindset indicate that the participant did not differentiate between the elements they were being asked to rate. Similarly, a participant that did not vary their ratings of

flexibility, for example, for all response options to a scenario contributed no value to the differentiation of the responses.

Also, a group of four research psychologists (three PhD-level, one Master's-level) familiar with Army leadership doctrine and critical incident methodology evaluated the scenarios to supplement the Army SME ratings with an alternative perspective.

Materials and Procedure

Participants were provided with a similar set of materials as in Stage 2. The demographics questionnaire and definitions sheet were identical to those provided in Appendix B. Participants also received a rating packet consisting of approximately 15 scenarios, each of which was followed by the list of response options twice, see Appendix C: Scenario and Response Rating Packet. The first time through the response options, participants used a 5-point Likert-type scale to indicate how strongly they agreed or disagreed that a response option would be an effective way to address the problem (1 = *Strongly Disagree* to 5 = *Strongly Agree*). Afterward, the participants rated each response option a second time, using the same scale, this time indicating how strongly they agreed or disagreed that the response would reflect a mindset of humility/inclusiveness/flexibility, as noted for that scenario.

Participants were briefed on the nature and objectives of the project in a fashion similar to Stage 2. Additional emphasis was placed on their understanding the difference between rating the effectiveness of a response option (i.e., how well would it address the problem scenario presented?) and how much it reflected the mindset characteristic (i.e., regardless of whether it is a good response, is it a flexible/humble/inclusive response?). Notably, the expertise of the SME sample is considerably stronger in regard to the likely effectiveness of a response option as compared to the level of characteristic shown. Therefore, considerable time was spent in the

briefing of the research about the meaning of flexibility, humility, and inclusiveness in this study.

Similar to Stage 2, the order of presentation in the scenario packet varied. For Stage 3, the order was carefully counter-balanced to avoid the order effects related to survey fatigue or contamination from a previous scenario. Four different scenario orderings were used: an initial order (1-15), a reversal of the initial order (15-1), a half-switch (8-15, 1-7), and a reversed half-switch (7-1, 15-8).

Stage 3 Results

Each scenario and its accompanying response options were reviewed with a goal to identify the best scenarios (6-8 for each characteristic) to use in pilot testing. Recall that the result of Stage 2 was a set of six response options for each scenario, two of which were written to represent a positive expression of the mindset characteristic, two representing a negative expression, and two representing a neutral expression.

For a scenario to become a pilot-test item, it needed a set of four response options with similar effectiveness ratings, one option to be positively keyed, one option to be negatively keyed, and two to be unkeyed, neutral options. This required a careful examination of the ratings for each response option (186 in total), as well as an evaluation of the scenarios with the best set of options. The primary criteria for evaluating a response option was the mean characteristic expression ratings given by the SMEs and the psychologists. Additionally, the standard deviation of the expression ratings was considered, with smaller deviations indicating greater rater agreement. Given the overall positive skew to the characteristic ratings ($M = 3.52$, $SD = 1.3$; 5-point scale), a rule of thumb was adopted for evaluating whether each option matched its intended level of characteristic expression. For positive expression options, a mean

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characteristic rating greater than 4.25 was a good match. Likewise, for negative expression options, a mean characteristic rating below 2.5 was a good match. For neutral options, mean characteristic ratings between 3.25 and 3.75 were considered good matches. For each scenario, the set of options had to be considered as well. Scenarios with a larger range between the mean ratings for the positive and negative expression options were favored. Likewise, scenarios with options scoring fairly equally on effectiveness were favored. Discrepancies between the ratings from Army SMEs and the psychologists were examined to further explore the level of agreement about how each option expressed the characteristic.

The process of selecting the best four response options for each scenario, and in turn selecting the best scenarios for each characteristic, proceeded according to these criteria. When multiple options could work for a particular keying, preference was given to the one with a smaller standard deviation and less discrepancy between the SME and psychologist samples. In cases where ratings for an intended keyed option did not support the intention, but a neutral response option aligned better, it was substituted. Ultimately, six scenarios were chosen as items to measure inclusiveness, eight scenarios as items to measure flexibility, and seven scenarios as items to measure humility. In Tables 5-7, the data for each response scenario and its response options are presented, along with which scenarios and options were selected and how the options were keyed.

Stage 4: Pilot Testing and Construct Validation

Stage 4 Method

Sample

A total of 229 Army personnel participated in this stage (26 additional participants were removed from the sample due to unscoreable SJT responses). The total sample was split into

51

two groups. Each group completed the pilot test of the STMT. In addition, Group 1 (n = 123, 84% male) completed measures for testing Hypotheses 2a-c, while Group 2 (n = 106) completed measures for testing Hypothesis 3 and gathering additional construct validity evidence. Group 2 was further subdivided into sub-samples based on response instructions for the STMT: a most/least likely response sub-sample (n = 54, 81% male) and a best/worst response sub-sample (n = 52, 83% male). Additional demographic information on each group is provided in Table 8.

 Materials and Procedure

Participants completed the same demographics sheet used in previous stages. All participants in both groups completed the pilot-test version of the STMT. In Group 1, all participants were instructed to respond to each scenario by identifying the two options they, personally, would be most and least likely to choose, from the options presented. Approximately one half of the Group 2 participants also responded according to these instructions. The remaining Group 2 participants were instructed to respond by identifying the two options that they believed were the best and worst options presented. The STMT has an eleventh grade reading level, as indicated by the Flesch-Kincaid Grade Level statistic (11.2), and a Flesch Reading Ease statistic of 50.3 (roughly equivalent to 10th to 12th grade). Although high, this reading level is appropriate considering the subject matter of the test and the education level of the test-taking population (in 2014, 90.6% of active duty officers had a high school diploma or higher; Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy; 2014).

In addition, participants completed five other measures. The additional measures were always completed after the STMT, to prioritize the completion of that test and avoid priming effects. In order to test Hypothesis 2a, that the flexibility subscale of the STMT would be

inversely related to resistance to change, participants in Group 1 completed the Resistance to

Change Scale (RCS; Oreg, 2003). The RCS is an 18-item self-report measure with items rated

using a six-point Likert-type agreement scale (1 = *Strongly Disagree* to 6 = *Strongly Agree*). For

example, "Once I've made plans, I'm not likely to change them." The RCS is scored by

calculating the mean item rating, after any reverse-scored items are recoded. The observed

coefficient alpha for the RCS in the current sample was .87. The development of the RCS was

published in the *Journal of Applied Psychology*, which details the convergent and divergent

validity evidence with measures of variables such as risk aversion, locus of control, dogmatism,

tolerance for ambiguity, generalized self-efficacy, self-esteem, and five factor personality.

Concurrent and predictive validity evidence in regard to actual behavior is also included.

To test Hypothesis 2b, that the inclusiveness subscale of the STMT would be positively

related to work-related openness, participants in Group 1 completed the Work-Related Openness

Scale (WROS; Socin, 2008). The WROS is a 30-item self-report measure with items rated using

a six-point Likert-type agreement scale (1 = *Strongly Disagree* to 6 = *Strongly Agree*). The scale

contains five facets: Fantasy, Feelings, Actions, Ideas, and Values, each of which are measured

with six items. For example, "I often think of a wide range of possible ways to complete a work-

task" is an Ideas item. The WROS is scored by calculating the mean item rating, after any

reverse-scored items are recoded. The observed coefficient alpha for the WROS in the current

sample was .89. The WROS was developed as a doctoral dissertation with criterion-related and

convergent validity evidence supporting its validity using existing measures of openness in the

five factor model and job performance in an applied sample.

To test Hypothesis 2c, that the humility subscale of the STMT would be positively

related to dispositional humility, participants in Group 1 completed the Dispositional Humility

Scale (DHS; Landrum, 2011). The DHS is a 17-item self-report measure with items rated using a six-point Likert-type agreement scale (1 = *Strongly Disagree* to 6 = *Strongly Agree*), all beginning with the item stem "In general, I like people who…." For example, "In general I like people who… are willing to take others' advice and suggestions when given." The DHS is scored by calculating the mean item rating, after any reverse-scored items are recoded. The observed coefficient alpha for the DHS in the current sample was .97. The development of the DHS is published in the journal *Psychological Reports*, with several pieces of convergent validity supporting the scale, such as measures of private and public self-consciousness, narcissism, need for achievement, and self-esteem.

To test Hypothesis 3, that best/worst instructions would result in a stronger relationship between SJT scores and cognitive ability than most/least likely instructions, participants in Group 2 completed the 16-item ICAR Sample Test from the International Cognitive Ability Resource (ICAR) group[1] (Condon & Revelle, 2014). The test measures general cognitive ability with four multiple-choice item types (four items each): Letter and Number Series, Matrix Reasoning, Three-Dimensional Rotation, and Verbal Reasoning.

A Letter and Number Series item presents a sequence of five letters and/or numbers with an underlying sequential logic. Respondents must correctly identify the next letter or number in the logical sequence from among six options. Similarly, a Matrix Reasoning item presents a 3x3 grid of shapes with an underlying logic, but one missing cell in the grid. Respondents must correctly identify the missing shape in the grid from among six options. A Three-Dimensional

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[1] ICAR test items are available as part of the public domain, with some restrictions on use to ensure legitimate scientific purposes. A summary of the current project and how the items would be used was submitted to the group. Access and use of the items was approved.

Rotation item presents an image of a six-sided cube. Three of the sides are shown and feature a distinct symbol. Respondents must consider each of six cubes and correctly identify the one cube that is a possible physical rotation of the given cube. A Verbal Reasoning item presents a word problem, the answer to which is one of four options presented. To illustrate, one item presents a series of statements about the relative heights of three boys. The respondent must then consider four statements about the boys' heights and correctly identify which of the four is true. The scale is scored as a percentage of the items answered correctly. The observed alpha for the test was .83 overall (.82 in the likelihood response instruction group, .84 in the best/worst response instruction group).

Finally, participants in Group 2 completed the Strategic Thinking Questionnaire (STQ; Pisapia et al., 2005). The STQ is a 25-item self-report measure with items rated using a five-point frequency scale (1 = *Almost Never* to 5 = *Almost Always*) in regard to how one thinks and acts in the context of facing a difficult problem or dilemma. There are three separate components to the scale, measuring *Reframing* (nine items), *Systems Thinking* (seven items), and *Reflection* (nine items). A sample item for *Reframing* is "I rethink the situation from another point of view." A sample item for *Systems Thinking* is "I define the entire problem before breaking it down into parts." A sample item for *Reflection* is "I consciously look for similarities between my past experiences and the current problem." The STQ is scored separately by component, calculating the mean item rating, after any reverse-scored items are recoded. The observed coefficient alphas for each component in the current sample were: *Reframing* (.68), *Systems Thinking* (.71), and *Reflection* (.70).

Stage 4 Results

Item scoring was initially done with the approach used by Motowidlo et al. (1990) whereby the options chosen for most and least likely (or best/worst) result in integer scores between -2 and 2. The system is simple: positive and negative keyed options each give a positive or negative score of 1 or -1, respectively, depending on whether they are endorsed (most likely/best) or rejected (least likely/worst). Neutral options give a score of 0. Each item score is thus a combination of the score for endorsement and rejection.

This approach, however, has two flaws. First, a random chance distribution of scores for items scored this way would be bimodal, as there are eight combinations that can result in a score of 1 or -1, two that result in a score of 0, and one combination each resulting in a score of -2 or 2. Upon review of the score distributions for the pilot SJT items, this flaw became evident, negatively affecting the tenability of any assumption of normality. A second flaw of this scoring system is the equal weight given to the options that are endorsed and rejected. Although there is meaning in the option that is rejected, the endorsed option is arguably more meaningful. In other words, what a person chooses to do (or says they *would* do) indicates more than what they choose *not* to do.

To my knowledge, no previous SJT development has chosen to weight the endorsed option over the rejected option, although there is clearly a wide variety of approaches taken. So, there is no known precedent for this approach. However, it is quite common for SJT developers to employ similar variations. A variant on the endorsement approach was adopted by Porterfield (2001), wherein three best options are rank-ordered and give 3, 2, or 1 point(s), while the remaining options give no points.

Bergman et al. (2006) compared validity results for several different methods of keying the same SJT (a leadership skills test). However, this analysis focused on the *keying* side of item

scoring (e.g., expert-based, theory-driven, or empirical), rather than the *scoring* system (all resulted in scoring outcomes of -1, 0, or 1). For the reasons noted above, I believe it is both theoretically justified and serves practical measurement purposes to adopt a unique approach which weights the endorsed option over the rejected one.

Specifically, the new scoring system gives an extra point of weight to the endorsed option. This extra point results in scores that range from -3 to 3. The random chance distribution of item scores is now more even (see Figure 2), with two response combinations each scored as -2, -1, 0, 1, or 2, and one combination each scored as -3 or 3. In Table 9, the descriptive statistics for each item under each scoring system are provided (under most/least likely conditions). The alternative scoring system slightly reduced issues of negative skew ($M_1 = -.48$ to $M_2 = -.45$, $N = 128$) and kurtosis ($M_1 = -.3$ to $M_2 = -.07$, $N = 128$). However, Shapiro-Wilk tests of normality still reject the null hypothesis of normality for each item, with test statistics ranging from .60 to .94 (df = 126).

Standard practice in test construction is to report estimates of measurement reliability. Coefficient alpha is a standard metric for estimating reliability, treating each item as an individual test administration of its own and comparing their consistency to estimate the reliability of the test. This approach requires an assumption of tau-equivalence, which some have argued is not a realistic condition in most test construction cases (Sijtsma, 2009). Furthermore, alpha has always been known to be a lower-bound estimate of a test's reliability, one which may grossly underestimate actual reliability (Sijtsma, 2009). Alternative reliability estimates, such as λ_2 (Guttman, 1945), exist which offer better lower bound estimates, although reliability is still underestimated and constrained by the difficulty of estimating reliability from a single test. In regard to SJTs in particular, internal consistency reliability is considered an

inappropriate index for reliability. As described by Whetzel and McDaniel (2009), SJT items are typically construct heterogeneous, which interferes with factor loadings and the assessment of scale reliability through homogeneity. Whetzel and McDaniel suggest test-retest reliability or parallel forms approaches instead. The nature of the current sample precluded a test-retest format, and establishing parallel forms was infeasible as well. Therefore, internal consistency estimates are provided, with a clear expectation that they underestimate the reliability of the test, due to the nature of these metrics and the construct heterogeneity of SJT items.

Coefficient alpha and λ_2 reliability estimates for the STMT items were all quite low. When all pilot test items were included, alpha and λ_2 were very low: inclusiveness ($\alpha = .14$, $\lambda_2 = .21$), flexibility ($\alpha = .08$, $\lambda_2 = .15$), humility ($\alpha = .03$, $\lambda_2 = .13$), and overall ($\alpha = .3$, $\lambda_2 = .35$).Four items for each characteristic were selected to remain in the item set, on the basis of item-total correlation, item-scale correlation, and normality (skew/kurtosis). The refined item set shows improved reliability estimates across the board: inclusiveness ($\alpha = .33$, $\lambda_2 = .34$), flexibility ($\alpha = .29$, $\lambda_2 = .31$), humility items ($\alpha = .25$, $\lambda_2 = .3$), and overall ($\alpha = .4$, $\lambda_2 = .43$). The average item distribution characteristics improved for skewness ($-.27$, $SE = .21$) and kurtosis ($-.43$, $SE = .43$).

Hypothesis 1 addressed the factor structure of the STMT items. Specifically, an oblique three-factor model was expected to fit the data better than an orthogonal model. Although the assumption of univariate and multivariate normality is questionable in this case, the models were tested using maximum likelihood estimation. Alternative estimation methods that do not assume normality require much larger sample sizes (e.g., asymptotically distribution free estimation, bootstrap estimation).

Using the 128 cases from Group 1 of Stage 4, both three-factor models, oblique and orthogonal, resulted in unidentified models. When the additional 54 cases from Group 2 were

included (originally intended as a hold-out sample) in the analysis, the oblique model was successfully identified and the fit estimated. The orthogonal model, however, produced inadmissible results.[2] This is likely due to a large negative error variance estimate for one item (-10.4). A one-factor model was also tested, for comparison against the hypothesized three-factor oblique model.

There are many indices and tests of model fit available. Absolute model fit is often tested with a chi-square test (χ^2; indicates bad fit if significant, Tabachnick & Fidell, 2006) alongside the ratio of χ^2 to its degrees of freedom (CMIN/df; threshold < 2, Tabachnick & Fidell, 2006). Hu and Bentler (1999) recommend also examining a combination of a relative fit index, such as the comparative fit index (CFI) which functions well for small sample sizes (Tabachnick and Fidell, 2006), and a non-centrality parameter, such as the root mean square error of approximation (RMSEA; threshold $< .07$; Steiger, 2007).

The oblique model demonstrated marginal to good fit, given the caveat that violations of normality likely cause the fit to be overestimated. The chi-square test for the oblique was not significant, $\chi^2 (51) = 55.28$, $p > .05$, and the CMIN/df was acceptable (1.084). The CFI indicated marginally poor fit (.88). The RMSEA indicated excellent fit (0.022; 90% CI [< 0.001, .054]). As shown in Figure 3, however, the standardized factor loadings for the three-factor model are inconsistent, quite low in multiple cases. Two items in particular (P16 under flexibility and P10 under humility) load so weakly on their factors (.04 and -.16, respectively) that the model would be clearly improved by removing those items.

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[2] A three-factor orthogonal model would likely be unsupported regardless, as there is a significant correlation between inclusiveness and humility subscale scores, as seen in Tables 11 and 14.

After removing items 16, 10, and an additional inclusiveness item (P6 under inclusiveness) to maintain an equal number of items per subscale, the models were estimated again. The orthogonal model was once again inadmissible due to a negative error variance. The three-factor oblique model showed improved fit, χ^2 (24) = 25.032, $p > .05$, CMIN/df = 1.043, CFI = .967, RMSEA = .015, 90% CI [< 0.001, 0.063] (see Figure 4). The one-factor model also showed strong fit, χ^2 (27) = 29.035, $p > .05$, CMIN/df = 1.075, CFI = .935, RMSEA = .02, 90% CI [< 0.001, .063] (see Figure 5). In this circumstance, where both models indicate good fit, it is appropriate to consider model parsimony. Although there are no well-established thresholds for the parsimony-adjusted CFI (PCFI; scaled 0-1; Bentler, 1990), it may be used to compare how well the fit of the two competing models maximizes parsimony. Unsurprisingly, the one-factor model (PCFI = .701) performs better than the three-factor oblique model (PCFI = 0.645), albeit slightly.

As noted above, there are important caveats to the interpretability and reliability of these fit assessments. The sample size is somewhat low ($N = 182$, 12 observed variables, ~15 subjects per variable) but within the recommended range (10-20 per variable). The non-normality of the data present a significant challenge to the accuracy of the fit estimation. Attempts to transform the item score distributions using square root and log 10 transformations, as recommended by Tabachnick and Fidell (2006) for negatively skewed data, resulted in slightly *more* skewed item distributions. Low inter-item correlations and factor loadings further suggested a problem with the model, and indicated that that very good fit indicated by the fit indices were likely substantially overestimating the fit of both models. As shown in Table 10, the inter-item correlations were mostly below .2 and, in several cases, negative.

Hypothesis 1 focused on the relative superiority of an oblique model compared to an orthogonal model. Due to the inadmissible nature of the results for the orthogonal model, this comparison cannot be fully completed. In place of that comparison, the three-factor and one-factor models were compared. In regard to the relative fit of those models, with the refined item set, the data fit both models fairly equally, with most indices slightly favoring the hypothesized three-factor oblique model, while parsimony-adjustments suggest the favorability of the one-factor model. Both these models, allow for the conceptual overlap of flexibility, humility, and inclusiveness components of the mindset, the difference being the extent to which the components can be shown to exist distinctly. Overall, there is insufficient compelling evidence to support that the hypothesized three-factor model better represents the data than a model encompassing one overall mindset factor. Therefore, these results suggest Hypothesis 1 is not supported.

For the remaining analyses, scale scores, alphas, and intercorrelations will use the 9-item form of the STMT derived from the CFA. Removing those items lowered alpha for flexibility (α = .26, down from .29) and inclusiveness (α = .26, down from from .33), but raised it for humility (α = .42, up from .25), and overall mindset (α = .45, up from .4).

Hypothesis 2 covered the expected relationships between the STMT subscales and the alternative measures of similar constructs to establish construct validity. Specifically, Hypothesis 2a predicted a negative relationship between strategic mindset flexibility and resistance to change.

The observed correlation between the three-item flexibility score and resistance to change was significant (r = -.27, p < .01). Hypothesis 2b predicted a positive relationship between strategic mindset inclusiveness and work-related openness. The observed correlation

between the three-item inclusiveness score and work-related openness was significant ($r = .18$, $p < .05$). Hypothesis 2c predicted a positive relationship between strategic mindset humility with dispositional humility. The observed correlation between the three-item humility score and dispositional humility was significant ($r = .34$, $p < .01$). See Table 11 for the full bivariate correlation matrix.

To place these relationships in context, the relationships between each characteristic and the other construct validity measures should be explored. Inclusiveness did not correlate significantly with either resistance to change ($r = -.06$) or dispositional humility ($r = .07$). Flexibility did not correlate significantly with work-related openness ($r = .04$) or dispositional humility ($r = .16$). Humility did not correlate with either work-related openness ($r = .11$) or resistance to change ($r = -.05$). To summarize, each subscale of the STMT correlated significantly with its corresponding self-report measure, but did not correlate significantly with the others. This evidence cumulatively supports Hypotheses 2a-c, with the caveat that measurement validity requires reliability, the estimates of which are low for the STMT.

In Group 2, an additional measure was included to explore the relationship between strategic mindset scores as measured by the STMT and scores on the Pisapia et al. (2005) STQ. Under the likelihood response instruction condition, inclusiveness correlated positively with STQ reflection ($r = .30$, $p < .05$), as did the overall mindset score ($r = .32$, $p < .05$). All other such correlations were non-significant. See Table 14 for the full bivariate correlation matrix, under each response instruction condition.

Hypothesis 3 concerned the relationship between STMT scores and cognitive ability when the item response instructions were changed. Specifically, the relationship with cognitive ability was predicted to be stronger when instructions were to choose the best and worst

response, compared to instructions to choose one's most and least likely response. Descriptive statistics for each item under both instruction conditions are provided in Table 12. The observed correlation between the overall STMT score and cognitive ability was nonsignificant in the likelihood condition, $r = -.12$, ns, but significantly negative in the best/worst condition, $r = -.29$, $p < .05$). See Tables 13 and 14 for further item-level and scale-level detail. Although the specific prediction made in Hypothesis 3 was technically supported by the significant relationship in the best/worst condition, the direction of that relationship was not in line with what was anticipated. However, the intended construct-level relationship between strategic mindset as measured with likelihood instructions and cognitive ability (i.e., a lack thereof) is bolstered by this evidence.

Exploratory analyses were conducted for the demographic variables in Stage 4. For analyses that include only the STMT scores, the Group 1 sample was combined with the subset of Group 2 respondents who completed the STMT with the same likelihood response instructions as Group 1. There was no effect of sex on scores for inclusiveness ($F(1,180) = 0.816$, ns), flexibility ($F(1,180) = 0.982$, ns), humility ($F(1,180) = 0.975$, ns), or total mindset ($F(1,180) = 2.099$, ns) as measured by the STMT. Likewise, there was no effect of sex on work-related openness ($F(1,126) = 0.013$, ns), resistance to change ($F(1,126) = 0.069$, ns), dispositional humility ($F(1,126) = 0.031$, ns), reframing ($F(1,103) = 0.037$, ns), systems thinking ($F(1,103) = 0.410$, ns), reflection ($F(1,103) = 0.039$, ns), or cognitive ability scores ($F(1,103) = 1.938$, ns). It should be noted that, although the sample's balance of males and females is consistent with the Army-wide population (cf., Maxfield, 2015), there is a large imbalance in the sample for this demographic variable.

There was no effect of rank on scores for inclusiveness ($F(4,177) = 0.37$, *ns*), flexibility ($F(4,177) = 1.58$, *ns*), humility ($F(4,177) = 1.760$, *ns*), or total mindset ($F(4,177) = 2.019$, *ns*). There was a significant effect of rank on work-related openness ($F(4,123) = 2.735$, $p = .032$), but no effect of rank on resistance to change ($F(4,123)$, 1.041, *ns*) dispositional humility ($F(4,123) = 0.576$, *ns*), reframing ($F(2,102) = 1.262$, *ns*), systems thinking ($F(2,102) = 1.172$, *ns*), reflection ($F(2,102) = 2.128$, *ns*), or cognitive ability scores ($F(2,102) = 1.165$, *ns*). Post-hoc examination of the rank effect on work-related openness, using Tukey's HSD test, reveals that 2nd Lieutenants ($M = 3.66$, $SD = 1.07$) scored significantly lower on work-related openness than Captains ($M = 4.33$, $SD = 0.55$).

There was no effect of functional branch on scores for inclusiveness ($F(16,165) = 1.131$, *ns*), flexibility ($F(16,165) = 0.582$, *ns*), humility ($F(16,165) = 0.814$, *ns*), or total mindset ($F(16,165) = 0.54$, *ns*). Likewise, there was no effect of functional branch on work-related openness ($F(14,113) = 1.593$, *ns*), resistance to change ($F(14,113) = 0.407$, *ns*), dispositional humility ($F(14,113) = 0.924$, *ns*), reframing ($F(13,91) = 1.224$, *ns*), systems thinking ($F(13,91) = 1.651$, *ns*), reflection ($F(13,91) = 1.319$, *ns*), or cognitive ability scores ($F(13,91) = 1.178$, *ns*).

Chapter 5 - Discussion

Gaining new understanding about the improvement of organizational strategy through the development of effective strategic thinkers is a goal shared by many academic scholars, human resource professionals, and organizational leaders. It has only been fairly recently that the so-called black box of the boardroom, the often empirically inaccessible environment in which high-level strategizing happens in large organizations, has started to open to scholars and researchers (Arnardottir, Fischer, & Martin, 2015). Much remains to be known about the individual and interpersonal dynamics of strategic thinking and strategizing. The current research sought to contribute to this understanding by conceptualizing a new construct: the strategic thinking mindset. In conjunction with cognitive ability and the domain-specific knowledge best gained with time, experience, and education, such a mindset reflects the unique perspective that makes a person well-suited to the complex and ambiguous thinking challenges required for successful strategy-making.

 The overarching goal of creating a test that measures the strategic thinking mindset was to help identify strengths related to strategic thinking in organizational members that have yet to be set on a path to strategic level leadership. This research study aimed to not only develop a theoretical understanding of the strategic thinking mindset as a construct, but also to measure that construct with a situational judgment test format conducive to identification and development in a way that is specific to an organization's work domain.

To that end, the current research was structured in four stages. The first three stages of data collection and analysis reflect the development of the STMT items. The standard form of a situational judgment test item consists of an item stem (a scenario of some kind), item options (ways in which one could respond in the scenario), and a scoring key (how each response option

relates to the item score, if chosen). The fourth stage consisted of the evaluation of the STMT's psychometric qualities.

In Stage 1, participants from a wide range of functional areas in the Army provided critical incidents from their experiences in which they or a close associate were confronted with a difficult problem that had no clear right answer. These critical incidents were carefully reviewed, culled, and edited into a set of scenarios that elicit a demonstration (or rejection) of humility, flexibility, or inclusiveness by a functionally generic audience of Army participants at a certain level of rank.

In Stage 2, a new group of participants read the scenarios and provided feedback on their realism and general applicability across the Army, as written. Participants also indicated the most relevant characteristic for the scenario and provided a range of response options, with emphasis on varying the focal characteristic within a range of reasonably realistic and effective approaches to responding to the problem depicted in the scenario. Scenario feedback was incorporated, as needed, to improve the scenarios. The votes for each scenario as relevant to flexibility, humility, or inclusiveness were tallied and used to assign each scenario a characteristic. The many response options provided for each scenario were reviewed and compiled into a set of candidate response options that represented different levels of the focal characteristic.

In Stage 3, another new group of Army participants considered the options for each scenario and rated them individually on the level of flexibility, humility, or inclusiveness shown and the likely effectiveness of the option. A small group of research psychologists also rated the scenarios and options in the same way. This data was carefully compiled and analyzed in an attempt to select the most appropriate options for each scenario and identify the scenarios with

the best group of response options to represent a range of flexible, humble, or inclusive responses, with generally equivalent effectiveness.

Finally, in Stage 4, the remaining scenarios and response options were presented to a final group of Army participants as pilot test items, alongside measures of other constructs for accumulating validity evidence. For a subset of participants, the instructions for how to respond were altered from a focus on one's most and least likely response to which would be the best and worst response.

In summary, existing scholarship on the characteristics of strategic thinking was summarized and synthesized by an analysis of the themes that underlie the breadth of the construct across several disciplines. Once the theoretical model of the strategic mindset was identified, four stages of progressive item development and refinement produced a 9-item situational judgment test, the STMT, for use by the U.S. Army with three sub-scales that show some evidence of construct validity, in line with the theoretical model.

The results demonstrated that the STMT suffers notably due to deviations from normality as well as low inter-item correlations and construct homogeneity. This is not particularly surprising given the issues of construct heterogeneity inherent to the SJT format (see Whetzel & McDaniel, 2009). Although some evidence emerged supporting the theoretical model underlying the STMT's structure, the lack of an adequate indicator of the test's reliability and the questionable factor structure of the test may limit the test's usability as a predictor or criterion. If the STMT were to be employed in research or selection, a better estimate of the reliability of the test, such as a test-retest form, would be needed before the test could be trusted for this purpose. Any criterion-related correlations would need to be substantially attenuated for any unreliability in the test. The single test administration nature of the current research posed a

difficult challenge to determining the test's true reliability. The construct heterogeneity of SJTs contributes to a lack of internal consistency of SJTs (Whetzel & McDaniel, 2009). Many other SJT developments have encountered similar issues. Schmitt and Chan (1997) describe the common occurrence of relatively low alphas, low inter-item correlations, and factor analytic results that account for a small portion of total variance in SJT development research. Porterfield (2001) developed an SJT for security officers, finding it to be an effective predictor of job performance, but suffering from a disappointing alpha (.31). Chan and Schmitt (1997) developed an SJT for generic skilled blue collar work with a final alpha of .55. There are, however, examples of SJTs that succeed in (or come close to) meeting the standard thresholds of alpha reliability (e.g., Ascalon, 2004, .69; Born, Van der Maessen, & Van der Zee 2001, .91). It has been suggested that an increased focus on measuring specific constructs, rather than the entire scope of a job may lead to better alphas (Ascalon, 2004). Born et al. (2001) developed a construct-focused SJT for social intelligence and achieved a very high alpha; however, Young's (2004) SJT focused on emotional intelligence suffered from an extremely low alpha (.17). Likewise, an SJT developed by Smith (2011) focused on entrepreneurial orientation produced an alpha of .32. Furthermore, coefficient alpha, as the standard metric for internal consistency reliability, has been criticized as a (potentially gross) underestimate of true reliability (Sijtsma, 2009).

Schmitt (1996) notes that a measure may have other strengths than high internal consistency reliability around a clear homogeneous construct, such as content coverage of a domain, that may support the test's use. The STMT's reliability is of greater concern when the purpose of the test is to analyze the score. Yet, one of the great strengths of an SJT is its content fidelity (Weekley & Ployhart, 2006). The use of the STMT as a starting point for self-awareness

training and group discussion about intellectual flexibility, humility, and inclusiveness is not substantially hindered by the unknown reliability and factor structure of the test. So, while the results of this study are disappointing in regard to the psychometric strength of the scale developed, this outcome is not inconsistent with the issues that have hindered many previous SJT developments.

There is some evidence that the measure taps into the constructs of flexibility, humility, and inclusiveness as intended. Relating to Hypothesis 1, the CFA provided some evidence supporting three factors, favoring the three-factor oblique model over the one-factor model in a pure fit sense. Ultimately, identifying paths for the three factors in the structural model did not add enough value to the model to overcome the cost of decreased parsimony. However, the results still supported the presence of those factors, albeit with fairly strong covariances between the factors and somewhat low factor loadings. Furthermore, the low inter-item correlations suggest that a factor analysis may not even be appropriate for the data obtained.

In support of Hypotheses 2a-c, each three-item subscale in the final test correlated as expected with its corresponding self-report measure, but did not correlate significantly with the others. The implications of this are that, while there may be significant construct overlap and statistical noise in each subscale's strength as a predictor and construct measurement, there is at least some signal that is uniquely tied to the intended construct.

That said, there is a reason why reliability, inter-item and item-total correlations, and factor structure are a concern in measurement, particularly when a test is designed to measure specific constructs, rather than broadly defined "judgment" in a job. In the current research, the STMT was designed to measure the construct of strategic thinking mindset as indicated by the constructs of flexibility, inclusiveness, and humility. There remain important concerns about the

overall evidence supporting the construct validity of the STMT in this regard. The low inter-item correlations suggest that each item reflects a heterogeneous set of constructs, even within the subscales. There is also evidence of significant overlap between the inclusiveness and humility subscales in particular, suggesting a need for some refinement to the theory underlying those two characteristics.

The lack of a relationship with cognitive ability, in the likelihood conditions, is noteworthy. It not only reinforces that the constructs being measured by the STMT are distinct from a general intelligence factor, as intended, but also reinforces the need to appreciate and understand the aspects of strategic thinking that require something other than a powerful intellect. The negative correlation with cognitive ability under best/worst instructions is difficult to interpret. To the extent that the relationship is not a spurious one, a possible interpretation is that people (perhaps Army officers in particular) with the strong reasoning skills required to score highly on a cognitive ability test have a tendency to be overconfident, especially when they are confronted with the notion that there is a clear best response. Such a condition may prompt more analytical thinking processes, rather than humanistic ones. More generally, highly intelligent people might have a tendency, either innate or learned, to devalue certain ways of approaching problems. They may be less likely to seek to integrate the viewpoints of others (inclusiveness), acknowledge their limits or biases (humility), and/or attend to clues that a change in approach or assumptions may be needed (flexibility). More research on this possibility is warranted.

The general lack of relationship between the STMT and the Pisapia et al. (2005) measure, the STQ, aligns with the different approach to conceptualizing the mindset in each measure. The approach taken by the STQ focuses more on three "cognitive processes" (p. 44): systems

thinking, reflection, and reframing. According to Pisapia et al., these processes facilitate the creation of the strategic mindset. These are certainly important elements of strategic thinking, as indicated by the inclusion of the Pisapia et al. model in the integrating themes analysis summarized in Table 1. The STMT focuses on the mindset characteristics that form a necessary foundation for the kinds of thinking processes measured in the STQ. Additionally, it should be noted that the methodological differences of the STMT and STQ as measures affect what exactly is being measured. While the STQ relies on the respondent's self-assessment of general tendencies, the STMT puts the respondent in a position to apply those tendencies in a series of situational judgments. The significant relationships found between inclusiveness and the total mindset score with reflection may suggest an avenue for further research. For example, it may be that inclusiveness plays a role in supporting the processes represented by the theme of self-awareness and self-control.

Strengths

Although the overall profile of results for the scale developed in this research are disappointing, there are still important strengths in the areas of conceptual development, method selection and item development, and research design. The conceptualization of the strategic thinking mindset may still need further refinement, but the process by which the mindset was conceptualized was sound, rooted in a diverse review and synthesis of existing scholarship from the disciplines of psychology, management, military art, and history. There is far too much empirical, conceptual, and philosophical literature about strategy to provide a fully comprehensive review of what we know or think we know about it. The scope for this research was to examine how different disciplines ascribe specific characteristics to individual strategic thinking. In some cases, this included explicitly designed scientific models of strategic thinking,

while in other cases, the substance of strategic thinking is described in a more philosophical way, or embedded in an approach to measurement. I believe this is a strength of this research, in that it avoids what can become a self-reinforcing cycle of overly-narrowing a concept by relying too heavily on one contextual lens. The notion of a strategy is unquestionably broad and fundamental to individuals and organizations of all types, be they small or big, private or public, military or civilian, athletic or artistic. There is a cost to the broader understanding of how to think about a complex problem environment and create effective strategies within it if researchers and scholars fail to maintain a sufficiently wide lens.

This research intentionally sought to integrate the common themes of all who think and write about what strategic thinking is and looks like, and then to take a step further in using that synthesized understanding to derive a new concept. For all that we might already understand about what strategic thinking is and who does it well, we know much less about how to identify those who have a talent for it and give them the right developmental experiences, such as planning and decision-making opportunities, broadening experiences, and education. The mindset for strategic thinking, how to approach complex problem environments in the right way, is an important tool, alongside intelligence and a base of relevant knowledge, for individuals to contribute to effective strategic thinking and strategy-making.

The choice of situational judgment testing as a method for assessing the strategic thinking mindset was thoughtfully rooted in the strengths of this format. First and foremost, the SJT format is a relatively inexpensive method that retains some content fidelity as a small-scale simulation, rather than relying on a test-taker's self-awareness and honesty. Face validity to test-takers, reduced adverse impact, and potential material for group-discussion and self-development also weighed in favor of this method. The item development process was carefully planned and

performed in line with the best practice guidance of SJT experts and practitioners, notably

McDaniel and Whetzel (2007). Each element of the STMT (item stem content, item response

content, scoring key) was developed in its own stage, allowing for each stage of development to

contribute to improving the products of the previous stages.

At each stage, the STMT was developed with a unique and relevant sample of

participants with expertise in the job environment at hand. Employing a more generic student

sample may have facilitated easier data collection and larger samples, which may have facilitated

greater flexibility for maximizing the psychometrics. However, the utility of the STMT, in the

end, would have suffered significantly from the lack of perspective on the real-life patterns of

thought and decision-making in the population for whom the test was intended.

Best practices in research methods were followed throughout. Item-order effects were

carefully counterbalanced. Efforts were made to prevent survey fatigue. Diverse and

representative participants were sampled. The assumptions underlying the evidence for statistical

and construct validity were evaluated, considered, and the results accurately reported.

A final strength of this research is the careful consideration of, and adherence to, ethical

standards for human subjects research. The use of a military sample required special attention to

including all relevant forms of institutional review. All stages of the research were reviewed and

approved by the institutional review board governing U.S. Army human subjects research. The

Kansas State University review board was also involved in the review process, through a

memorandum of understanding established between the university and Army review boards.

The Army process for obtaining access to participants also ensures that Army units allowing

their personnel to participate are given the opportunity to consider the goals and anticipated

benefits of the research in order to prioritize and selectively support individual research projects.

Intellectual property rights were respected throughout. The appropriate permissions were

obtained for use of the ICAR Sample Test (Condon & Revelle, 2014) and the Strategic Thinking

Questionnaire (Pisapia et al., 2005).

Limitations

The primary limitation of this research relate the lack of a solid understanding of what

the STMT is truly measuring at a construct level. The reliability problems are inherently related,

in that they rely on the internal consistency model of estimating reliability, which treats each

item as a mini-test and therefore the degree to which the items intercorrelate with each other

determines the estimate of how reliable the test is. As noted above, and according the

recommendation of Whetzel and McDaniel (2009) this approach to estimating the reliability of

an SJT is suboptimal compared to other approaches, such as test-retest reliability.

As noted above, SJTs commonly present muddled results in regard to identifying the

constructs measured. The current test was no different. There are also limitations related to

sample size. The 54 cases in Group 2 of the Stage 4 pilot test were meant to be a hold-out

sample to replicate test the results of the CFA. However, they were instead incorporated into the

main CFA to boost its power and overcome model identification problems. Sample size is also

related to the violations of the general linear model. Many of the analyses reported here require

an assumption of univariate, and in the case of structural equation modelling, multivariate

normality. Although there are techniques which can overcome violations of normality, they

generally require very large sample sizes. Steps were taken to address the normality of the item

distributions, and the implications of those violations are acknowledged throughout. An option

would be to seek out more participants until a sufficient sample for these robust analyses is

obtained. However, extensive effort and resources were put into obtaining the current minimally

viable sample size. The costs of obtaining what would be a much larger sample would have been unrealistic and untenable.

The nature of the Army sample should be considered a strength of this research overall. However, there are limitations aside from the restrictions on sample size and restraints on the opportunity to estimate reliability through test-retest correlations. Although the samples obtained certainly have expertise derived from first-hand knowledge of decision-making in the job, there is no real expertise in the sample regarding the constructs of flexibility, humility, and inclusiveness. Although the author's involvement at all points, and the research psychologist sample in Stage 3, serve to balance this concern, the participants may have been limited in their ability to sufficiently conceptualize the relevance of a scenario to the mindset characteristics, or to generate a wide enough range of realistic flexible, humble, and inclusive response options.

In addition to the psychometric weaknesses of the developed test, there are limitations to the strength of the strategic thinking mindset at a conceptual level. As noted throughout the introduction, there is a likely a curvilinear relationship between each of the strategic thinking mindset characteristics and success in strategic thinking. In other words, there is reason to believe that, beyond a certain threshold, these characteristics may become a hindrance to strategic thinking. This research does not allow for an investigation of that phenomenon; however, it bears mentioning here as the application of these characteristics in problem-solving requires a judgment about where that threshold may be. Some respondents may value inclusiveness highly, but feel that in the scenario presented, to embrace an inclusive approach to the problem would be more problematic than helpful.

A related point regarding the interpretation of one's mindset from SJT responses is that one's natural tendencies may be suppressed by the wishes of an authority figure or the norms of

a culture. This is of particular relevance in the military, which has a clearly defined chain of command, powerful cultural and climate norms, and constant peer competition for promotion. A respondent may be naturally inclined to endorse an inclusive response to a given scenario, but also feel that such a response would be perceived badly by peers or authority figures. For example, an inclusive response may be seen as an abdication of one's own decision-making responsibility, perhaps with the intent of sharing the risks associated with failure.

In this case, it would be more accurate to say that the STMT is measuring the degree to which the unit climate a respondent comes from is receptive to flexibility, humility, and inclusiveness. Future research could effectively explore this phenomenon by comparing the results of Soldiers within and between units. This also points back to the measure's strength as a source of group discussion and self-development. If a unit leader wishes to get a sense of how their command climate does or does not support flexibility, inclusiveness, and humility, the test could be used as a group diagnostic and source of material for discussion.

Future Research

As noted above, future research for the STMT in particular should focus on the question of whether it tends to measure an innate trait or a more transient perception of the characteristics, perhaps brought on by climate and/or leadership, using a between- and within-unit design. Although there were no significant effects of branch on scores, a more directed effort to obtain a sufficient sample from each of the major branches may reveal something about the areas in the Army that tend to produce (or attract) individuals with a strategic thinking mindset, and might, therefore, be under- or over-represented in promotion to strategic-level leadership positions. If the mindset is more transient and influenced by unit, this would suggest that the mindset could be developed through education or facilitated by improvements to unit climates. This is a critical

area of future research on the mindset as it stands to define whether, and through what time and resources, any Soldier can be trained to think this way, or if organizations are better off facilitating the promotion of Soldiers who already think about problems in this way. As for what the current study can show about the transience of the mindset, there was no significant effect of any demographic variable on STMT scores, suggesting that the Army is not already indirectly selecting for and promoting this mindset into the higher ranks or key branches.

Related to the issue of transience is the question of how one's mindset relates to one's actions. The SJT format uses decisions about actions to indicate tendencies about a test-taker's mindset. Therefore, it is conceptually possible that a person who does not have a mindset favoring those characteristics would still make decisions and act in a way that suggests they do. This might happen, for example, if the Army's evaluation and promotion processes begin to explicitly evaluate and reward these characteristics. Future research could explore this possibility, perhaps through an experimental design that involves priming a group of participants that the Army highly values those characteristics. In some ways, it may not matter whether an officer is being inclusive, humble, or flexible in their actions, but not in their thinking; for example, the subordinates they oversee may witness it the same and be developed to appreciate the role of these characteristics in problem-solving. However, when it comes to the individual officer's ability make good decisions, if they only go through the motions of inclusiveness, for example, without truly incorporating the perspectives provided, their thinking will still suffer from a narrow lens.

The STMT should be tested in an environment in which test-retest reliability can be estimated, as well as other methods for evaluating the validity of the test, such as criterion-related validity. A research design might utilize course performance at various Army schools,

such as the Captain's Career Course or the Command and General Staff College. Depending on the nature of the course, this may be a useful performance criterion for the test. Conversely, the STMT could be used to evaluate training interventions related to flexibility, humility, or inclusiveness.

The relationship of the STMT with cognitive ability could also be explored more fully. Although the results supported the independence of the strategic mindset and cognitive ability, a qualitative and quantitative approach could be designed to explore how people high and low in cognitive ability tend to think about and value the importance of flexibility, humility, and inclusiveness. The STMT's relationship with personality and other individual difference variables should also be explored. Although one element of the five-factor model was incorporated in this research (the WROS focuses on the openness to experience factor), there may be significant overlap with one or more of the other four factors. Need for cognitive structure may be revealing of why certain individuals struggle to embrace a mindset of flexibility, for example. All such analyses would likely help to clarify the constructs being measured in the STMT.

Finally, further research could be done to clarify whether the mindset is truly unrelated to aspects of problem-solving and strategic thinking that it is expected to be unrelated to. It remains to be seen if domain-relevant knowledge affects the mindset. It may be that more domain-relevant knowledge decreases the ability of the mindset to influence decision-making, as more focus may be paid to the particular facts of the situation. If this were the case, it may be preferable to measure the mindset when officers are still recruits and have yet to gather any knowledge or experience at the Company grade. However, a recruit may be inclined to score highly on flexibility, humility, and inclusiveness when presented with scenarios that they know

are beyond their training, education, and experience. When the scenarios match the level of the test-takers, however, higher mindset scores may be more indicative of how they would actually think and behave. Finally, as noted in Figure 1, there are two themes that were not tied to a mindset characteristic, directionality and awareness of time. Future research should seek to develop measures of those processes and assess whether the mindset characteristics relate in a meaningful way.

Other approaches to measuring the strategic thinking mindset should also be explored. Some SJTs are developed using multi-media formats, depicting the scenario through audio-visual means, for example. This presents a substantial resource challenge, however, a multi-media version of the assessment might allow for an investigation of how interpersonal biases (racial, ethnic, gender, etc.) or stereotypes affect scores on the STMT. For example, someone biased against female officers in a combat environment may be much less likely to be inclusive than if a male officer is presented in the same role.

A self-report measure similar to the STQ might be developed, based on the specific concepts of flexibility, humility, and inclusiveness in problem-solving as modeled in this research. This would allow for a better comparison of the way in which people assess their own tendencies and how they apply them in scenario-based judgments. The issue of social desirability in responding is certainly relevant here. No explicit measure of socially desirable responding was included in this research, however, future studies should examine this issue, both for the SJT and especially if a self-report version of the STMT is developed. The STMT should be considerably more resistant to socially desirable responding, as the constructs being measured in each item are more obscured and embedded than, for example, in the Pisapia et al. (2005) STQ. That said, future research could explore how honest or accurate participants' responses to

the SJT are in relation to how they actually behave in problem-solving. An observational study could be designed in which participants take the SJT and participate in one or more group problem-solving exercises.

A qualitative approach might also prove valuable. The growing field of computational linguistics and natural language processing might open up new options for assessing a person's cognitions in their written or oral communication. Critical self-reflection essays, lessons-learned reports, or after-action review transcripts may contain sufficient content to assess the mindset. Similarly, such an approach could be used to further refine the strategic mindset concept itself by obtaining written or oral reflections on decision-making by individuals in strategic positions and mining the ways and frequency with which they refer to moments of flexibility, inclusiveness, and humility in their thought process.

Future research in the area of SJT development in general should continue the work of Bergman et al. (2006), focused on keying and scoring methods. Further refining the circumstances in which each of the many options is most desirable and defining the ways in which choices in keying and scoring impact the data will help future researchers better anticipate and account for the data-related problems so commonly faced by SJTs. Specific research in this line might focus on alternate methods of keying and scoring the STMT in particular, altering the nature of the hybrid keying system employed, to explore the effect of those changes on relationships with variables in the current or future studies. One example might be to weight each item in the total scale score according to its discrepancy between the positive and negative keyed options as scored in Stage 3. This would give greater weight to scores of items that feature a clearer delineation of the characteristic among the options.

Further research could also explore the nature of the relationship between SJTs as a method, the constructs they measure, and cognitive ability. Although there seems to be consistent evidence that instructions to respond with a best/worst dichotomy vs. a most/least likely dichotomy influence the degree of relationship with cognitive ability (McDaniel, Hartman, Whetzel, & Grubb, 2007), there is likely more to be understood as to why this occurs. Particularly given the negative relationship with cognitive ability found in the current study, the construct being measured by an SJT may play a role in determining whether high cognitive ability is likely to increase or decrease test scores.

Finally, future SJT research should seek to expand the SJT into the computer adaptive realm. In what a test-taker might experience as a choose-your-own-adventure test, each response option to an initial scenario would have its own item characteristics based on an item response theory analysis. As with any computer adaptive test, the test-taker's response would drive the next test item presented. Instead of an entirely separate item presented next, the next item could be a new scenario depicting the same character confronted with the consequences of the initial choice, and with a set of response options that have item characteristic curves that will help refine the estimate of the test-taker's true ability level.

There are obvious practical challenges to developing the content for such a test. However, this approach would be a natural fit for the assessment of strategic thinking, as it would allow a test-taker to experience the evolution of a problem and how their choices can shape the environment. An even loftier goal might be to develop a system that allows for free responding to each scenario, rather than a multiple choice format. If an adequate algorithm could be derived through computational linguistics to evaluate the response in relation to a bank

of existing coded responses, the item could be scored the same as any other SJT, but without providing the range of possible answers for the respondent.

Implications

Despite the disappointing evidence in regard to the utility of the scale developed, there are useful implications that can be derived from this research. The primary implication, for the theory of strategic thinking, is the ability to put to use the integrating themes described in Chapter 2. As shown in Table 1, the various models/descriptions of strategic thinking published in articles and books from various disciplines cover much of the same content domain. Furthermore, many of the same terms are often used. However, each of them leaves out at least a few of the important concepts described in the other models, and in some cases, slightly different terms are used to describe the same general idea. Although each scholar has the right to their own unique understanding and preferred terminology, this can create problems for the practical application of this scholarship to the development of strategy and strategic thinking. The nine themes provide a description of the shared space that theorists in fundamentally different environments have described when identifying what strategic thinking is and what it requires. Although the environments of strategizing for private-sector competitive position in industrial markets and grand military strategy for the use of the elements of national power differ widely in what their strategies consist of and look like, the art and science of strategic thinking are largely the same. Practitioners and theorists interested in developing, identifying, coaching, or evaluating strategic thinkers can use these themes to ensure they are operating with all the valuable insights brought by scholars in various disciplines.

In addition, the strategic thinking mindset conceptualized and pursued in this scale development project has similar implications. Further research must be done to refine the understanding of

what the mindset consists of and how it is best measured and applied in problem-solving. However, the more general description of the mindset, distinct from intelligence and knowledge, provides an avenue for organizational solutions related to producing better strategic thinkers in organizations. Ensuring that organizational climates are maintained that support the growth of the mindset and do not suppress or eliminate it is an important implication of this concept. Likewise, organizations would benefit from providing opportunities to apply the mindset in practice, particularly among those with exceptional intelligence and high levels of the mindset characteristics who have yet to be put in the position to engage with strategic level problem-solving.

Conclusion

The current research was designed to accomplish three main objectives: 1) to build a theoretically sound concept of a strategic thinking mindset that is rooted in the understanding of strategic thinking in multiple disciplines, 2) to develop a test of the mindset for U.S. Army officers using situational judgment testing, and 3) to evaluate the psychometric and construct validity evidence of the test.

Although the objective to create and evaluate such a test was accomplished, the implicit objective that the test successfully demonstrate psychometric utility and validity is much more ambitious and presented an elevated risk of failure. Strategic thinking is a highly subjective phenomonen that is challenging to define (see Chapter 2) and to operationalize in psychological measurement. Furthermore, the SJT format was chosen to assess the strategic thinking mindset for its potential as a middle ground solution between a high-fidelity simulation exercise technique and a behavioral self-report technique reliant on the honest reflection and self-

awareness of a test-taker. However, the SJT format brings with it significant issues for constructing a reliable and valid scale of identifiable constructs.

While the theoretical work in integrating theories of strategic thinking and conceptualizing the mindset construct represent useful contributions to theory and practice, the evidence supporting the psychometric quality of the STMT and its construct-related validity did not, in general, prove convincing. Although there is some evidence suggesting that the STMT measures what it was designed to measure, it is questionable as to whether it measures it well (reliably, comprehensively, and accurately). Additional research on the STMT, other methods of measuring the strategic mindset, and further clarification of the concept of a strategic mindset are needed.

Chapter 6 - References

Abraham S. (2005). Stretching strategic thinking. *Strategy & Leadership, 33*(5), 5-12. doi: 10.1108/1087850510616834.

Alberts, D.S. & Hayes, R.E. (2003). *Power to the edge: Command and control in the information age*. Washington, DC: U.S. Department of Defense Command and Control Research Program.

Anderson, P. (1999). Complexity theory and organization science. *Organization Science, 10*(3), 216-232. doi: 1047-7039/99/1003/0216.

Argyris, C. (1991). Teaching smart people how to learn. *Harvard Business Review, 69*(3), 99-109.

Arnardottir, A. A., Fischer, M. D., & Martin, T. A. (2015). Inside the black box: Board observation in practice. *Academy of Management Proceedings* (Meeting Abstract Supplement). doi: 10.5465/AMBPP.2015.11810symposium.

Arthur, W. & Villado, A. J. (2008). The importance of distinguishing between constructs and methods when comparing predictors in personnel selection research and practice. *Journal of Applied Psychology, 93*, 435-442. doi: 10.1037/0021-9010.93.2.435.

Ascalon, M. E. (2004). *Improving expatriate selection: Development of a situational judgment test to measure cross-cultural social intelligence*. (Doctoral Dissertation). Retrieved from ProQuest Dissertations & Theses Global. (3148748).

Barling, J., Christie, A., & Hoption, C. (2011). Leadership. In S. Zedeck (Ed.), *APA Handbook of Industrial and Organizational Psychology, Vol. 1: Building and Developing the Organization*. Washington, DC: American Psychological Association.

Bentler, P. M. (1990). Comparative fit indices in structural models. *Psychological Bulletin, 107*(2), 238-246. doi: 10.1037/0033-2909.107.2.238.

Bethel, S. A., Prupas, A., Ruby, T. Z., & Smith, M. V. (2010). Developing Air Force strategists: Change culture, reverse careerism. *Joint Forces Quarterly, 58*(3), 82-88.

Bonn, I. (2001). Developing strategic thinking as a core competency. *Management Decision, 39*(1), 63-70. doi: 10.1108/EUM0000000005408.

Bonn, I. (2005). Improving strategic thinking: A multilevel approach. *Leadership and Organizational Development Journal, 26*(5), 336-354. doi: 10.1108/01437730510607844.

Born, M. P., Van der Maessen, P. E. A. M., & Van der Zee, K. I., (2001). A multimedia situational judgment test for social intelligence. *Journal of eCommerce and Psychology, 2*(2), 54-72.

Budner, S. (1962). Intolerance of ambiguity as a personality variable. *Journal of Personality, 30*(1), 29-50. doi: j.1467-6494.1962.tb02303.x.

Casey, A. J. & Goldman, E. F. (2010). Enhancing the ability to think strategically: A learning model. *Management Learning, 41*(2), 167-185. doi: 10.1177/1350507609355497.

Chan & Schmitt (1997). Video-based versus paper-and-pencil method of assessment in situational judgment tests: Subgroup differences in test performance and face validity perceptions. *Journal of Applied Psychology, 82*(1), 143-159.

Cherniss, C. & Goleman, D. (2001). *The emotionally intelligent workplace*. San Francisco, CA: Jossey-Bass.

Condon, D. M. & Revelle, W. (2014). The international cognitive ability resource: Development and initial validation of a public-domain measure. *Intelligence, 43*, 52-64. doi: 10.1016/j.intell.2014.01.004.

Cortina, J. M. & Folger, R. G. (1998). When is it acceptable to accept a null hypothesis: No way, Jose? *Organizational Research Methods, 1*(3), 334-350. doi: 10.1177/109442819813004.

Costa, P. T. & McCrae, R. R. (1992). Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) manual. Odessa, FL: Psychological Assessment Resources.

Cyert, R. M. & March, J. G. (1963). *The Behavioral Theory of the Firm.* Englewood Cliffs, NJ: Prentice-Hall.

Dragoni, L., Oh, I., Vankatwyk, P., & Tesluk, P. E. (2011). Developing executive leaders: The relative contribution of cognitive ability, personality, and the accumulation of work experience in predicting strategic thinking competency. *Personnel Psychology, 64*, 829-864. doi: 10.1111/j.1744-6570.2011.01229.x.

DuBois, P. H. (1970). *A history of psychological testing*. Boston: Allyn & Bacon.

Duhaime, I. M., Stimpert, L., & Chesley, J. A. (2012). *Strategic Thinking: Today's Business Imperative*. New York, NY: Routledge.

Dweck, C. (2006). *Mindset: The new psychology of success*. New York: Random House, Inc.

Eden, C. (1990). Strategic thinking with computers. *Long Range Planning: International Journal of Strategic Management, 23*(6), 35-43. doi: 10.1016/0024-6301(90)90100-I.

Eifler, B. S. (2012). *Developing strategic thinking leaders in the U.S. Army*. (Master's thesis). Carlisle, PA: U.S. Army War College.

Flanagan, J. C. (1954). The critical incident technique. *Psychological Bulletin, 41*, 237-358. doi: 10.1037/h0061470.

Freedman, L. D. (2013). *Strategy: A History*. New York, NY: Oxford University Press.

Goldman, E. (2008). The power of work experience characteristics critical to developing expertise in strategic thinking. *Human Resource Development Quarterly, 19*(3). doi: 10.1002/hrdq.1237.

Goldman, E. F. & Casey, A. J. (2010). Building a culture that encourages strategic thinking. *Journal of Leadership & Organizational Studies, 17*(2), 119-128. doi: 10.1177/1548051810369677.

Goleman, D. (1995). *Emotional intelligence*. New York, NY: Bantam Books.

Graetz, F. (2002). Strategic thinking versus strategic planning: Towards understanding the complementarities. *Management Decision, 40*(5), 456-462. doi: 10.1108/00251740210430434.

Grier, R. A. (2012). Military cognitive readiness at the operational and strategic levels: A theoretical model for measurement development. *Journal of Cognitive Engineering and Decision Making, 6*(4), 358-392. doi: 10.1177/1555343412444606

Guttman, L. (1945). A basis for analyzing test-retest reliability. *Psychometrika, 10*, 255-282.

Hausknecht, J.P., Day, D.V., & Thomas, S. C. (2004). Applicant reactions to selection procedures: An updated model and meta-analysis. *Personnel Psychology, 57*(3), 639-683. doi: 10.1111/j.1744-6570.2004.00003.x.

Heracleous, L. (1998). Strategic thinking or strategic planning? *Long Range Planning: International Journal of Strategic Management, 31*(3), 481-487. doi: 10.1016/S0024-6301(98)80015-0.

Huber, G. P. (2004). *The necessary nature of future firms: Attributes of survivors in a changing world.* Thousand Oaks, CA: Sage.

Huber, G. P. (2011). Organizations: Theory, design, and future. In Zedeck (Ed.) *APA Handbook of Industrial and Organizational Psychology, Vol. 1 Building and Developing the Organization* (pp. 117-160). Washington, DC: American Psychological Association.

Kolb, D. (1984). *Experiential learning: Experience as the source of learning and development.* Upper Saddle River, NJ: Prentice Hall.

Krepinevich, A. F. & Watts, B. D. (2009). Regaining strategic competence. *Strategy for the Long Haul Series*. Washington, DC: Center for Strategic and Budgetary Assessments.

Landrum, R. E. (2011). Measuring dispositional humility: A first approximation. *Psychological Reports, 108*(1), 217-228. doi: 10.2466/02.07.09.PR0.108.1.217-228.

Le, H., Oh, I., Robbins, S. B., Ilies, R., Holland, E. (2011). Too much of a good thing: Curvilinear relationships between personality traits and job performance. *Journal of Applied Psychology, 96*(1), 113-133. doi: 10.1037/a0021016.

Liedtka, J. (1998a) Strategic thinking: Can it be taught? *Long Range Planning: International Journal of Strategic Management, 31*(1), 120-129.

Liedtka, J. (1998b). Linking strategic thinking and strategic planning. *Strategy & Leadership, 26*(4), 30-35.

Lievens, F. & Motowidlo, S. J. (2016). Situational judgment tests: From measures of situational judgment to measures of general domain knowledge. *Industrial and Organizational Psychology, 9*(1), 3-22. doi: 10.1017/iop.2015.71.

Lumpkin, G. T. & Dess, G. G. (1996). Clarifying the entrepreneurial orientation construct and linking it to performance. *Academy of Management Review, 21*(1), 135-172. doi: 10.2307/258632.

Luthans, F. (2002). Positive organizational behavior: Developing and managing psychological strengths. *Academy of Management Executive, 16*, 57-72. doi: 10.2307/4165814.

Maxfield, B. D. (2015). *Army demographics: FY15 Army profile*. Retrieved from http://www.armyg1.army.mil/hr/docs/demographics/BlueFinalFY15APR.pdf.

Mayer, J. D., Salovey, P., & Caruso, D. R. (2000). Models of emotional intelligence. In R. Sternberg (Ed.), *Handbook of Intelligence* (pp. 396-420). Cambridge, UK: Cambridge University Press.

McCauley, D. (2012). Strategic thinking: Providing the competitive edge. *Small Wars Journal, 8*(2). Retrieved from http://smallwarsjournal.com/jrnl/art/strategic-thinking-providing-the-competitive-edge.

McDaniel, M. A., Hartman, N. S., Whetzel, D. L., & Grubb, W. L. (2007). Situational judgment tests, response instructions, and validity: A meta-analysis. *Personnel Psychology, 60*, 63-91. doi: 10.1111/j.1744-6570.2007.00065.x.

McDaniel, M. A., Morgeson, F. P., Finnegan, E. B., Campion, M. A., & Braverman, E. P. (2001). Use of situational judgment tests to predict job performance: A clarification of the literature. *Journal of Applied Psychology, 80*, 730-740. doi: 10.1037//0021-9010.86.4.730.

McDaniel, M. A. & Whetzel, D. L. (2007). Situational judgment tests. In D. L. Whetzel & G. R. Wheaton (Eds.), *Applied measurement*. (pp. 235-257). Mahwah, NJ: Erlbaum.

Mintzberg, H. (1994a). *The rise and fall of strategic planning*. New York, NY: The Free Press.

Mintzberg, H. (1994b). The fall and rise of strategic planning. *Harvard Business Review,* January-February, 107-114.

Moldoveanu, M. (2009). Thinking strategically about thinking strategically: The computational structure and dynamics of managerial problem selection and formulation. *Strategic Management Journal, 30*(7), 737-763. doi: 10.1002/smj.757.

Morris, A. J., Brotheridge, C. M., & Urbanski, J. C. (2005). Bringing humility to leadership: Antecedents and consequences of leader humility. *Human Relations, 58*(10), 1323-1350. doi: 10.1177/0018726705059929.

Moss, F.A. (1931). Preliminary report of a study of social intelligence and executive ability. *Public Personnel Studies*, 9, 2-9.

Motowidlo, S. J., Dunnette, M. D., & Carter, G. W. (1990). An alternative selection procedure: The low-fidelity simulation. *Journal of Applied Psychology, 75*, 640-647.

Motowidlo, S. J., Hooper, A. C., & Jackson, H. L. (2006). A theoretical basis for situational judgment tests. In J. A. Weekley & R. E. Ployhart (Eds.), *Situational judgment tests: Theory, measurement, and application* (pp. 57-81). Mahwah, NJ: Erlbaum.

Mumford, T. V., Van Iddekinge, C. H., Morgeson, F. P., & Campion, M. A. (2008). The team role test: Development and validation of a team role knowledge situational judgment test. *Journal of Applied Psychology, 93*(2), 250-267. doi: 10.1037/0021-9010.93.2.250.

Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy (2014). *2014 demographics: Profile of the military community*. Retrieved from http://download.militaryonesource.mil/12038/MOS/Reports/2014-Demographics-Report.pdf.

Olson-Buchanan, J. B. & Drasgow, F. (2006). Multimedia situational judgment tests: The medium creates the message. In J. Weekley (Ed.) *Situational judgment tests: Theory, measurement, and application*. Mahwah, NJ: Lawrence Erlbaum Associates.

Oreg, S. (2003). Resistance to change: Developing an individual differences measure. *Journal of Applied Psychology, 88*(4), 680-693. doi: 10.1037/0021-9010.88.4.680.

Payne, S. C., Youngcourt, S. S., & Beaubien, J. M. (2007). A meta-analytic investigation of the goal orientation nomological net. *Journal of Applied Psychology, 92*(1), 128-150. doi: 10.1037/0021-9010.92.1.128.

Pelc, A. & Pelc, K. J. (2009). Same game, new tricks: What makes a good strategy in the prisoner's dilemma? *Journal of Conflict Resolution, 53*(5), 774-793. doi: 10.1177/0022002709339045.

Pisapia, J. R., Reyes-Guerra, D., Coukos-Semmel, E. (2005). Developing the leader's strategic mindset: Establishing the measures. *Leadership Review, 5*, 41-68.

Pisapia J. R. (2009). *The strategic leader: New tactics for a globalizing world*. Charlotte, NC: Information Age Publishing.

Ployhart, R. E. & Holtz, B. C. (2008). The diversity-validity dilemma: Strategies for reducing racioethnic and sex subgroup differences and adverse impact in selection. *Personnel Psychology, 61*, 153-172. doi: 10.1111/j.1744-6570.2008.00109.x.

Ployhart, R. E. & MacKenzie, W. I. (2011). Situational judgment tests: A critical review and agenda for the future. In Zedeck (Ed.) *APA Handbook of Industrial and Organizational Psychology, Vol. 2 Selecting and Developing Members for the Organization* (pp. 237-252). Washington, DC: American Psychological Association.

Ployhart, R. E. & Ryan, A. M. (2000). *Integrating personality tests with situational judgment tests for the prediction of customer service performance.* Paper presented at the 15th annual conference of the Society for Industrial and Organizational Psychology, New Orleans, LA.

Porter, M. E. (1987, May). Corporate strategy: The state of strategic thinking. *The Economist, 303*(7499), 17-24.

Porter, M. E. (1996). What is strategy? *Harvard Business Review, 74*(6), 61-78.

Porterfield, R. W. (2001). *The development, psychometric evaluation, and validation of a situational judgment inventory for security officers.* (Doctoral Dissertation). Retrieved from ProQuest Dissertations & Theses Global. (3035702).

Reynolds, D. H., Sydell, E. J., Scott, D. R., & Winter, J. L. (2000, April). *Factors Affecting Situational Judgment Test Characteristics.* Paper presented at the 15th annual conference of the Society for Industrial and Organizational Psychology, New Orleans, LA.

Sacco, J. M., Schmidt, D. B., & Rogg, K. L. (2000, April). *Using readability statistics and reading comprehension scores to predict situational judgment test performance, black-white differences, and validity.* Paper presented at the 15th annual conference of the Society for Industrial and Organizational Psychology, New Orleans, LA.

Sackett, A. S., Karrasch, A. I., Weyhrauch, W. S., & Goldman, E. F. (2016). Enhancing the strategic capability of the Army: An investigation of strategic thinking tasks, skills, and development (Research Report 1995). Fort Belvoir, VA: U.S. Army Research Institute for Behavioral and Social Sciences.

Salmoni, B., Hart, J., McPherson, R., & Winn, K. (2010). Growing strategic leaders for future conflict. *Parameters, 40*, 72-88.

Salovey, P., Bedell, B. T., Detweiler, J. B., & Mayer, J. D. (2000). Current directions in emotional intelligence research. In M. Lewis & J. M. Haviland-Jones (Eds.), *Handbook of Emotions* (pp. 504-520). New York: Guildford Press.

Schmidt, F. L. & Hunter, J. E. (1998). The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. *Psychological Bulletin, 124*(2), 262-274.

Schmitt, N. & Chan, D. (2006). *Situational judgment tests: Method or construct?* In J. A. Weekley & R. E. Ployhart (Eds.), *Situational judgment tests: Theory, measurement, and application* (pp. 135-155). Mahwah, NJ: Erlbaum.

Senge, P. M. (1990). *The fifth discipline: The art and practice of the learning organization.* New York, NY: Random House.

Sleesman, D. J., Conlon, D. E., McNamara, G., & Miles, J. E. (2012). Cleaning up the big muddy: A meta-analytic review of the determinants of escalation of commitment. *Academy of Management Journal*, *55*(3), 541–562. doi:10.5465/amj.2010.0696

Socin, R. J. (2008). *Measuring openness to experience in the work environment.* (Doctoral Dissertation). Retrieved from ProQuest Information and Learning. (AAI3298424).

Smith, M. R. (2011). *Initial development and validation of the entrepreneurial orientation profile inventory (EOPI).* (Doctoral Dissertation). Retrieved from ProQuest Dissertations & Theses Global. (3458439).

Staw, B. M. (1976). Knee deep in the big muddy: A study of escalating commitment to a chosen course of action. *Organizational Behavior and Human Performance*, *16*, 27–44.

Stieglitz, N., Knudsen, T., & Becker, M. C. (2015). Adaption and inertia in dynamic environments. *Strategic Management Journal*. Advance Online Publication. doi: 10.1002/smj.2433.

Story, J. S. P., & Barbuto, J. E. (2011). Global mindset: A construct clarification and framework. *Journal of Leadership and Organizational Studies, 18*(3), 377-384. doi: 10.1177/1548051811404421.

Sugerman, J., Scullard, M., & Wilhelm, E. (2011). *The 8 dimensions of leadership: DiSC strategies for becoming a better leader.* San Francisco, CA: Berrett-Koehler.

Toffler, A. (1970). *Future Shock.* New York: Bantam Books.

Torbert, B. (2004). *Action inquiry: The secret of timely and transforming leadership.* San Francisco, CA: Jossey-Bass.

U.S. Army Training and Doctrine Command (2009). *A Leader Development Strategy for a 21st Century Army*. Retrieved from http://www.cgsc.edu/alds/#imp1.

U.S. Department of Defense (2013). *Department of Defense Dictionary of Military and Associated Terms* (Joint Publication 1-02). Washington, DC: Author.

Van Rooy, D. L. & Viswesvaran, C. (2004). Emotional intelligence: A meta-analytic investigation of predictive validity and nomological net. *Journal of Vocational Behavior, 65*(1), 71-95.

Waters, D. E. (2011). Understanding strategic thinking and developing strategic thinkers. *Joint Forces Quarterly, 63*, 113-119.

Weekley, J. A. & Ployhart, R. E. (2006). An introduction to situational judgment tests. In J. A. Weekley and R. E. Ployhart (Eds.),*Situational judgment tests: Theory, measurement, and application*. Mahwah, NJ: Erlbaum.

Weekley, J. A., Ployhart, R. E., & Holtz, B. C. (2006). On the development of situational judgment tests: Issues in item development, scaling, and scoring. In J. A. Weekley & R. E. Ployhart (Eds.), *Situational judgment tests: Theory, measurement, and application* (pp. 135-155). Mahwah, NJ: Erlbaum.

Wheatley, W. J., Anthony, W. P., Maddox, E. N. (1991). Selecting and training strategic planners with imagination and creativity. *The Journal of Creative Behavior, 25*(1), 52-60.

Whetzel, D. L. & McDaniel, M. A. (2009). Situational judgment tests: An overview of current research. *Human Resource Management Review, 19*, 188-202. doi: 10.1016/j.hrmr.2009.03.007.

Wolters, H. M. K., Grome, A. P., & Hinds, R. M. (Eds.). (2013). *Exploring strategic thinking: Insights to assess, develop, and retain Army strategic thinkers* (Research Product 2013-1). Fort Belvoir, VA: U.S. Army Research Institute for the Behavioral and Social Sciences. ADA577290.

Yarger, H. (2008). *Strategy and the National Security Professional*. Westport, CT: Praeger Security International.

Yorks, L. & Nicolaides, A. (2012). A conceptual model for developing mindsets for strategic insight under conditions of complexity and high uncertainty. *Human Resource Development Review, 11*(2), 182-202. doi: 10.1177/1534484312439055.

Young, R. E. (2004). *The creation of an emotional intelligence situational judgment test with the ability-based model of emotional intelligence as the operative construct*. (Doctoral Dissertation). Retrieved from ProQuest Dissertations & Theses Global. (3153979).

Zabriskie, N. B. & Huellmantel, A. B. (1991). Developing strategic thinking in senior management, *Long Range Planning: International Journal of Strategic Management, 24*(6), 25-32.

Zeidner, M., Matthews, G. & Roberts, R. D. (2004). Emotional intelligence in the workplace: A critical review. *International Review of Applied Psychology, 53*(3), 371-399.
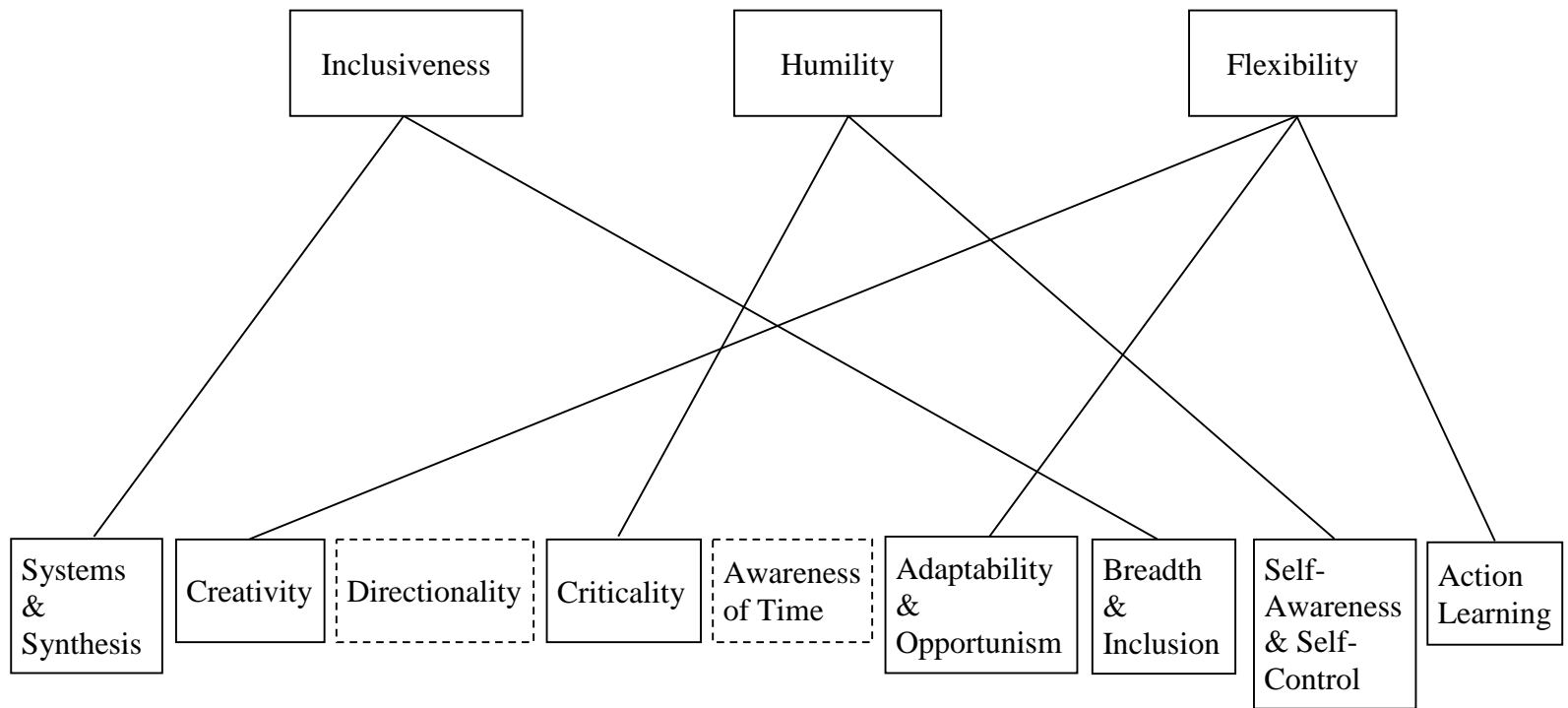
Figure 1 Relation of mindset characteristics to integrating themes.

Two of the identified themes are not linked to a mindset characteristic, these are shown with dashed lines.
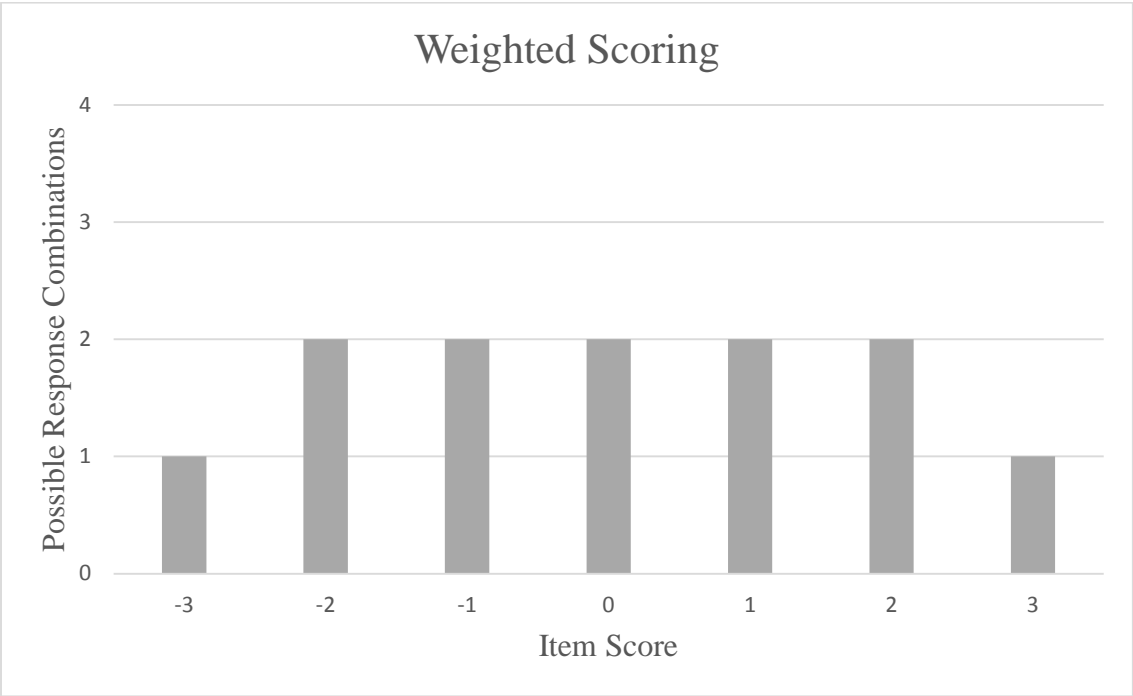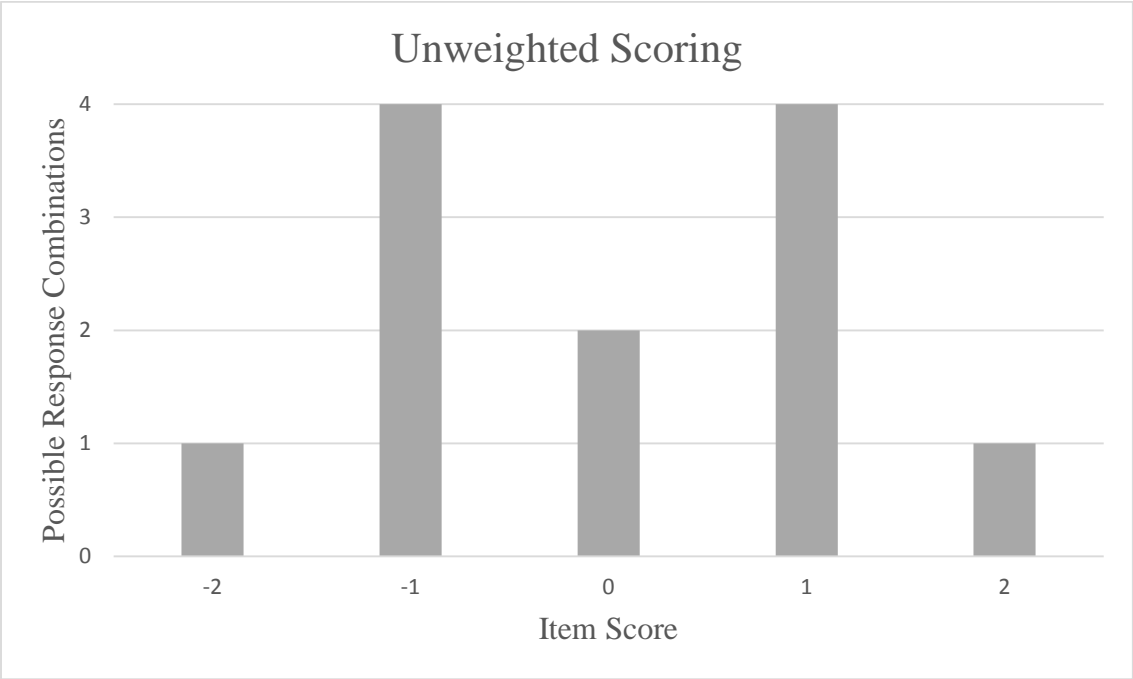
Figure 2 Original Unweighted and Alternative Weighted SJT Item Scoring Random Chance Distributions
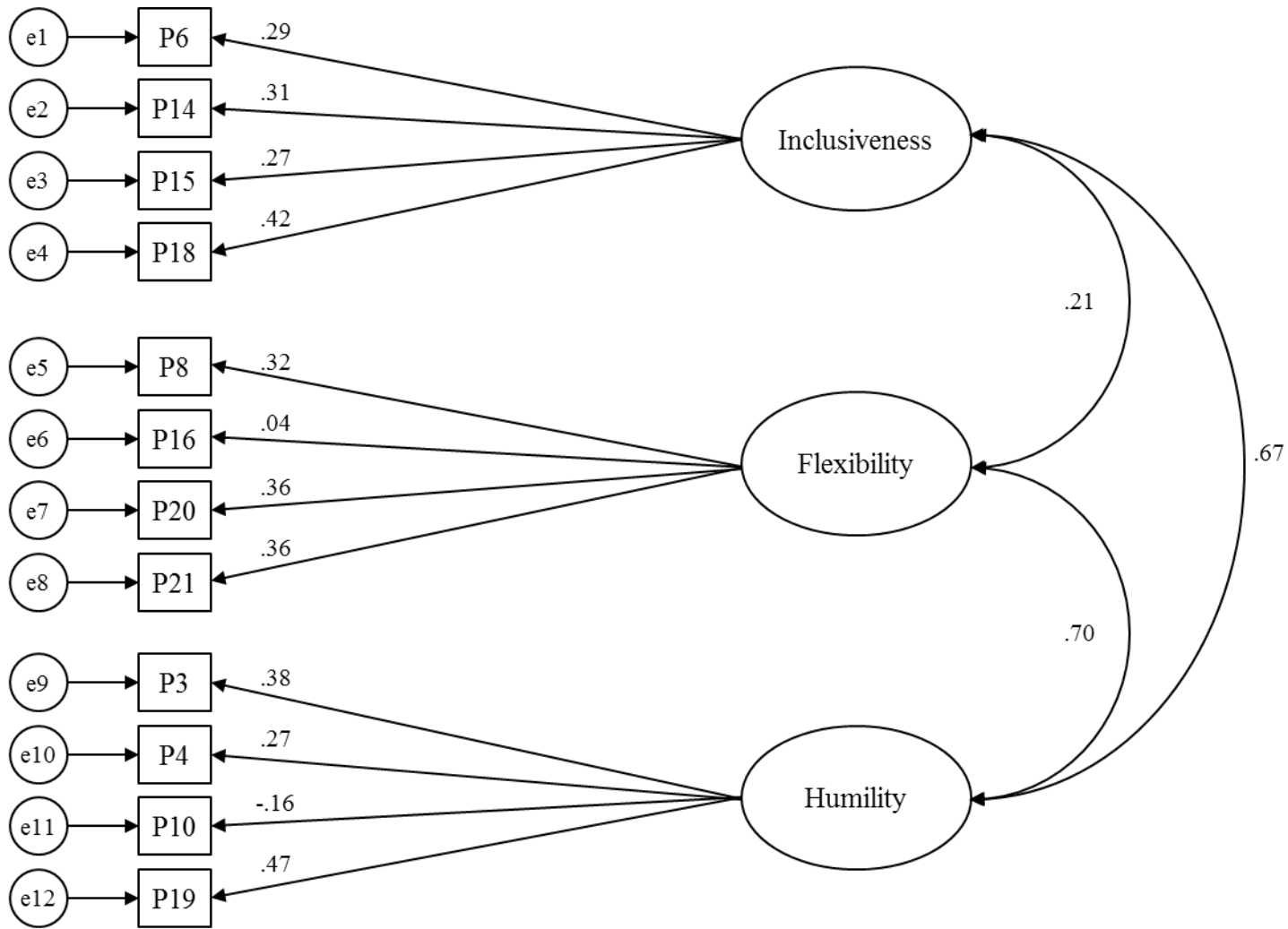
Figure 3 Standardized Estimates of 12-Item Three-Factor Oblique Model
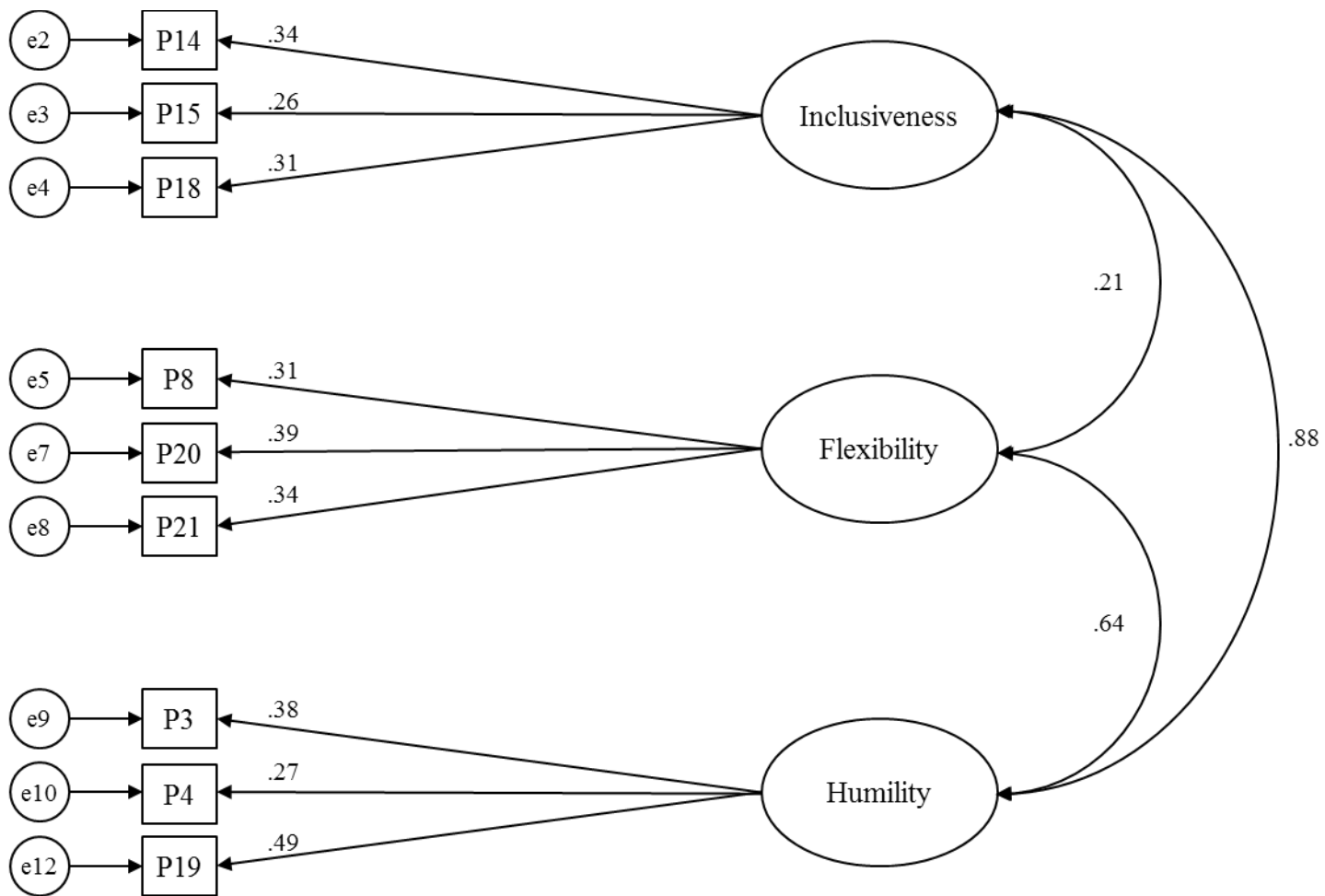
Figure 4 Standardized Estimates of 9-Item Three-Factor Oblique Model
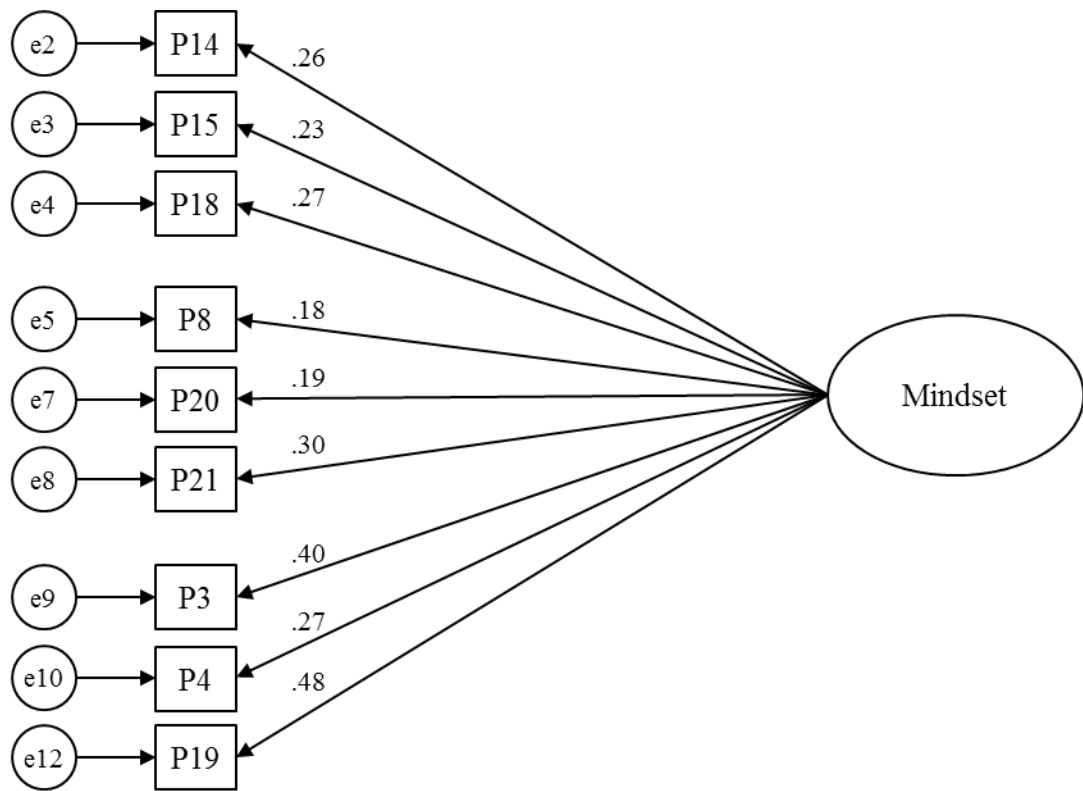
Figure 5 Standardized Estimates of 9-Item One-Factor Model

Table 1 Relation of models to integrating themes

	Systems & Synthesis	Creativity	Directionality	Criticality	Awareness of Time	Adaptability & Opportunism	Breadth & Inclusion	Self-Awareness & Self-Control	Action Learning
Heracleous (1998)	X	X		X					
Liedtka (1998b)	X		X		X	X			X
Bonn (2001)	X	X	X						
Graetz (2002)	X	X							
Pisapia et al. (2005)	X	X		X		X			
Yarger (2008)	X	X		X	X				
Casey & Goldman (2010)	X	X	X	X		X			X
Salmoni et al. (2010)						X	X	X	
Dragoni et al. (2011)	X		X			X			
Waters (2011)	X	X	X	X	X			X	
Duhaime et al. (2012)					X	X	X		X
Grier (2012)		X				X		X	
McCauley (2012)	X		X			X	X		
Yorks & Nicolaides (2012)				X	X		X	X	

Table 2 Stage 1 Sample Demographics

Sex	Male	Female		
	n = 104	n = 21		
Branch	Intelligence	Engineer	Armor	Infantry
	n = 21	n = 15	n = 12	n = 12
	Field Artillery	CBRN*	Military Police	Logistics
	n = 10	n = 8	n = 7	n = 7
	Aviation	Air Defense	Marines*	Adjutant General
	n = 6	n = 4	n = 4	n = 3
	Medical Services	Health Services	Quartermaster	Signal
	n = 3	n = 3	n = 3	n = 3
	Ordnance	Public Affairs	JAG*	
	n = 2	n = 1	n = 1	
Rank	Major	Captain	First Lieutenant	Gunnery Sergeant (Marine)
	n = 5	n = 107	n = 8	n = 1
	Staff Sergeant (Marine)	Sergeant (Marine)	Specialist	
	n = 1	n = 2	n = 1	
Avg. Time in Rank (months)	Major	Captain	First Lieutenant	Gunnery Sergeant (Marine)
	53	27	13	48
	Staff Sergeant (Marine)	Sergeant (Marine)	Specialist	
	36	39	48	
Most Recent Deployment	Afghanistan	Iraq	Other Nation	Never Deployed or None Indicated
	n = 57	n = 37	n = 9	n = 22

Note. CBRN = Chemical, Biological, Radiological, and Nuclear, JAG = Judge Advocate General

Table 3 Stage 2 Sample Demographics

Sex	Male	Female		
	n = 69	n = 5		
Branch	Infantry	Armor	Intelligence	Field Artillery
	n = 31	n = 10	n = 7	n = 7
	Logistics	Engineer	Adjutant General	CBRN
	n = 4	n = 3	n = 2	n = 1
	Aviation	Military Police	Signal	JAG
	n = 2	n = 1	n = 1	n = 1
	Simulation Operations	Public Affairs	Army Medical Specialist Corps	Army Nurse Corps
	n = 1	n = 1	n = 1	n = 1
Rank	Lieutenant Colonel	Major	Captain	First Lieutenant
	n = 1	n = 15	n = 56	n = 2

Note. CBRN = Chemical, Biological, Radiological, and Nuclear, JAG = Judge Advocate General

Table 4 Stage 3 Sample Demographics

Sex	Male	Female		
	n = 203	n = 20		

Branch	Field Artillery	Air Defense Artillery	Intelligence	CBRN
	n = 48	n = 38	n = 46	n = 24
	Military Police	Infantry	Armor	Engineer
	n = 20	n = 17	n = 5	n = 5
	Aviation	Signal	Cavalry	Medical
	n = 4	n = 4	n = 3	n = 2
	EW	Ordnance	Quartermaster	Transportation
	n = 2	n = 1	n = 1	n = 1
	Adjutant General			
	n = 1			

Rank	Corporal	Sergeant	Staff Sergeant	Sergeant First Class
	n = 1	n = 3	n = 44	n = 5
	Warrant Officer	2nd Lieutenant	1st Lieutenant	Captain
	n = 1	n = 4	n = 49	n = 114
	Major			
	n = 2			

Note. CBRN = Chemical, Biological, Radiological, and Nuclear, EW = Electronic Warfare

Table 5 Response Option Keying Data – Flexibility Items

S		Options	Flexibility SMEs M	SD	Psychologists M	SD	Effectiveness SMEs M	SD	Key	Pilot #
1	1	Negative	3.41	1.2	2.25	0.8	3.63	1.2	Negative	P20
	2	Negative	4.46	0.8	4.00	1.2	4.60	0.6		
	3	Neutral	3.32	1.2	4.00	0.0	3.36	1.2		
	6	Neutral	3.21	1.3	2.50	1.1	3.49	1.1	Neutral	
	4	Positive	2.88	1.4	3.50	1.7	3.22	1.3	*Neutral*	
	5	Positive	4.14	0.9	4.25	0.4	4.12	0.9	Positive	
2	1	Negative	3.59	1.2	3.00	0.7	3.53	1.1		P8
	5	Negative	2.82	1.2	2.50	0.5	2.94	1.1	Negative	
	2	Neutral	3.05	1.2	1.25	0.4	4.07	0.9	Neutral	
	4	Neutral	3.85	1.1	4.50	0.5	3.49	1.2	Neutral	
	3	Positive	4.30	0.7	4.50	0.5	3.93	1.0	Positive	
	6	Positive	4.40	0.9	5.00	0.0	4.48	0.7		
14	1	Negative	3.82	1.3	4.00	1.2	4.00	1.1		P9
	4	Negative	2.70	1.2	2.00	0.7	3.23	1.3	Negative	
	5	Neutral	3.02	1.1	3.25	0.8	2.91	1.2	Neutral	
	3	Neutral	4.36	0.8	3.75	0.4	4.22	0.9	*Positive*	
	2	Positive	3.85	1.2	3.75	0.4	3.74	1.1		
	6	Positive	3.56	1.3	4.00	0.7	3.01	1.2	*Neutral*	
10	1	Negative	3.51	1.2	3.75	0.4	3.20	1.4		P2
	5	Negative	2.44	1.3	3.00	1.4	2.64	1.4	Negative	
	3	Neutral	3.83	1.0	2.00	0.7	3.95	1.1	Neutral	
	4	Neutral	3.58	1.2	2.25	0.8	3.57	1.1	Neutral	
	2	Positive	3.96	0.9	4.25	0.4	3.85	1.0	Positive	
	6	Positive	3.86	1.2	3.75	0.8	3.48	1.3		
19	4	Negative	4.04	1.0	4.00	0.7	3.74	1.3		P13
	2	Negative	2.48	1.0	2.75	0.4	3.21	1.0	Negative	
	5	Neutral	2.93	1.1	3.25	0.8	3.06	1.2	Neutral	
	6	Neutral	2.81	1.2	2.75	0.8	2.58	1.3	Neutral	
	3	Positive	2.67	1.2	2.75	1.1	2.94	1.1		
	1	Positive	3.89	0.9	3.75	0.4	4.03	0.7	Positive	
23	3	Negative	2.29	1.1	1.75	0.8	2.98	1.2		P16
	4	Negative	3.01	1.3	3.00	0.7	3.56	1.1	*Neutral*	
	5	Neutral	2.10	1.1	1.50	0.5	2.53	1.2	*Negative*	
	6	Neutral	4.16	0.9	4.25	0.4	4.06	1.0		
	1	Positive	3.58	1.2	3.75	0.8	3.16	1.3	*Neutral*	
	2	Positive	4.18	0.8	4.25	0.4	4.24	0.9	Positive	
26	2	Negative	2.13	1.2	1.25	0.4	2.60	1.2	Negative	P5
	6	Negative	3.14	1.2	2.50	0.5	3.02	1.2		
	4	Neutral	3.69	1.0	3.00	1.0	3.97	0.9	Neutral	
	5	Neutral	2.88	1.2	2.25	1.1	3.28	1.2	Neutral	
	1	Positive	3.65	1.3	4.50	0.5	3.16	1.1		
	3	Positive	3.88	0.8	4.00	0.7	3.77	0.8	Positive	

S		Options	Flexibility SMEs		Psychologists		Effectiveness SMEs		Key	Pilot #
			M	SD	M	SD	M	SD		
29	1	Negative	2.66	1.3	2.25	1.1	3.93	1.0	Negative	P21
	3	Negative	3.96	1.1	4.25	0.4	4.09	1.1		
	2	Neutral	4.32	0.7	4.50	0.5	4.32	0.9		
	6	Neutral	3.25	1.3	2.50	0.9	3.52	1.1	Neutral	
	4	Positive	4.46	0.8	4.50	0.5	4.36	0.8	Positive	
	5	Positive	3.97	1.0	4.00	0.7	4.28	0.8	*Neutral*	

Note: Pilot # refers to the re-numbering of items for the Stage 4 pilot test. Empty cells under Key indicate response options that were not retained for that item

Table 6 Stage 3 Response Option Keying Data – Humility Items

S	Options		Humility SMEs M	SD	Psychologists M	SD	Effectiveness SMEs M	SD	Key	Pilot #
3	1	Negative	2.08	1.3	2.00	1.2	2.12	1.2	Negative	P7
	6	Negative	3.54	1.1	3.25	0.8	4.07	0.9		
	3	Neutral	3.84	1.0	3.75	0.4	4.00	1.0	Neutral	
	5	Neutral	3.39	1.2	3.25	1.1	4.10	0.9	Neutral	
	4	Positive	4.37	0.9	4.25	0.8	4.39	0.8	Positive	
	2	Positive	4.31	1.0	3.50	1.5	4.35	0.7		
	7	Positive	4.30	0.9	4.25	0.4	4.25	1.0		
13	2	Negative	3.33	1.3	2.75	1.8	3.73	1.1	*Neutral*	P10
	5	Negative	3.20	1.1	2.25	0.4	3.92	1.2	Negative	
	3	Neutral	3.59	1.1	3.00	0.7	4.00	1.1		
	1	Neutral	3.73	1.1	2.75	0.8	3.61	1.2	Neutral	
	4	Positive	4.42	0.9	5.00	0.0	4.10	1.0	Positive	
	6	Positive	3.56	1.2	5.00	0.0	2.48	1.2		
17	2	Negative	2.94	1.26	2.25	0.43	3.90	0.98	*Neutral*	P3
	6	Negative	2.14	1.18	1.75	0.43	2.53	1.30	Negative	
	3	Neutral	4.01	1.01	4.25	0.83	4.27	0.92		
	5	Neutral	3.78	1.08	3.25	0.83	3.55	1.19		
	4	Positive	3.65	1.08	4.75	0.43	3.07	1.32	Positive	
	1	Positive	3.77	1.11	3.00	0.71	4.55	0.72	*Neutral*	
21	2	Negative	2.91	1.2	3.00	1.0	2.78	1.3	Negative	P12
	4	Negative	3.36	1.2	3.50	1.1	3.18	1.4		
	3	Neutral	3.55	1.1	3.50	0.5	3.46	1.3	Neutral	
	5	Neutral	3.49	1.2	3.75	1.1	2.75	1.4	Neutral	
	1	Positive	4.08	1.0	3.75	1.1	4.13	1.1	Positive	
	6	Positive	3.75	1.2	4.50	0.5	3.66	1.2		
24	1	Negative	2.97	1.2	1.50	0.5	4.27	0.7		P4
	3	Negative	2.61	1.1	2.00	0.0	3.11	1.1	Negative	
	4	Neutral	3.43	1.1	3.50	0.5	3.89	1.0	Neutral	
	6	Neutral	3.58	1.0	2.75	0.8	3.86	0.7	Neutral	
	2	Positive	3.97	0.9	4.25	0.4	3.43	0.9	Positive	
	5	Positive	3.68	1.2	4.50	0.5	2.88	1.3		
30	1	Negative	3.53	1.3	2.50	0.9	4.34	0.8	*Neutral*	P19
	2	Negative	2.53	1.2	2.50	0.5	3.15	1.3	Negative	
	4	Neutral	3.43	1.1	2.75	0.8	4.07	0.9	Neutral	
	5	Neutral	2.63	1.3	1.50	0.5	2.46	1.2		
	3	Positive	3.77	1.1	3.50	0.9	3.54	1.1	Positive	
	6	Positive	3.78	1.1	3.25	1.3	4.21	0.9		
32	1	Negative	2.90	1.3	1.75	0.8	3.46	1.1	Negative	P11
	5	Negative	2.93	1.2	2.00	1.0	3.73	1.0		
	2	Neutral	3.17	1.2	2.25	1.1	3.61	1.2	Neutral	
	4	Neutral	2.97	1.2	2.50	1.1	2.69	1.2	Neutral	
	3	Positive	4.20	1.0	4.75	0.4	4.27	0.9	Positive	
	6	Positive	3.93	1.0	3.75	1.1	3.27	1.3		

Note: Pilot # refers to the re-numbering of items for the Stage 4 pilot test. Empty cells under Key indicate response options that were not retained for that item

Table 7 Response Option Keying Data – Inclusiveness Items

S		Options	Inclusiveness SMEs M	SD	Psychologists M	SD	Effectiveness SMEs M	SD	Key	Pilot #
4	1	Negative	2.85	1.2	3.50	1.5	3.35	1.1	Negative	P17
	5	Negative	3.42	1.2	3.00	1.0	3.60	1.1		
	3	Neutral	3.07	1.2	2.75	1.1	3.25	1.2	Neutral	
	6	Neutral	3.43	1.2	2.75	1.3	3.39	1.2	Neutral	
	2	Positive	3.95	0.9	4.00	0.0	4.13	0.8		
	4	Positive	4.41	0.9	4.75	0.4	3.95	1.2	Positive	
6	1	Negative	1.79	1.1	1.00	0.0	2.31	1.3	Negative	P1
	4	Negative	3.25	1.2	2.33	0.9	3.74	1.1	*Neutral*	
	3	Neutral	3.87	1.1	3.50	0.5	4.09	1.0		
	5	Neutral	3.98	1.0	3.50	0.9	3.94	1.0		
	2	Positive	3.16	1.3	3.25	1.1	3.25	1.3	*Neutral*	
	6	Positive	3.97	1.0	3.50	1.1	3.97	1.1	Positive	
8	1	Negative	2.19	1.3	1.50	0.9	2.78	1.3	Negative	P15
	4	Negative	2.99	1.1	2.25	0.8	3.78	1.0		
	3	Neutral	3.66	1.1	3.25	0.8	3.53	1.3	Neutral	
	5	Neutral	3.79	1.1	3.50	0.9	3.44	1.1	Neutral	
	2	Positive	4.36	0.7	4.25	0.4	3.47	1.1	Positive	
	6	Positive	4.27	0.9	4.75	0.4	4.45	0.8		
9	2	Negative	2.24	1.2	1.25	0.4	2.98	1.0	Negative	P18
	5	Negative	3.33	1.1	2.75	0.8	4.30	0.9	*Neutral*	
	1	Neutral	3.69	1.2	3.00	1.2	3.59	1.2	Neutral	
	6	Neutral	3.97	1.1	2.75	1.1	3.92	1.1		
	3	Positive	4.59	0.6	4.75	0.4	4.22	1.0	Positive	
	4	Positive	4.57	0.7	4.00	0.7	4.60	0.7		
11	1	Negative	2.42	1.3	2.00	0.7	3.39	1.3	Negative	P14
	3	Negative	4.07	1.0	3.75	0.4	4.00	1.2		
	2	Neutral	3.40	1.2	2.25	0.8	3.83	1.1	Neutral	
	4	Neutral	2.39	1.2	2.50	0.5	2.61	1.2	Neutral	
	5	Positive	4.57	0.8	4.67	0.5	4.06	1.1	Positive	
	6	Positive	4.49	0.8	5.00	0.0	4.13	1.0		
15	4	Negative	2.83	1.1	2.75	1.1	2.96	1.1	Negative	P6
	5	Negative	3.75	1.1	3.50	0.5	3.55	1.0		
	2	Neutral	3.05	1.4	3.25	0.8	3.52	1.2	Neutral	
	6	Neutral	3.02	1.3	2.50	1.1	2.85	1.2	Neutral	
	1	Positive	4.55	0.8	5.00	0.0	4.40	0.7	Positive	
	3	Positive	4.47	0.8	4.50	0.9	4.32	0.8		

Note: Pilot # refers to the re-numbering of items for the Stage 4 pilot test. Empty cells under Key indicate response options that were not retained for that item

Table 8 Stage 4 Sample Demographics

Sex	Male	Female		
Group 1	n = 108	n = 20		
Group 2	n = 87	n = 19		
Branch	Infantry	Engineer	Military Police	CBRN
Group 1	n = 16	n = 18	n = 13	n = 7
Group 2	n = 22	n = 21	n = 19	n = 15
	Logistics	Intelligence	Transportation	Armor
Group 1	n = 20	n = 3	n = 13	n = 0
Group 2	n = 1	n = 2	n = 0	n = 13
	Adjutant General	Quartermaster	Medical Services	Field Artillery
Group 1	n = 2	n = 4	n = 1	n = 1
Group 2	n = 1	n = 5	n = 1	n = 2
	Public Affairs	Ordnance	Cavalry	Signal
Group 1	n = 1	n = 8	n = 0	n = 8
Group 2	n = 0	n = 1	n = 1	n = 2
Rank	Corporal/ Specialist	Private First Class	2nd Lieutenant	1st Lieutenant
Group 1	n = 3	n = 2	n = 6	n = 26
Group 2	n = 0	n = 0	n = 6	n = 62
	Captain			
Group 1	n = 91			
Group 2	n = 38			

Note. CBRN = Chemical, Biological, Radiological, and Nuclear

Table 9 Stage 4 Group 1 Item-level Distribution Characteristics by Scoring Method

Item	Original Unweighted Scoring					Alternative Weighted Scoring				
	M	*SD*	*Mdn*	Skew	Kurtosis	*M*	*SD*	*Mdn*	Skew	Kurtosis
I - P1	0.92	1.01	1	-1.29	1.44	1.11	1.56	1	-0.83	0.68
I - P6	0.89	0.91	1	-0.75	0.25	1.47	1.44	2	-1.03	0.44
I - P14	0.40	1.15	1	-0.23	-1.19	0.49	1.82	1	-0.21	-1.19
I - P15	0.63	1.07	1	-0.70	-0.34	0.98	1.61	1	-0.65	-0.33
I - P17	0.37	1.17	1	-0.33	-0.95	0.66	1.91	1.5	-0.45	-1.16
I - P18	0.35	1.10	1	-0.27	-0.85	0.58	1.60	1	-0.21	-0.63
F - P2	0.56	0.99	1	-0.54	-0.50	0.80	1.44	1	-0.33	-0.30
F - P5	0.74	1.20	1	-0.63	-0.91	1.13	1.67	1	-0.45	-0.83
F - P8	0.60	0.94	1	-0.38	-0.74	0.81	1.40	1	-0.19	-0.50
F - P9	0.51	1.16	1	-0.38	-0.99	0.75	1.58	1	-0.14	-0.62
F - P13	0.54	0.97	1	-0.48	-0.67	0.91	1.71	2	-0.70	-0.84
F - P16	0.67	1.02	1	-0.52	-0.48	0.94	1.58	1	-0.45	-0.47
F - P20	0.16	1.13	1	-0.01	-1.42	0.26	1.86	1	-0.09	-1.52
F - P21	0.58	1.05	1	-0.60	-0.39	0.77	1.70	1	-0.55	-0.58
H - P3	0.22	1.11	1	-0.10	-1.33	0.30	1.39	1	0.16	-0.31
H - P4	-0.30	1.15	-1	0.48	-0.91	-0.33	1.57	-1	0.36	-0.23
H - P7	1.59	0.71	2	-2.11	4.70	2.45	1.05	3	-2.39	6.00
H - P10	0.41	1.05	1	-0.42	-0.53	0.39	1.50	1	-0.25	0.01
H - P11	-0.39	0.94	-1	0.40	-0.60	-0.74	1.53	-1	0.46	-0.78
H - P12	0.92	0.84	1	-1.16	1.55	1.60	1.28	2	-1.39	1.66
H - P19	0.01	1.08	0	-0.02	-1.43	0.01	1.25	0	-0.01	0.07

Note. Original scoring method ranged from -2 to +2, giving equal weight in scoring to endorsed and rejected options. The alternative scoring method ranged from -3 to +3, giving an extra point of weight in scoring the endorsed option.

Table 10 Stage 4 Group 1 Item-level Correlation Matrix

Item	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
1 I - P1																									
2 I - P6	-.02																								
3 I - P14	.04	.12																							
4 I - P15	.03	.07	.17																						
5 I - P17	-.12	-.10	-.04	.11																					
6 I - P18	.05	.17	.11	.02	-.15																				
7 F - P2	.02	<.01	.10	.04	.07	-.01																			
8 F - P5	.04	.02	-.03	.20*	.09	-.08	-.02																		
9 F - P8	-.04	.09	-.13	.11	-.12	.02	-.05	.08																	
10 F - P9	-.13	.10	.05	<.01	.19*	.08	-.05	-.09	-.13																
11 F - P13	.04	-.03	.01	-.06	.05	-.10	-.03	-.12	-.03	.02															
12 F - P16	.11	.06	.03	<-.01	.14	.17*	.13	-.05	.03	-.04	.05														
13 F - P20	.01	.04	.09	.05	.04	-.07	.03	<-.01	.20*	-.04	-.03	.04													
14 F - P21	-.03	-.12	.06	.06	.26**	.06	<.01	.11	-.03	.07	-.08	.13	.13												
15 H - P3	.03	-.02	.19*	.10	-.06	.04	-.07	.07	-.09	-.13	-.02	-.08	.03	.10											
16 H - P4	-.01	.13	.11	.13	<.01	.19*	.01	.13	.03	.10	-.01	.03	-.03	.09	.13										
17 H - P7	-.06	.06	.01	-.09	-.02	-.12	-.10	.01	.13	.22*	.13	.06	-.10	-.03	-.09	-.08									
18 H - P10	.03	-.02	-.04	-.06	.03	-.05	.01	.04	-.13	.06	.18*	.04	-.07	-.12	-.09	-.01	.16								
19 H - P11	-.07	-.02	.07	-0.18	-.15	-.08	.04	<-.01	-.16	-.04	.01	-.04	-.04	.01	-.10	.01	-.08	.09							
20 H - P12	-.09	<-.01	.13	.02	.12	-.11	-.01	-.02	.02	-.01	.04	.05	.11	.09	.04	-.08	.06	-.09	-.09						
21 H - P19	-.06	-.07	.17	.12	.05	-.16	-.08	.03	.10	.01	-.02	-.09	.15	.15	.20*	.26**	-.05	<.01	-.01	-.13					
22 Inclus.	.35**	.42**	.56**	.53**	.33**	.43**	.09	.10	-.04	.12	-.03	.19*	.07	.13	.11	.21*	-.09	-.04	-.16	.04	.20	(.14)			
23 Flex.	.01	.04	.07	.14	.26**	.02	.31**	.33**	.33**	.25**	.28**	.43**	.49**	.48**	-.06	.13	.10	.04	-.07	.10	.10	.22*	(.08)		
24 Hum.	-.07	.03	.23**	.01	-.02	.03	.02	.10	-.07	.06	.11	-.02	.01	.10	.41**	.51**	.25**	.42**	.37**	.23**	.47**	.10	.10	(.03)	
25 Total	.15	.25**	.43**	.36**	.31**	.25**	.22*	.28**	.14	.23**	.19*	.33**	.32**	.39**	.21*	.40**	.12	.19*	.04	.18*	.34**	.68**	.73**	.55**	(.29)

Note: $N = 128$, inter-item and item-total correlations are marked.

Table 11 Stage 4 Group 1 Scale-level Correlation Matrix

	Variable	*M*	*SD*	1	2	3	4	5	6	7
1	Work-Related Openness	4.26	0.58	(.89)						
2	Resistance to Change	3.15	0.73	-.44**	(.87)					
3	Dispositional Humility	5.26	0.84	.20*	-.26**	(.97)				
4	Inclusiveness	1.83	2.96	.18*	-.06	.07	(.26)			
5	Flexibility	1.84	3.16	.04	-.27**	.16	.09	(.26)		
6	Humility	-0.02	2.87	.11	-.05	.34**	.31**	.13	(.42)	
7	Total Mindset	3.88	6.17	.17	-.20*	.27**	.70**	.61**	.70**	(.45)

Note: Based on 9 item SJT version, N = 128, α in parentheses

Table 12 Stage 4 Group 2 Item-level Distribution Characteristics by Response Instructions

Item	Most/Least Likely Response Instructions					Best/Worst Response Instructions				
	M	*SD*	*Mdn*	Skew	Kurtosis	*M*	*SD*	*Mdn*	Skew	Kurtosis
I - P1	1.69	1.16	1	-0.54	0.46	1.04	1.45	1	-0.98	1.53
I - P6	1.48	1.49	2	-1.53	2.10	1.67	1.02	2	-1.12	2.02
I - P14	0.22	1.68	0	0.06	-0.78	-0.02	1.77	0	0.25	-1.02
I - P15	0.85	1.74	1	-0.48	-0.88	0.75	1.79	1	-0.67	-0.33
I - P17	0.83	1.77	2	-0.70	-1.00	0.37	2.07	2	-0.31	-1.66
I - P18	0.89	1.38	1	0.03	-0.96	1.10	1.43	1	-0.22	-0.90
F - P2	1.13	1.53	1	-0.55	-0.23	1.25	1.36	1	-0.62	0.93
F - P5	1.20	1.63	1	-0.75	-0.11	0.88	1.82	1	-0.11	-1.36
F - P8	1.19	1.60	1	-0.94	0.79	0.94	1.11	1	-1.05	2.88
F - P9	0.59	1.42	1	0.15	-0.27	0.40	1.24	1	-0.12	0.53
F - P13	1.26	1.33	2	-0.65	-0.08	0.44	1.89	1	-0.24	-1.42
F - P16	0.89	1.66	1	-0.20	-1.07	0.37	1.58	0	-0.11	-0.74
F - P20	0.37	1.96	1	-0.22	-1.39	0.08	1.87	0	-0.02	-1.63
F - P21	0.69	1.72	1	-0.57	-0.51	1.08	1.54	1	-0.50	-0.62
H - P3	0.19	1.29	1	-0.30	0.03	0.44	1.33	1	0.31	-0.43
H - P4	-0.07	1.39	-1	0.54	-0.63	-0.31	1.55	-1	0.47	0.08
H - P7	2.41	0.98	3	-1.66	2.16	2.65	0.74	3	-2.08	3.40
H - P10	0.46	1.56	0	-0.11	-0.96	0.75	1.63	1	-0.17	-0.97
H - P11	-0.70	1.68	-1	0.53	-0.60	-1.06	1.27	-2	0.64	-0.47
H - P12	1.80	1.16	2	-0.88	-0.20	1.58	1.27	2	-1.39	2.27
H - P19	0.33	1.33	1	-0.25	0.24	-0.15	1.02	-1	0.79	-0.23

Note: Likelihood N = 54, Best/Worst N = 52

Table 13 Stage 4 Group 2 Item-level Correlation Matrix

Item		1	2	3	4	5	6	7	8	9	10	11	12
Likelihood Response Instructions													
1	I - P14												
2	I - P15	.05											
3	I - P18	-.01	.21										
4	F - P8	-.12	.18	.06									
5	F - P20	.02	-.07	-.07	.12								
6	F - P21	.06	-.02	.17	.14	.17							
7	H - P3	.02	.17	.23	.28*	.08	.32*						
8	H - P4	-.01	.03	.03	.13	-.14	-.07	-.04					
9	H - P19	.04	-.1	.03	.20	.10	.11	.18	-.19				
10	Inclus.	.59**	.70**	.58**	.06	-.06	.10	.22	.02	-.02			
11	Flex.	-.01	.03	.07	.60**	.71**	.66**	.33*	-.05	.21	.04		
12	Hum.	.03	.06	.17	.36**	.02	.20	.65**	.47**	.58**	.13	.28*	
13	Total	.31*	.41**	.41**	.53**	.40**	.53**	.57**	.16	.34*	.60**	.74**	.62**

Item		1	2	3	4	5	6	7	8	9	10	11	12
Best/Worst Response Instructions													
1	I - P14												
2	I - P15	.18											
3	I - P18	.04	.42**										
4	F - P8	.09	.21	.13									
5	F - P20	.08	-.13	.09	-.06								
6	F - P21	.09	-.09	-.08	.01	-.15							
7	H - P3	.17	.16	-.02	.06	-.19	.11						
8	H - P4	.13	.10	< .01	-.09	-.04	-.15	-.07					
9	H - P19	.05	-.04	-.26	-.13	-.07	.05	.15	.11				
10	Inclus.	.63**	.79**	.65**	.21	.01	-.03	.16	.11	-.10			
11	Flex.	.16	-.06	.07	.41**	.64**	.52**	-.06	-.17	-.08	.08		
12	Hum.	.20	.14	-.13	-.08	-.16	-.02	.58**	.66**	.58**	.12	-.17	
13	Total	.61**	.58**	.42**	.31*	0.243	.23	.36**	.31*	.17	.79**	.47**	.48**

Note: Limited to revised 9-item pool. Likelihood $N = 54$, Best/Worst $N = 52$. Item-item correlations and item-total correlations are outlined. Significant correlations are marked (*.05; **.01)

Table 14 Stage 4 Group 2 Scale-level Correlation Matrix

Variable	M	SD	1	2	3	4	5	6	7	8
Likelihood Response Instructions										
1 Cognitive Ability	62.04%	22.84%								
2 Reframing	3.57	0.51	-.06	(.68)						
3 Systems Thinking	3.86	0.47	-.04	.07	(.71)					
4 Reflection	3.98	0.44	-.05	.51**	.60**	(.70)				
5 Inclusiveness	1.96	3.00	.01	.12	.30*	.19	(.21)			
6 Flexibility	2.24	3.48	-.17	.18	.22	-.05	.04	(.33)		
7 Humility	0.44	2.26	-.06	-.08	.08	-.01	.13	.28*	(-.07)	
8 Total Mindset	4.65	5.76	-.12	.14	.32*	.06	.60**	.74**	.62**	(.36)
Best/Worst Response Instructions										
1 Cognitive Ability	64.66%	24.15%								
2 Reframing	3.49	0.51	-.02	(.58)						
3 Systems Thinking	3.82	0.56	-.11	.26	(.81)					
4 Reflection	3.95	0.55	-.11	.42**	.63**	(.80)				
5 Inclusiveness	1.83	3.45	-.18	< -.01	.11	.23	(.44)			
6 Flexibility	2.10	2.45	-.12	-.03	-.01	.01	.08	(-.27)		
7 Humility	-0.19	2.38	-.23	.18	.15	.11	.12	-.17	(.12)	
8 Total Mindset	3.90	4.99	-.29*	0.068	.15	.22	.79**	.47**	.48**	(.19)

Note: Based on 9-item SJT version. Likelihood $N = 54$, Best/Worst $N = 52$

Appendix A - Stage 1 Materials

Definitions

Flexibility

What it is:
- A mindset characterized by a willingness and tendency to adjust one's understanding, opinions, or approach when conditions change or new information is presented.

What it is NOT:
- Resisting necessary or optimal change.
  - Breaking from long-term strategy. "Bend, don't break" from a long-term strategy. *Bending* a strategy allows for adaptation and adjustment of the strategy and its implementation in the face of changing conditions, without abandoning the long-term effort and developing another strategy from scratch.

Why flexibility?
- Flexibility underlies the following themes of strategic thinking models:
  - *Adaptability and opportunism*: being willing and comfortable to deal with change, major or minor in nature, is crucial to being adaptive and taking advantage of opportunities.
  - *Action learning*: being inflexible might cause one to hesitate to look fairly at the results of an action, for fear that they might indicate changes are necessary.
  - *Creativity*: new ideas and associations will inevitably cause changes to one's understanding and processes in other areas, which requires a level of flexibility.

Inclusiveness

What it is:
- A mindset characterized by the welcoming of information and opinion from a broad range of sources (e.g. individuals, groups, disciplines, or other relevant parties).
- Maintaining an inclusive mindset allows one to value the holistic understanding that can come from examining an issue from many perspectives.

What it is NOT:
- Being hesitant to consider new or unusual sources of information.
- Fearing having too many voices involved in a discussion.
- Including everything; an inclusive mindset values the potential benefit of a broad perspective, while relying on other processes and judgment to filter information that does not contribute to understanding.

Why inclusiveness?
- Inclusiveness underlies the following themes of strategic thinking models:
  - *Breadth and inclusion*: engaging in a broad and inclusive information search requires first acknowledging and embracing the value of a broad information search.

- *Systems thinking and synthesis*: differs from traditional analytical processes in that system factors are gathered together for holistic understanding, rather than segmented into divisions which are handled separately. Therefore, systems thinking requires an inclusive mindset: a willingness to consider the breadth of a system all together.

Humility

What it is:
- A mindset characterized by comfort with admitting to being wrong or having an incomplete understanding of something.
- Tendency to check oneself; examining issues as if one's understanding is somehow wrong or incomplete.

What it is NOT:
- Reacting defensively to proposed changes or constructive feedback.
- Having a bias in favor of maintaining old beliefs or assumptions.

Why humility?
- Humility underlies the following themes of strategic thinking models:
  - *Self-awareness and self-control*: To critically evaluate one's own opinions and assumptions, a certain level of humility must be reached which allows for acceptance that one may be wrong.
  - *Criticality*: Once open to and comfortable with the position of reasonable self-doubt, behaviors and positions can be examined and, with effort, improved.

Instructions for Reporting Critical Incidents

What do you mean by critical incident?
- A **specific example** of work, from your experience, representing some aspect of your job (in this case, a novel, complex problem
- They are *not **descriptions of general types of problems*** you experienced.
- There can be a **short or extended time frame**. Problems can be contained in a short period, or throughout a deployment.

What kind of critical incident do you want?
- Incidents of **dealing with highly complex problems requiring a novel solution**. In other words, unique problems that weren't specifically covered during training and don't have established solutions.
- If you did not experience such a problem, try to **think of one you closely observed** a peer dealing with.

What should I include?
- The **mindset** of an officer during decision-making in complex, novel problem situations. So, the **way you assessed the problem** is as relevant as **what you did to solve it**. Describe actions taken *and* the process for understanding the problem and possible solutions.
- Can be an example of **good, poor, or mediocre performance**. We want stories reflecting a range of performance. Complex, novel problems are rarely resolved perfectly; failures and successes are expected.
- We are **mostly concerned with the situations**. Focus the forces acting on the situation and how each impacted you.
- Courses of action that were considered, but not adopted, are welcome.

How will these be used?
- We will use the incidents you provide to **build problem scenarios** for officer development. Expert feedback and theory will help us **develop various courses of action**. These scenarios will help us compare and assess the way Officers respond to the types of scenarios presented.

Strategic Thinking Competencies

In addition to describing the behaviors you engaged in, you will be asked to indicate the types of thinking that were required, according to the categories defined below.

Critical Thinking: Reflecting on a variety of positions on an issue and evaluating each in an unbiased way. This type of thinking requires seeking out evidence to support a variety of points of view, clarifying assumptions, and making logical inferences.

Creative Thinking: Generating new insights into an issue. This type of thinking requires establishing new connections between previously unassociated concepts or applying them in new ways or in new contexts.

Systems Thinking: Perceiving how a set of elements interact to form a whole. This type of thinking requires considering how contextual variables influence the cause-and-effect relationships within an environment.

Thinking in Time: Considering the influence of the past and the desired future on the current status of an issue. This type of thinking requires examining how a current issue developed, how the pattern is likely to unfold in the future, and how actions could shape a desired future state.

Ethical Thinking: Considering the value, moral, and ethical factors in a situation which determine what one must do, what one must *not* do, and what is acceptable to do. This type of thinking requires knowledge of the values, morals, and ethics of yourself and those you represent.

Tips for writing good incidents

Describe an event, don't give advice. We need examples from the work of Army officers of complex, novel problems. Try to avoid speaking in general terms about how to solve such problems.

Write events in the third person (e.g., using "he" or "she" instead of "I" and "we"). Even if you are writing about things you did or things that happened to you, please write about them as things you observed.

Do not include specific identifying information, such as a person's name, a unit name, or a specific time and place (e.g. FOB Bravo, August 2010). Instead, use terms such as "the interpreter" or "MAJ X." To the extent that a detail is important (e.g. took place during a local election) include only enough to explain the context.

Take your time. It may take up to an hour to recall and report a relevant incident with sufficient detail. One effective incident is better than two that miss the point.

Include what you considered doing as well as what you did do.

DO NOT report incidents in which you participated in illegal activity. These may be subject to the Uniform Code of Military Justice and we may be required to report these events to the appropriate authorities.

Examples

On the following pages, there are two example incidents, to help you understand what we're looking for. The first is an example of an ideal style, length, and detail. The second is a real critical incident collected from a similar project we've conducted, but that is somewhat lacking in detail. We hope you can aim for something between these examples.

Example Incident 1

The following incident is a fictional depiction of an incident similar to what we are seeking. This is an adaptation of a scenario described in "The Strategic Corporal: Leadership in the Three Block War" by Marine Gen. Charles Krulak, in *Marines Magazine*, January 1999.

Check the box for each type of thinking that was required:
□ Critical Thinking   **X** Creative Thinking   □ Systems Thinking   **X** Thinking in Time   **X** Ethical Thinking

Situation (Refer to the instructions packet for clarification on what to include here)	CPL H was a squad leader in a Regional Multi-National Force (RMNF) providing security for a food distribution point (FDP). Food and medical supplies from the FDP had a positive impact on the community, with daily death tolls decreasing. A supply convoy brought news that members of a local faction, led by Warlord N, were gathering near the boundary of a rival faction's territory. Warlord N criticized the presence of the RMNF, but so far hadn't targeted Americans. However, as starvation became less of a concern, there was fear that political tensions would erupt in violence. LT F ordered CPL H's squad to man a roadblock at Checkpoint (CP) Charlie. Barricades were moved into place to secure the street. CPL S established an observation post on a nearby rooftop. A large crowd gathered waiting to pass through the checkpoint. CPL S reported that the crowd included many visibly upset young adult males. Meanwhile, he could see the vehicles of Warlord N's gang gathered at the boundary. CPL H learned that Warlord N's rival, Warlord M, was moving directly toward the CP and a likely collision with Warlord N, with the squad squarely in the middle. LT F directed CPL H to extend the road block and started moving another squad to help reinforce the checkpoint. The tension grew as the crowd became upset by the delay. The young men chanted anti-U.S. slogans and began to throw rocks. CPL H felt the situation slipping out of control and decided to close the road completely. The crowd erupted in protest and pressed forward. A helicopter nearby was hit by ground fire and crashed several blocks

	away. CPL S observed the crash and saw survivors. In the distance, he could see Warlord N's men rushing across the boundary. CPL S urgently requested permission to move to assist the crash survivors. Warlord M's armed men arrived at the checkpoint followed closely by local media. They forced their way up to the barricade and the crowd began pelting the squad with rocks. CPL H, who knew the fate of his men and perhaps the humanitarian mission, hung in the balance.
Problem-solving approach (Refer to the Instructions Packet for clarification on what to include here)	CPL H reviewed what he knew. He was certain that LT F and 2nd Squad would arrive within minutes. He knew that the crash site was in the adjacent unit's sector and that checkpoints existed along Warlord N's route to the site. He knew that exchange of gunfire with Warlord M's men would likely lead to civilian casualties and jeopardize the success of the humanitarian mission. Then, he considered what he didn't know. He wasn't certain of either warlord's intentions, nor of the likelihood of a successful rescue attempt. CPL S was directed to maintain his position and monitor Warlord N's progress and the status of the crash survivors. CPL H contacted the adjacent RMNF unit and learned that they had already dispatched medical personnel to the crash site. He informed them of Warlord N's movement, prompting them to reinforce the appropriate checkpoints.
Outcome (Refer to the Instructions Packet for clarification on what to include here)	LT F arrived with the additional squad, along with a neighborhood leader who had previously acted as an interpreter and mediator, recognized and respected in the community. Warlord M's men withdrew. The mediator addressed the crowd. The situation was diffused: Warlord M's men departed, the crowd calmed, and personnel reached the crash site.

Circle the number that best reflects how effectively the problem was dealt with

1	2	3	4	5
Very Ineffective/ Detrimental				Highly Effective/ Successful

Example Incident 2

The following is a real critical incident collected during a project investigating the work of combat advisors.

<table>
<tr>
<td colspan="2">Check the box for each type of thinking that was required:
X Critical Thinking □ Creative Thinking □ Systems Thinking □ Thinking in Time □ Ethical Thinking</td>
</tr>
<tr>
<td>Situation
(Refer to the instructions packet for clarification on what to include here)</td>
<td>There was an incident where CF fired on 4 IA who were on leave in civilian attire. US claimed these individuals were planting an IED however there was no evidence. 2 of the 4 were killed and the other two detained. Although our BN was not directly involved, our inability to satisfactory answer questions and relay decisions hurt our relationship with the IA BN officers. The CPT detained had been with the IA for four years. They passed through 11 checkpoints and had access to DIV HQs yet were accused of placing an IED in the middle of nowhere.</td>
</tr>
<tr>
<td>Problem-solving approach
(Refer to the instructions packet for clarification on what to include here)</td>
<td>Advisor coordinated through CF Intel channels to ascertain detainee and incident information. CF held information in 15-6 format and would not release through intel channels. IA is certain this incident is a cover up by the US Army and these detainees will be held indefinitely.</td>
</tr>
<tr>
<td>Outcome
(Refer to the instructions packet for clarification on what to include here)</td>
<td>CF refuses any wrong doing. 2 dead IA and 2 detained IA. Information provided from advisor to IA built a better relationship but lack of resolution damaged Iraqi/US relations. Advisor frustrated with no sense of accomplishment yet situation was resolved as far as the advisor could take it. This incident is like the entire deployment. Many tasks would not be considered complete by US standards. This mission is frustrating on the best day yet completed to the best ability of all advisors involved.</td>
</tr>
<tr>
<td colspan="2">Circle the number that best reflects how effectively the problem was dealt with

1   2   3   4   5

Very Ineffective/   Highly Effective/
Detrimental   Successful</td>
</tr>
</table>

Incident 1

Using the space provided below, describe a problem-solving incident that you witnessed, either as an active participant or close observer. As described in the instructions packet, the incident should reflect a problem of heightened complexity and novelty. Pay special attention to detailing the nature of the situation and the various aspects contributing to the complexity.

Check the box for each type of thinking that was required: ☐ Critical Thinking ☐ Creative Thinking ☐ Systems Thinking ☐ Thinking in Time ☐ Ethical Thinking	
Situation (Refer to the instructions packet for clarification on what to include here)	
Problem-solving approach (Refer to the instructions packet for clarification on what to include here)	
Outcome (Refer to the instructions packet for clarification on what to include here)	

Circle the number that best reflects how effectively the problem was dealt with

1	2	3	4	5
Very Ineffective/ Detrimental				Highly Effective/ Successful

Incident 2

Using the space provided below, describe a problem-solving incident that you witnessed, either as an active participant or close observer. As described in the instructions packet, the incident should reflect a problem of heightened complexity and novelty. Pay special attention to detailing the nature of the situation and the various aspects contributing to the complexity.

Check the box for each type of thinking that was required: ☐ Critical Thinking ☐ Creative Thinking ☐ Systems Thinking ☐ Thinking in Time ☐ Ethical Thinking	
Situation (Refer to the instructions packet for clarification on what to include here)	
Problem-solving approach (Refer to the instructions packet for clarification on what to include here)	
Outcome (Refer to the instructions packet for clarification on what to include here)	

Circle the number that best reflects how effectively the problem was dealt with

1	2	3	4	5
Very Ineffective/ Detrimental				Highly Effective/ Successful

Demographics and Background

The information requested below will allow us to summarize the basic demographics and experiences of our sample.

1. Gender: _____

2. Rank (e.g., O-3): _____

3. Current functional branch (e.g. Civil Affairs, Infantry): _____

4. Current MOS (e.g., 12B): _____

Appendix B - Stage 2 Materials

Scenario Review and Feedback Packet

Demographics and Background

The information requested below will allow us to summarize the basic demographics and experiences of our sample.

5. Gender: _____

6. Rank (e.g., O-3): _____

7. Current functional branch (e.g. Civil Affairs, Infantry): _____

     Current MOS (e.g., 12B): _____

Instructions

In this section, you will read a sequence of brief problem scenarios and provide feedback on their usability for the strategic thinking mindset assessment. You will also be asked to provide brief behavioral response options a Soldier might engage in to deal with that scenario. Additionally, we would like you to vary the level of flexibility, inclusiveness, or humility shown in the response options you provide.

Below is an example of a scenario with responses that vary on the element of inclusiveness. The A response is designed to reflect a low level of inclusiveness, while the B response reflects a high level of inclusiveness. Use these as a guide to the length and type of behavioral responses we are looking for.

EXAMPLE - You are a platoon leader and combat advisor assigned to mentor host nation police in an area of operations. You have two squads of coalition forces attached with you to a host nation police platoon. Another platoon nearby is delayed in arriving to their location, so your platoon is split in half and forced to cover two locations, reducing your combat effectiveness and placing your sergeant in charge at the second location. Both locations soon come under attack from positions deep in the surrounding mountains and valleys. The host national police at the other location are not responding to your Sergeant's instructions for dealing with the attack. He is quickly becoming frustrated and angry.

    A. Travel to the second location to replace the Sergeant and give the instructions, as you've seen a tendency for the host nationals to have more respect for officers.

    B. Consult with the interpreter to find out what may be causing the host nation forces to resist complying with the Sergeant's advice and what they think should be done instead.

    C. Work on improving the defensibility of both positions while instructing the Sergeant to try other influence tactics and to control his emotions better when he speaks to the host nationals.

    D. Instruct the Sergeant to have his squad execute the necessary actions for the host nationals until the other platoon arrives. Then report the incident to the host national police chief.

Scenarios

Instructions: Read the problem scenario provided in the box, then consider each question below. When appropriate, place an X in the box next to your desired response.

> [Each scenario appeared in a text box like this, but for the sake of simplifying these appendices,
>
> the general form of the packet is presented only.]

Which of the three mindset characteristics is this scenario most appropriate for? In other words, is it easier to think of Soldier responses that vary on flexibility, inclusiveness, or humility?

☐ Flexibility   ☐ Inclusiveness   ☐ Humility

In the space below, provide any general feedback you have on the scenario, how it might be fit to a mindset characteristic, made more relevant to a variety of Soldiers with different specialties, and any other additions or changes could be made to improve it.

Now, please consider what behaviors the Soldier in the above scenario might engage in to try to understand and resolve the problem.

In 1-2 sentences each, please describe up to ten different behavioral responses by varying the level of flexibility, inclusiveness, or humility shown, depending on which characteristic you believe can best be measured with this problem scenario. The responses don't have to be behaviors you think would definitely solve the problem, just actions that a typical Soldier might take.

1.

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Appendix C - Stage 3 Materials

Scenario and Response Rating Packet

Demographics and Background

The information requested below will allow us to summarize the basic demographics and experiences of our sample.

1. Gender: _____

2. Rank (e.g., O-3): _____

3. Current functional branch (e.g. Civil Affairs, Infantry): _____

4. Current MOS (e.g., 12B): _____

Instructions

In this survey, you will be presented with real Company-grade problem scenarios. Associated with each is a set of response options that Army leaders have provided to us as realistic, viable ways to respond to the problem. Your task is to give us a rating of how effective each option would likely be. The second aspect of your task is to indicate how much each option indicates a mindset reflecting either flexibility, inclusiveness, or humility. Your ability to judge these scenarios and response options in the context of your experience and military training are crucial to developing a quality assessment.

For each scenario, you will be asked to rate how strongly you disagree or agree 1) that a response option would be effective, and 2) that the response option would reflect a mindset of flexibility/inclusiveness/humility. Please circle one number that best represents your level of agreement.

> EXAMPLE - You are a platoon leader and combat advisor assigned to mentor host nation police in an area of operations. You have two squads of coalition forces attached with you to a host nation police platoon. Another platoon nearby is delayed in arriving to their location, so your platoon is split in half and forced to cover two locations, reducing your combat effectiveness and placing your sergeant in charge at the second location. Both locations soon come under attack from positions deep in the surrounding mountains and valleys. The host national police at the other location are not responding to your Sergeant's instructions for

1. Travel to the second location to replace the Sergeant and give the instructions, as you've seen a tendency for the host nationals to have more respect for officers.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

Please ***do not*** use the space between numbers to indicate a more refined level of agreement, as shown below.

1. Consult with the interpreter to find out what may be causing the host nation forces to resist complying with the Sergeant's advice and what they think should be done instead.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

Scenarios

Please read the scenario and *all* of the response options *before* providing any ratings. Please rate each of these possible response options in terms of how strongly you disagree or agree that the response would be an ***effective way to address the problem***.

> LT Nunez was an observer/controller (OC) tasked to oversee and provide feedback on a multinational, virtual exercise. Many tiers of systems participated, each with various sensors and weapon systems being used in the scenarios. During the scenarios, LT Nunez witnessed a glitch in the scenario, in which digital clutter appeared on the display screens whenever an incoming target was destroyed. The operators' responded by temporarily switching off their radar and turning it back on to remove the visual clutter.
> LT Nunez saw this as a huge problem. The clutter and the switching off of the radar caused a lack of situational awareness on part of the operators, especially during intense parts of the scenario. LT Nunez brought his concerns to the attention of the scenario coordinator, but was met with resistance and an insistence that the lack of situational awareness was not a problem.

1. Gather evidence about the consequences of the glitch and bring it up during after-action review.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

2. Report the problem with the scenario coordinator to his/her superior.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

3. Talk to someone with more expertise in the systems being used and find out what it will take to fix the glitch.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

4. Accept that it is the scenario coordinator's job to oversee the running of the scenario and focus on how the participants overcome the lack of situational awareness.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

5. Focus on what the participants in the exercise are learning and don't hold problems associated with the glitch against them.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

6. Encourage the participants to complain that they don't feel they're getting a realistic exercise due to the glitch with the scenario systems.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

Review the scenario and response options as necessary and now please rate each of these possible options in terms of how strongly you agree or disagree that the response would *reflect a mindset of humility*. Please refer back to the Definitions sheet you were provided to refresh yourself on what is meant by humility.

1. Gather evidence about the consequences of the glitch and bring it up during after-action review.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

2. Report the problem with the scenario coordinator to his/her superior.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

3. Talk to someone with more expertise in the systems being used and find out what it will take to fix the glitch.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

4. Accept that it is the scenario coordinator's job to oversee the running of the scenario and focus on how the participants overcome the lack of situational awareness.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

5. Focus on what the participants in the exercise are learning and don't hold problems associated with the glitch against them.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

6. Encourage the participants to complain that they don't feel they're getting a realistic exercise due to the glitch with the scenario systems.

1	2	3	4	5
Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree

Appendix D - STMT Pilot Test Items

FLEXIBILITY ITEM P5

> While deployed, CPT Matthews lead a platoon on a mission to recover a shipping container that had been detained by local national police. The contracted shipping company had been stopped at the border carrying Army equipment containers that were marked as being U.S. property containing HMMWV repair parts, but were not escorted by U.S. forces. The local nationals suspected the container was carrying ammunition that was not properly marked. CPT Matthews could not see any reason for the local nationals to be suspicious. The local nationals believed they had the right to view the contents of any container crossing their border. CPT Matthews wanted to be very sensitive not to disrupt the relationship with the locals and wanted to help save face for the local base CDR, while still recovering the equipment and assuring them it was properly marked.

1. Refuse to open the container unless the local nationals can justify their suspicions.
2. Open the shipping container and allow them view its contents, but not to search the container.
3. Talk to the local nationals and try to get to the bottom of what caused them to be suspicious.
4. Explain to the local nationals that for the nation to be allies with coalition forces, there needs to be a level of trust that would be violated by opening the container.

KEY: 1 – NEG, 2 – POS, 3 – NEUT, 4 - NEUT

FLEXIBILITY ITEM P8

> Bravo Company was set to redeploy soon and LT Graves, the Company XO, had spent weeks planning the process of turning in the remaining rolling stock (HMMWV/MRAPs) to clear the equipment hand receipt and had begun to execute the plan. However, with a week left before redeployment, the Company received an order that the rest of the Brigade would redeploy and the Company would act as a ready reserve for units all over the country.

1. Be candid with the Battalion XO that, in order to successfully complete the redeployment mission, they will need more time.
2. Contact other Company XOs in the Brigade to brainstorm ways to meet the one week suspense.
3. Create a new redeployment plan first and work to get the equipment that was already turned in returned or replaced later.
4. Conduct a VTC with the other Company XOs and the Battalion XO to convince him/her of the need for a longer suspense.

KEY: 1 – NEUT, 2 – POS, 3 – NEUT, 4 - NEG

FLEXIBILITY ITEM P16

> LT Gonzalez was in command of a convoy that included multiple fuel tankers. Nearby, another convoy came under heavy enemy fire. Helicopters nearby were called in to provide close air support, but were getting low on fuel. The only place to receive fuel was far enough to delay the support to the convoy by 30-45 minutes. While on route to the fuel point, the pilots spotted LT Gonzalez's convoy. They landed immediately and briefed LT Gonzalez on the situation and their need for immediate resupply. LT Gonzalez resisted, noting that his fuel had not been tested to determine if it was aviation-grade or not. The pilot wanted to accept the risk, because the need was so pressing. However, LT Gonzalez was concerned about completing his own mission as well as the risk to the aircraft.

1. Give the pilot the fuel that he is requesting.
2. Attempt to communicate with another informed party, e.g., at the fuel point or an engineer, to get another perspective on how much risk is associated with using lower-grade fuel.
3. Wait to get approval from higher up on the helicopter pilot's chain of command.
4. Argue that the fuel is needed at their original destination and that the pilots should use their designated re-fueling point where they can obtain appropriate fuel.

KEY: 1 – NEUT, 2 – POS, 3 – NEUT, 4 - NEG

FLEXIBILITY ITEM P21

> LT Allen was stationed in Europe preparing for a deployment as a platoon leader attached with a military intelligence company in an infantry brigade. LT Allen's platoon needed extensive training in preparation for the upcoming deployment. However, a request to send his Soldiers to MOS-specific training courses back in the U.S. was denied due to lack of funding and frequent course cancellations.

1. Approach the commander and argue that, for the sake of your platoon's chance of success in deployment and in their careers, they need to be given the opportunity to receive training for their mission.
2. Ask other units nearby if there are people that have graduated from those courses that are available to give your Soldiers some of the training.
3. Submit a second request for only one or two of your better Soldiers to go to the courses and plan to have them teach the rest of your platoon when they return.
4. Ask for guidance from the commander on what to do when budgets are constrained, but Soldiers need training.

KEY: 1 – NEG, 2 – POS, 3 – NEUT, 4 - NEUT

FLEXIBILITY ITEM P20

LT Mason was a company fire support officer (FSO) providing advice to the commander and de-conflicting different assets. LT Mason was preparing to return home with his unit for an early redeployment, but instead he was assigned to stay and work on the Battalion staff. LT Mason would have to serve as the civil-military relations officer (S9), information operations officer (S7), and assistant Battalion FSO. LT Mason knew he hadn't received any training for the S7 and S9 positions and was concerned that he would not perform well in those functions.

1. Request an NCO stay on to help with the additional staff roles.
2. Focus on performing well in the FSO duties and make the best of it with the other areas.
3. Pore over doctrine and other reference material on the new staff functions.
4. Try to replicate the products produced by the previous S7 and S9 to make them work for the remainder of the deployment.

KEY: 1 – NEG, 2 – NEUT, 3 – POS, 4 - NEUT

FLEXIBILITY ITEM P13

While at home station, CPT Adams received word of a dispute between SGT Hayes and his platoon sergeant, SFC Crouch. SFC Crouch has a very "in your face" style which produced a strained relationship with many Soldiers in the platoon. One day, after his graduation ceremony from the Advanced Leader Course (ALC), SGT Hayes went home for the rest of the day rather than returning to the unit. SFC Crouch called SGT Hayes back to work and chewed him out severely in front of many peers. SGT Hayes reportedly stormed away and threatened to get even with SFC Crouch. At this point, the incident was reported to the company commander CPT Adams.

1. Have a private conversation with SGT Hayes' to see if his anger about the incident might result in him actually doing something to SFC Crouch.
2. Treat the comment as a legitimate threat and take the appropriate disciplinary actions.
3. Counsel SFC Crouch and explain to him that his leadership style is ineffective and the way he handles discipline needs to change.
4. Treat it as an isolated incident of blowing off steam, but tell SGT Hayes' peers to report if he continues to make any kind of threat to SFC Crouch.

KEY: 1 – POS, 2 – NEG, 3 – NEUT, 4 - NEUT

FLEXIBILITY ITEM P2

> Two platoons responded to intelligence that a high value target had bedded down in a nearby village. LT Smith led the effort to search the target house and surrounding area. LT Jones led the outer cordon enclosing the village. A local national opened fire on the outer cordon and was killed. At the target house with the local police, the villagers became upset and gathered aggressively. The local police wanted to leave without searching the houses. However, LT Smith needed the local police to enter the target house first and assist due to the rules of engagement.

1. Maintain the inner cordon, but wait to enter the house until you can disperse the crowd by having the interpreter explain the situation.
2. Focus on the local police leader and challenge him to set an example of courage for his men and lead the entrance into the target house.
3. Contact your Company commander and ask him/her to communicate with the local police commander to order his men to enter the house.
4. Call off the search if the police refuse to participate to avoid breaking rules of engagement.

KEY: 1 – POS, 2 – NEUT, 3 – NEUT, 4 - NEG

HUMILITY ITEM P7

> CPT Smith was a Field Artillery (FA) officer assigned to an Apache helicopter task force, working in the S3 shop. The Battalion XO assigned CPT Smith to plan and run the redeployment of the task force back to home station. This included hundreds of Soldiers, 27 helicopters, and 90+ containers. As an FA officer, CPT Smith lacked experience and in-depth knowledge of how to transport aviation equipment. Coordination for personnel movement, container movement, and helicopter flight/movement all needed to be coordinated separately through different Brigade/theater organizations. Furthermore, the Battalion XO emphasized the need to prevent any loss of flight hours or ground support in the process.

Given the following options for responding to this scenario, select the one that you would be most likely to choose?

1. Accept the mission without comment and do your best to figure it out through trial and error.
2. Spend a couple of days reading reference materials on aviation movement requirements and other logistics principles.
3. Gather a team of others in the Battalion who together have the necessary knowledge and experience and operate as the coordinator of their efforts.
4. Use a whiteboard to visualize all the elements of the problem and create a plan from there.

KEY: 1 – NEG, 2 – NEUT, 3 – POS, 4 - NEUT

HUMILITY ITEM P9

LT Hansen was assigned to serve as the senior advisor to a local national army battalion. The history of the area of operations and the local Army battalion required a consistent, strong presence with the local nationals. LT Hansen was an experienced 1LT close to promotion and highly thought of by his superiors. However, it was clear the local national army commander, who was a LTC and accustomed to being advised by American CPTs, was hesitant to work with an American advisor of an even lower rank than he was used to.

1. Try to use his extensive time in the local national army to your benefit by consulting him about what has gone on in the local national army in the past.
2. Ask your superiors to contact the LTC before you begin and vouch for you and describe how capable you are.
3. Focus on the LTC's subordinates and work with them more directly and demonstrate your competence to them.
4. Defer to the LTC whenever there is a disagreement in order to maintain a positive relationship.

KEY: 1 – POS, 2 – NEG, 3 – NEUT, 4 - NEUT

HUMILITY ITEM 3 P3

LT Nunez was an observer/coach (OC) tasked to oversee and provide feedback on a multinational, virtual exercise. Many tiers of systems participated, each with various sensors and weapon systems being used in the scenarios. During the scenarios, LT Nunez witnessed a glitch in the scenario, in which digital clutter appeared on the display screens whenever an incoming target was destroyed. The operators' responded by temporarily switching off their radar and turning it back on to remove the visual clutter.
LT Nunez saw this as a huge problem. The clutter and the switching off of the radar caused a lack of situational awareness on part of the operators, especially during intense parts of the scenario. LT Nunez brought his concerns to the attention of the scenario coordinator, but was met with resistance and an insistence that the lack of situational awareness was not a problem.

1. Gather evidence about the consequences of the glitch and bring it up during after-action review.
2. Report the problem with the scenario coordinator to his/her superior.
3. Accept that it is the scenario coordinator's job to oversee the running of the scenario and focus on how the participants overcome the lack of situational awareness.
4. Encourage the participants to complain that they don't feel they're getting a realistic exercise due to the glitch with the scenario systems.

KEY: 1 – NEUT, 2 – NEUT, 3 – POS, 4 - NEG

HUMILITY P12

CPT Bolino was tasked by LTC Young to conduct a commander's inquiry into an allegation that SSG Adams, the command group secretary, had falsified documents in order to get promoted. Despite being in the same company, CPT Bolino and SSG Adams did not work directly together. However, SSG Adams would occasionally come to CPT Bolino to talk about difficult personal situations outside of work. LTC Young needed the inquiry done quickly. CPT Bolino felt that he could be objective in the inquiry and wanted to accomplish the tasks assigned to him.

1. Conduct the inquiry and include a summary of your personal relationship as part of your report.
2. Ask a peer to volunteer to do the inquiry in your place and recommend the peer while informing LTC Young of the relationship.
3. Conduct the inquiry, but ask a trusted peer to go over things with you as a check to prevent any bias from coming in.
4. Tell LTC Young that you have a personal relationship with SSG Adams that some might see as influencing your objectivity, but that you would still like to conduct the investigation, with his approval.

KEY: 1 – NEG, 2 – NEUT, 3 – NEUT, 4 - POS

HUMILITY ITEM P4

CPT Donaldson lead a group of military advisors assigned to a local national police force. The advisors and police conducted a combined operation to locate a high value target hiding in a small house in a nearby village. The police detained the target and processed him in the local judicial system. The next day, CPT Donaldson went to the prison to visit the target and was told that the target had been released to the community. CPT Donaldson asked the police leadership why he had been released and did not receive a clear reason. Mistrust grew between the two units, disrupting the advising relationship.

1. Reframe your thinking about how involved you need to be in the local judicial system, knowing that it will have to work on its own eventually.
2. Advise the police chief to conduct another operation to re-take the target and allow your advisor team to obtain any information the target can provide.
3. Talk to other parties in the local judicial system to see if you can find out what the justification for his release was.
4. Work on gathering better intelligence and evidence on the target and present this to the police chief and advise him to conduct another mission to re-detain the target.

KEY: 1 – POS, 2 – NEG, 3 – NEUT, 4 - NEUT

HUMILITY ITEM P10

LT Smith was a highly motivated officer right out of ranger school when he arrived at his unit. The commander placed LT Smith in charge of a platoon managing the unit's logistics, a position usually reserved for a senior LT before moving on to CPT. When he arrived at the platoon, LT Smith was overwhelmed by the enormous amount of disorder and the lack of morale in the platoon. The platoon was performing poorly: missing ammunition draw times, vehicles not ready to refuel before leaving for training exercises, bickering amongst NCOs, Soldiers getting into trouble, and bad PT scores. To complicate matters, LT Smith had trained for combat arms, but was instead was tasked with managing logistics which he struggled to wrap his head around.

1. Focus on improving the morale of the platoon. Come up with creative solutions to get everyone's buy-in before cracking down on the standards.
2. Communicate to the Soldiers that the platoon is not up to standard and that while you adjust to the logistics world, they will have to adjust to a higher standard of unit performance.
3. Ask NCOs to provide candid feedback on your own performance while also giving feedback to them on the ways they can take more responsibility for the performance of their Soldiers.
4. Challenge the Soldiers to take more pride in their branch and show that they can meet the same standard of discipline as a combat arms unit.

KEY: 1 – NEUT, 2 – NEUT, 3 – POS, 4 - NEG

HUMILITY ITEM P19

CPT Norris was a company executive officer serving under what he felt was an incompetent commander, CPT Jacobs. CPT Jacobs struggled to make decisions, and often showed little personal respect for his Soldiers, a lack of trust in his NCOs, and was not confident tactically. Many in the company felt the performance of the company was degraded since the previous CDR had left.

1. Use your own leadership skills to maintain performance and morale among the Soldiers in the company while CPT Jacobs remains in command.
2. Request a meeting with the Battalion XO to explain to him the problems you see with CPT Jacobs.
3. Accept that CPT Jacobs is in command and focus on what you can learn about what you won't do if you become a company commander.
4. Be up front with CPT Jacobs that the Soldiers and NCOs in the unit feel disrespected and that if nothing changes you are worried about the performance of the unit.

KEY: 1 – NEUT, 2 – NEG, 3 – POS, 4 - NEUT

INCLUSIVENESS ITEM P15

> While deployed on a security force assistance mission, CPT Jones was tasked with oversight of police mentors. A local cultural advisor had been assigned to the lead U.S. police mentor. This individual had served well as an advisor for three years. CPT Jones received word that the cultural advisor's name had been mentioned by known criminal actors as being a bad guy who extorted other locals with his position, using it to extort money and improve his position in the local community. He was also accused of passing classified or sensitive information to others. The cultural advisor was married to the local governor's daughter.

1. Fire the cultural advisor to avoid the risk of any more classified or sensitive information being released.
2. Speak to a trusted leader in the local community about the situation as a hypothetical and see what he recommends.
3. Wait to take action until a source more trustworthy than the known criminal actors makes an accusation.
4. Speak with the cultural advisor and see if he gets unusually defensive or seems guilty.

KEY: 1 – NEG, 2 – POS, 3 – NEUT, 4 - NEUT

INCLUSIVENESS ITEM P17

> CPT Kennedy was deployed as an advisor to CPT Hadad, a local district chief of police. CPT Kennedy's mission was to help CPT Hadad and his police gain the trust of locals and establish security within his district so that the host nation could regain all control and responsibility of his district.
> CPT Hadad was a competent police officer, but struggled with long-range planning, and was unfamiliar with the district he just assumed responsibility over. CPT Kennedy had knowledge and experience planning and needed to devise a method of simultaneously gaining and maintaining security while mentoring CPT Hadad on assuming all control of his district.

1. Do the necessary long-range planning yourself and have CPT Hadad build short-term plans within that, while extending the length of CPT Hadad's plans over time.
2. Conduct long-range planning yourself, but keep CPT Hadad closely involved in all meetings so that he learns through observation.
3. Invite local leaders with the trust of the population to long-range planning meetings with CPT Hadad so that he gets to know the area and can get their input on how his plans will affect the population.
4. Research the history of the area and find examples of previous police chiefs who have ignored long-range issues and explain what happened as a result.

KEY: 1 – NEG, 2 – NEUT, 3 – POS, 4 - NEUT

INCLUSIVENESS ITEM P6

CPT Clark was attached as civil-military support to a humanitarian dental effort. CPT Clark was there to facilitate interaction with the local population and spread the word about the services available. However, the local government insisted that information about the services could only be distributed with approval and through the national government. However, the representatives CPT Clark had to work with were antagonistic and slow in responding and generally publicizing the effort.

1. Arrange a meeting with the local government officials and try to understand more about why they are resistant.
2. Request that someone above you in the U.S. chain of command reach out to someone higher in the local government to bypass the resistance.
3. Try to informally publicize your services through word of mouth, but nothing official.
4. Comply with their bureaucratic processes for publicizing the efforts, accepting the delays in order to maintain a good relationship with the government.

KEY: 1 – POS, 2 – NEUT, 3 – NEG, 4 - NEUT

INCLUSIVENESS ITEM P18

While deployed, CPT McCoy, Battalion S4, noticed shortages in fuel as fuel trucks arrived to her forward operating base (FOB). Records show that the local national fuel trucks had the appropriate fuel when leaving from the previous FOB and surveillance images did not indicate the vehicles were not leaving the route to offload fuel while moving between FOBs. No obvious leaks in the tanks could be found. As the amount of fuel missing increased over the months, CPT McCoy became concerned as it was approaching several hundred gallons a week.

1. Confront the truck drivers with the missing fuel numbers and request an explanation.
2. Get rid of the existing truck drivers and contract with a different local trucking company.
3. Consult with U.S. engineers to see if they have any explanation for why fuel levels might decrease from departure to arrival.
4. Recommend to the paying agent to only pay for the amount of fuel that arrives.

KEY: 1 – NEUT, 2 – NEG, 3 – POS, 4 - NEUT

INCLUSIVENESS ITEM P1

Newly promoted CPT Stevens has just begun a new assignment as a General Support Officer (GSO), tasked with sustaining the Brigade with supplies, such as food, ammunition, and fuel. The Brigade was initiating closure of a battle space, including 15 forward operating bases (FOB). CPT Stevens needed to create a plan for future sustainment operations. A problem arose when reports from several of the FOBs did not provide clear responses about their current stock of food, while still regularly sending new requests for food. CPT Stevens became confused and frustrated at how this prevented his ability to plan ahead for future sustainment.

1. Withhold all new food requests to those FOBs until a clear response has been given.
2. Make plans using an estimate of the food stocks at each FOB based on what is on hand at the other FOBs.
3. Provide the Brigade XO with a list of the FOBs that are hoarding their food stocks.
4. Continue to request revised reports from each until you get a clear picture of what is on hand at each.

KEY: 1 – NEG, 2 – NEUT, 3 – NEUT, 4 - POS

INCLUSIVENESS ITEM P14

CPT Martin was a Battalion signal staff officer in an aviation unit, primarily assigned to maintain a computer network to prevent sensitive information being compromised. One day, CPT Martin was notified that the network had a potential compromise on a mission-critical weather station computer. That computer largely determined if it was safe for the pilots to fly or not. Scans indicated the computer had a virus, but it was unclear how threatening it was. Standard protocol in this case would be to remove the computer from the network. However, at that time, the weather was becoming severe and pilots already in the air needed guidance on which paths they could safely travel. Inaccurate guidance or a lack of guidance posed a grave threat to the pilots. The Battalion XO and commander deferred to CPT Martin's judgment about the level of threat posed by the virus.

1. Remove the computer from the network and instruct the pilots to ground their flights as soon as possible.
2. Wait to remove the computer until the pilots can find a suitable landing spot.
3. Leave the computer on the network until the mission is complete.
4. Discuss the nature of the virus with other signal officers you can get in touch with and see if they have any knowledge on the severity.

KEY: 1 – NEG, 2 – NEUT, 3 – NEUT, 4 - POS

LT Aldridge's platoon leader was responsible for providing security in a sector of town. Many welcomed the platoon's presence because it helped decrease crime in the area. While on patrol, LT Aldridge encountered an incident involving two young local females in the market area dressed in an American style, rather than traditional religious garments. The young women were being followed and verbally accosted by a group of men who felt the women were being disrespectful in their dress and mannerisms. The women were afraid and claimed that they had believed the presence of American Soldiers in their town meant they were free to dress and act more liberally. Although LT Aldridge knew the rules of engagement instructed not to interfere with local tribal traditions, his interpreter warned that if the women were left on their own, they would likely be killed or stoned.

1. Place your squad between the males and females to buy time for the females to get to safety.
2. Tell the females that your presence there does not change their society and that they should go home as quickly as possible.
3. Tell the females to find some garments in the market as soon as possible and follow them until they are adequately dressed.
4. Encourage local bystanders to help resolve the situation peacefully by separating the men from females and finding them adequate clothing.

KEY: 1 – NEG, 2 – NEUT, 3 – NEUT, 4 - POS