Psychological hardiness predicts adaptability in military leaders:

A prospective study

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Abstract

To perform effectively in complex mission environments, security personnel and leaders must be flexible and adaptable in responding to rapidly changing conditions. Psychological hardiness marks resilient people who maintain their health and performance despite stressful situations. The present study evaluates psychological hardiness at entry to West Point military academy as a predictor of leader performance and adaptability over time. Predictors also included SAT scores, and a composite indicator of leader potential (Whole Candidate Score) taken from admissions records. Using the Pulakos et al (2000) framework as a guide, adaptability performance items were taken from a survey of graduates given three years after graduation. Also, military leadership grades as West Point seniors provided an index of traditional military performance. Hierarchical regression analyses showed that Whole Candidate Scores predict military leader performance at West Point, but not leader adaptability after graduation. However, hardiness predicts leader performance at West Point, and also leader adaptability (self- and supervisor ratings) after graduation. SAT scores and the challenge facet of hardiness are negative predictors of leader performance at West Point. Results indicate that while the traditional measures Whole Candidate Score predicts leader performance in the stable, highly regulated environment of West Point, it does not predict leader adaptability and performance in the uncertain environment of real-world operations. In contrast, psychological hardiness (commitment and control facets) measured as academy freshmen does predict leader adaptability in officers, as long as seven years later. Psychological hardiness appears to be a promising factor in promoting the development of adaptability.
Psychological hardiness predicts adaptability in military leaders: A prospective study

In today’s rapidly changing world, the challenge for workers to adjust and adapt quickly to changing circumstances has grown substantially (Ilgen & Pulakos, 1999). New technologies, equipment and systems appear at a fast pace, changing the way many work tasks get accomplished (Thach & Woodman, 1994). In addition to changing technologies, increasing globalization of operations for many firms means that employees often must learn to function effectively in unfamiliar cultures and languages (Molinsky, 2007).

The concept of adaptability has been broadly applied at many levels, from biological systems (Darwin, 1859; Ben-Jacob, 2003) to individuals (Burke, Pierce & Salas, 2006), to teams (Hackman, 2002), organizations (Zaccaro & Banks, 2004) and even entire nations or cultures (Ben-Dor, 2004; Gaillard, 2007). Regardless, adaptability always has to do with effective change or adjustment in response to changing conditions (Mueller-Hanson, White, Dorsey & Pulakos, 2005). A recent report by the Defense Science Board (2011) goes even further, defining adaptability as “…the ability and willingness to anticipate the need for change, to prepare for that change, and to implement changes in a timely and effective manner in response to the surrounding environment.” (p. 3). This report also notes that in the new and rapidly changing global environment, the ability of defense agencies and military organizations and personnel to adapt is essential to successful performance.

A more detailed and work-behavior oriented definition of adaptability is provided by Pulakos, Arad, Donovan & Plamondon (2000). Based on a review of relevant literature, these authors posit a “taxonomy” of adaptive performance that includes the following eight dimensions: (1) Handling emergencies or crisis situations; (2) Handling work stress; (3) Solving...
problems creatively; (4) Dealing with uncertain and unpredictable work situations; (5) Learning new work tasks, technologies and procedures; (6) Demonstrating interpersonal adaptability; (7) Demonstrating cultural adaptability; and (8) Demonstrating physically oriented adaptability. These dimensions were supported by exploratory and confirmatory factor analytic findings (Pulakos et al. 2000), and by additional empirical studies examining predictors of adaptive job performance (Pulakos, Schmitt, Dorsey, Arad, Hedge & Borman, 2002). These authors found that (self-reported) past experience in behaviors related to the eight adaptability dimensions was a predictor of adaptive performance (as measured by supervisor ratings). In addition, adaptive performance was predicted by cognitive ability \( r = .14 \), and even more significantly by the non-cognitive variables of achievement motivation \( r = .31 \) and emotional stability \( r = .18 \). These findings highlight the potential importance of non-cognitive variables as well as cognitive ones to influence successful adaptive performance (Rumsey, 1995; Rumsey & White, 2010).

The present study was undertaken to test the potential influence of a promising non-cognitive or personality variable, psychological hardiness, on later adaptive performance of military officers. Military personnel today are called upon to perform a wide variety of functions, from peacekeeping, nation building and disaster response to counterinsurgency and combat operations. As noted in the Defense Science Board (2011) report, successful performance in this new and rapidly changing security environment calls for military personnel, and especially leaders, who are agile and quick to adapt to novel situations, and are relatively unperturbed by uncertainty. In this context, it is important to select officer candidates who are most likely to develop into adaptable leaders, and also to train and develop them in ways that maximize later adaptive performance.
Psychological hardiness is a constellation of personality qualities found to characterize people who remain healthy and continue to perform well under a range of stressful conditions (Kobasa, Maddi & Kahn, 1982; Bartone, 1999; Bartone, Roland, Picano & Williams, 2008). The key facets of hardiness are commitment – an active engagement and involvement with the world, and a sense of meaning in life (versus isolation), control – a belief that through effort one can influence events and outcomes, and challenge – a receptivity to variety and change. As a personality variable, hardiness and the facets of commitment, control and challenge appear to be distinct from any of the “Big Five” personality dimensions.

The Big Five, or “Five Factor Model” of personality (Neuroticism, Extraversion, Openness, Agreeableness, and Conscientiousness) has emerged in recent years as a potential unifying framework for describing normal personality (Digman, 1990; McCrae, 1992). A growing body of research has explored the influence of these five general personality dimensions on leadership and job performance (e.g., Barrick & Mount, 1991; McCormack and Mellor, 2002; Rubenzer, Faschingbauer & Ones, 2000). Several meta-analytic studies have examined the effects of Big Five personality dimensions on leadership, across multiple studies and groups (Judge & Bono, 2000; Judge, Bono, Ilies & Gerhardt, 2002). A comprehensive review by Judge et al. (2002) indicates that of the Big Five dimensions, Extraversion and Conscientiousness show the most consistent effects on leadership performance, while effects of Openness, Neuroticism, and Agreeableness are more variable. Big Five corrected mean correlations with leader performance have ranged from .31 (Extraversion) to .08 (Agreeableness) (Judge et al., 2002). Further inconsistencies with the Big Five are seen in cross-cultural research. For example, in a sample of Chinese business school students, extraversion was negatively related to
transformational leadership style, while neuroticism correlated in the expected direction, (Shao & Webber, 2006).

Thus, while the Big Five model represents a significant advance in personality research, it nevertheless does not encompass all of the important personality factors that may influence performance. Block (1995) for example has criticized the Five Factor approach as being too global to be of practical value in understanding actual behavior. Similarly, Hough (1992) argues that the Big Five factors are too broad to adequately predict important life outcomes or criteria. Judge et al. (2002) attempt to address this problem by focusing on the 30 underlying, more specific Big Five facets (according to Costa & McCrae, 1992) as predictors of leadership. Their results are somewhat mixed, but they did find that leadership performance was more strongly predicted by facets of Conscientiousness (achievement and dependability) and Extraversion (sociability and dominance) than by any of the global dimensions.

The question of whether the Five Factor model is fully adequate for describing normal personality extends beyond this levels-of-analysis perspective of Judge et al. (2002) and even earlier by Mount & Barrick (1995). It’s conceivable that some important personality characteristics are not captured at all by the Big Five, no matter how finely the general dimensions are broken down. Conceptually and empirically, hardiness appears to be independent of all of the Big Five dimensions. In a study that examined hardiness alongside the “Big-Five” personality dimensions of Neuroticism, Extraversion, Openness, Conscientiousness and Agreeableness, hardiness emerged as a unique predictor of cadet performance during the summer field training months, as well as during the academic year (Bartone, Eid, Johnsen, Laberg & Snook, 2009). In this study, the effects of hardiness were over and above any variance accounted for by the Big-Five personality factors. And while hardiness did show modest
correlations with Big Five Conscientiousness (r = .18, p < .01), Extraversion (r = .14, p < .01), and Neuroticism (r = -.25, p < .001), these correlations were all substantially lower than several intercorrelations within the Big Five factors, as for example Conscientiousness with Neuroticism (r = -.67, p < .001); Extraversion with Neuroticism (r = -.40, p < .001); and Conscientiousness with Extraversion (r = .50, p < .001). This further argues for the independence of hardiness from the Big Five dimensions.

The concept of hardiness is theoretically grounded in the work of existential philosophers and psychologists (Kobasa & Maddi, 1977) such as Heidegger (1986), Frankl (1960), and Binswanger (1963). It is a broad, generalized perspective that affects how one views the self, others, work, and even the physical world (in existential terms, umwelt, the “around” or physical world; mitwelt, the “with” or social world, and eigenwelt, the world of the self). People high in hardiness see life as meaningful and worthwhile, even though it is sometimes painful and disappointing. The commitment facet of hardiness builds on the work of Antonovsky (1974), whose “sense of coherence” entails commitment and engagement with others, which lends resistance to the ill effects of stress. White’s (1959) ideas on self-awareness and striving for competence also influenced Kobasa’s understanding of commitment. Hardiness-commitment provides a sense of internal balance and confidence which is important for realistic assessment of stressful and threatening situations.

The control facet of hardiness derives primarily from Rotter’s concept of locus of control (Rotter, Seeman & Liverant, 1962), and Lefcourt (1973) on control beliefs. Kobasa’s emphasis on control was also influenced by extensive experimental research showing that when subjects have control over aversive stimuli, the stress effects are substantially reduced (eg., Averill, 1973; Seligman, 1975). In the hardiness model, challenge involves an appreciation for variety and
change in the environment, and a motivation to learn and grow by trying new things. Primary theoretical influences on challenge are Fiske & Maddi (1961) on variety in experience, and Maddi (1967) on engagement vs. alienation. Maddi (1967) used the term "ideal identity" to describe the person who lives a vigorous and proactive life, with an abiding sense of meaning and purpose, and a belief in his own ability to influence things. This is contrasted with the “existential neurotic,” who shies away from change, seeking security and sameness in the environment. Although Kobasa described hardiness in terms of these three personality traits (commitment, control and challenge), it is best considered as a general style, a holistic pattern rather than individual, discrete traits. In Adler’s (1956) terms, hardiness would be a “worldview” or broad framework that people apply to interpret their entire experience. It is a generalized style of functioning that includes cognitive, emotional and behavioral features, and characterizes people who stay healthy under stress in contrast to those who develop stress-related problems.

Since Kobasa’s original report on hardiness and health in executives (Kobasa, 1979), an extensive body of research has accumulated showing that hardiness protects against the ill effects of stress on health and performance. Studies with diverse occupational groups have found that hardiness operates as a significant moderator or buffer of stress (e.g. Contrada, 1989; Kobasa, Maddi & Kahn, 1982; Roth, Wiebe, Fillingim & Shay, 1989; Wiebe, 1991; Kobasa & Maddi, 1984). Hardiness has also been identified as a moderator of combat exposure stress in Gulf War soldiers (Bartone, 1993; Bartone, 1999; Bartone, 2000). Psychological hardiness has emerged as a stress buffer in other military and security groups as well, including U.S. Army casualty assistance workers (Bartone, Ursano, Wright & Ingraham, 1989), peacekeeping soldiers (Bartone, 1996; Britt, Adler & Bartone, 2001), Israeli soldiers in combat training (Florian, Mikuluncer & Taubman, 1995), Israeli officer candidates (Westman, 1990), and Norwegian
Navy cadets (Bartone, Johnsen, Eid, Brun & Laberg, 2002). Studies have found that troops who develop PTSD symptoms following exposure to combat stressors are significantly lower in hardiness, compared to those who don’t get PTSD (Bartone, 1999). Moreover, there is evidence that high hardy soldiers not only adapt better during operational deployments, but also adjust more favorably in the months following their return from deployments (Britt, Adler, & Bartone, 2001).

Earlier research at West Point found that psychological hardiness is a predictor of several important outcomes. For example, across multiple West Point classes, Kelly & Bartone (2005) found the hardiness facet of commitment to be particularly important in predicting cadets who successfully complete the rigorous 6-week Cadet Basic Training, versus those who drop-out. Hardiness-commitment also predicts retention throughout the four-year West Point experience, successful graduation. Total hardiness and the hardiness facet of commitment were also found to predict military performance scores, which are grades received by cadets for their performance of military and leadership tasks. Other studies found hardiness-commitment to be a stronger predictor of retention at West Point than the traditional weighted composite (Whole Candidate Score) of academic aptitude, leadership, and physical fitness indicators (Kelly, Matthews & Bartone, 2005). Also, hardiness was second only to high school class rank in its relationship to military performance scores (Kelly, Matthews & Bartone, 2005).

Based on these earlier findings as well as theoretical considerations, it was expected that psychological hardiness in cadets would be predictive of adaptive performance as Army officers. Conceptually, hardiness is a set of qualities that confers resistance to the ill-effects of stress. Many studies have confirmed that people who are high in hardiness adjust to stressful conditions more effectively than those low in hardiness, both in terms of health (Beehr & Bowling, 2005;
Contrada, 1989; Hystad, Laberg, Eid, Johnsen & Bartone, 2009; Kobasa, Maddi & Kahn, 1982; Waysman, Schwarzwald & Solomon, 2001) and performance (Bartone et al., 2009; Golby & Sheard, 2004; Hanton, Evans & Neil, 2003; Johnsen, Eid, Pallesen, Bartone & Nissestad, 2009). This entails adjusting effectively in the face of changes and unexpected events in life. High hardy persons typically interpret experience as (1) overall interesting and worthwhile (commitment), (2) something they can exert control over (control), and (3) challenging, presenting opportunities to learn and grow (challenge).

We expect all three hardiness facets to contribute to adaptive performance. Commitment should help people be more adaptable in novel and rapidly changing situations, since the high commitment person tends to see all experience as interesting and meaningful, and also has a strong sense of self and confidence in his own abilities (Kobasa, 1979). People high in commitment are more intimately engaged with the world, seeing their experience as generally meaningful and important. They are more interested in what’s going on around them, more attentive, and thus more likely to perceive different aspects of situations, as well as to envision multiple possible response alternatives.

Control should likewise lead to greater adaptability, since people high in control approach novel situations with the belief they can respond well and influence outcomes. Regardless of changing conditions, those with a strong sense of control tend to believe they can influence and manage events effectively. Studies have shown, for example, that hardiness increases the sense of self-efficacy which in turn can lead to more positive and healthy behaviors (Oman & Duncan, 1995; Delahaija, Gaillard & van Damb, 2010).
Challenge should also facilitate greater adaptability. By definition, hardiness-challenge involves an abiding acceptance of change in life, and a proclivity for variety. People high in challenge enjoy novelty and tend to see changing circumstances as an opportunity to learn. Thus, challenge should facilitate a person’s adapting to changing conditions. Specifically, we hypothesize that:

1. Hardiness-commitment is related to adaptive performance
2. Hardiness-control is related to adaptive performance
3. Hardiness-challenge is related to adaptive performance

There has been some debate in the field as to whether hardiness is best considered a unitary construct, or whether it is three separate but related constructs of commitment, control and challenge (Funk, 1992; Maddi & Kobasa, 1984). Early studies often considered only the three facets (e.g., Florian, Mikulincer & Taubman, 1995). More recent work has examined hardiness total scores as well as the facets, finding meaningful effects under both approaches (Johnsen, Eid, Pallesen, Bartone & Nissestad, 2009; Eid, Johnsen, Bartone & Nissestad, 2007). A recent confirmatory factor analysis conducted in a large sample of Norwegian defense workers suggests that both approaches make sense (Hystad, Eid, Johnsen & Bartone, 2010). Here, the best fitting model was a hierarchical one in which the three hardiness facets are nested under general higher-order factor of hardiness. For this reason, we also examine the impact of the higher order construct of hardiness on adaptability.

Method

Participants
At the start of the research, participants were all freshmen cadets in the West Point classes of 2005 and 2006 (N= 2,383 combined). These were typical West Point cohorts in terms of gender (16% female) and race (24% non-white), and graduation rate (N= 1818; 76%). Initial survey distribution to the graduates of the Classes of 2005 and 2006 was conducted in September, 2008 and September, 2009 respectively. Graduates had typically attained the rank of First Lieutenant in the United States Army.

Of the 1,731 graduates from both classes that received a survey, 694 responded with completed surveys (40% response rate). Of these 694 respondents, 259 also forwarded the companion commander survey to their direct supervisors for completion (37%). This is consistent with previous graduate surveys, where only about 40% of graduates pass the commander survey on to their supervisors. Of the 259 commander surveys distributed, 145 were completed and returned (56% response rate).

**Predictor Variables**

**Hardiness.** To measure hardiness, this study used the Dispositional Resilience Scale - DRS-15 (v.1), which includes 5-items each to measure the hardiness facets of commitment, control and challenge (Bartone, 1995). The scale was administered as part of the Reception Day (R-Day) battery of tests taken by all new West Point cadets shortly after they arrive as freshmen. The commitment scale of the DRS-15 measures active engagement or involvement in life (as opposed to alienation). Control measures the belief that one can influence events in his/her experience (as opposed to a sense of powerlessness). Challenge measures openness and receptivity to variety and changes in life, which are seen as opportunities (as opposed to a threat perspective, or the tendency to see change as threatening and frightful). Cronbach’s alpha reliability coefficients for the DRS-15(v.1) are reported at .82 for total hardiness, and
commitment = .77; control = .68; challenge = .69 (Bartone, 1999). The 3-week test-retest reliability coefficient is .73 (Bartone, 1999).

**Whole Candidate Score (WCS).** WCS is a weighted composite of academic (greatest weight; includes high school rank, Scholastic Aptitude Test Verbal and Math scores), leadership (moderately weighted; extracurricular activities including school officers, newspaper, music, scouting, debate, foreign study, etc., and faculty appraisals) and physical fitness (lightly weighted; assessment on standardized physical exercises, including: kneeling basketball throw, long jump, pull-ups, and shuttle run) indicators. WCS scores were obtained from the West Point Admissions Office records.

**SAT total score.** In addition to WCS, total SAT score (verbal + math) was included as a separate predictor of adaptability performance. These scores were also obtained from West Point Admissions Office records.

**Criterion Variables**

Measures of performance were obtained at two intervals, as seniors at West Point, and as graduates three years later. For the measure of leader performance at West Point, we used the cumulative Military Performance Score. The MPS is the cumulative (over all four years of undergraduate work) weighted average of grades received in sixteen domains of leadership and military performance. Evaluations are made by the cadet’s military chain of command and instructors, including: cadet summer training and military duty performance during each term (70% Total) and Military Science courses during the Academic Year (30% Total). The scores are weighted progressively, with activities completed at higher levels of responsibility receiving greater weight in the overall MPS score.
Adaptability as graduates was measured by means of self and supervisor ratings of adaptability three years after graduation, in a survey administered to the Classes of 2005 and 2006. The survey questions were part of a larger set developed by the West Point Institutional Assessment Committee to evaluate the military, leadership, intellectual, physical, moral-ethical, and human spirit dimensions of development. Response options reflect ratings of the graduate’s ability to perform in each of the skill areas, using a five-point Likert rating scale ranging from “Very Confident” to “Not At All Confident”.

**Adaptability.** The adaptability scale was constructed from a subset of ten survey items (Cronbach’s alpha = .90) that were judged to closely map with the dimensions of the Adaptive Performance Taxonomy of Pulakos et al. (2000). Only items that appeared in both the 2005 and 2006 surveys were used in this scale. The adaptability scale covers all 8 of the Pulakos et al. (2000) adaptability dimensions. Scores reflect the mean rating of the 10 items making up the scale (Table 1).

**Procedures**

The DRS-15 hardiness measure was completed by all members of the West Point Classes of 2005 and 2006 at entry (July 2001 and July 2002, respectively). On the 2nd and 3rd days after arrival, the new cadets attended routine group testing sessions. After agreeing to participate, the cadets completed the hardiness measure as one of a battery of tests administered at the testing session. The WCS composite, SAT scores, and cumulative (includes freshman through senior year grades) military program scores were taken from official college records, and then cross-linked with the predictor data.
Three years after graduation from West Point (seven years after completing the hardiness measure as a new cadet at West Point), Graduate Surveys were sent to the Army e-mail addresses of all Class 2005 and Class 2006 graduates, with surveys to commanders attached. Graduates were asked to complete their own survey, and also forward the Commander Survey to their present commander for completion and electronic submission to researchers at West Point. Thus, measures of West Point graduate performance were derived from survey ratings provided by graduates themselves, as well as by their immediate commanders.

Results

Table 1 lists the survey items chosen to assess adaptability, and shows how these align with the eight adaptability dimensions of Pulakos et al. (2000).

Correlations of all predictor and outcome variables are presented in Table 2. Predictors include the three measures obtained at entry to West Point: Whole Candidate Score (WCS); total SAT score; and self-ratings on the hardiness facets of commitment, control and challenge. Criterion variables include: cumulative (as a senior at West Point) Military Program Score (MPS); and self and commander ratings of leader adaptability.
Results reveal that Whole Candidate Score is a significant predictor of military leader performance while at West Point – but has no apparent relation to military performance as a junior Army officer. Hardiness – commitment is correlated with military performance while a cadet at West Point, and also with later self-ratings of adaptability, but not with commander ratings. Hardiness – control shows a significant correlation with military performance at West Point, and also correlates with self- and commander ratings of adaptability. Finally, total hardness scores are correlated with military performance at West Point, and with self-ratings of adaptability.

To follow-up on these correlational findings, hierarchical multiple regressions were performed with SAT scores entered at step 1, Whole Candidate Scores at step 2, and the hardness facets of commitment, control and challenge at step 3. The three performance variables were examined in three separate regressions: military leader performance at West Point (Table 3), self-rated leader adaptability as officers three years after graduation, (Table 4), and commander-rated leader adaptability, also as officers three years after graduation (Table 5).

As is seen in Table 3, SAT scores alone do not predict military performance at West Point. However in the final model including Whole Candidate Score (WCS) and the hardness facets, SAT scores are a negative predictor of military performance. Hardiness challenge is also a negative predictor. Whole Candidate Score is the strongest positive predictor of military performance, with hardness commitment and control also contributing positively. The pattern
suggests that more intelligent (SAT score) and adventurous (challenge) cadets do not perform as well in the conventional military and leadership tasks in the West Point environment.

- INSERT TABLE 4 ABOUT HERE –

A different pattern emerges for adaptability ratings (self) as Army officers three years after graduation (Table 4). Here, hardiness facets commitment and control are positive predictors of adaptability, while SAT, WCS and challenge scores do not contribute.

- INSERT TABLE 5 ABOUT HERE –

For supervisor ratings of adaptability as Army officers, hardiness control is the only significant predictor (Table 5). However the overall model accounts for a larger percentage of variance \( R^2 = .18 \) than any previous model. Traditional predictors of leadership success (Whole Candidate Score) appear unrelated to later performance as adaptable, flexible leaders, either by self- or supervisor ratings. As a further check on these findings and directly addressing hypothesis 4, we repeated these regressions but with total hardiness entered in the third step rather than the three hardiness facets. A similar pattern emerged, with total hardiness a significant predictor of military performance at West Point and also later adaptive performance measured by self-report. However total hardiness did not predict supervisor ratings of adaptive performance. Also, all models using the facets of hardiness rather than
total hardiness yielded higher $R^2$ coefficients, accounting for more variance in performance outcomes.

Discussion

Results of this study show that Whole Candidate Score, a measure that reflects a range of high school activities including sports and leadership roles, serves as a good predictor of military and leader performance of cadets while they are at West Point. In addition, SAT scores and hardiness – challenge emerged as *negative* predictors of military performance while at West Point. Like other military service academies, West Point provides a fairly regimented and predictable environment for cadets. In such an environment, cadets who follow the rules and don’t question conventional approaches may be rewarded with higher military and leadership performance grades. In contrast, cadets who are more intelligent (SAT scores) and adventurous (hardiness-challenge) may be less inclined to follow conventions and directives, leading to somewhat poorer military leadership grades in this environment. However, the situation appears quite different after graduation, when these cadets are functioning as Army officers in real-world operations. Here, it is psychological hardiness (commitment and control) that predicts adaptable performance, and not Whole Candidate Score. Traditional predictors of military and leadership performance at West Point appear not to hold in the fast-paced and unpredictable operational environment in which military officers are working today.

The ability to adjust and adapt quickly to rapidly changing conditions is increasingly important in many occupations, especially the military. Military personnel are being deployed more frequently into a range of operational environments, from disaster response and humanitarian assistance to counterinsurgency and combat. Furthermore, operations are complex and multifaceted, calling for a range of response capabilities and the ability to shift modes quickly as conditions change.
Looking prospectively over a seven year period, we found the hardiness facets of commitment and control in freshman military academy cadets are significant predictors of adaptability as junior officers seven years later, by self-ratings (commitment and control) and supervisor ratings (control). In the intervening years after hardiness-control was assessed, cadets in this study experienced four years of intensive military and academic training, followed by demanding first assignments as army leaders, often involving overseas deployments. It may be that cadets who begin their academy training with a stronger level of commitment and internal sense of control are better able to capitalize and build on their experiences, even highly stressful ones, building confidence, self-efficacy and an open learning orientation through the process. Some support for this notion comes from a recent study by Delahaij et al. (2010), who found that hardiness influences positive appraisals and coping behaviors toward stressful situations, but that this relation is mediated by coping self-efficacy. Thus, high-hardy persons have stronger self-efficacy beliefs and confidence in their ability to solve problems, leading to proactive coping behaviors in dealing with stressful circumstances. While Delhaij et al (2010) did not look at individual hardiness facets, the present study suggests that control may be the key element in this pathway.

A strong sense of control is perhaps especially important for positive, adaptive development in high-risk occupations such as the military, which typically have strict routines and protections in place due to the dangerous nature of the work, and the risks associated with performance failures (Weick & Sutcliffè, 2001). In such relatively proscribed organizational environments, the strongly internal control oriented person is more likely to take initiative to get things done, adjusting and adapting systems and procedures as needed. This balancing between regulation and flexibility is reminiscent of what Grote and colleagues have described at the
organizational level as “flexible routines,” or rules and patterns of behavior in high risk organizations that are necessary to guide actions and maintain safety, yet must also be readily adapted when the situation changes, as is often the case in ambiguous and uncertain environments (Grote, Weichbrodt, Günter, Zala-Mezö & Künzle, 2009). According to these authors, this flexible routine approach fosters resilience through “loose coupling” in high-risk organizations. Similarly, the high-hardy, high control person makes constructive use of routines and standards, yet is not overly constrained or rule-bound by them, and will find ways to adapt or adjust the rules to fit a changing situation.

While hardiness is often treated as a unitary construct, the present results show that the facets of commitment, control and challenge can operate somewhat differently with respect to important performance outcomes. This underscores the value of examining the hardiness facets separately, along with total hardiness scores.

Study Limitations

A potential limitation of this study concerns the generalizability of findings beyond the military occupation. Military training academies like West Point provide unusual environments and experiences, and the military occupation itself is not directly comparable to most other occupations. However, the military does provide a valuable context for studying leader performance under highly stressful and demanding conditions. As such, our results provide some promising new leads for understanding the determinants of adaptability under stress. Still, this research will need to be replicated in other, non-military groups.

Another potential limitation of this study concerns the relatively small sample size obtained for supervisor ratings of officer adaptability. To assess the representativeness of this
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sample, we compared those with supervisor performance ratings (N=145) to those with only self-ratings of performance on the graduate survey (N=544). These two groups did not differ on any of the hardiness facets or other study variables. Next, we compared all of the graduate survey respondents (N=694) to those graduates who did not respond (N=1104). These groups also did not differ with respect to hardiness or SAT scores. However, those who responded to the graduate survey showed slightly higher Whole Candidate scores (p < .05) and Military Performance grades (p < .001) while at West Point. This likely reflects a tendency for better performing officers to be more inclined to complete the graduate survey. This should not influence our results regarding hardiness and later performance differences as officers. If anything, having a sample of somewhat better performers would create a range restriction problem for performance ratings in this group, making any associations with predictor variables more difficult to detect, not less. This should lend greater confidence to any observed significant predictive associations.

Conclusions

The present findings could be useful in informing policy and training programs for developing or encouraging higher levels of adaptability in personnel entering high-risk occupations, such as fire, police, and rescue personnel (Zaccaro, Weiss, Hilton & Jeffries, 2011). For example, rather than trying to train mental agility or adaptability directly, our results suggest that a more successful approach would involve providing individuals with challenging tasks and experiences in an organizational context that maximizes and encourages individual initiative and control. By providing trainees with more choice and control in a challenging, stressful environment, the organization is fostering the growth of a sense of control and self-efficacy in its
personnel, which should in turn lead to greater readiness and willingness to adapt in the face of changing conditions.

Our study adds to the growing evidence that non-cognitive or personality factors are important predictors of human performance, in addition to cognitive ones. For example, in other research with West Point cadets, character strengths according to Peterson & Seligman (2004) were found to be associated with retention and academic, military, and physical fitness performance (Matthews, 2007). Also “grit” – a measure of passionate pursuit of long term goals – has been linked to retention and a variety of other outcome measures among cadets (Duckworth, Peterson, Matthews, & Kelly, 2007). Another recent study with cadets found that the Big Five personality factors of extraversion and conscientiousness, as well as hardiness predicted academic and military performance (Bartone et al., 2009).

The present research shows that over a seven-year time frame, hardiness-control is predictive of later adaptability in army officer leaders. In contrast, traditional measures incorporating cognitive abilities did not predict adaptability. Future efforts to understand the determinants of human adaptability should thus focus greater attention on non-cognitive motivational and personality factors that may contribute both directly and indirectly (eg, in interaction with training approaches) to the development of greater adaptability.
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References


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Table 1  

*West Point survey items corresponding to adaptability dimensions of Pulakos et al, (2000)*

<table>
<thead>
<tr>
<th>Pulakos et al (2000) Taxonomy of Adaptability Dimension</th>
<th>Corresponding West Point Graduate Survey item(s)</th>
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<tbody>
<tr>
<td>1. Handles emergencies or crisis situations</td>
<td>• Acts decisively under pressure(^1)</td>
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</table>
| 2. Handles work stress                                 | • Acts decisively under pressure\(^1\)  
|                                                        | • Uses subordinates’ mistakes as an opportunity for teaching them |
| 3. Solves problems creatively                          | • Devises creative solutions to complex problems |
|                                                        | • Thinks ‘out-of-the-box’ when given an opportunity |
| 4. Deals with uncertain and unpredictable work situations| • Accomplishes a mission without specific guidance |
| 5. Learns new work tasks, technologies & procedures     | • Learns from Non-Commissioned Officers in the unit |
| 6. Demonstrates interpersonal adaptability             | • Adapts communication style to any audience  
|                                                        | • Tailors leadership skills to individual soldiers |
| 7. Demonstrates cultural adaptability                  | • Works with soldiers from diverse cultural backgrounds |
| 8. Demonstrates physically oriented adaptability        | • Demonstrates the physical and mental courage to accomplish physically challenging activities |

\(^1\) Item is judged to be relevant to two dimensions of adaptive performance. However it is used only once in computing total adaptability score. Adaptability score = sum of responses on all 10 items.
### Table 2

**Means, standard deviations, and intercorrelations for all study variables (graduating cadets only)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>S.D.</th>
<th>SAT</th>
<th>WCS</th>
<th>COMM</th>
<th>CONT</th>
<th>CHAL</th>
<th>HARDY</th>
<th>MPS</th>
<th>Adapt-Self</th>
<th>Adapt-Supv</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT score</td>
<td>1209.99</td>
<td>256.71</td>
<td>1.0</td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>WCS score</td>
<td>6065.38</td>
<td>380.18</td>
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<tr>
<td>Commitment</td>
<td>10.79</td>
<td>1.96</td>
<td>-0.02</td>
<td>.05*</td>
<td>1.0</td>
<td></td>
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<td></td>
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<td></td>
</tr>
<tr>
<td>Control</td>
<td>10.20</td>
<td>1.98</td>
<td>-0.06**</td>
<td>-0.10***</td>
<td>.50***</td>
<td>1.0</td>
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<tr>
<td>Challenge</td>
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<td>.04</td>
<td>.04</td>
<td></td>
<td>.17***</td>
<td>.02</td>
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<td>.66***</td>
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<td>Hardiness total</td>
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<td>-0.00</td>
<td>.75***</td>
<td>.67***</td>
<td>.66***</td>
<td>1.0</td>
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</tr>
<tr>
<td>MPS - Military Performance Score</td>
<td>2.92</td>
<td>.42</td>
<td>.00</td>
<td>.27***</td>
<td>.12***</td>
<td>.08**</td>
<td>-.04</td>
<td>.06**</td>
<td>1.0</td>
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</tr>
<tr>
<td>Adaptability – Self rating</td>
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<td>-.06</td>
<td>.24***</td>
<td>.25***</td>
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<td>.27***</td>
<td>.05</td>
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</tr>
<tr>
<td>Adaptability – Supervisor rating</td>
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<td>.03</td>
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<td>.14</td>
<td>.20*</td>
<td>.23**</td>
<td>1.0</td>
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</tbody>
</table>

Note: * p < .05; ** p < .01; *** p < .001. Pairwise deletion of missing data; N’s for the correlations vary due to missing data for some variables. SAT scores = total Scholastic Aptitude Test achievement scores. WCS (Whole Candidate Score) is a weighted composite of academic, leadership, and physical fitness indicators used in the admission process at West Point. Hardiness ratings were made by West Point cadets from the Classes of 2005 (N=1,186) and 2006 (N=1,197) at entry into academy (July 2001, and July 2002 respectively). Only those cadets from both classes who graduated are included here (N = 1798). The MPS (Military Performance Score) reflects cadets’ cumulative grades over four years in military and leadership performance.
Table 3
Hierarchical Multiple Regression Predicting Military Leader Performance Grades as West Point Seniors ($N = 1664$)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th></th>
<th></th>
<th>Model 2</th>
<th></th>
<th></th>
<th>Model 3</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$B$</td>
<td>$SE$</td>
<td>$\beta$</td>
<td>$B$</td>
<td>$SE$</td>
<td>$\beta$</td>
<td>$B$</td>
<td>$SE$</td>
<td>$\beta$</td>
</tr>
<tr>
<td>SAT Score</td>
<td>-.00</td>
<td>.00</td>
<td>-.01</td>
<td>.00</td>
<td>.00</td>
<td>-.08***</td>
<td>.00</td>
<td>.00</td>
<td>-.07**</td>
</tr>
<tr>
<td>Whole Candidate Score</td>
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<td>.00</td>
<td>.30***</td>
<td>.00</td>
<td>.00</td>
<td>.30***</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardiness – Commitment</td>
<td>.07</td>
<td>.03</td>
<td>.07**</td>
<td>.00</td>
<td>.00</td>
<td>.07**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hardiness - Control</td>
<td>.06</td>
<td>.03</td>
<td>.06*</td>
<td>.00</td>
<td>.00</td>
<td>.06*</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Hardiness – Challenge</td>
<td>-.04</td>
<td>.02</td>
<td>-.06*</td>
<td>.00</td>
<td>.00</td>
<td>-.06*</td>
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</tr>
<tr>
<td>$R^2$</td>
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<td></td>
<td>.08</td>
<td>.10</td>
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<tr>
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<td>150.46***</td>
<td>8.45***</td>
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</table>

* $p < .05$.  ** $p < .01$.  *** $p < .001$. Final model $F (5, 1659) = 35.58$, $p < .001$. 
Table 4

Hierarchical Multiple Regression Predicting Self Ratings of Adaptability (N = 633)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
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<th>Model 2</th>
<th></th>
<th></th>
<th>Model 3</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>SE B</td>
<td>β</td>
<td>B</td>
<td>SE B</td>
<td>β</td>
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<td>SE B</td>
</tr>
<tr>
<td>SAT Score</td>
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<td>.00</td>
<td>-.04</td>
<td>.00</td>
<td>-.03</td>
<td>-.00</td>
<td>.00</td>
<td>-.02</td>
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<tr>
<td>Whole Candidate Score</td>
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<td>-.00</td>
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<td>-.05</td>
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<td>Hardiness – Commitment</td>
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<td>.18***</td>
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<td>$R^2$</td>
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<td>.00</td>
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<td>.00</td>
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<tr>
<td>$F$ for change in $R^2$</td>
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<td>20.98***</td>
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</table>

* $p < .05$. ** $p < .01$. *** $p < .001$. Final model $F (5, 628) = 13.23$, $p < .001$. 
Table 5

*Hierarchical Multiple Regression Predicting Supervisors’ Ratings of Adaptability (N = 123)*

<table>
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<th>Model 1</th>
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<th>Model 2</th>
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<tbody>
<tr>
<td></td>
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<td>SE B</td>
<td>β</td>
<td>B</td>
<td>SE B</td>
<td>β</td>
<td>B</td>
<td>SE B</td>
</tr>
<tr>
<td>SAT Score</td>
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<td>-.00</td>
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<td>-.11</td>
<td>-.00</td>
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<tr>
<td>Whole Candidate Score</td>
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<td>.05</td>
<td>.00</td>
<td>.00</td>
<td>.09</td>
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<tr>
<td>Hardiness – Commitment</td>
<td>-1.91</td>
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<tr>
<td>Hardiness - Control</td>
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<td>.91</td>
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**R²**

<p>| | | | | | |</p>
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<td>.01</td>
<td>.18</td>
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**F for change in R²**

<p>| | | | | | |</p>
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<tbody>
<tr>
<td></td>
<td>1.37</td>
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</table>

* p < .05.  ** p < .01.  *** p < .001.  Final model F (5, 118) = 5.23, p < .001