

## ABSTRACT

JOHNSON, ANN-MARIE CLAYTON. Investigating Personality Profiles in Action Teams: Relationships with Performance. (Under the direction of Dr. Lori Foster).

Action teams are highly interdependent teams of skilled individuals formed to accomplish collective tasks requiring intense yet brief periods of maximum performance. Examples include, but are not limited to, military combat units, surgical teams, disaster response teams, and law enforcement special weapons and tactics (SWAT) teams. The significance of this type of teamwork creates a pressing need to understand who is best suited to such work. This study investigates whether the personality characteristics of neuroticism, extroversion, openness to experience, agreeableness, conscientiousness, grit, hardiness, and core self-evaluation predict action team performance over and above physical fitness and cognitive ability. This was examined in two ways, by employing: (a) the more traditional variable-centered approach (i.e., regression analysis) and the (b) the less commonly utilized person-centered approach (i.e., latent profile analysis). Participants consisted of 894 action team candidates working in a physically demanding, high stress team environment to complete complex, interdependent tasks. Afterwards, their teammates rated their performance. Regression results indicated that three personality variables predicted performance over and above the influence of cognitive ability and physical fitness: openness to experience, neuroticism, and extraversion. LPA analyses revealed four distinct clusters of personality characteristics in the study sample. One of these profiles, labeled the "Negative Extreme," included candidates who trended  $-.5$  standard deviations from the mean on all variables of interest except neuroticism where they were  $+.5$  standard deviations from the mean. Candidates with this personality profile showed significantly lower performance compared to those characterized by the other three profiles, even when cognitive ability and physical fitness were controlled for. Overall, this study helps to pinpoint personality variables

and combinations that should be taken into account when seeking to identify who will be viewed by teammates as effective contributors in an action team context.

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Investigating Personality Profiles in Action Teams: Relationships with Performance

by  
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## **BIOGRAPHY**

Ann-Marie Clayton Johnson was born in Fresno, California. She received her Bachelor of Arts degree in Psychology from California State University, Fresno in 2012. She immediately began graduate school at North Carolina State University where she received her Master of Arts degree and Doctor of Philosophy degree in Industrial and Organizational Psychology. During this time, she worked for the Department of Defense applying psychology to teams, selection, assessment and training. She continues this work at Cisco as an Executive Leadership Assessment and Selection Consultant. She currently lives in Southern Pines, North Carolina, with her husband, Brian, and their yellow lab, Cara.

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## Investigating Personality Profiles in Action Teams: Relationships with Performance

Action teams are arguably one of the most elite types of teams in the world. They are made up of men and women considered specialists in their field; among them are surgical teams, disaster response teams, law enforcement special weapons and tactics (SWAT) teams, firefighting teams, shock trauma medical teams, aircraft flight crews, and military combat units (Sundstrom, deMeuse & Futrell, 1990). The literature defines action teams as highly interdependent teams of skilled individuals formed to accomplish collective tasks and goals requiring intense yet brief periods of maximum performance (Sundstrom et al., 1990). True action teams occur in physically or psychologically stressful contexts where the outcomes of the team's actions, even in training, can have significant consequences—for example, potential death (Hannah, Walumba, & Fry, 2011).

On action teams, each team member's performance is entwined with others' to the degree that hardly any level of disagreement or miscommunication can be tolerated in the moment of action and still result in success. It is plausible that some types of people do better in such environments than others. Given the high consequences of error, it is critical to look at personality to find out who tends to succeed when put in an action team role. Organizational team research that contributes to our understanding of personality and its relationship to performance has received concerted attention with mixed results; however, scant research has focused on the role individual personality variables play on performance in action teams specifically (Sartori, Constantini, Ceschi, & Scalo, 2016). In fact, where action teams are investigated in the industrial-organizational psychology literature, student samples have been utilized rather than intact action teams (Ellis, Bell, Ployhart, Hollenbeck, & Ilgen, 2005). Understandably, given the difficulty of studying intact action teams in the field, Ellis et al.'s

methodology and findings are respectable and interesting. However, questions about external validity remain, as we cannot be certain of the extent to which laboratory research on student samples generalizes to action teams in the field.

The present study aims to close this gap in the literature by analyzing relevant personality variables as they relate to performance of action team members in the field. This study expands the literature by examining the influence of personality on performance in an intact action team context, specifically doing so by exploring whether personality variables cluster to form distinct profiles and then investigating the relationship between personality profiles and action team members' effectiveness from the perspective of their teammates.

### **Personality**

Physical fitness and cognitive ability are known to be important for action team member performance (Beal, 2010). However, these qualities alone may not be sufficient. It is quite possible that two equally bright, physically fit individuals will not be equivalent action team performers. In all likelihood, there are additional factors at play. Specifically, personality is likely to play a role. Screening for pathology among action team candidates is already common place, for example, with the Minnesota Multiphasic Personality Inventory (Ben-Porath & Tellegen, 2008). While this is important, the current study is designed with a different question in mind. For action teams, (e.g., military combat units) that demand high levels of team coordination, autonomy from higher authorities, and an expectation of successful interaction with diverse populations, all while under extreme stress, normal personality's effect on performance becomes a particularly salient contributor to overall mission success (Zazanis, Zaccaro, & Kilcullen, 2001). Thus, rather than looking at psychopathology, this study focuses on normal personality.

Personality is a spectrum of individual differences that “consistently distinguish people from one another in terms of their basic tendencies to think, feel, and act in certain ways” (Ones, Viswesvaran, & Dilchert, 2005, p. 390). As such, it affects how we think about, influence, and relate to one another, as well as our work. Unlike many more solitary kinds of work such as accounting or some kinds of computer programming, action teamwork is inherently interdependent and interpersonal in nature. How and whether teammates rely on and react to each other depends on perceptions of those around them. For example, results from a large-scale study of enlisted soldiers known as Project A (McHenry et al., 1990), found that the U.S. Army can improve the prediction of performance of nine military occupational specialties existing within the larger structure of the Army by adding personality predictors to its present battery of selection tests. For example, the correlation between the predictor “leadership ability” and the criterion “extra effort” ( $R = .33$ ) increased by including facets of conscientiousness and neuroticism ( $R = .44$ ;  $\Delta .11$ ). Outside of the action team context, research shows that personality contributes validity in the prediction of both individual and team performance above and beyond other predictors, including general mental ability and biodata (e.g., McHenry, Hough, Toquam, Hanson, & Ashworth, 1990; Mount, Witt, & Barrick, 2000; Neuman, Wagner, & Christensen, 1999; Schmidt & Hunter, 1998).

There are a number of personality variables worth considering in the context of action team performance, beginning with the “Big Five.” A robust set of five factors has emerged from almost every major personality inventory and from analyses of more than 15,000 trait adjectives in a variety of languages, across cultures, sources of ratings, and measures (Goldberg, 1990; John & Srivastava, 1999). These five factors are often referred to as the “Big Five,” and include neuroticism, extroversion, openness to experience, agreeableness, and conscientiousness. Those

who score high in neuroticism tend to show poor emotional adjustment in the form of stress, anxiety, and depression. Extraversion represents the tendency to be sociable, dominant, and positive (Watson & Clark, 1997). Scoring high in openness to experience indicates creativity, flexibility, curiosity, and unconventionality (McCrae, 1996). Agreeableness consists of tendencies to be kind, gentle, trustworthy, and warm. Finally, high scores in conscientiousness indicate achievement-orientation, dependability (Barrick & Mount, 1991), orderliness, and deliberateness (Costa & McCrae, 1992).

The relationship between the Big Five and job performance is unclear to date. Authors have yet to agree on how many Big Five factors are considered valid predictors of performance. For example, in the same journal and issue, two meta-analyses based on similar literature report conflicting results (Barrick & Mount, 1991; Sartori, Constantini, Ceschi, & Scalo, 2016; Tett et al., 1991). Two more recent meta-analyses examining personality and job performance likewise found inconsistent results. Peeters and colleagues (2006) found agreeableness ( $p = .24$ ) and conscientiousness ( $p = .20$ ) to be the personality variables predictive of performance, while Hurtz and Donovan (2000) found conscientiousness ( $p = .20$ ) and emotional stability ( $p = .13$ ) to be the personality variables predictive of performance.

Another strategy by Ones and colleagues (2005) was to compute multiple correlations for the Big Five as a set with overall job performance ( $r = .30-.40, p < .05$ ), objectively assessed performance ( $r = .28, p < .05$ ), citizenship performance ( $r = .43, p < .05$ ), teamwork ( $r = .47, p < .05$ ), training performance ( $r = .44, p < .05$ ), leadership, performance motivation, and job satisfaction ( $r = .40-.50, p < .05$ ). All validities and predictor intercorrelations were sourced from meta-analytic investigations. The validities for the Big Five as a set were substantial if not clarifying.

To overcome what Goldberg (1993) called “befuddling” differences in findings, Sartori and colleagues (2016) recently presented an exploratory study that took into account people’s perceptions, versus correlation coefficients, of the relationship between the Big Five and job performance. This was explored via two different methods with two different results. The first of the two methods involved asking raters to describe the requirements of high levels of job performance in their own words. Conscientiousness and emotional stability were described most frequently. The second of the two methods involved providing participants explicitly defined Big Five facets to choose from. When defined for them, conscientiousness and extraversion were chosen most frequently. Rothman and Coetzer (2003) claim, “to the lay person it is a self-evident fact that personality factors play an important part in job performance” (p. 69). While this appears to be true, and offers an important perspective, it does not add definitive clarity to the question of how personality relates to action team performance.

Researchers Barrick and Mount (2005) acknowledge the general lack of agreement within the literature, but outline several reasons (i.e., research streams) why personality matters. Reasons include, that unlike cognitive ability, there are not significant mean score differences in personality between racial or ethnic groups (Hough, 1998; Hough, Oswald, & Ployhart, 2001; Mount & Barrick, 1995). In addition, managers are willing to weigh personality factors as if equal to cognitive ability during the hiring process (Dunn, Mount, Barrick, & Ones, 1995). Moreover, the literature points to the Big Five being predictive of job performance to varying degrees within different contexts. For example, conscientiousness and neuroticism predict performance across many jobs, while extraversion, agreeableness, and openness seem to be relevant when persuasion, teamwork, or adaptability, respectively, are necessary for success (e.g., Barrick, Mount, & Judge, 2001; Hogan & Holland, 2003; Judge, Bono, Ilies, & Gerhardt,

2002; Judge & Ilies, 2002). Despite the aforementioned relationships, authors cite a possible underestimation of the relationship between the Big Five and performance in the literature due to relating each construct to performance individually as opposed to all relevant personality traits when used in combination (Barrick & Mount, 2005). Another reason why researchers Barrick and Mount (2005) deem personality important is because personality has been shown to have cumulative, longitudinal effects, such as enduring relations between conscientiousness and neuroticism measured in childhood to career success measured in adulthood decades later (Judge, Higgins, Thorensen, & Barrick, 1999). Finally, personality has been linked to many other important outcomes in the workplace—such as, citizenship behaviors, success in teams, job satisfaction, safety, leadership effectiveness, and task performance (Barrick, Mitchell, & Stewart, 2003; Johnson, 2003).

The action team context is unlike that of a regular work team. Job success in this case is not merely meeting a deadline via collaboration with teammates, for example, but being responsible for the lives of teammates while collaborating on the fly. Past research has given glimpses into the role the Big Five may play on teams in a variety of contexts (e.g., Tobin, Graziano, Vanman, & Tassinary, 2000), but given the added pressures of an action team, and the exaggerated role personality could play in emotionally charged environments, all five factors will be included in the current study for examination. This is in the spirit of exploratory research and to provide basis for more specific inquiry moving forward.

### **Grit and Hardiness**

Because personality could potentially be the nuance that explains variance in performance between otherwise equally staffed action teams, grit, hardiness, and core self-evaluation, are also examined in this study. Action teams are marked by "high risk, high reward"



contexts. These environments often give way to elevated levels of stress and require above average levels of resilience, or a capacity to respond adaptively while remaining healthy (Bartone, 2006; Lukey, & Tepe, 2008; Maddi, 2002, 2008). Successful action team members are therefore extraordinarily resilient despite high stress levels. Though resilience varies across context, two personality factors have been shown to facilitate resilience under stress: grit and hardiness (Bonanno, 2004; Lukey & Tepe, 2008). According to Maddi, Mathews, Kelly, Villarreal, and White (2012), grit and hardiness offer operationalized forms of the motivation required to deal with stressful situations.

Grit, a trait-level construct, is defined as the perseverance and passion for long-term goals (Duckworth, Peterson, Matthews, & Kelly, 2007). Duckworth et al. posit that those high in grit are more apt to work strenuously towards challenges over long periods of time despite setbacks, distractions, lack of feedback, plateaus in progress, or failures. The perseverance required to stay the course has been shown to increase work performance and decrease counterproductive work behaviors (Littman-Ovadia & Lavy, 2015). Grit has a two-factor structure, one concerning consistency of interest and the other concerning perseverance of relevant effort. Both factors are highly correlated with the total score. Grit is orthogonal to IQ, but highly correlated to conscientiousness. It has shown incremental predictive validity above and beyond that of IQ in studies of success outcomes including educational attainment, grade point average, retention in the United States Military Academy, and ranking in the National Spelling Bee (Duckworth et al., 2007). Grit is not only about working hard, but working hard toward higher-order goals over time. This narrow definition has led researchers to find predictive validity over and above conscientiousness for achievement outcomes despite the relatedness between these two constructs (Abuhassan & Bates, 2015; Duckworth et al., 2007; Paunonen &

Ashton, 2001).

Hardiness is a characteristic sense that life is meaningful, we choose our own futures, and change is interesting and valuable (Bartone, 2006; Kobasa, 1979). Since hardiness was originally introduced into the psychological literature in 1979, extensive research has shown hardiness moderates the relationship between stress and health and stress and performance (e.g., Bartone, 1989; Contrada, 1989; Kobasa, Maddi, & Kahn, 1982; Roth, Wiebe, Fillingim, & Shay, 1989; Wiebe, 1991). This effect has been particularly salient in military contexts: 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, Mikulincer, & Taubman, 1995), Israeli officer candidates (Westman, 1990), Norwegian Navy cadets (Bartone, Johnsen, Eid, Brun, & Laberg, 2002), and soldiers with combat exposure in the Gulf War (Bartone, 1993, 1999a, 2000). Hardiness has shown moderate correlations with the Big Five, namely neuroticism, but has demonstrated explained variance over and above the Big Five in studies of leader performance (Bartone et al., 2009). Bartone (2006) contends that under high-stress conditions the resiliency effects of hardiness are most apparent.

In the case of the current study, in order to be placed on an action team, participants must have the stamina required to withstand long, grueling days. For some participants, failure could spell the end of their careers, and for others, a significant negative mark on their employment records. Properly studying grit and hardiness requires a context sufficiently stressful to activate these constructs in the participants that possess them.

### **Core Self-Evaluation**

Core self-evaluation (CSE) refers to an individual's subconscious, fundamental evaluations about his or her own abilities and control. There are four components included in

CSE: locus of control, neuroticism, generalized self-efficacy, and self-esteem. Locus of control can be either internal or external, where internal involves attributing life's events to one's own doing and external involves attributing life's events to external forces beyond one's control (Judge, Locke, Durham, Kluger, 1998; Spector, 1982). An internal locus of control contributes to more favorable core self-evaluations. As suggested earlier, neuroticism is an enduring tendency to experience unpleasant emotions (e.g., anger or depression; Costa & McCrae, 1988). High levels of neuroticism impede favorable core self-evaluations. Self-efficacy is defined as an individual's estimate of his or her own ability to perform well and handle situations as they arise (Judge, Locke, & Durham, 1997). Self-esteem reflects one's overall appraisal of his or her own worth (Harter, 1993). Both are positively related to favorable core self-evaluations. Interestingly, CSE has been shown to predict in some capacity: manager turnover, team performance when CSE is possessed by the team leader (Resick, Whitman, Weingarden, & Hiller, 2009), job satisfaction (Judge, Erez, Bono, Locke, 2005), job performance (Erez & Judge, 2001; Judge & Hurst, 2008), job and academic burnout (Lian, Sun, Ji, Peng, 2014), and training effectiveness (Stanhope, Pond, & Surface, 2013).

CSE may come to bear in the action team context when considering the short time frame available for decision making. Each member of an action team is highly trained and often relies on his or her ability to perform complex tasks from memory. Low CSE scores, or low evaluations of oneself and one's abilities, could slow down the decision-making process to unacceptable levels (Hiller & Bambrick, 2005). Conversely, individuals with high CSE scores are far less likely to feel unsure of their abilities to successfully complete tasks, and exhibit persistent effort toward task completion (Judge, Locke, & Durham, 1997). Additionally, they cope better in the face of challenge, and show more willingness to address problems as they arise

(Kammeyer-Mueller, Judge, & Scott, 2009; Haynie & Shepherd, 2011). In other words, CSE is seen in behaviors that should affect the performance of action team members both individually and collectively.

### **Profiling Personality: Person-Centered Research**

Several studies have examined the relationship between various personality variables and the performance of general work teams (e.g., Barrick & Mount, 1991; Barrick, Steward, Neubert & Mount, 1998; Halfhill, Nielson, & Sundstrum, 2005; Halfhill, Sundstrum, Lehner, Calderone, & Nielson, 2005; Hofmann & Jones, 2005.) Further, several applied studies have investigated which personality variables are most important for success in particular jobs, roles, and tasks (e.g., Barrick & Mount, 1991; Borman et al., 1980; Lord et al., 1986; Day & Silverman, 1989; Tett et al., 1991). The majority of these studies utilize variable-centered analyses such as regression to explain how one or more variables predict criteria of interest (e.g., performance), or ANOVAs, to investigate group differences. Variable-centered analyses are both practically useful and theoretically important as a means for considering how characteristics are related to each other. In other words, variable-centered analyses are adequate for telling us how related conscientiousness within a sample is to performance. A researcher can examine multiple predictors at one time as they relate to the criterion of interest, but then must parse the interactions after the fact. Furthermore, in order for a variable-centered analysis to indicate a relationship between a predictor and criterion, the relationship must hold more often than not across all members of the research sample.

A person-centered approach (e.g., cluster analysis or latent profile analysis), however, allows researchers to identify disparate, but internally homogenous subgroups for whom different rules apply. For example, researchers from the Department of Health and Human

Services explored whether various neighborhoods in metropolitan areas produced differing profiles of population body mass indexes (BMI), walkability, recreation, transit scores, and self-reported physical activity. This was confirmed by four distinct profiles where one profile representing 37.6% of the sample, for example, depicted a neighborhood with average BMIs of about 27, low walkability, recreationally dense, and an average of about 60 minutes of physical activity per week (Adams et al., 2011). Each profile included city samples that were similar to each other with a particular combination of characteristics, but different than the cities in the other three profiles that each have their own unique combination of traits. A person-centered approach similarly offers a holistic view of a subject seen as an organized whole, functioning and developing as a totality (Magnusson & Stattin, 1998). In sum, and in the context of the current study, person-centered analyses indicate how variables (e.g., conscientiousness and hardiness) combine within individuals to reveal effective and ineffective personality characteristics in the context of team performance. Said another way, person-centered analyses allow a researcher to examine what performance looks like for team members with different personality profiles or patterns of the personality variables in question.

Variable-centered analyses remain important in this context; they inform hypotheses and offer information about the majority of a sample. What variable-centered analyses cannot do is expand on a scenario where two individuals have similar performance scores, but very different personality makeups. This would appear as noise in the variable-centered approach. To expand the literature, and inform future action team selection and construction, the current study is the first to utilize both variable and person-centered analyses in examining the role of personality during action team performance. Further, it is the first study to examine how this particular assortment of personality variables may combine to form profiles.

**Ability: Physical Fitness and Cognitive Ability**

It is clear that physical fitness and cognitive ability play a critical role in performance for the strenuous, complex tasks associated with action teams. Many of the action teams presented as examples in this paper (e.g., SWAT teams and firefighting teams) have been empirically shown to require levels of physical fitness and cognitive ability beyond that of the average person (Pryor, Colburn, Crill, Hostler, & Suyama, 2012). In fact, even higher levels of cognitive ability and physical fitness delineate tiers of action teams, distinguishing, for example, elite from non-elite combat teams (Beal, 2010; Carlson & Jaenen, 2012). A key question then is not only whether personality predicts action team member performance, but also whether it has explanatory power over and above physical and mental abilities known to be important (Beal, 2010; Carlson & Jaenen, 2012; Pryor, Colburn, Crill, Hostler, & Suyama, 2012; Teplitzky, 1991). For this reason, both physical fitness and cognitive ability will be included in this study as control variables.

**Measuring Performance: Peer Evaluations**

Any research focused on understanding the personality characteristics that distinguish top action team performers requires a solid measure of performance. This leads to questions about who is in a good position to evaluate performance in the unique context of action teams. Several options are viable. While supervisory or trainer ratings are common in team research and have their merits, peer ratings deserve serious consideration, given the close and critical interdependencies among action teammates (Peeters, van Tuikl, Rutte, & Reyman 2006).

In the most recent meta-analytic study exploring the relationship between personality and team performance, performance was rated by a supervisor or instructor in all studies included ( $n = 10$ ; Peters et al., 2010). These types of ratings offer one view, but in the context of action

teams, where performance of one teammate is heavily dependent on the performance of the other teammates, peer ratings become especially relevant while offering statistically unique variance (Dierdorff & Surface, 2007). Peer judgments of performance, and actions in response to them, are arguably the essence of what moves an action team toward completion of an operation. Peer ratings have been leveraged for selection, training, and promotion purposes for the unique assessment and information peers can provide within action teams of physicians (Ramsey, Wenrich, Carline, Inui, Larson, & Logerfo, 1993), Naval aviators (Wahlberg, Boyles, & Boyd, 1971), Army aviators (McAnulty, 1990), and senior level Army officers (Downey, Medland, & Yates, 1976). Accordingly, the current study will focus specifically on peers' perception of action teammates' performance.

### **Research Questions and Hypotheses**

As outlined below, this study's research questions and hypotheses test the relationships between personality variables and peer ratings of action team member performance, examine whether personality variables combine to create homogenous profiles, and last, determine whether these profiles have the power to predict action team member performance over and above the influence of physical fitness and cognitive ability.

RQ1: What are the distinct personality profiles within action teams?

H1a: Personality *variables* (i.e., neuroticism, extroversion, openness, agreeableness, conscientiousness, grit, hardiness, and core self-evaluation) will significantly predict action team performance.

H1b: Personality *profiles* (constructed from neuroticism, extroversion, openness, agreeableness, conscientiousness, grit, hardiness, and core self-evaluation) will significantly predict action team performance.

RQ2a: Do the personality variables of neuroticism, extroversion, openness, agreeableness, conscientiousness, grit, hardiness, and core self-evaluation predict action team performance over and above physical fitness and cognitive ability?

RQ2b: Do the personality profiles (constructed from neuroticism, extroversion, openness, agreeableness, conscientiousness, grit, hardiness, and core self-evaluation) predict action team performance over and above physical fitness and cognitive ability?

## **Method**

### **Participants**

This study was conducted on 894 action team candidates working in a physically demanding, high stress environment to complete complex tasks. Participants were male U.S. military soldiers enrolled in a 21-day assessment center designed to identify individuals with the potential to attend and successfully complete subsequent special training. If training is completed by the soldier, he is assigned to a US Army Special Forces team. The possible age of participants, determined by criteria used to select assessment center attendees, ranges from 18-47 years of age.

Power analyses were completed for bivariate correlations (H1a), ANOVA (H1b and RQ2b), and regression analyses (H1a and RQ2a). This was done using G\*Power to determine the minimum sample size needed for 80% power to detect a medium-sized effect of .25 at  $\alpha = .05$ , with the medium effect size estimate based on the rule of thumb offered by Cohen (1992). The sample size estimates for all of the relevant analyses produced a range of 92 to 159 total participants. Although there is no agreed upon rule of thumb for required sample size in a Latent Profile Analysis (LPA; RQ1), Tein, Coxe, and Cham (2013) conducted a literature review of studies utilizing LPA (38 total) and found the sample size to range from 79 to 5183. The target sample size of 350 exceeds the required number of participants as indicated by the power



analyses and fits within this range. The data were pulled from four cycles of the assessment center.

### **Design and Procedure**

This study has eight predictor variables, two control variables, and one criterion variable. The predictor variables are the Five Factor Model of Personality (i.e., neuroticism, extraversion, openness, agreeableness, and conscientiousness), grit, hardiness, and core self-evaluation. The control variables are physical fitness and cognitive ability and the criterion is peer assessments of performance. All data were collected between October 2016 and March 2017 and are considered archival at the time of analysis.

Participants arrived at the assessment center via bus on day one of approximately 21 days total. Each day required anywhere from 18-20 hours of work. Approximately 70% of participants were sent home before the last day of the assessment center. Dismissal typically occurred prior to the opportunity to engage in action teamwork, described below. Common reasons for dismissal included physical injury, voluntary withdrawal, or failing to meet a predetermined standard— for example, failing to complete an event in a prescribed amount of time.

Participants completed a series of self-assessments that included the cognitive ability measure controlled for, and all personality-related predictors in this study, on paper and in a group setting, within the first three days of the assessment center. They were allowed as much time as needed to complete the assessments. Data collected were not anonymous, though it was announced that the specific predictors measured for this study were for research purposes only and would not inform whether respondents were selected for further training. All data collected on paper were manually entered into a database by the researcher for later analysis. Within the first week of the assessment center, physical fitness, as described below, was tested and scored.

As the days progressed, participants completed challenging individual and team tasks designed to elicit high levels of stress, physical, and mental exhaustion. The tasks were intended to provide participants both the opportunity to draw upon past experiences in order to show their relevant knowledge, skills, and abilities, but also their ability to cooperate, communicate, and manage ambiguity. They were physically demanding, complex assignments that required combined effort and problem-solving for success.

Between approximately day 15 and 17, participants began four days of activities devoted to testing their ability to complete work on a team. Subject matter experts assigned individuals to teams of approximately 15 participants based upon multiple variables (e.g., rank, military occupational specialty, etc.) to ensure a comparable distribution of leadership and military experience on each team. Each activity was impossible to complete solo, necessitating team members communicate with one another to decide how to proceed. For example, team members were required to move extremely heavy, awkward objects from one point to another. At the completion of each two-day set of team tasks, individuals conducted a computerized eight-item assessment of their teammates' performance. The survey was completed in a group setting, at the end of day two in a classroom, via computer. Participants had as much time to complete the survey as they needed. All tasks and team rating sessions were monitored by trained assessors. Another two days of team tasks were then completed with new teams and new, comparable tasks, followed by the same peer assessment. In sum, each person finished the four days of team-based events and were rated twice on an 8-item scale by each teammate.

### **Measured Variables**

**Five Factor Model of Personality (FFM).** The “big five” personality factors were assessed using the Revised NEO Personality Inventory (NEO-PI-R; Costa & McCrae, 2008). A

sample item used to assess each include: neuroticism (e.g., “I am not a worrier”), extraversion (e.g., “I sometimes fail to assert myself as much as I should”), openness to experience (e.g., “I sometimes lose interest when people talk about abstract matters”), agreeableness (e.g., “I would hate to be thought of as a hypocrite”), and conscientiousness (e.g., “When a project gets too difficult, I decline and start a new one;”; Barrick, Scullen, & Rounds, 2005). The scale includes 30 rationally constructed facets (i.e., six facets per factor and eight items per facet), that each capture one dimension of the FFM. This results in a total of 48 items per factor and 240 items total. Response options are rated on a five-point Likert-type rating scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*; Costa & McCrae, 1992). Each participant has one averaged score per factor for a total of five scores per participant. Each factor score can range from one to five. Table 1 displays the internal consistency reliabilities for each of the five factors as well as three other personality scales administered.

**Grit.** Eight items were included to assess participants’ ability to sustain effort over time (e.g., “I have overcome setbacks to conquer important challenge”) and consistency of efforts over time (e.g., “I have difficulty maintaining my focus on projects that take more than a few months to complete”). The eight items cover two dimensions labeled perseverance of effort and consistency of interests. Response options are on a five-point Likert-type rating scale, ranging from 1 (*not like me at all*) to 5 (*very much like me*; Duckworth & Quinn, 2009). Consistent with past research, scores for both dimensions are combined, averaged, and analyzed as a single grit score ranging from one to five (Duckworth & Quinn, 2009; Eskreis-Winkler, Shulman, Beal, & Duckworth, 2014).

**Hardiness.** Fifteen items were included to assess the three dimensions associated with hardiness: a high sense of life and work commitment (e.g., “Most of my life gets spent doing

things that are meaningful;”) a greater feeling of control (e.g., “By working hard you can nearly always achieve your goals;”) and an openness to change and challenge (e.g., “Changes in routine are interesting to me;”) Response options are on a four-point Likert-type rating scale, ranging from 1 (*not at all true*) to 4 (*completely true*; Bartone, 2007.) Scores for each of the three dimensions are added together and analyzed as a single composite hardiness score, ranging from 15 to 60, according to manual instructions for scoring (Bartone, 2014).

**Core Self-Evaluation.** Twelve items were included to assess the four dimensions associated with core self-evaluation: locus of control (e.g., “I determine what will happen in my life;”) neuroticism (e.g., “Sometimes I feel depressed;”) self-efficacy (e.g., “I am confident I get the success I deserve in life;”) and self-esteem (e.g., “I am filled with doubts about my competence;”) Response options are on a five-point Likert-type rating scale, ranging from 1 (*strongly disagree*) to 5 (*strongly agree*; Judge, Erez, Bono, & Thoresen, 2003.) Core self-evaluation is analyzed as one, unidimensional, averaged score ranging from one to five. (e.g., McNall, Masuda, Rhoades Shanock, & Nicklin, 2011).

**Physical Fitness.** All participants completed the Army Physical Fitness Test (APFT) to determine their level of physical fitness. The assessment requires participants to demonstrate the maximum number of push-ups and sit-ups they are capable of completing within two minutes for each exercise, as well as a timed two-mile run. The raw data for each of these measures is transformed into a scale score ranging from 0 to 100, based on official Army APFT scales (these can be viewed in Appendix A.) The scores are then summed into a total score ranging from 0 to 300, with 300 being the maximum possible score (Eskreis-Winkler et al., 2014; Steed, Krull, Morgan, Tucker, Ludy, 2016; Teyhen et al., 2016).

**Cognitive ability.** Cognitive ability was assessed via a proprietary cognitive ability test that is highly correlated with the full-scale WAIS-R (i.e., Wechsler Adult Intelligence Scale-Revised; Wechsler, 1981). The measure includes five verbal subtests (i.e., information, comprehension, arithmetic, similarities, and vocabulary) and five performance subtests (i.e., digit symbol, picture completion, spatial, picture arrangement, object assembly) that are computed into proprietary scale scores and combined to provide a “Full Scale” score. Test-retest reliability for the Full Scale score is  $r = .97$ . Each participant was given seven minutes per subscale, or 70 minutes total, to complete the measure with paper and pencil. All scoring was done via computer, by inputting raw scores, resulting in one Full Scale score per participant.

**Performance.** Participants completed four days of team-based activities where each person was assigned to a new team at the completion of day two. Each item on the teammate performance assessment measure corresponded to one of the following eight attributes: professionalism, team player, adaptability, perseverance, personal responsibility, courage, integrity, and capability. Each participant was required to rate his teammates using a 5-point Likert response scale (1 = displayed very low levels; 5 = displayed very high levels). For each participant, the eight ratings produced by a given teammate were summed into a single score that could range between eight and forty. At this point, a participant with ten teammates would thus have ten performance scores for the first of the two team assignments. These performance scores were then averaged across raters, producing a performance score for the first team assignment that could range from eight to forty. This process was repeated for the participant’s second team assignment. Afterwards, the two were averaged producing a final performance score that could range between eight and forty, used to test all hypotheses and research questions pertaining to performance. To confirm the eight items comprise a unidimensional performance score, an

exploratory factor analysis was completed (Table 2). The performance measure, including all 16 items, presented an eigenvalue of 13.26 and explained 82.89% of variance, confirming a robust, one-factor measure (Nunnally, 1978).

## **Results**

Prior to conducting hypothesis tests, measured variables were assessed for violations of normality assumptions. All measures were within the acceptable range for skewness and kurtosis. In addition, all between-group comparisons were preceded by a test of the homogeneity of variance assumption. The assumption held in all cases. Descriptive statistics, including means, standard deviations, correlations, and internal consistency estimates can be found in Table 1. All analyses were performed using JMP Version 13 (SAS Institute, Inc., Cary, NC, 1989-2007) and IBM SPSS Version 25.0 (IBM Corp., 2010).

### **Manipulation Checks, Missing Data, and Total *N***

The total number of participants was 894. Of that total, 438 successfully made it to the stage of the selection system that resulted in performance reviews, or the criterion, being collected. Responses were then examined for missing values; 49 participants, via listwise deletion, were removed from the dataset for missing data on predictor variables yielding a sample of 389. Listwise deletion removes participants when one or more survey items has not been answered.

Attention check items acted as a basis for removing participants who failed to answer questions correctly when the answer was either provided or obvious in order to detect careless responding. Two items were included: participants were asked to rate the item, "I get paid weekly by leprechauns" as "Not at all true," "A little true," "Quite true," or "Completely true," and to "Please select the number four, or 'Agree.'" Participants who did not rate the first item as

“Not at all true,” and/or failed to select the number four, or “Agree” for the second item, were removed before hypothesis testing. An additional 34 participants were removed.

Latent profiles were investigated (i.e., RQ1) for the entire sample of 894. In response to missing data and attention check items, a total of 355 participants were included in the remaining analyses.

### **Personality Profiles and Relationships with Performance**

To address the RQ1 (i.e., what are the distinct personality profiles within action teams) a latent profile analysis (LPA) was conducted ( $n = 894$ ). When analyzing LPA, several statistical criteria may be used to determine the most appropriate number of latent profiles. The Bayesian Information Criterion (BIC) and the bootstrapped likelihood ratio test (BLRT) are commonly assessed criteria at the introduction of each new profile to the model (Nylund et al., 2007). The BLRT is a likelihood-based technique that provides a  $p$ -value indicating whether the increase in model fit between the  $k-1$  and  $k$  class models is significant (McLachlan & Peel, 2000). When the  $p$ -value with  $k$  number of classes is no longer significant, BLRT implies the  $k-1$  class solution is the preferred model.

Researchers have relied on BIC to determine the number of latent profiles because it tends to be the most consistent in selecting the “true model” (Collins, Fidler, Wugalter, & Long, 1993; Hagenars & McCutcheon, 2002; Magidson & Vermunt, 2004; Nylund et al., 2007). Further, as  $n$  grows larger, the probability of BIC selecting the “true model” approaches 1.0 (Vrieze, 2012). This is particularly efficient when the true model is amongst the candidate models being analyzed. When the true model is especially complex, the Akaike Information Criterion (AIC) provides the best trade-off between bias and variance error in minimizing the loss function (Shao, 1997). Practically speaking, AIC tends to choose too big of a model

regardless of  $n$ , and BIC has a larger chance than AIC, for any given  $n$ , of choosing too small a model. Said another way, AIC is better in situations when a false negative finding would be considered more misleading than a false positive, and BIC is better in situations where a false positive is as misleading, or more misleading than, a false negative. In general, it is considered best practice to use AIC and BIC together in model selection opting for a solution that falls within the number of profiles indicated by each statistical criterion (Vrieze, 2012). In other words, if BIC indicates four profiles and AIC indicates six as the optimal solution, selecting among four, five and six-profile solutions, is the preferred way forward. The ideal solution, then, has the lowest BIC and AIC, a significant BLRT, and no profiles with a negligent number of cases (Meyer, Stanley, & Parfyonova, 2012).

Keeping the above criteria in mind, a four-profile solution emerged as optimal in response to RQ1. The BIC and AIC of the four-profile model was 30891 and 30597.2, respectively. This was the lowest BIC of the models available. The five-profile model had the smallest AIC at 30533 but indicated an additional, practically redundant profile. Further, BLRT remained significant at  $p < .05$  at the four-profile solution, and lost significance with the introduction of the fifth profile. Figure 1 depicts each of the four profiles at once, displaying each profile's standing on the eight predictor variables.

Profile one ( $n = 78$ ; Figure 2), referred to as the "Negative Extreme," is lowest on CSE, grit, hardiness, extraversion, agreeableness, and conscientiousness, highest in neuroticism, and second to lowest on openness. Members of the "Negative Extreme" profile do not appear to: work hard, naturally get along with others, or stick it out when the going gets tough. Profile two ( $n = 296$ ; Figure 3) is referred to as the "Negative Average." This profile was lowest in openness, second to lowest on CSE, grit, hardiness, extraversion, agreeableness, and conscientiousness, and second



to highest in neuroticism. Members of the “Negative Average” profile present standardized scores that trend approximately .5 standard deviations below zero, where the only positive deviation from zero is on neuroticism. Profile three ( $n = 97$ ; Figure 4) was highest in CSE, grit, hardiness, extraversion, openness, agreeableness, and conscientiousness, and lowest in neuroticism. This profile is referred to as “Positive Extreme.” Members of the “Positive Extreme” group delineate themselves by an extremely low Neuroticism score ( $\sigma = -1.41$ ) and an extremely high Conscientiousness score ( $\sigma = 1.53$ ). Profile four ( $n = 257$ ; Figure 5) is the “Positive Average” profile, mirroring the approximate opposite of the “Negative Average” profile. They are second to highest in CSE, grit, hardiness, extraversion, openness, agreeableness, and conscientiousness, and second to lowest in neuroticism. Where the “Positive Extreme” profile averages 1.04 standard deviations from zero on all variables except neuroticism, members of the “Positive Average” profile average a positive .32 standard deviations from the mean.

Next, the variables’ and profiles’ relationships with performance were examined. Hypothesis 1a (i.e., that the personality *variables* of interest would significantly predict action team member performance ratings) was tested by examining the significance of eight bivariate correlations and one regression analysis. All correlations can be found in Table 1. Of note, all variables except for openness and agreeableness were significantly ( $p < .05$ ) correlated with performance. Specifically, grit, hardiness, CSE, extraversion, and conscientiousness were positively correlated with performance such that when each of the aforementioned variables increased, performance increased as well. Neuroticism was significantly, but negatively correlated with performance. Next, performance was regressed onto each of the eight personality variables. Results of this analysis, shown in Table 3, indicated that openness had a significant,

negative relationship with performance ( $p = .04$ ). Though the remaining seven variables were not significant predictors of performance, the overall regression was significant ( $R^2 = .04$ ,  $p = .03$ ). Together there is support for H1a: the bivariate correlations and regression each indicate a relationship between personality and performance.

Hypothesis 1b (i.e., that the personality *profiles* would significantly predict action team member performance ratings) was tested by examining the significance of the overall omnibus  $F$  provided by a one-way ANOVA. The ANOVA results, shown in Table 4, indicate a significant difference between profiles on performance, providing support for H1b. A Bonferroni post hoc analysis was completed to further investigate the differences among profiles, and results (also shown in Table 4) indicate that participants characterized by Profile 1, the “Negative Extreme,” had significantly lower performance ratings than the “Negative Average,” “Positive Extreme,” and “Positive Average” profiles. The latter three were not significantly different from one another.

Research question 2a, which inquired whether personality *variables* predict performance over and above that of cognitive ability and physical fitness, was tested via a hierarchical regression. Results are shown in Table 5. Model 1,  $F(2, 352) = 6.81$ ,  $p < .01$ ,  $R^2 = .04$ , including cognitive ability ( $\beta = .13$ ,  $p < .05$ ) and physical fitness ( $\beta = .14$ ,  $p < .01$ ), was significant. Model 2,  $F(10, 344) = 2.97$ ,  $p < .01$ ,  $R^2 = .10$ , including cognitive ability, physical fitness, and the eight aforementioned personality variables was also significant. As shown in Table 5, cognitive ability, physical fitness, openness, extraversion, and CSE had significant beta weights in model 2, with openness detracting from and CSE and extraversion contributing to effective performance. There was a significant change in  $R^2$  from Model 1 to Model 2, indicating an increase in variance explained over and above cognitive ability and physical fitness alone.

Last, RQ2b, regarding whether the personality *profiles* predicted performance over and above that of cognitive ability and physical fitness, was tested via ANCOVA. The ANCOVA results, shown in Table 6, indicate the profiles to be significant predictors of performance when the influence of cognitive ability and physical fitness are controlled for as covariates. A Bonferroni post hoc analysis was completed to further investigate the differences among profiles. The results, shown in Table 7, indicate similarities to that of the analysis computed without holding cognitive ability or physical fitness constant. In other words, people with profile one, the “Negative Extreme” performed significantly worse than the “Negative Average,” “Positive Extreme,” and “Positive Average” profiles. The latter three were not significantly different from one another.

Candidates who completed the 21-day assessment center moved to subsequent phases of the selection process, which included an interview. Ultimately, a selection decision was made which determined whether each candidate was invited to attend specialized training. In order to further investigate the personality profiles uncovered in this study, the percentage of members in each profile selected to attend the specialized training was examined. As shown in Figure 6 the “Negative Extreme” profile had the lowest proportion selected at approximately 17%. The “Negative Average” was selected at 33%, “Positive Extreme” at 39%, and “Positive Average” at 34%, where the difference amongst the four profiles was significant,  $\chi^2(3, n = 728) = 11.19, p < .01$ .

## Discussion

The performance of action team members is critical in a way unlike that of a corporate or athletic team. The outcomes, complex, dangerous, or often both, require skill sets and personalities to culminate in ways we have yet to precisely define. Industrial and organizational psychology offers multiple avenues to increased team performance. This includes, but is certainly not limited to, the focus of this research: strategies related to performance prediction and subgroup comparisons. This study explored the effects of personality on peer ratings of performance in two ways, by employing: (a) the more traditional variable-centered approach (i.e., regression) and (b) the less commonly utilized person-centered approach (i.e., latent profile analysis; LPA).

### Conceptual Implications

Eight predictor personality variables (i.e., grit, hardiness, CSE, extraversion, conscientiousness, agreeableness, openness and neuroticism) were included in this study. Results of the bivariate correlations indicated that six of the eight were significantly related to performance, and in combination, they explained a small, but significant, amount of variance. These findings are consistent with studies previously completed that investigated the relationship between personality and performance (e.g., Barrick, Mount, & Judge, 2001; Bonanno, 2004; Haynie & Shepherd, 2011; Hogan & Holland, 2003; Lukey & Tepe, 2008). Further, when physical fitness and cognitive ability were held constant, CSE, extraversion, and openness, are shown to be uniquely explanatory. This means personality is important, over and above commonly attended to factors such as being smart and strong.

To be specific, CSE and extraversion positively impacted performance while openness detracted from performance. It is possible that a team member who believed in his own ability

and worth signaled to peers that they, too, should believe in his ability and worth. Further, as previously noted, individuals with high CSE exhibit a persistent effort towards task completion, cope better in the face of challenges, and show more willingness to address problems as they arise (Judge, et al., 1997; Kammeyer-Mueller, Judge, & Scott, 2009; Haynie & Shepherd, 2011). Those high in CSE and extraversion believe in themselves internally and behave in ways externally that may secure the confidence of their teammates, which may in turn increase their confidence in themselves to be a good teammate. The feedback loop is positive and spirals upward in their favor. Perhaps those whose CSE is coupled with extraversion benefit from an amplified feedback loop by more apparently conveying that CSE to those around them. Interestingly, three profiles with the highest performance (e.g., “Positive Extreme”, “Positive Average”, “Negative Average”) also had the highest levels of CSE.

It is noteworthy that CSE uniquely predicted performance over and above physical fitness and cognitive ability when hardiness, grit, and Big Five characteristics like conscientiousness and agreeableness did not. Further, this is the first study the researchers are aware of that introduces CSE as an important predictor of performance in the action team context. Continued study as to whether this is a population specific phenomenon, or whether CSE should be more regularly included in applied military research is an important way forward. It should be noted that the negative relationship between openness to experience and performance was unexpected. Previous research has found openness to experience to have a positive relationship with performance when adaptability is an emphasized component (e.g., Hogan & Holland, 2003). This departure from the literature may be due to this study’s population and setting, where openness can manifest and/or be viewed as unpredictability or lack of focus (Ambridge, 2014). Those high in openness tend to appreciate a variety of experiences and high affect, neither of

which is characteristic of the military culture under investigation (McRae, 1987). It is possible the facets of openness may have told a more complex story. Personality data, however, were not available at the facet level.

By using both variable-centered and person-centered approaches, this study captures some of the nuance of how personality combines within subgroups to result in performance. The LPA identified like-group membership categories. From there it was possible to test whether the differences among the subgroups were significant. In this case, the “Negative Extreme” profile was the only profile to show significant differences in performance. The remaining three profiles, “Negative Average,” “Positive Average,” and “Positive Extreme,” though displaying rather different profiles of personality, showed no significant variation in terms of performance and selection even after cognitive ability and physical fitness were controlled for. It is clear that personality matters for performance, but there does not appear to be a single personality profile that will be successful on an action team of this sort.

Aside from performance, this study provides insight into how this set of personality variables commonly attended to in research and practice actually combine in the real world. Figure 1 indicates that the majority (about 62%) of people (i.e., “Negative Average” and “Positive Average” profiles) fall between  $-.5$  and  $+.5$  standard deviations from the mean on every measured variable. Those in the “Positive Average” profile trended  $+.5$  standard deviations above the mean on grit, hardiness, CSE, openness, agreeableness, conscientiousness, and extraversion, and trended  $-.5$  standard deviations below the mean on neuroticism. The reverse is true of those trending  $-.5$  standard deviations below the mean on grit, hardiness, CSE, openness, agreeableness, conscientiousness, and extraversion, and  $+.5$  standard deviations on neuroticism. We see a similar, but more extreme pattern in the remaining two profiles (i.e., “Negative

Extreme” and “Positive Extreme”) where each fall between -1.5 and +1.5 standard deviations from the mean on every measured variable. The “Negative Extreme” profile was approximately -1.5 standard deviations below the mean on grit, hardiness, CSE, openness, agreeableness, conscientiousness, and extraversion and +1.5 standard deviations above the mean on neuroticism. The reverse is true for the “Positive Extreme” profile, trending +1.5 standard deviations above the mean on grit, hardiness, CSE, openness, agreeableness, conscientiousness, and extraversion and -1.5 standard deviations below the mean on neuroticism. Thus, there are essentially two types of profiles: average and extreme.

Each approach in this scenario offered valuable and unique information in pursuit of understanding personality’s effect on performance. Each approach, separately or in combination, ought to be investigated when the context calls for it. The addition of the person-centered analysis to our variable-centered approaches inserts flexibility into our models and can provide an increasingly nuanced understanding of how each construct relates to another.

### **Practical Implications**

When thinking about the variables included in this investigation, there is a tendency to look at each individually in terms of “good” or “bad.” Neuroticism, for example, is often thought of as maladaptive to the lay person, but when considered in conjunction with other variables, it could actually be offset. As this study suggests, openness, which is valued in many societal contexts, can impede performance. Yet its negative effects can be offset by other personality characteristics. In this context, openness shows up highest in the “Positive Extreme” and “Positive Average” profiles, which did not statistically impact either profile’s overall performance or selection potential.

It is also worth pointing out that top performers in this context came in different “personality packages.” While personality profile matters in the context of performance, there is not a single profile that characterizes top performance; rather, there were three distinct profiles that all performed equivalently well. The “Negative Average” profile scored .5 standard deviations above the mean on neuroticism, approximately zero standard deviations from the mean on openness, and despite being .5 standard deviations *below* the mean in everything else typically considered “good,” any decrement in their average performance was statistically non-significant. Further, the “Positive Extreme” profile scored between 1 and 1.5 standard deviations from the mean on all things “good,” and -1.5 standard deviations from the mean on neuroticism, but did not perform better or get “Selected” at statistically higher rates than the “Negative Average” or “Positive Average.” These numbers, taken at face value, could cause decision makers not to select candidates who may actually be very successful. Understanding the ways these commonly measured variables combine in real people could contribute to the proper and effective staffing of the teams that do this special work.

### **Limitations and Future Research**

One limitation of this study is a lack of gender diversity. Action teams are not always all men.

A second limitation of this study pertains to the nature of the performance data available for analysis. The performance data were provided to the researchers as a score aggregated across raters. Prior to this, interrater agreement (e.g., rWG) indices would have typically been calculated to ensure the data were appropriate for higher level analyses. This was not possible with the data set provided.



A third limitation of this study stemmed from the real-world context in which it took place, possibly resulting in a restriction of range. Cognitive ability and physical fitness are established requirements of the military action team. There are cultural minimums for each factor that will not necessarily guarantee the success of a candidate, but will reduce the cost and risk associated with their participation. This results in a restriction of range where a possible maximum score of 300 on the physical fitness test is more likely than a score below a 200 despite still considered “passing.” The variance in cognitive ability and physical fitness is thus limited.

A related, but separate, concern that may come up is that there is a required minimum number of candidates that must pass through the selection system in order to staff all action teams. Ideal standards of performance can give way to these practical staffing concerns. Whereas this issue could mask differences among the profiles that could otherwise emerge in selection ratios, this issue does not explain the statistical similarity in performance ratings across the three top-performing profiles.

A fourth limitation related to the context of this study, is the potential for socially desirable responding on measures like grit and hardiness. Though the respondents were informed that these responses were not being used for selection, they may not have believed this assurance. This may have led to a lack of candor, especially on measures where the socially desirable response was obvious.

Despite its limitations, this study offers valuable new insights for practitioners as well as researchers concerned with action team performance. It also suggests several interesting research directions. For example, one fruitful avenue for future research entails examining how people with the different personality profiles revealed in this study perform in action teams following

the point of selection. It would be interesting to determine which, if any, contribute to more nuanced aspects of performance on the job, such as emergent leadership and various forms of organizational citizenship behavior. Another research direction involves pinpointing optimal combinations of personality in an action team as a unit. It stands to reason some combinations would enhance and some would detract from context-specific team performance. Continued research in this vein may also contribute to team building strategies in the future. Last, there may be personality profiles most responsive to coaching. Practically, this information would help leaders to structure training and development when an investment in an action team member has already been made.

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Table 1

*Means, Standard Deviations, Correlations, and Internal Consistency Estimates.*

Variables	M (SD)	Correlations												
		1	2	3	4	5	6	7	8	9	10	11		
1. Hardiness	3.41 (0.30)	(0.77)												
2. Grit	3.67 (0.46)	0.55**	(0.74)											
3. CSE	3.82 (0.44)	0.66**	0.63**	(0.82)										
4. Extraversion	120.00 (17.23)	0.43**	0.38**	0.48**	(0.89)									
5. Openness	116.63 (15.77)	0.19**	0.07**	0.10*	0.33**	(0.87)								
6. Agreeableness	125.08 (15.73)	0.33**	0.30**	0.36**	0.33**	0.20**	(0.86)							
7. Neuroticism	44.98 (19.17)	-0.47**	-0.55**	-0.63**	-0.55**	-0.15**	-0.54**	(0.92)						
8. Conscientiousness	144.98 (16.65)	0.48**	0.61**	0.58**	0.54**	0.13**	0.51**	-0.77**	(0.90)					
9. Physical Fitness	280.85 (17.58)	0.00	-0.01	-0.01	0.08*	0.04	0.09*	0.08*	0.02					
10. Cognitive Ability	110.57 (9.60)	-0.01*	-0.09*	-0.05	-0.09*	0.19**	-0.07*	-0.39	-0.10**	0.13**				
11. Performance	3.29 (0.60)	0.13**	0.11*	0.16**	0.10*	-0.05	0.05	-0.10*	0.11*	0.17**	0.16**			

Note.  $n = 355$ ; internal consistency reliabilities (Cronbach's alphas) are presented in parentheses on the diagonal

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

Table 2

*Summary of Exploratory Factor Analysis Results for Peer Ratings of Performance Measure Using Maximum Likelihood Estimation with Oblimin Rotation*

Item	Factor Loadings	
	Performance	Factor 2
Adaptability 1	<b>.95</b>	
Adaptability 2	<b>.95</b>	
Personal Responsibility 1	<b>.95</b>	
Personal Responsibility 2	<b>.95</b>	
Team Player 1	<b>.92</b>	
Team Player 2	<b>.94</b>	
Perseverance 1	<b>.93</b>	
Perseverance 2	<b>.94</b>	
Capability 1	<b>.94</b>	
Capability 2	<b>.95</b>	
Courage 1	<b>.93</b>	
Courage 2	<b>.95</b>	
Integrity 1	<b>.87</b>	
Integrity 2	<b>.90</b>	
Professionalism 1	<b>.92</b>	
Professionalism 2	<b>.93</b>	
Eigenvalues	13.26	0.22
% of variance	82.89	1.37

*Note.* Chi-Square = 586.64\*\*

\*\*  $p < .01$ .

Table 3

*Regression Analysis of Performance Regressed on Personality*

	Unstandardized Coefficients		Standardized Coefficients	t	p
	B	SE	$\beta$		
Hardiness	0.12	0.16	0.05	0.75	0.45
Grit	0.07	0.11	0.05	0.63	0.53
CSE	0.14	0.12	0.09	0.09	0.26
Extraversion	0.00	0.00	0.11	0.11	0.09
Openness	-0.01*	0.00	-0.12	-2.09	0.04
Agreeableness	0.00	0.00	0.01	0.17	0.87
Neuroticism	0.00	0.00	0.02	0.27	0.79
Conscientiousness	0.00	0.00	-0.05	-0.05	0.57
$R^2$	0.04*				0.03

Note.  $n = 355$

\*  $p < .05$ .

Table 4

*Analysis of Variance for Performance by Profile*

Group	<i>n</i>	Mean	<i>SD</i>	Bonferroni Comparisons		
				Neg. Ext.	Neg. Avg.	Pos. Ext.
Negative Extreme	26	2.85	0.62			
Negative Average	147	3.25	0.57	-0.4**		
Positive Extreme	54	3.27	0.71	-0.42*	-0.02	
Positive Average	128	3.24	0.57	-0.45**	-0.05	-0.03

Note.  $n = 355$ .  $[F(3, 351) = 4.17, p < .01]$

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



Table 5

*Hierarchical Regression Analysis of Personality on Performance Controlling for Physical Fitness and Cognitive Ability*

	Model 1			Model 2		
	B	SEB	$\beta$	B	SEB	$\beta$
Cognitive Ability	0.01	0.04	0.13*	0.02	0.00	0.21**
Physical Fitness	0.01	0.00	0.14**	0.01	0.00	0.13*
Hardiness				0.14	0.15	0.06
Grit				0.07	0.10	0.05
CSE				0.15	0.12	0.15*
Extraversion				0.01	0.00	0.15*
Openness				-0.01	0.00	-0.18**
Agreeableness				0.00	0.00	0.03
Neuroticism				0.00	0.00	0.01
Conscientiousness				0.00	0.00	-0.01
$R^2$	0.04			0.10		
$F$ for change in $R^2$	6.81**			2.97**		

Note.  $n = 355$

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

Table 6

*Analysis of Co-Variance of Profiles on Performance Controlling for Physical Fitness and Cognitive Ability*

Source	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>Partial eta<sup>2</sup></i>
Cognitive Ability	2.62	1	2.62	7.69*	.022
Physical Fitness	2.69	1	2.69	7.88*	.022
Profiles	5.26	3	1.76	5.15**	.042
Error	119.00	349	0.34		
Total	3858.40	355			

*Note. n = 355*

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

Table 7

*Bonferroni Pairwise Comparisons of Performance by Profile Controlling for Physical Fitness and Cognitive Ability*

	Neg. Ext.	Neg. Avg.	Pos. Ext.
Profile			
Negative Extreme			
Negative Average	-0.43*		
Positive Extreme	-0.44*	-0.02	
Positive Average	-0.49*	-0.07	-0.05

*Note.*  $n = 355$

\*  $p < .05$ .

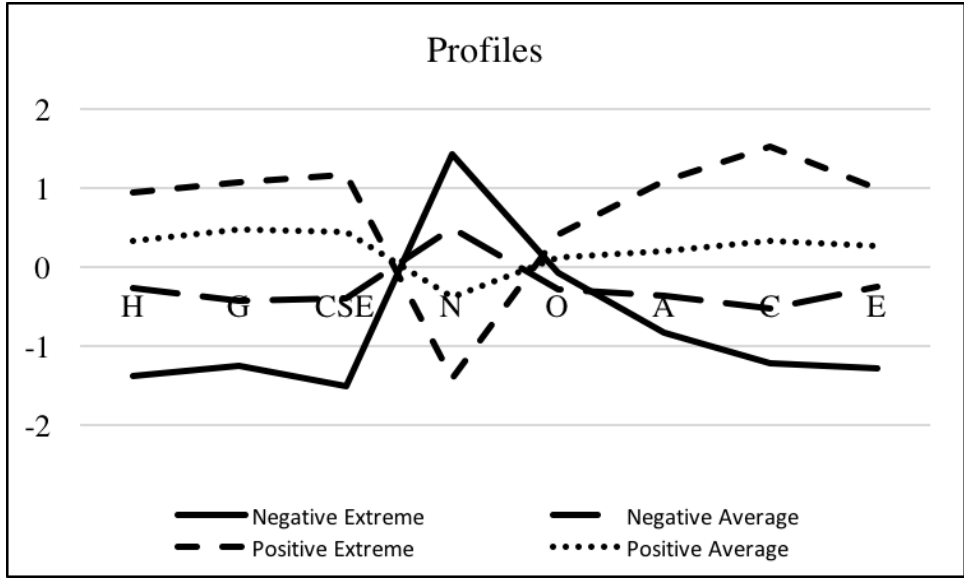


Figure 1  
*Latent Profiles*

Note. Standard deviations depicted  
*n* = 894.

Key:

- H: Hardiness
- G: Grit
- CSE: Core Self-Evaluation
- N: Neuroticism
- O: Openness
- A: Agreeableness
- C: Conscientiousness
- E: Extraversion

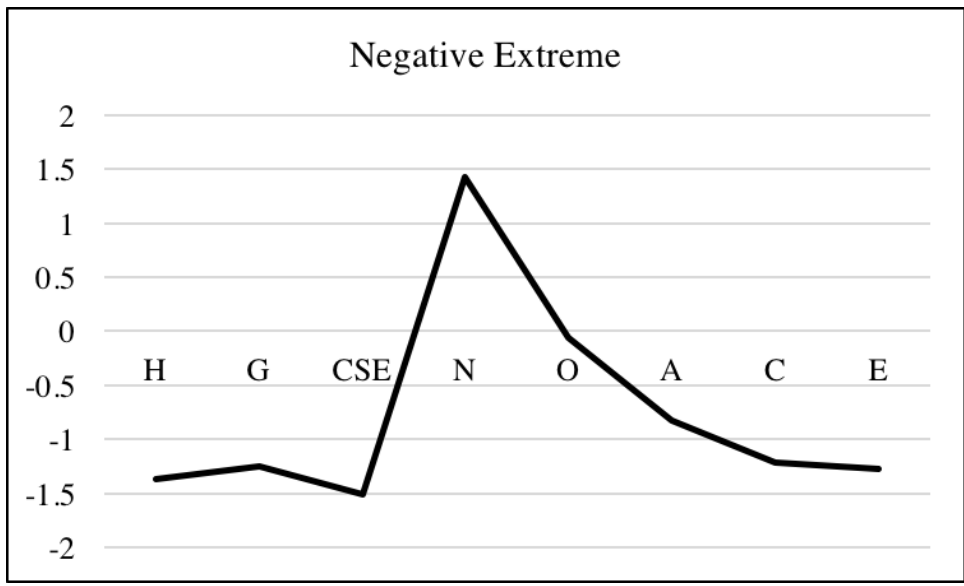


Figure 2

Profile 1: "Negative Extreme"

Note. Standard deviations depicted

n = 78.

Key:

- H: Hardiness
- G: Grit
- CSE: Core Self-Evaluation
- N: Neuroticism
- O: Openness
- A: Agreeableness
- C: Conscientiousness
- E: Extraversion

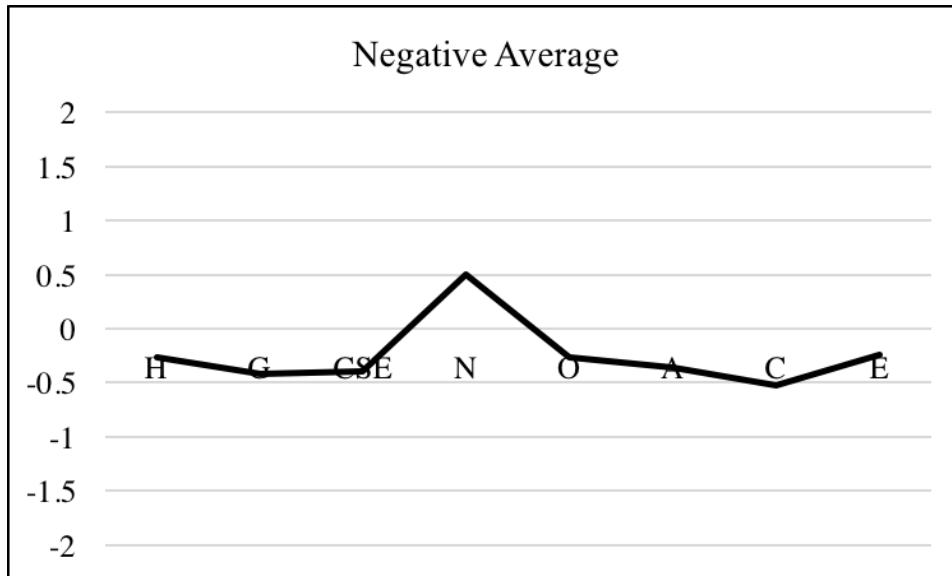


Figure 3

*Profile 2: "Negative Average"*

*Note.* Standard deviations depicted

*n* = 297.

Key:

H: Hardiness  
 G: Grit  
 CSE: Core Self-Evaluation  
 N: Neuroticism  
 O: Openness  
 A: Agreeableness  
 C: Conscientiousness  
 E: Extraversion

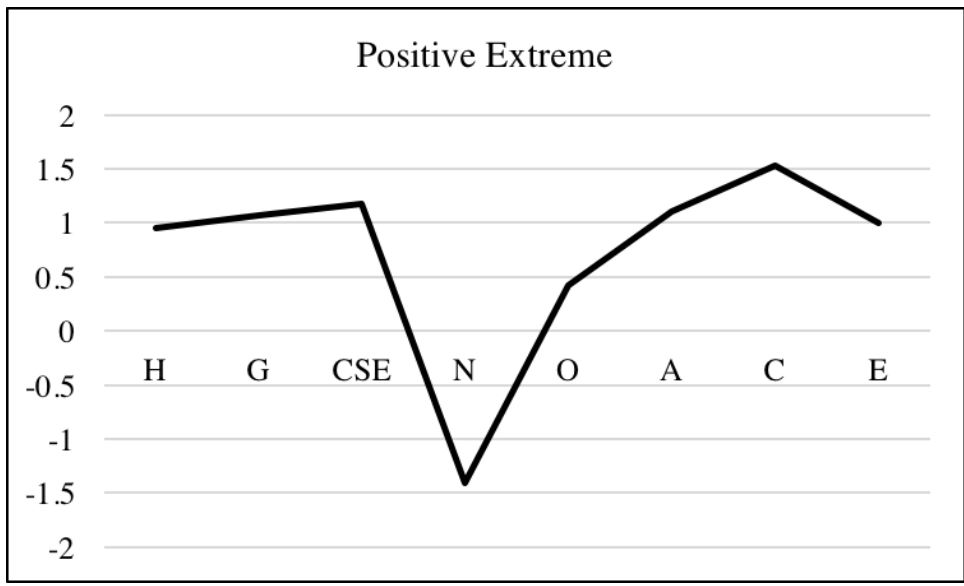


Figure 4

*Profile 3: "Positive Extreme"*

Note. Standard deviations depicted  
*n* = 97.

Key:

- H: Hardiness
- G: Grit
- CSE: Core Self-Evaluation
- N: Neuroticism
- O: Openness
- A: Agreeableness
- C: Conscientiousness
- E: Extraversion

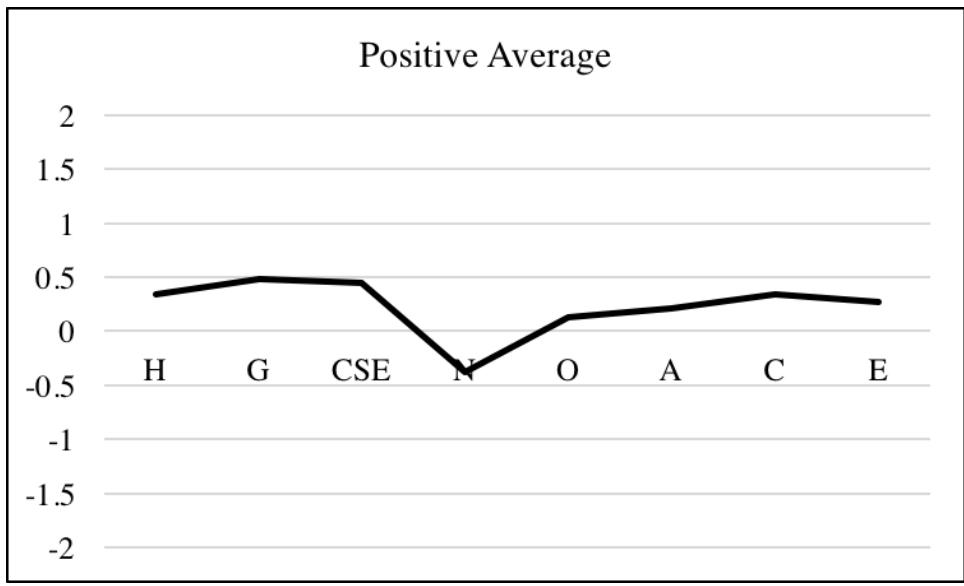


Figure 5

Profile 4: "Positive Average"

Note. Standard deviations depicted  
n = 256.

Key:

- H: Hardiness
- G: Grit
- CSE: Core Self-Evaluation
- N: Neuroticism
- O: Openness
- A: Agreeableness
- C: Conscientiousness
- E: Extraversion



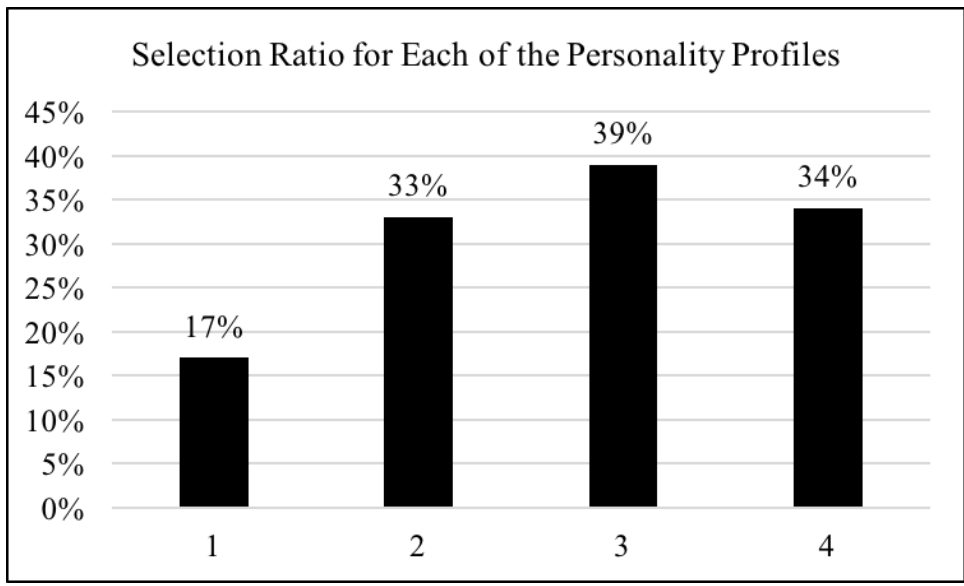


Figure 6

*Selection Ratio for Each of the Personality Profiles*

Note. Total  $n = 728$

$\chi^2 = 11.19^{**}$ ,  $df = 3$  (i.e., there is a significant difference among groups with respect to the percentage selected)

$^{**}p < .01$ .

Key:	
1:	Negative Extreme ( $n = 13$ )
2:	Negative Average ( $n = 98$ )
3:	Positive Extreme ( $n = 38$ )
4:	Positive Average ( $n = 87$ )

**APPENDIX**

## Appendix A

### APFT Scale Scoring

Scoring standards are used to convert raw scores to point scores after test events are completed. Male scores are indicated by the M at the top of every other column. Female scores are indicated by the F on the top of every other column. To convert raw scores to point scores, find either the run time total, or the number of repetitions performed (i.e., push-ups or sit-ups) in the left-hand column. Next, move right along the row and locate the intersection of the soldier's appropriate age column (DA Form 705, 1998).

### 2-MILE RUN STANDARDS

AGE GROUP	17-21		22-26		27-31		32-36		37-41		AGE GROUP	42-46		47-51		52-56		57-61		62+	AGE GROUP	
Time	M	F	M	F	M	F	M	F	M	F	Time	M	F	M	F	M	F	M	F	M	F	Time
12:54											12:54											12:54
13:00	100		100								13:00											13:00
13:06	99		99								13:06											13:06
13:12	97		96								13:12											13:12
13:18	96		97		100		100				13:18											13:18
13:24	94		96		99		99				13:24											13:24
13:30	93		94		96		96				13:30											13:30
13:36	92		93		97		97		100		13:36											13:36
13:42	90		92		96		96		99		13:42											13:42
13:48	89		91		95		95		98		13:48											13:48
13:54	88		90		94		95		97		13:54											13:54
14:00	86		89		92		94		97		14:00											14:00
14:06	85		88		91		93		96		14:06	100										14:06
14:12	83		87		90		92		95		14:12	99										14:12
14:18	82		86		89		91		94		14:18	96										14:18
14:24	81		84		88		90		93		14:24	97	100									14:24
14:30	79		83		87		89		92		14:30	97	99									14:30
14:36	78		82		86		88		91		14:36	96	98									14:36
14:42	77		81		85		87		91		14:42	95	98	100								14:42
14:48	75		80		84		86		90		14:48	94	97	99								14:48
14:54	74		79		83		85		89		14:54	93	96	98								14:54
15:00	72		78		82		85		88		15:00	92	95	98								15:00
15:06	71		77		81		84		87		15:06	91	95	97								15:06
15:12	70		76		79		83		86		15:12	90	94	96								15:12
15:18	68		74		78		82		86		15:18	90	93	95	100							15:18
15:24	67		73		77		81		85		15:24	89	92	95	99							15:24
15:30	66		72		76		80		84		15:30	88	91	94	96							15:30
15:36	64	100	71	100	75		79		83		15:36	87	91	93	97							15:36
15:42	63	99	70	99	74		78		82		15:42	86	90	92	97	100						15:42
15:48	61	98	69	98	73	100	77		81		15:48	85	89	91	95	99						15:48
15:54	60	96	68	97	72	99	76	100	80		15:54	84	88	91	95	98						15:54
16:00	59	95	67	96	71	98	75	99	80		16:00	83	87	90	94	97						16:00
16:06	57	94	66	95	70	97	75	99	79		16:06	83	87	89	93	96						16:06
16:12	56	93	64	94	69	97	74	96	78		16:12	82	86	88	92	95						16:12
16:18	54	92	63	93	68	96	73	97	77		16:18	81	85	87	91	94						16:18
16:24	53	90	62	92	66	95	72	97	76		16:24	80	84	87	90	93						16:24
16:30	52	89	61	91	65	94	71	96	75		16:30	79	84	86	90	93						16:30
16:36	50	88	60	90	64	93	70	95	74		16:36	78	83	85	89	92						16:36
16:42	49	87	59	89	63	92	69	94	74		16:42	77	82	84	88	91						16:42
16:48	48	85	58	88	62	91	68	94	73		16:48	77	81	84	87	90						16:48
16:54	46	84	57	87	61	91	67	93	72		16:54	76	80	83	86	89						16:54
17:00	45	83	56	86	60	90	66	92	71	100	17:00	75	80	82	85	88						17:00
17:06	43	82	54	85	59	89	65	92	70	99	17:06	74	79	81	84	87						17:06
17:12	42	81	53	84	58	88	65	91	69	98	17:12	73	78	80	83	86						17:12
17:18	41	79	52	83	57	87	64	90	69	98	17:18	72	77	80	83	85						17:18
17:24	39	78	51	82	56	86	63	90	68	97	17:24	71	100	76	79	82	84					17:24
17:30	38	77	50	81	55	86	62	89	67	96	17:30	70	99	76	78	81	83					17:30
17:36	37	76	49	80	54	85	61	88	66	96	17:36	70	99	75	100	77	80	82				17:36
17:42	35	75	48	79	52	84	60	88	65	95	17:42	69	98	74	99	76	79	81				17:42
17:48	34	73	47	78	51	83	59	87	64	94	17:48	68	97	73	99	76	78	80				17:48
17:54	32	72	46	77	50	82	58	86	63	94	17:54	67	97	73	98	75	77	80				17:54
18:00	31	71	44	76	49	81	57	86	63	93	18:00	66	96	72	97	74	77	79				18:00
18:06	30	70	43	75	48	80	56	85	62	92	18:06	65	96	71	97	73	76	78				18:06
18:12	28	68	42	74	47	80	55	84	61	92	18:12	64	95	70	96	73	75	77				18:12
18:18	27	67	41	73	46	79	55	83	60	91	18:18	63	94	69	96	72	74	76				18:18
18:24	26	66	40	72	45	78	54	83	59	90	18:24	63	94	69	95	71	73	75				18:24
18:30	24	65	39	71	44	77	53	82	58	89	18:30	62	93	68	94	70	72	74				18:30
18:36	23	64	38	70	43	76	52	81	57	89	18:36	61	92	67	94	69	71	73				18:36
18:42	21	62	37	69	42	75	51	81	57	88	18:42	60	92	66	93	69	70	72				18:42
18:48	20	61	36	68	41	74	50	80	56	87	18:48	59	91	65	92	68	70	71				18:48
18:54	19	60	34	67	39	74	49	79	55	87	18:54	58	90	65	92	67	69	70				18:54
19:00	17	59	33	66	38	73	48	79	54	86	19:00	57	90	64	91	66	100	68	69			19:00
19:06	16	58	32	65	37	72	47	78	53	85	19:06	57	89	63	91	65	99	67	68			19:06
19:12	14	56	31	64	36	71	46	77	52	85	19:12	56	89	62	90	65	99	66	67			19:12
19:18	13	55	30	63	35	70	45	77	51	84	19:18	55	88	62	89	64	98	65	67			19:18
19:24	12	54	29	62	34	69	45	76	51	83	19:24	54	87	61	89	63	67	64	66			19:24
19:30	10	53	28	61	33	69	44	75	50	82	19:30	53	87	60	88	62	96	63	65			19:30
19:36	9	52	27	60	32	68	43	74	49	82	19:36	52	86	59	87	62	96	63	64			19:36
19:42	8	50	26	59	31	67	42	74	48	81	19:42	51	85	58	87	61	95	62	100	63		19:42
19:48	6	49	24	58	30	66	41	73	47	80	19:48	50	85	58	86	60	94	61	99	62		19:48
19:54	5	48	23	57	29	65	40	72	46	80	19:54	50	84	57	86	59	93	60	98	61		19:54
20:00	3	47	22	56	28	64	39	72	46	79	20:00	49	83	56	85	58	93	59	98	60	100	20:00
20:06	2	45	21	55	26	63	38	71	45	78	20:06	48	83	55	84	58	92	58	97	59	99	20:06
20:12	1	44	20	54	25	63	37	70	44	78	20:12	47	82	55	84	57	91	57	96	58	98	20:12
20:18	0	43	19	53	24	62	36	70	43	77	20:18	46	82	54	83	56	90	57	95	57	98	20:18
20:24		42	18	52	23	61	35	69	42	76	20:24	45	81	53	82	55	90	56	95	56	97	20:24
20:30		41	17	51	22	60	35	68	41	75	20:30	44	80	52	82	55	89	55	94	55	96	20:30

**PUSH-UP STANDARDS**

AGE GROUP	17-21		22-26		27-31		32-36		37-41		AGE GROUP	42-46		47-51		52-56		57-61		62+		AGE GROUP		
	Repetitions	M	F	M	F	M	F	M	F	Repetitions		M	F	M	F	M	F	M	F	M	F		Repetitions	
77					100						77											77		
76					99						76												76	
75				100	98			100			75												75	
74				99	97			99			74												74	
73				98	96			98		100	73												73	
72				97	95			97		99	72												72	
71	100			95	94			96		98	71												71	
70	99			94	93			95		97	70												70	
69	97			93	92			94		96	69												69	
68	96			92	91			93		95	68												68	
67	94			91	89			92		94	67												67	
66	93			90	88			91		93	66	100											66	
65	92			89	87			90		92	65	99											65	
64	90			87	86			89		91	64	98											64	
63	89			86	85			88		90	63	97											63	
62	88			85	84			87		89	62	96											62	
61	86			84	83			86		88	61	94											61	
60	85			83	82			85		87	60	93											60	
59	83			82	81			84		86	59	92		100									59	
58	82			81	80			83		85	58	91		99									58	
57	81			79	79			82		84	57	90		98									57	
56	79			78	78			81		83	56	89		96			100						56	
55	78			77	77			79		82	55	88		95			99						55	
54	77			76	76			78		81	54	87		94			98						54	
53	75			75	75			77		79	53	86		93			97		100				53	
52	74			74	74			76		78	52	84		92			96		99				52	
51	72			73	73			75		77	51	83		91			94		98				51	
50	71			71	72			100	74	76	50	82		89			93		97			100	50	
49	70			70	71			99	73	75	49	81		86			92		95		95		49	
48	68			69	69			98	72	74	48	80		87			91		94		98		48	
47	67			68	68			96	71	73	47	79		86			90		93		96		47	
46	66			67	67			95	70	72	46	78		85			89		92		95		46	
45	64			66	66			94	69	100	71	77		84			88		91		94		45	
44	63			65	65			93	68	99	70	76		82			87		90		93		44	
43	61			63	64			92	67	97	69	75		81			86		89		92		43	
42	60	100		62	64			90	66	96	68	73		80			85		87		91		42	
41	59	98		61	63			89	65	95	67	72		79			83		86		89		41	
40	57	97	60	60	62			88	64	93	66	70		78			82		85		88		40	
39	56	95	59	60	60			87	63	92	65	69		76			81		84		87		39	
38	54	93	58	59	59			85	62	91	64	67		75			80		83		86		38	
37	53	91	57	58	58			84	61	89	63	68	100	74			79		82		85		37	
36	52	90	55	56	57			83	60	88	62	67	99	73			78		81		84		36	
35	50	88	54	55	56			82	60	87	61	66	97	72			77		79		82		35	
34	49	86	53	54	55			81	59	86	60	65	95	71	100		76		78		81		34	
33	48	84	52	53	54			79	57	84	59	63	94	69	98		74		77		80		33	
32	46	83	51	52	53			78	56	83	58	62	92	68	97		73		76		79		32	
31	45	81	50	51	52			77	55	81	57	61	90	67	95		72	100		75		78	31	
30	43	79	49	50	51			76	54	80	56	60	89	66	93		71	98		74		76	30	
29	42	77	47	48	49			75	53	79	55	62	87	65	92		70	96		73		75	29	
28	41	76	46	47	48			73	52	77	54	62	85	64	90		69	95	100		71		74	28
27	39	74	45	46	47			72	51	76	53	61	84	62	88		68	93	70	98		73	27	
26	38	72	44	45	46			70	50	75	52	78	82	61	87		67	91	99	96		72	26	
25	37	70	43	44	45			69	49	73	51	76	81	60	85		66	89	98	94	71	100	25	
24	35	69	42	43	44			68	48	72	50	76	80	59	83		64	87	92	90	98	98	24	
23	34	67	41	42	43			67	47	71	49	75	78	58	82		63	85	89	96	96	96	23	
22	32	65	39	40	41			66	46	69	48	73	77	57	80		62	84	87	94	95	93	22	
21	31	63	38	39	40			65	45	68	47	72	76	56	80		61	82	85	91	92	91	21	
20	30	62	37	38	39			64	44	67	46	70	74	55	78		60	80	82	88	90	89	20	
19	29	60	36	37	38			63	43	65	45	69	73	54	77		59	79	81	86	88	87	19	
18	27	58	35	36	37			62	42	64	44	67	71	53	75		58	78	80	84	86	84	18	
17	26	57	34	35	36			61	41	63	43	66	70	52	73		57	76	78	82	84	82	17	
16	24	55	33	34	35			60	40	62	42	64	69	51	72		56	75	77	80	82	81	16	
15	23	53	31	32	33			60	41	63	43	65	68	50	71		55	74	76	79	81	80	15	
14	21	51	30	31	32			60	41	63	43	65	68	50	71		55	74	76	79	81	80	14	
13	20	50	29	30	31			60	41	63	43	65	68	50	71		55	74	76	79	81	80	13	
12	19	48	28	29	30			60	41	63	43	65	68	50	71		55	74	76	79	81	80	12	
11	17	46	27	28	29			60	41	63	43	65	68	50	71		55	74	76	79	81	80	11	
10	16	44	26	27	28			60	41	63	43	65	68	50	71		55	74	76	79	81	80	10	
9	14	43	25	26	27			60	41	63	43	65	68	50	71		55	74	76	79	81	80	9	
8	13	41	23	24	25			60	41	63	43	65	68	50	71		55	74	76	79	81	80	8	
7	12	39	22	23	24			60	41	63	43	65	68	50	71		55	74	76	79	81	80	7	
6	10	37	21	22	23			60	41	63	43	65	68	50	71		55	74	76	79	81	80	6	
5	9	36	20	21	22			60	41	63	43	65	68	50	71		55	74	76	79	81	80	5	
4	8	34	19	20	21			60	41	63	43	65	68	50	71		55	74	76	79	81	80	4	
3	6	32	18	19	20			60	41	63	43	65	68	50	71		55	74	76	79	81	80	3	
2	5	30	17	18	19			60	41	63	43	65	68	50	71		55	74	76	79	81	80	2	
1	3	29	15	16	17			60	41	63	43	65	68	50	71		55	74	76	79	81	80	1	

Scoring standards are used to convert raw scores to point scores after test events are completed. Male point scores are indicated by the M at the top and bottom of the shaded column. Female point scores are indicated by the F at the top and bottom of the unshaded column. To convert raw scores to point scores, find the number of repetitions performed in the left-hand column. Next, move right along that row and locate the intersection of the soldier's appropriate age column. Record that number in the Push-Up points block on the front of the scorecard.

SIT-UP STANDARDS												
AGE GROUP	17-21	22-26	27-31	32-36	37-41	AGE GROUP	42-46	47-51	52-56	57-61	62+	AGE GROUP
Repetitions	MF	MF	MF	MF	MF	Repetitions	MF	MF	MF	MF	MF	Repetitions
82			100			82						82
81			99			81						81
80		100	98			80						80
79		99	97			79						79
78	100	97	96			78						78
77	98	96	95			77						77
76	97	95	94	100	100	76						76
75	95	93	92	99	99	75						75
74	94	92	91	98	98	74						74
73	92	91	90	96	97	73						73
72	90	89	89	95	96	72	100					72
71	89	88	88	94	95	71	99					71
70	87	87	87	93	94	70	98					70
69	86	85	86	92	93	69	97					69
68	84	84	85	91	92	68	96					68
67	82	83	84	89	91	67	95					67
66	81	81	83	88	89	66	94	100	100			66
65	79	80	82	87	88	65	93	99	99			65
64	78	79	81	86	87	64	92	98	98	100		64
63	76	77	79	85	86	63	91	97	97	99	100	63
62	74	76	78	84	85	62	90	96	96	98	99	62
61	73	75	77	82	84	61	89	94	95	97	98	61
60	71	73	76	81	83	60	88	93	94	96	97	60
59	70	72	75	80	82	59	87	92	93	95	96	59
58	68	71	74	79	81	58	86	91	92	94	95	58
57	66	69	73	78	80	57	85	90	91	92	94	57
56	65	68	72	76	79	56	84	89	89	91	92	56
55	63	67	71	75	78	55	83	88	88	90	91	55
54	62	65	70	74	77	54	82	87	87	89	90	54
53	60	64	69	73	75	53	81	86	86	88	89	53
52	58	63	68	72	75	52	80	84	85	87	88	52
51	57	61	66	71	74	51	79	83	84	86	87	51
50	55	60	65	69	73	50	78	82	83	85	86	50
49	54	59	64	68	72	49	77	81	82	84	85	49
48	52	57	63	67	71	48	76	80	81	83	84	48
47	50	56	62	66	69	47	75	79	80	82	83	47
46	49	55	61	65	68	46	74	78	79	81	82	46
45	47	53	60	64	67	45	73	77	78	79	81	45
44	46	52	59	62	65	44	72	76	77	78	79	44
43	44	50	58	61	65	43	71	74	76	77	78	43
42	42	49	57	60	64	42	70	73	75	76	77	42
41	41	48	56	59	63	41	69	72	74	75	76	41
40	39	47	55	58	62	40	68	71	73	74	75	40
39	38	45	54	56	61	39	67	70	72	73	74	39
38	36	44	52	55	60	38	66	69	71	72	73	38
37	34	43	51	54	59	37	65	68	69	71	72	37
36	33	41	50	53	58	36	64	67	68	70	71	36
35	31	40	48	52	57	35	63	66	67	69	70	35
34	30	39	48	50	56	34	62	64	66	68	69	34
33	28	37	47	49	55	33	61	63	65	66	68	33
32	25	36	46	48	54	32	60	62	64	65	66	32
31	25	33	45	47	53	31	59	61	63	64	65	31
30	23	33	44	46	52	30	58	60	62	63	64	30
29	22	32	43	45	50	29	57	59	61	62	63	29
28	20	31	42	44	49	28	56	58	60	61	62	28
27	18	29	41	42	48	27	55	57	59	60	61	27
26	17	28	39	41	47	26	54	56	58	59	60	26
25	15	27	38	40	46	25	53	54	57	58	59	25
24	14	25	37	39	45	24	52	53	56	57	58	24
23	12	24	36	38	44	23	51	52	55	56	57	23
22	10	23	35	36	43	22	50	51	54	55	56	22
21	9	21	34	35	42	21	49	50	53	54	55	21
Repetitions	MF	MF	MF	MF	MF	Repetitions	MF	MF	MF	MF	MF	Repetitions
AGE GROUP	17-21	22-26	27-31	32-36	37-41	AGE GROUP	42-46	47-51	52-56	57-61	62+	AGE GROUP

Scoring standards are used to convert raw scores to point scores after test events are completed. To convert raw scores to point scores, find the number of repetitions performed in the left-hand column. Next, move right along that row and locate the intersection of the soldier's appropriate age column. Record that number in the Sit-Up points block on the front of the scorecard.