A Study of the Impact of Core Values on Leadership Development and Performance in Military Trainees

by
Nathan R. Lausmann

A THESIS

submitted to
Oregon State University
Honors College

in partial fulfillment of
the requirements for the
degree of

Honors Baccalaureate of Science in Industrial Engineering
(Honors Scholar)

Presented May 21, 2020
Commencement June 2020
AN ABSTRACT OF THE THESIS OF


Abstract approved: ____________________________________________________

Toni L. Doolen

Organizational values are an important factor in the work of many organizations and can guide both day-to-day decision-making and long-term strategic planning. Little previous research has documented the impact of core values on individual performance in military environments nor the effect of core values on leadership attributes. In this study, Air Force Reserve Officer Training Corps (AFROTC) trainees completed a survey asking about their comprehension and application of the U.S. Air Force core values, their perception of personal leadership attributes, and to self-report performance measures used in AFROTC. Correlational analyses conducted on the data revealed that comprehension of organizational values had few statistically significant relationships with leadership attributes and no relationships with performance. Application of organizational values was found to be highly correlated with leadership attributes and had one relationship with performance (physical fitness). The length of time exposed to core values had no relationships with the level of comprehension or application of values, only one relationship with leadership attributes (delegation), and no relationships with performance. These findings indicate that simply comprehending organizational values is not enough to have a major impact on leadership skills or performance and that opportunities to apply values may be more important in developing
leadership skills. However, practitioners should be aware of the possibility that neither comprehension nor application of values has a large-scale influence on individual performance in this training context. The results also emphasize the importance of physical fitness in a military environment. Organizational leaders, both military and civilian, can use these findings to guide the development and evaluation of training programs.

Key Words: organizational values, performance, leadership, military

Corresponding e-mail address: lausmann@lifetime.oregonstate.edu
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APPROVED:

_____________________________________________________________________
Toni L. Doolen, Mentor, representing Industrial Engineering

_____________________________________________________________________
Ean H. Ng, Committee Member, representing Industrial Engineering

_____________________________________________________________________
John J. Abbatiello, Committee Member, representing the U.S. Air Force Academy

_____________________________________________________________________
Toni L. Doolen, Dean, Oregon State University Honors College

I understand that my project will become part of the permanent collection of Oregon State University, Honors College. My signature below authorizes release of my project to any reader upon request.

_____________________________________________________________________
Nathan R. Lausmann, Author
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A Study of the Impact of Core Values on Leadership Development and Performance in Military Trainees

1 Introduction

Core values are an important factor in the work of many organizations. Core values can guide both day-to-day decision-making and long-term strategic planning. Literature on the impact of core values on organizational performance has been growing, particularly in the last two decades. However, little previous research has documented the impact of core values on organizational or individual performance in military environments. Additionally, little previous research documents the effect of core values on growth and leadership development. This research study seeks to fill this gap by studying relationships between organizational core values and individual leadership skills and performance within in a military training setting.

This chapter provides motivation for the study and clarifies how the research undertaken will contribute to the existing body of knowledge. Additionally, this chapter outlines the research objectives and methodology employed for the study.

1.1 Motivation

Organizational values can impact a variety of important behaviors of organizational members. Past research has shown that organizational values can affect decision-making, employee satisfaction, and organizational culture. Previous studies have confirmed relationships between an understanding of organizational values and performance: when strong organizational values are
congruent with the values of employees, performance outcomes have been shown to improve (Meglino, Ravlin, & Adkins, 1989). This impact is more notable when the organizational values are clearly defined and communicated to employees, as employees tend to be more participatory in decision-making processes as a result (Fitzgerald & Desjardins, 2004).

In the last two decades, the United States military has integrated core organizational value work into operations. All branches of the United States military, except the newly established U.S. Space Force, have developed and share core values with their members using a variety of mechanisms. Within military environments, it is assumed that core values will be used by organizational members in guiding both mission execution and individual conduct (United States Air Force, Lemay Center for Doctrine, 2015). One of the very first topics presented to new military recruits is their branch’s core organizational values. The branch’s core values are presented and reviewed multiple times during an individual’s military career. The U.S. Navy, for example, integrates core value training as a key component of initial recruit training, or “boot camp”: “The goal of military training is to instill and reinforce the Navy’s Core Values of Honor, Courage, and Commitment with the basic skills of training in a team environment,” (United States Navy, n.d.). The U.S. Air Force also prioritizes frequent exposure to training around core values: “All education and training in the Air Force will address the Core Values... The goal is to educate all officers, enlisted personnel, and civilians throughout their careers,” (United States Air Force, 1997). However, despite the military’s focus on core values, it is unclear the extent to which core values are understood and/or applied by military trainees. Further, there is little evidence to suggest whether strong organizational core values are positively correlated with the development of leadership skills and/or with overall performance within a military environment.
The motivation for this research stemmed, in part, from the work of the U.S. Air Force Academy’s Center for Character and Leadership Development (USAFA CCLD). One of the CCLD’s primary goals is to determine how military training can most effectively develop recruits into high-performing, professional, honorable leaders of character. The CCLD staff expressed interest in learning more about the importance and efficacy of the U.S. Air Force’s core values within a training context.

Currently, teaching and reinforcing organizational values early and often is a foundational piece of U.S. military training, regardless of the branch of service. However, there is little data or evidence to understand how exposure to core values in the context of various training activities impacts recruits. This research is focused on determining whether a focus on organizational values during initial military training is effective in improving leadership skills and/or performance.

1.1.1 Contribution

This study contributes to the existing body of knowledge by examining the extent to which core values influence the performance of individuals in carrying out the work undertaken within the organization. This research study specifically focuses on trainees within a military environment. Like the USAFA CCLD, other military research groups have examined training efficacy and leadership development. In particular, the Arroyo Center, U.S. Army’s Center for the Army Profession and Leadership, and RAND Corporation have undertaken studies to establish the efficacy of specific types of training. This research will contribute to and expand on these studies, while also contributing more generally to engineering management research focused on the role of core values on the performance of organizational members.
It is important for military training programs to produce quality leaders. Newly commissioned officers quickly go on to command multi-million-dollar aircraft, safeguard the nation’s nuclear weapons, and lead hundreds of troops. Both national defense and public trust dictate that military officers be able to lead effectively. Findings from this study can be used to assist military administrators in improving the efficacy of leadership training, as well as helping clarify the role of core values in the development of leaders.

1.2 Research Objectives

The objective of this research is to better understand whether knowledge of the U.S. Air Force's core values, which are an integral part of all Air Force military training programs, impacts the leadership development and/or overall performance of Air Force military trainees. In the U.S. Air Force, officer trainees are called cadets. The term cadets will be used to refer to the subjects of this study in the remainder of this thesis. The research questions underlying this study are summarized in Table 1-1.

Table 1-1. Summary of Research Questions

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<tr>
<td>1. How strongly do cadets feel that they</td>
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<td>a. Comprehend the U.S. Air Force core values?</td>
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<td>b. Can apply the U.S. Air Force core values?</td>
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<td>2. Does comprehension of the U.S. Air Force core values have an impact on</td>
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<td>a. Leadership attributes (communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, and being a role model)?</td>
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<td>b. Cadet performance?</td>
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<tr>
<td>3. Does the ability to apply the U.S. Air Force core values have an impact on</td>
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<tr>
<td>a. Leadership attributes (communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, and being a role model)?</td>
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<tr>
<td>b. Cadet performance?</td>
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</table>
4. Does the amount of time that cadets are exposed to U.S. Air Force core values have any impact on
   a. Comprehension of core values?
   b. Ability to apply the core values?
   c. Leadership attributes (communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, and being a role model)?
   d. Cadet performance?

1.3 Methodology

A review of the literature was conducted to understand existing research on the relationship between comprehension of organizational values, performance, and leadership. Surveys are a common tool used to evaluate individuals’ thoughts and perceptions on concepts, such as organizational values and the efficacy of organizational values.

The motivating question for this research, originating from the USAFA CCLD, helped inform the variables chosen and the setting in which the study would be administered. Because the majority of the U.S. Air Force’s new officers are commissioned through the Air Force Reserve Officer Training Corps (AFROTC), and since most cadets spend four years in the program, AFROTC was determined to be the best setting in which to conduct the study (Harrington & Terry, 2016). The independent variables were determined to be time exposed to core values, comprehension of each core value, and application of each core value. The dependent variables were cadet performance and eight leadership attributes, including communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, and being a role model. The dependent variables were identified through a synthesis of military leadership doctrine, AFROTC instructional materials, and AFROTC cadet performance and ranking metrics.

Incorporating quantitative performance data from peers and trainers of AFROTC cadets would provide helpful information in this type of study. However, these data are directly connected with
an individual cadet. As a result, it would not be possible for participants to remain anonymous if these data were collected and then matched with the perceptual data provided via a cadet survey. Given the sensitive nature of these data within the training environment, it was determined that self-report performance data would be used to maintain anonymity. It was determined that this would also help increase the likelihood of cadet participation.

Specific survey items were developed for each independent and dependent variable. Survey items focusing on the comprehension and application variables were developed and based upon Bloom’s Taxonomy levels 2 and 3 (Adams, 2015). Most survey items were structured to use a 7-point Likert Scale. The scale was defined using the following phrases:

- Strongly agree
- Agree
- Somewhat agree
- Neither agree nor disagree
- Somewhat disagree
- Disagree
- Strongly disagree

For ease-of-use and to maintain anonymity, the survey was administered online and used the survey software Qualtrics. The survey was distributed to AFROTC cadets at eight universities across the western United States via a recruitment email. Respondents clicked a link in the recruitment email and were directed to the survey.

Following data collection, the Kolmogorov-Smirnov goodness of fit test was used to assess each variable for normality. None of the variables were sufficiently normal, meaning that non-parametric correlation testing had to be employed. Cronbach’s alpha was then used to test internal reliability of the survey constructs and determine if any specific survey items should be removed.
to create reliable measures for each variable. Four items were removed from the survey data as a result of this analysis.

Spearman’s rank correlation was used to test the study hypotheses. Post hoc analysis was conducted on the leadership attribute variables and the cadet performance variables. This analysis was completed using Spearman’s rank correlation and the Kruskal-Wallis one-way analysis of variance test.

1.4 Conclusions

The results showed evidence that comprehension of the Air Force core values had only minor relationships with the leadership attributes tested in this study. Comprehension of values had no correlations to cadet performance. These findings suggest that simple comprehension of values likely is not enough to influence individuals’ behaviors, influence skill proficiency, develop leaders, or change levels of performance. A lack of any correlations with comprehension of the third Air Force core value, “excellence in all we do,” may indicate that this core value is more difficult for cadets to comprehend than the others.

Unlike comprehension of core values, the results showed that application of core values had a much larger impact on a cadet’s demonstration of leadership abilities, suggesting that as cadets have more opportunities to practice the core values, their leadership skills improve. Practitioners should therefore incorporate opportunities for trainees to practice applying values throughout the length of a training program. However, only one correlation was found between application of core values and cadet performance: application of “integrity first” and the Physical Fitness Assessment.
Surprisingly, the length of time exposed to core values showed no relationships with comprehension of core values, application of core values, or cadet performance, and only showed one significant relationship with a leadership attribute: delegation. These results suggest that the length of time a cadet is exposed to core values does not influence the level to which they comprehend or apply the core values. The relationship between time exposed to core values and delegation may be a result of the fact that cadets take on expanding areas of responsibility as they progress through the AFROTC program and must bolster their delegation skills accordingly. The lack of any correlations between time and cadet performance was surprising but may be explained by cadets having stable levels of performance relative to their peers in the same year group, upperclassmen burnout, a combination, or some other factor, not included in this study.

Post hoc findings concluded that there were significant correlations between most of the leadership attributes tested in this study, implying that leadership skills influence each other. The importance of physical fitness in the military, already seen in previous research, was further underlined in this study. Interestingly, CGPA was shown to have no correlations with any other variable. Field Training performance was not impacted by CGPA or Physical Fitness Assessment scores. Field Training performance did not, based on this study, influence any other variable, including cadre, peer, and self-ratings. This result may be due to the Field Training variables having limited variability. Additionally, cadre feedback was shown to impact Field Training rank; cadre, peer, and self-ratings were influenced by Physical Fitness Assessment score; and cadre, peer, and self-ratings were all correlated with each other.

The findings from this research can assist military and civilian leaders in developing more effective training programs. The relationships between organizational values, leadership skills, and performance in a training context are undoubtably complex, but this research sheds light on some
of the significant relationships between various elements included within a training context. AFROTC leaders can use these findings to guide the evaluation and development of curriculum. Cadre and cadet leadership can also use these findings to focus unit priorities throughout training. Finally, civilian leaders can use the findings from this study to create content for values-based training programs.

Ultimately, the findings of this study emphasize the importance of applying organizational values throughout training. These study results indicate that while stronger application of values is correlated to increased levels of leadership skills (using self-assessment data), the link between comprehending and applying organizational values and individual performance was not supported, indicating that additional research is needed to further untangle this web of relationships.
2 Literature Review

The literature reviewed for this study is focused in three primary areas: organizational values, leadership attributes, and performance. Much of the research literature reviewed references these three areas individually, as well as collectively. Literature on Bloom’s Taxonomy was also reviewed.

The two main online resources used to identify published papers to be included in the literature review were EBSCOhost and Google Scholar. Keywords used to identify relevant research are summarized in Table 2-1.

Table 2-1. Keywords for Literature Review

<table>
<thead>
<tr>
<th>Research Area</th>
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<td>● Team performance</td>
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<td>● Organizational performance</td>
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The following sections synthesize relevant research within each research area.

### 2.1 Organizational Values

Organizational values can have significant impacts on work environments. When deployed efficaciously, values have been shown to impact employee satisfaction, commitment, and cohesion (Boxx, Odom, & Dunn, 1991). Organizational values can also play a role in how effectively leaders and employees manage ethical dilemmas they are faced with (Liedtka, 1989).

Clarity of organizational values matters. Leaders and employees who feel that their organization’s values are clear reported more positive attitudes about their work, while those who felt the values were unclear reported unfavorable work attitudes (Posner & Schmidt, 1993).

The congruence of organizational and personal values is important as well. When the organization’s values are congruent with the personal values and beliefs of employees, the satisfaction, commitment, and cohesion of employees increases further, as well as the positive feelings associated with their work and impact (Boxx, Odom, & Dunn, 1991; Posner, 2010). When employees are unclear about their personal values, this congruence effect is limited, so it is important that both personal and organizational values are clear (Posner & Schmidt, 1993).
To be truly effective, organizational values should be emphasized at all levels of the organization. Leaders play a critical role in fostering a culture and climate that aligns with the organization’s values (Grojean, Resick, Dickson, & Smith, 2004). Leaders often do this unknowingly through establishing appropriate behavior, decision-making processes, and behavioral and organizational norms for their teams, as well as serving as a role model for their subordinates (Grojean, Resick, Dickson, & Smith, 2004; Shamir, House, & Arthur, 1993). Like the congruence effect seen with personal and organizational values, positive effects on employee satisfaction and commitment stem from congruence between the leader and subordinates’ values (Byza, Dorr, Schuh, & Maier, 2019; Meglino, Ravlin, & Adkins, 1989). Relationships between leaders and subordinates are often moderated by a perceived similarity in values; the more that a subordinate believes their values are aligned with a leader’s, the more that that subordinate will identify with the leader (Marstand, Epitropaki, & Martin, 2018). These results emphasize the importance of leaders modeling values that align with the values of the organization.

2.1.1 Length of Time Exposed to Values

As leaders are exposed to an organization’s values for longer time periods, those individuals tend to adopt the organization’s values, regardless of the individual’s predispositions or biases (Posner & Schmidt, 1992). Over time, individuals tend to express greater congruency between the organization’s values and their personal values, as well as greater clarity about the organization’s values (Posner, 2010). While there is evidence to indicate a correlation between the values that a manager holds and the manager’s success, there is also evidence suggesting that there may be no significant link between managerial success and the length of time exposed to values (England & Lee, 1974).
Incongruency between organizational values and personal values often leads to lower organizational commitment, which, in turn, leads to significantly higher employee turnover (Porter, Steers, Mowday, & Boulian, 1974). However, organizational commitment tends to increase in longer-tenured employees, further suggesting that there is a correlation over time between organizational values and personal values congruency (Meglino, Ravlin, & Adkins, 1989).

2.2 Leadership Attributes

The leadership attributes focused on in this study were determined by a review and analysis of applicable leadership doctrine for different branches of the United States military. Given that the United States Air Force is specifically targeted in the present study, Air Force literature was the starting point for this portion of the literature review.

New AFROTC cadets, who are generally freshmen in college, learn from the “Air and Space Studies 100” curriculum. This curriculum was developed by the Jeanne M. Holm Center for Officer Accessions and Citizen Development (“Holm Center”), which creates the AFROTC curriculum. The Holm Center is part of the Air Force’s training component, the Air Education and Training Command (AETC). One of the foci in this year-long curriculum is titled “The Air Force Leader.” Within this part of the curriculum, the Holm Center outlines recommended leadership traits and leadership principles for cadets and Air Force officers. Seventeen leadership traits and principles are covered, including: communication; decisiveness; take care of your people; know your job; educate yourself and others; motivate people; accept responsibility; and set the example
The U.S. Army and U.S. Marine Corps have also developed a widely known “11 Leadership Principles.” This set of leadership principles includes the following: make sound and timely decisions; ensure the task is understood, supervised, and accomplished; develop a sense of responsibility among your people; know your people and look out for their welfare; be technically and tactically proficient; seek responsibility and take responsibility for your actions; and set the example (United States Marine Corps; United States Army, 1990; United States Marine Corps, 2016).

There is significant overlap between these two sets of principles. From the descriptions provided in the curriculum and manuals regarding these principles, a refined set of testable variables was determined for the purposes of this study and included communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, and (being a) role model. The next sections will define and provide an overview each of these leadership attributes.

### 2.2.1 Communication

Communication competence strongly correlates to leadership efficacy. Communication competency is important in dyadic leader-follower relationships. High communication competency leads to high-quality transactional and transformational leadership between leader and follower (Flauto, 1999). Additionally, when supervisors are strong communicators, organizational performance tends to improve (Snyder & Morris, 1984).

Strong ratings of leadership communication, as rated by both the leaders themselves and their subordinates, have been repeatedly shown to correlate to high job satisfaction ratings in leaders.
and subordinates alike (Erben, Schneider, & Maier, 2019; Madlock, 2008; Schnake, Dumler, Cochran, & Barnett, 1990; Steele & Plenty, 2015). There are multiple facets of strong communication between leaders and subordinates, but supportive communication from a leader to a subordinate seems to be important, across a variety of leadership styles; precise and structured communication are also important (de Vries, Bakker-Pieper, & Oostenveld, 2010). Consistency between a leader’s words and actions builds trust in subordinates and thereby increases their motivation and engagement (Wang & Hsieh, 2013).

Communication skills are particularly important in stressful situations. Communication strategies such as positivity, listening, ensuring understanding, and appropriate body language have been shown to be a significant predictor of leader effectiveness during crises (Jamal & Bakar, 2017). The strong communication skills and appropriate responses of an organization’s leaders in times of crisis also protect an organization’s reputation in the eyes of the public, even when the crisis is the fault of individuals within that organization (Coombs, 2004).

Extroversion also leads to stronger communication performance (Chi & Huang, 2014; Thomas, Dickson, & Bliese, 2001). Extroverted leaders perform better and are promoted to top management positions at a higher rate than non-extroverts (Dulewicz & Herbert, 1999; Robertson, Gibbons, Baron, MacIver, & Nyfield, 1999).

Charismatic communication is also an important factor in leadership performance. The charisma of a leader is often revealed through the leader’s communication (Flauto, 1999). Charismatic communication has significant effects on leader emergence and ratings of a leader’s prototypicality (Antonakis, Fenley, & Liechti, 2011). Charisma has also been shown to correlate to better performance of the leader and the team (Russ, McNeilly, & Comer, 1996). Charismatic communication in leadership may also increase followers’ trust, feelings of self-worth,

2.2.2 Decision-Making

Leaders must make decisions. Often these decisions will be in complex, rapidly changing environments. History has shown that the decisions of a single leader can have disastrous results. One example is the death of 14 wildland firefighters during the South Canyon fire in 1994. Despite a poor operating environment and governmental error contributing to the deaths, analysts have nonetheless placed the majority of the blame on the team leader and his lack of experience making critical leadership decisions (Useem, Cook, & Sutton, 2005). Especially in a military context, the consequences for poor decision-making can quickly become deadly or have far-reaching impacts on the safety and security of individuals and nations.

Supervisors who use their intelligence and expertise to make better decisions are rated as more competent transformational and transactional leaders (Atwater & Yammarino, 1993). Acting decisively is important. When leaders make decisions quickly yet carefully, they are viewed as higher performers than their counterparts who delay or avoid decisions (Dulewicz & Herbert, 1999; Russ, McNeilly, & Comer, 1996). Some individuals try to make decisions too quickly and fail to collect relevant data prior to making a decision. Relevant data is almost always a prerequisite for making a good decision. Good leaders know to collect data on the current situation and the desired outcomes before making decisions, as this improves the success rate of decisions (Guerra-Lopez & Blake, 2011; Nutt, 2008).

An important component of decision-making is a focus on innovation and improvement. In a study done in the British Royal Navy, a forward-thinking mindset has been correlated with higher-
performing team managers, better job reviews, and is described as one of the most important management competencies (Young & Dulewicz, 2008).

2.2.3 Delegation

Leaders have a finite amount of time and attention they can dedicate to tasks. Delegating tasks to subordinate team members is, in many cases, preferential to dedicating the leader’s own resources through preparatory, supervisory, or collaborative efforts. By delegating project tasks to trusted subordinates, leaders are freer to spend time on other, possibly more pressing activities and tasks (Swank & Visser, 2006).

Although leaders generally have access to better and more complete information than team members, delegation of decisions and projects to subordinates may still be the better choice; if a leader chooses a project that an employee dislikes, it can be costly to motivate that employee on that project (Zábojník, 2002). Instead, delegating project ownership to employees provides great returns for managers. Delegation has been found to be a significant predictor of subordinates’ job performance (Leana, 1986).

By delegating to team members, leaders show they have high confidence in subordinates, which is highly motivational for the team (Swank & Visser, 2006; Yukl & Fu, 1999). In high-stress, rapidly changing environments, where extremely consequential decisions must be made quickly and accurately, a type of give-and-take delegation to and from senior leaders is key to ensuring reliable action (Klein, Ziegert, Knight, & Xiao, 2006). Delegation also helps less experienced team members learn and grow.

Delegation may also lead employees to better internalize organizational values. When given autonomy in their work – thereby providing experiential learning opportunities to see how high-
level organizational values can be enacted in daily decisions – employees tend to internalize organizational values better and have a clearer idea of the organization’s overarching goal (Peng, Pandey, & Pandey, 2015).

2.2.4 Empathy

Effective leaders are often extroverts, have strong interpersonal skills, and emphasize the feelings of others over a strictly rational outlook (Atwater & Yammarino, 1993; Jamal & Bakar, 2017; Thomas, Dickson, & Bliese, 2001; Wang & Hsieh, 2013). Effective leaders perceive variations in interpersonal communication when interacting with different groups or in different settings and are able to alter their own behavior and thinking as a result of these interactions. Effective leaders, therefore, are highly skilled at observing and understanding the needs of their team members and changing their responses to more effectively assist others (Kenny & Zaccaro, 1983). Team members notice when their leaders focus on the team’s wellbeing and, over time, tend to develop deep admiration for and trust in the leader, eventually forming a collective team identity congruent with the leader’s vision (Conger, Kanungo, & Menon, 2000).

Leaders who have a personality that emphasizes “feeling” (according to the Myers-Briggs Type Indicator personality test) receive higher leadership assessment ratings by both subordinates and superiors (Atwater & Yammarino, 1993; Goodyear, 1989). Indeed, displaying emotion has been shown to be a significant differentiator between below-average and superior leaders, indicating that showing emotion in leadership is an important factor in effective leadership (Young & Dulewicz, 2008). Expressing genuine concern and empathizing with others are hallmarks of effective leadership, especially during crises (Jamal & Bakar, 2017).
2.2.5 Job Knowledge

Knowledge of the team’s tasks, goals, and mission are crucial for a leader to understand. Job knowledge has been shown to impact performance ratings (Borman, White, Pulakos, & Oppler, 1991). When employees seek out and learn more about their work, overall job performance also improves (Zhang, 2017).

Not only does individual job knowledge impact performance, but when leaders share “candid insights and experiences, concerns about the project, personal beliefs and lessons learned,” group performance also improves and a culture of team information sharing and trust is developed (Lee, Gillespie, Mann, & Wearing, 2010, p. 485). Trust is crucial to team effectiveness. Feelings of trust within teams leads to sharing of knowledge and heightened performance (Chowdhury, 2005).

In studies of generalist versus specialist leaders, unit performance is higher with specialist leadership, indicating that deeper job expertise is important to effectively lead successful teams (Li & Patel, 2019). Experience in problem solving and evaluating risks within an industry is also important to team performance. If organizational leadership is well-versed in the specifics of an industry, organizational performance tends to improve (Hup Chan, 2010). Team performance is also improved when a strategy – created in large part by leaders’ experiences – is utilized (Dalenberg, Vogelaar, & Beersma, 2009).

Goals are also important for leaders and groups. Goal-oriented leadership is a precursor for goal-oriented teams, and leaders who guide their teams to stay focused on their goals reap larger returns in performance and success (Chi & Huang, 2014). Groups that establish difficult goals, specifically, are more motivated, task-focused, and successful than groups with weaker goal understanding or without goals (Knight, Durham, & Locke, 2001).
2.2.6 Motivation

In a study of the British Royal Navy, motivation was defined as “having drive and energy to achieve results” and was determined to be the most important single predictor of both overall performance and leadership (Young & Dulewicz, 2008, p. 26). Motivation was also found to be the only characteristic that significantly differentiated top and bottom performers in a leadership context (Young & Dulewicz, 2008). Multiple studies have shown that leaders who are better at motivating others and building enthusiasm in the face of risks are promoted into senior management roles at a significantly higher rate than those who were not as motivational (Dulewicz & Herbert, 1999; Robertson, Gibbons, Baron, MacIver, & Nyfield, 1999). Surprisingly, motivation can be undervalued. Having the internal motivation to take initiative and act has been shown to be significantly more important in the eyes of supervisors than subordinates tend to believe (Atwater & Yammarino, 1993).

Goal setting often leads to a more motivated team. Effective goal setting – generally prompted and directed by the team leader – has been shown to differentiate between high- and low-performing teams (Young & Dulewicz, 2008). Leaders who set demanding goals for their teams tend to perform better than those who do not (Dulewicz & Herbert, 1999).

Motivational and enthusiastic communication is even more important in stressful, challenging situations, as both team members and third parties look to leadership for guidance (Jamal & Bakar, 2017). Leaders are also generally responsible for team cohesion, which affects performance. Teams with higher cohesion perform better (Cohen & Bailey, 1997). Leaders must take responsibility for creating team cohesion.
2.2.7 Responsibility

In multiple studies of officer cadets in the Royal Military College of Canada, locus of control correlated the strongest with final evaluation scores in a standardized training environment. Cadets with an internal locus of control scored higher than their counterparts with an external locus of control (Bradley, Nicol, Charbonneau, & Meyer, 2002; Bradley & Nicol, 2006). Maintaining an internal locus of control may lead to improved job satisfaction and job performance, as well (Judge & Bono, 2001).

Showing initiative and being a self-starter for issues within one’s area of responsibility is important for leaders. Displaying these qualities of initiative, both personally and in directing a team, has a positive impact on performance and tends to fast-track a leader to positions of more leadership responsibility (Dulewicz & Herbert, 1999). Following a crisis event, organizational leaders who take responsibility for the crisis are viewed more positively and lead to a better rebound of organizational reputation than those that attempt to deny or diminish their involvement in the crisis (Claeys, Cauberghe, & Vyncke, 2010).

Leaders generally seek to build trust within a team and do this in a variety of ways, including taking responsibility for their own actions and the actions of the team, supporting the team through commitment and dedication, and building personal relationships. Trust in leadership, both high-level organizational leadership and direct supervisors, has been shown to improve employee task performance and risk-taking, while reducing counterproductive behavior (Colquitt, Scott, & LePine, 2007; Costigan, Ilter, & Berman, 1998; Dirks, 1999; Dirks & Ferrin, 2002). There is also evidence to suggest that employees may be more motivated, assertive, and show a greater personal initiative to improve professionally when there is a culture of trust in an organization (Costigan, Ilter, & Berman, 1998). This trust may improve group performance by channeling team members’
energy and motivation toward the team’s goals (Dirks, 1999). Overall, trust between a supervisor and employee – built through integrity, keeping promises, being receptive, and many other positive leadership traits – leads employees to exceed their prescribed job requirements and go above and beyond in pursuit of the team’s goals (Deluga, 1995). Finally, high team performance may lead to an increased trust in leadership for guiding the team to success, which may lead to heightened performance, creating a cyclical pattern of improved performance and trust (Dirks, 2000).

2.2.8 Role Model

Leaders serve as an important role model for those around them. Followers closely observe behavior, reactions, preferences, and lifestyles of leaders and use this information to determine the traits, values, beliefs, and behaviors that they themselves should develop (Shamir, House, & Arthur, 1993). It is for this reason that being a role model is a heavy responsibility for leaders. This effect may be even stronger when leaders subject themselves to personal risks and make personal sacrifices for the benefit of the team’s collective well-being and vision (Conger & Kanungo, 1987).

Emerging adults, approximately 18-25 years old, constitute the core age range of new military recruits, regardless of whether these recruits enlist or join an officer development program, such as AFROTC. Emerging adults are also particularly influenced by positive leadership qualities from individuals in leadership positions around them. Because of this, it is especially important for leaders to display the positive leadership qualities that they hope to impress upon younger and/or subordinate team members (Bowers, Rosch, & Collier, 2016). The importance of a role model may be compounded in minority contexts. Because males make up the majority in military units, females may benefit even more from positive female role models (Bowers, Rosch, & Collier, 2016).
Role models serve as mentors in many cases, including the education and training context in the present study. The U.S. Air Force defines mentorship as a “professional relationship in which a person with greater experience and wisdom guides another person to develop both personally and professionally. This relationship helps achieve mission success and motivates Airmen to achieve their goals” (United States Air Force, 2019, p. 2). Mentorship relationships have been shown to relate to positive outcomes in education and leadership (Bordes & Arredondo, 2005; Dugan & Komives, 2010). Mentorship activities, especially involving personal development and leadership empowerment – such as in an officer development program like AFROTC – are further linked to higher socially responsible leadership capacity (Campbell, Smith, Dugan, & Komives, 2012).

Overall, the behaviors of leaders can strongly influence their teams and the individual performance of team members. As leaders show concern for others, mutual respect, and care for the mission, their teams will follow (Conger, Kanungo, & Menon, 2000).

2.3 Performance

2.3.1 Individual Performance in Organizations

The KSA framework is commonly used to model key performance requirements in the execution of positional duties. “KSA” has two commonly-used definitions: “Knowledge, Skills, and Attitudes” and “Knowledge, Skills, and Abilities”. For the purposes of the present study, the latter definition will be used. KSAs are often displayed on applicant resumes, listed on position postings by job experts, used in performance evaluations, and more (Roulin & Bangerter, 2013; Van Iddekinge, Raymark, & Eidson, Jr., 2011).
Many organizations use some form of individual performance review process, in which a performance evaluation is delivered through both a written summary document and some type of verbal communication between an employee and their supervisor. Although evaluations vary across industries and organizations, most focus on specific KSAs. A wide variety of KSAs can be included in an evaluation and often identify the knowledge, skills, and abilities that are valued within the organization. Examples of KSAs included on performance evaluations are communication, problem-solving and decision-making skills, organizational skills, leadership skills, teamwork, professionalism, and more. KSAs are used to assess individual performance within their scope of responsibility. As individual employee performance has been shown to impact overall organizational success, evaluation and feedback opportunities between employees and supervisors are important, and the use of specific KSAs supports this process (Bonache & Noethen, 2014; Chang, Gong, & Peng, 2012; United States General Accounting Office, 2003).

2.3.2 Individual Performance in the U.S. Air Force

Like other types of organizations, the U.S. military uses KSAs to evaluate the performance of its servicemembers. KSAs used by the military include items that may not be routinely used in other types of organizations. Physical fitness, for example, is a unique military personnel requirement resulting from the unique responsibilities of military organizations. There is also a leadership component to physical fitness, as physical fitness has been shown to be predictive of leader emergence and effectiveness in a military environment as well as a buffer for stress (Atwater, Dionne, Avolio, Camobreco, & Lau, 1999; Taylor, et al., 2008).

Both enlisted and officer personnel in the U.S. Air Force undergo frequent performance evaluations. These evaluations involve both the servicemember and their supervisor and typically use an Airman Comprehensive Assessment Worksheet, an Enlisted Performance Report (EPR), or
an Officer Performance Report (OPR). These documents, particularly the Airman Comprehensive Assessment Worksheet, specifically outline the knowledge, skills, and abilities that are expected of servicemembers at different military ranks.

The Airman Comprehensive Assessment Worksheet for most enlisted ranks, AF Form 931, includes the following KSAs to assess performance (United States Air Force, 2017):

- Task knowledge/proficiency
- Initiative/motivation
- Completion of skill level upgrade training
- Fulfillment of duty position requirements, qualifications, and certifications
- Training of others
- Resource utilization
- Comply with/enforce standards
- Communication skills
- Promotes caring, respectful, and dignified environment
- Adheres to the Air Force core values
- Pursues personal and professional development
- Esprit de corps and community relations

The Airman Comprehensive Assessment Worksheet for most officer ranks, AF Form 724, includes the following KSAs to assess officer performance (United States Air Force, 2014):

- Job knowledge
- Leadership skills
- Professional qualities
- Organizational skills
- Judgment and decisions
- Communication skills
- Physical fitness
The evaluation criteria for enlisted and officer personnel is notably different. This is due in part to the fact that within the organization, enlisted personnel are subject matter experts while officers are unit leaders. In both the enlisted and officer corps, KSAs are used to measure the individual performance of Air Force servicemembers.

2.3.3 Individual Performance in AFROTC

Like the U.S. Air Force at-large, KSAs are also used in AFROTC to determine individual levels of cadet performance. The KSAs at the cadet level generally include metrics like college cumulative grade point average (GPA), AFROTC exam scores, and physical fitness assessments – aligning well with knowledge, skills, and abilities, respectively. These KSAs are used to provide feedback to cadets and to stratify and rank cadets against their peers, both at the unit level and nationally.

AFROTC ranks cadets for a variety of reasons throughout their cadet careers. For example, a ranking for a college scholarship includes different quantitative factors and weights than a ranking for entrance into a competitive Air Force career field. The factors and weights included in each ranking are reviewed, and changes made, each academic year by AFROTC headquarters. Two of the most common times that cadets are ranked are for the Professional Officer Course Selection Process and for career field selections.

Each spring, underclassmen AFROTC cadets compete for a spot in the Professional Officer Course (POC). Cadets in the POC hold “cadet officer” ranks, from Cadet Second Lieutenant to Cadet Colonel, and have leadership authority within cadet operations. Although there are differences across individual AFROTC units, cadets in the POC are generally responsible for organizing and executing all cadet activities as well as training the underclassmen cadets, preparing them for
formal evaluations. With a few rare exceptions, a spot in the POC also requires a signed contract for military service (if cadets have not already signed a service contract in exchange for a scholarship).

The POC Selection Process (PSP) includes a national AFROTC selection board that determines how many POC – and therefore, how many Second Lieutenants from AFROTC in 2-3 years – are needed to fulfill Air Force manning requirements. Once the required number of Second Lieutenants from AFROTC is determined and all AFROTC cadets in a specific fiscal year are nationally stratified and ranked, the selection board determines which cadets will have the opportunity to proceed into the POC (United States Air Force, 2018).

In academic year 2020, this ranking is composed of 55% Commander’s Ranking, 25% college cumulative GPA, and 20% Air Force physical fitness assessment score, as shown in Figure 2-1 (AFROTC Registrar, 2020). The Commander’s Ranking that is mentioned throughout this section is a qualitative ranking at the discretion of each AFROTC unit commander.

Cadets are also commonly ranked for career field selections, particularly “rated” careers. The Air Force has specific career fields that are designated as “rated,” meaning that all personnel in those careers are qualified (“rated”) to be on a flight crew. “Rated” careers include pilots, aircraft navigators, aircraft combat systems operators (like gunners or bombardiers), and others.

A national Air Force selection board is convened to determine who is selected to enter rated career fields. A major component of the board’s decision is the quantitative ranking of each candidate. In academic year 2020, the ranking for rated boards is composed of 40% rated career aptitude tests (dependent on which careers the individual is pursuing), 25% Commander’s Ranking, 15% Field Training leadership evaluation, 10% college cumulative GPA, and 10% Air Force physical fitness
assessment score, as shown in Figure 2-1 (AFROTC Registrar, 2019). Field Training is the extended leadership evaluation that takes place the summer before cadets enter the upperclassmen ranks of the POC.

2.3.4 Individual Performance Rankings at Oregon State University’s AFROTC Unit

Along with the metrics used to determine rankings discussed in the previous sections, each AFROTC unit commander, generally a Lieutenant Colonel or Colonel with 16 to 23 years of experience in the military, determines Commander Ranks for all cadets in the unit.

At Oregon State University’s AFROTC unit, the following ranking components are used by AFROTC staff to suggest a ranking to the unit commander: 30% primary AFROTC instructor qualitative ranking, 18% alternate AFROTC instructor qualitative ranking, 16% college cumulative GPA, 12% non-commissioned officer (NCO) qualitative rankings (6% for each of the two NCOs), 8% Air Force physical fitness assessment score, 8% Field Training leadership evaluation, 4% AFROTC academic course grades, and 4% Air Force Officer Qualifying Test (AFOQT) Academic Aptitude score (which includes verbal skills, arithmetic skills, word knowledge, and math knowledge) (M. VanderLaan, personal communication, October 2, 2019). This breakdown is shown in Figure 2-1.
Figure 2-1. Components and Weights for AFROTC Rankings: Air Force ROTC POC selection process (left), rated career selection (middle), and Detachment 685 (Oregon State University)’s staff recommendation to the commander for commander’s ranking (right). Adapted from ARMS-AFROTC-20-038-DET ACTION – CY20 Professional Officer Course (POC) Selection Process (PSP), AFROTC Registrar, 2020; ARMS-AFROTC-20-023-DET ACTION – FY21 Rated Board, AFROTC Registrar, 2019; M. VanderLaan, personal communication, 2019.
The ranking list produced by these metrics is a recommendation to the AFROTC unit commander, who has the final determination of Commander’s Ranking. Note that as GPA, physical fitness assessment score, Field Training performance, and AFOQT score are included in both the Commander’s Ranking recommendation and other rankings, these scores are factored in twice.

This set of metrics to establish a suggested Commander’s Ranking is specific to the AFROTC unit at Oregon State University. Each AFROTC unit has its own methodology to determine their unit Commander’s Ranking.

2.3.5 Self-Appraisal and Self-Reporting

In the present study, AFROTC cadets were asked to self-report information that was used as a measure of cadets’ past performance. Generally, self-reported ratings are different than ratings from supervisors and are influenced by a multitude of external factors (Shore & Tashchian, 2002). Self-reported ratings tend to be higher, with at least 40%, and sometimes over 80%, of employees self-reporting that they are performing within the top 10%; meanwhile, no more than 1-2% will place themselves in any below-average category (Meyer, 1980; Thornton, 1980). This effect is seen at all organizational levels, from low-level employees to the C-suite (Thornton, 1968). This finding is not universally held, however, and there are circumstances where specific questions/activities and a shared pool of performance data, such as specific activity reports or evaluations, tend to produce more congruent supervisor- and self-ratings (Farh, Werbel, & Bedeian, 1988). Therefore, self-report ratings may be more accurate in a context like AFROTC, since performance metrics are clearly outlined and then used for formal evaluations.

In the present study, there is only one subjective self-appraisal and self-report survey item. The remaining survey items that constitute the cadet performance variable ask respondents to self-
report a previously assigned rating that they have received through official AFROTC assessments. The accuracy of self-reporting a previously assigned rating is, in general, higher than self-appraisals. Previous studies have found that asking respondents about specific metrics like cumulative college GPA are of moderate accuracy, but are both underestimated and overestimated depending on the situation in which the value is reported (Cassady, 2000; Cassady, 2001; Dobbins, Farh, & Werbel, 1993; Schwartz & Beaver, 2015). Self-report accuracy is moderate to high when reporting physical activity, especially if the activity is particularly vigorous, such as in a formal Air Force physical fitness assessment (Han & Dinger, 2009; Richardson, Ainsworth, Jacobs, Jr., & Leon, 2001; Sallis & Saelens, 2000). This level of recall accuracy is similar whether responding in-person or remotely (Hayden-Wade, Coleman, Sallis, & Armstrong, 2003). However, there remains a trend for the lowest performing individuals to slightly inflate self-reported scores (Cassady, 2000; Dobbins, Farh, & Werbel, 1993). Ultimately, self-reporting has the key benefit of anonymity, which was determined to be essential in ensuring broad participation in the present study.

2.4 Bloom’s Taxonomy

Bloom’s taxonomy is a hierarchical system of organizing educational objectives, ranging from “Knowledge/Remembering” (Level 1) to “Evaluation/Creating” (Level 6). Bloom’s taxonomy is generally used in educational environments and is common in Science, Technology, Engineering, and Mathematics (STEM) disciplines. It is often used as a method to develop questions that target specific levels of educational proficiency, with increasing levels of difficulty (Ursani, Memon, & Chowdhry, 2014). For example, the “Knowledge/Remembering” tasks may be repeating simple
information to show retention, while “Evaluation/Creating” tasks may be generating something original, like designing a product or writing a report (Adams, 2015).

Bloom’s taxonomy has been shown to be an accurate model to base assessments. The six levels within the system correctly represent the described educational objectives (Ursani, Memon, & Chowdhry, 2014). It remains a common tool in engineering and education, including at the university level. Some researchers have previously used it to evaluate curriculum and target possible areas of improvement (Spivey, 2007). Bloom’s taxonomy was applied in this way to the present study. The literature documents the use of Bloom’s taxonomy in a variety of studies since its creation in 1956, providing evidence of its applicability and value in measuring learning (Seaman, 2010).
3  Research Methodology

This chapter describes the methodology used for this study and describes the variables, hypotheses, and survey instrument used to collect the data for this study. Survey administration and data analyses details are also described.

3.1 Variables

The motivation for this research stemmed, in part, from the U.S. Air Force Academy’s Center for Character and Leadership Development (USAFA CCLD). The CCLD staff conduct their own research studies on topics such as training efficacy, group accountability, loyalty, and responses to training, primarily at the U.S. Air Force Academy in Colorado Springs, CO, where they are based. They expressed interest in learning more about the role of core values on officer candidate development. The CCLD put forward two primary questions: (1) How do cadets perceive the core values? and (2) What benefits do the core values bring to the training program? The variables for this study were developed with the goal of helping to answer these questions.

3.1.1 Independent Variables

The independent variables are focused on the level of comprehension and ability to apply core values, as well as the amount of time that cadets were exposed to the core values. The three core values of the U.S. Air Force are “integrity first,” “service before self,” and “excellence in all we do” (United States Air Force, 1997). The independent variables and definitions are summarized in Table 3-1.
Table 3-1. Definition of Independent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Comprehension of “Integrity First”</td>
<td>Comprehension and understanding of the Air Force core value of “integrity first.”</td>
</tr>
<tr>
<td>Comprehension of “Service Before Self”</td>
<td>Comprehension and understanding of the Air Force core value of “service before self.”</td>
</tr>
<tr>
<td>Comprehension of “Excellence in All We Do”</td>
<td>Comprehension and understanding of the Air Force core value of “excellence in all we do.”</td>
</tr>
<tr>
<td>Application of “Integrity First”</td>
<td>The frequency and ease with which a cadet applies the Air Force core value of “integrity first” in daily life, outside of a classroom setting.</td>
</tr>
<tr>
<td>Application of “Service Before Self”</td>
<td>The frequency and ease with which a cadet applies the Air Force core value of “service before self” in daily life, outside of a classroom setting.</td>
</tr>
<tr>
<td>Application of “Excellence in All We Do”</td>
<td>The frequency and ease with which a cadet applies the Air Force core value of “excellence in all we do” in daily life, outside of a classroom setting.</td>
</tr>
<tr>
<td>Time Exposed to Core Values</td>
<td>The total length of time that a cadet has been exposed to the Air Force core values, whether in Air Force ROTC or in prior Air Force enlisted experience.</td>
</tr>
</tbody>
</table>

3.1.2 Dependent Variables

The dependent variables were identified through a synthesis of literature on leadership, military leadership doctrine, AFROTC instructional materials, and AFROTC cadet performance and ranking metrics. The dependent variables are defined in Table 3-2.

Table 3-2. Definition of Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>Ability to communicate with others effectively both via strong listening skills as well as an ability to clearly and thoughtfully convey ideas.</td>
</tr>
<tr>
<td>Decision-Making</td>
<td>Ability to make sound and timely decisions, often in complex and rapidly changing situations.</td>
</tr>
<tr>
<td>Delegation</td>
<td>Ability to appropriately assign projects and tasks to team members/subordinates, which enables the cadet to spend more time planning and supervising.</td>
</tr>
<tr>
<td>---------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Empathy</td>
<td>The expression of genuine concern for and a desire to help team members/subordinates grow.</td>
</tr>
<tr>
<td>Job Knowledge</td>
<td>Knowledge of the team’s tasks, goals, and mission, and a desire to continue improving that knowledge.</td>
</tr>
<tr>
<td>Motivation</td>
<td>Ability to motivate team members/subordinates by building enthusiasm about the mission.</td>
</tr>
<tr>
<td>Responsibility</td>
<td>Ability to show initiative, correct for mistakes, and take responsibility for one’s own actions and – when in a leadership role – the actions of the team.</td>
</tr>
<tr>
<td>Role Model</td>
<td>Ability to set a good example through the cadet’s ability to consistently demonstrate high standards of performance and conduct.</td>
</tr>
<tr>
<td>Cadet Performance</td>
<td>Overall cadet performance within Air Force ROTC, based upon the data that are used to determine Air Force ROTC cadet rankings.</td>
</tr>
</tbody>
</table>

### 3.2 Hypotheses

Hypotheses were constructed based upon the research questions described in Chapter 1 and are summarized in Table 1-1. Hypotheses H1a-i, H2a-i, and H3a-i focus on the relationship between comprehension of each U.S. Air Force core value, leadership attributes (communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, and being a role model), and cadet performance. H1 focuses on the first U.S. Air Force core value: “integrity first.” H2 focuses on the second: “service before self.” H3 focuses on the third: “excellence in all we do.” Figure 3-1 provides a pictorial representation of the hypotheses within H1. All hypotheses for H1, H2, and H3 are summarized in Appendices A, B, and C, respectively. Table 3-3 outlines all hypotheses associated with H1, H2, and H3.
Figure 3-1. Research Hypothesis H1

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1a</td>
<td>Comprehension of “integrity first” has a direct relationship with communication</td>
</tr>
<tr>
<td>H1b</td>
<td>Comprehension of “integrity first” has a direct relationship with decision-making</td>
</tr>
<tr>
<td>H1c</td>
<td>Comprehension of “integrity first” has a direct relationship with delegation</td>
</tr>
<tr>
<td>H1d</td>
<td>Comprehension of “integrity first” has a direct relationship with empathy</td>
</tr>
<tr>
<td>H1e</td>
<td>Comprehension of “integrity first” has a direct relationship with job knowledge</td>
</tr>
<tr>
<td>H1f</td>
<td>Comprehension of “integrity first” has a direct relationship with motivation</td>
</tr>
<tr>
<td>H1g</td>
<td>Comprehension of “integrity first” has a direct relationship with responsibility</td>
</tr>
<tr>
<td>H1h</td>
<td>Comprehension of “integrity first” has a direct relationship with being a role model</td>
</tr>
<tr>
<td>H1i</td>
<td>Comprehension of “integrity first” has a direct relationship with cadet performance</td>
</tr>
</tbody>
</table>

H2a: Comprehension of “service before self” has a direct relationship with communication
<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H2b</td>
<td>Comprehension of “service before self” has a direct relationship with decision-making</td>
</tr>
<tr>
<td>H2c</td>
<td>Comprehension of “service before self” has a direct relationship with delegation</td>
</tr>
<tr>
<td>H2d</td>
<td>Comprehension of “service before self” has a direct relationship with empathy</td>
</tr>
<tr>
<td>H2e</td>
<td>Comprehension of “service before self” has a direct relationship with job knowledge</td>
</tr>
<tr>
<td>H2f</td>
<td>Comprehension of “service before self” has a direct relationship with motivation</td>
</tr>
<tr>
<td>H2g</td>
<td>Comprehension of “service before self” has a direct relationship with responsibility</td>
</tr>
<tr>
<td>H2h</td>
<td>Comprehension of “service before self” has a direct relationship with being a role model</td>
</tr>
<tr>
<td>H2i</td>
<td>Comprehension of “service before self” has a direct relationship with cadet performance</td>
</tr>
<tr>
<td>H3a</td>
<td>Comprehension of “excellence in all we do” has a direct relationship with communication</td>
</tr>
<tr>
<td>H3b</td>
<td>Comprehension of “excellence in all we do” has a direct relationship with decision-making</td>
</tr>
<tr>
<td>H3c</td>
<td>Comprehension of “excellence in all we do” has a direct relationship with delegation</td>
</tr>
<tr>
<td>H3d</td>
<td>Comprehension of “excellence in all we do” has a direct relationship with empathy</td>
</tr>
<tr>
<td>H3e</td>
<td>Comprehension of “excellence in all we do” has a direct relationship with job knowledge</td>
</tr>
<tr>
<td>H3f</td>
<td>Comprehension of “excellence in all we do” has a direct relationship with motivation</td>
</tr>
<tr>
<td>H3g</td>
<td>Comprehension of “excellence in all we do” has a direct relationship with responsibility</td>
</tr>
<tr>
<td>H3h</td>
<td>Comprehension of “excellence in all we do” has a direct relationship with being a role model</td>
</tr>
<tr>
<td>H3i</td>
<td>Comprehension of “excellence in all we do” has a direct relationship with cadet performance</td>
</tr>
</tbody>
</table>

Hypotheses H4, H5, and H6 focus on the relationship between the ability to apply each U.S. Air Force core value, leadership attributes (communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, and being a role model), and cadet performance. H4 focuses on the first U.S. Air Force core value: “integrity first.” H5 focuses on the second: “service before self.” H6 focuses on the third: “excellence in all we do.” Figure 3-2 provides a pictorial representation of the hypotheses within H4. All hypotheses for H4, H5, and H6 are summarized in Appendices D, E, and F, respectively. Table 3-4 outlines all hypotheses associated with H4, H5, and H6.
Figure 3-2. Research Hypothesis H4

Table 3-4. Research Hypotheses H4a-i, H5a-i, and H6a-i

<table>
<thead>
<tr>
<th>Hypothesis</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>H4a</td>
<td>Ability to apply “integrity first” has a direct relationship with communication</td>
</tr>
<tr>
<td>H4b</td>
<td>Ability to apply “integrity first” has a direct relationship with decision-making</td>
</tr>
<tr>
<td>H4c</td>
<td>Ability to apply “integrity first” has a direct relationship with delegation</td>
</tr>
<tr>
<td>H4d</td>
<td>Ability to apply “integrity first” has a direct relationship with empathy</td>
</tr>
<tr>
<td>H4e</td>
<td>Ability to apply “integrity first” has a direct relationship with job knowledge</td>
</tr>
<tr>
<td>H4f</td>
<td>Ability to apply “integrity first” has a direct relationship with motivation</td>
</tr>
<tr>
<td>H4g</td>
<td>Ability to apply “integrity first” has a direct relationship with responsibility</td>
</tr>
<tr>
<td>H4h</td>
<td>Ability to apply “integrity first” has a direct relationship with being a role model</td>
</tr>
<tr>
<td>H4i</td>
<td>Ability to apply “integrity first” has a direct relationship with cadet performance</td>
</tr>
<tr>
<td>H5a</td>
<td>Ability to apply “service before self” has a direct relationship with communication</td>
</tr>
</tbody>
</table>
H5b: Ability to apply “service before self” has a direct relationship with decision-making
H5c: Ability to apply “service before self” has a direct relationship with delegation
H5d: Ability to apply “service before self” has a direct relationship with empathy
H5e: Ability to apply “service before self” has a direct relationship with job knowledge
H5f: Ability to apply “service before self” has a direct relationship with motivation
H5g: Ability to apply “service before self” has a direct relationship with responsibility
H5h: Ability to apply “service before self” has a direct relationship with being a role model
H5i: Ability to apply “service before self” has a direct relationship with cadet performance

H6a: Ability to apply “excellence in all we do” has a direct relationship with communication
H6b: Ability to apply “excellence in all we do” has a direct relationship with decision-making
H6c: Ability to apply “excellence in all we do” has a direct relationship with delegation
H6d: Ability to apply “excellence in all we do” has a direct relationship with empathy
H6e: Ability to apply “excellence in all we do” has a direct relationship with job knowledge
H6f: Ability to apply “excellence in all we do” has a direct relationship with motivation
H6g: Ability to apply “excellence in all we do” has a direct relationship with responsibility
H6h: Ability to apply “excellence in all we do” has a direct relationship with being a role model
H6i: Ability to apply “excellence in all we do” has a direct relationship with cadet performance

Hypothesis H7 focuses on the relationship between the time that an individual has been exposed to the U.S. Air Force core values, comprehension of each core value, ability to apply each core value, leadership attributes (communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, and being a role model), and cadet performance. Any relationship – or lack of relationship – between the independent variables (time exposed to core values, comprehension of core values, and ability to apply core values) may provide valuable insight into how cadets in AFROTC comprehend or apply values at different periods of time in the program. Figure 3-3 and Appendix G provide a pictorial representation of the hypotheses within H7. Table 3-5 outlines all hypotheses associated with H7.
Table 3-5. Research Hypothesis H7a-o

H7a: Time exposed to core values has a direct relationship with comprehension of “integrity first”
H7b: Time exposed to core values has a direct relationship with comprehension of “service before self”
H7c: Time exposed to core values has a direct relationship with comprehension of “excellence in all we do”
H7d: Time exposed to core values has a direct relationship with the ability to apply “integrity first”
H7e: Time exposed to core values has a direct relationship with the ability to apply “service before self”
H7f: Time exposed to core values has a direct relationship with the ability to apply “excellence in all we do”
H7g: Time exposed to core values has a direct relationship with communication
H7h: Time exposed to core values has a direct relationship with decision-making
H7i: Time exposed to core values has a direct relationship with delegation
H7j: Time exposed to core values has a direct relationship with empathy
H7k: Time exposed to core values has a direct relationship with job knowledge
H7l: Time exposed to core values has a direct relationship with motivation
H7m: Time exposed to core values has a direct relationship with responsibility
H7n: Time exposed to core values has a direct relationship with being a role model
H7o: Time exposed to core values has a direct relationship with cadet performance

3.3 Survey Creation

The purpose of this study is to evaluate the impact of core values on leadership development and overall trainee performance in a military training environment. A survey was determined to be the best method to collect data. Incorporating standardized, quantitative performance data from peers and evaluators of AFROTC cadets would provide additional, helpful information in this study. However, these data would require identification of cadets, and participants could not remain anonymous for performance data to be matched with survey responses. Without a strictly anonymous survey, there was an increased risk that respondents’ identities could be determined and a subsequent associated risk of negative repercussions from the U.S. Air Force and/or AFROTC, if information presented a cadet in a negative light. As a result, a self-reported, anonymous survey was used. The anonymity of the survey potentially enabled higher participation rates and allowed respondents to be honest in their responses without fear of repercussions.
Because respondents were asked to self-report several performance metrics, such as collegiate cumulative GPA, AFROTC physical fitness scores, and rankings from AFROTC performance evaluations, there is a chance that some cadets submitted responses that would suggest they are performing at a higher level than in actuality.

### 3.3.1 Survey Items

Multiple survey items were developed for each variable. Most survey items were structured to use a 7-point Likert Scale of agreement (Strongly agree, Agree, Somewhat agree, Neither agree nor disagree, Somewhat disagree, Disagree, Strongly disagree). Survey items were formatted to utilize a standard structure whenever possible to allow respondents to complete the survey efficiently.

The survey items used to measure the independent variables are summarized in Table 3-6. The survey items used to measure the dependent variables are summarized in Table 3-7. For survey items that did not use Likert responses, the requested response is provided in italics. For survey items that are dependent on specific responses to other items, prerequisite responses are indicated with an arrow (→), and the survey item is shown after the arrow.

### Table 3-6. Survey Items for Independent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Survey Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Exposed to Core Values</td>
<td>I joined AFROTC in… (select a term and year)</td>
</tr>
<tr>
<td></td>
<td>I have prior Air Force enlisted experience → I joined the Air Force in…</td>
</tr>
<tr>
<td></td>
<td>(select a month and year)</td>
</tr>
<tr>
<td></td>
<td>I have prior Air Force enlisted experience → I separated from the Air Force</td>
</tr>
<tr>
<td></td>
<td>in… (select a month and year)</td>
</tr>
<tr>
<td></td>
<td>(If you’re still on guard or reserve status, put the month and year you</td>
</tr>
<tr>
<td></td>
<td>joined AFROTC)</td>
</tr>
<tr>
<td>Comprehension of “Integrity</td>
<td>I can recite the first Air Force core value</td>
</tr>
<tr>
<td>First”</td>
<td>I understand the Air Force core value of “integrity first”</td>
</tr>
<tr>
<td></td>
<td>I can explain the meaning of the Air Force core value of “integrity first” to someone else</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Comprehension of “Service Before Self”</th>
<th>I can describe the importance of the Air Force core value of “integrity first”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I can recite the second Air Force core value</td>
</tr>
<tr>
<td></td>
<td>I understand the Air Force core value of “service before self”</td>
</tr>
<tr>
<td></td>
<td>I can explain the meaning of the Air Force core value of “service before self” to someone else</td>
</tr>
<tr>
<td></td>
<td>I can describe the importance of the Air Force core value of “service before self”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Comprehension of “Excellence in All We Do”</th>
<th>I can recite the third Air Force core value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I understand the Air Force core value of “excellence in all we do”</td>
</tr>
<tr>
<td></td>
<td>I can explain the meaning of the Air Force core value of “excellence in all we do” to someone else</td>
</tr>
<tr>
<td></td>
<td>I can describe the importance of the Air Force core value of “excellence in all we do”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application of “Integrity First”</th>
<th>I am able to apply the Air Force core value of “integrity first” during AFROTC training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I rely on the Air Force core value of “integrity first” when making decisions</td>
</tr>
<tr>
<td></td>
<td>I find myself using the Air Force core value of “integrity first” when solving problems</td>
</tr>
<tr>
<td></td>
<td>I find that my actions are impacted by the Air Force core value of “integrity first” when executing the mission</td>
</tr>
<tr>
<td></td>
<td>During the last month, I acted differently on at least one occasion because of the Air Force core value of “integrity first”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application of “Service Before Self”</th>
<th>I am able to apply the Air Force core value of “service before self” during AFROTC training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I rely on the Air Force core value of “service before self” when making decisions</td>
</tr>
<tr>
<td></td>
<td>I find myself using the Air Force core value of “service before self” when solving problems</td>
</tr>
<tr>
<td></td>
<td>I find that my actions are impacted by the Air Force core value of “service before self” when executing the mission</td>
</tr>
<tr>
<td></td>
<td>During the last month, I acted differently on at least one occasion because of the Air Force core value of “service before self”</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Application of “Excellence in All We Do”</th>
<th>I am able to apply the Air Force core value of “excellence in all we do” during AFROTC training</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>I rely on the Air Force core value of “excellence in all we do” when making decisions</td>
</tr>
<tr>
<td></td>
<td>I find myself using the Air Force core value of “excellence in all we do” when solving problems</td>
</tr>
<tr>
<td></td>
<td>I find that my actions are impacted by the Air Force core value of “excellence in all we do” when executing the mission</td>
</tr>
<tr>
<td></td>
<td>During the last month, I acted differently on at least one occasion because of the Air Force core value of “excellence in all we do”</td>
</tr>
<tr>
<td>Variable</td>
<td>Survey Item</td>
</tr>
<tr>
<td>----------</td>
<td>-------------</td>
</tr>
<tr>
<td>Cadet Performance</td>
<td>My academic major is considered by AFROTC to be… (&quot;tech&quot;, &quot;non-tech&quot;, not known)</td>
</tr>
<tr>
<td></td>
<td>My current college cumulative GPA is… (insert a number in the format X.XX)</td>
</tr>
<tr>
<td></td>
<td>My most recent Physical Fitness Assessment score was… (insert a number in the format XX.X)</td>
</tr>
<tr>
<td></td>
<td>I completed Field Training ➔ My ranking within my Field Training flight was… (top-third, middle-third, bottom-third, not known)</td>
</tr>
<tr>
<td></td>
<td>I completed Field Training ➔ My ranking within my Field Training MAX was… (top-third, middle-third, bottom-third, not known)</td>
</tr>
<tr>
<td></td>
<td>I completed Field Training ➔ While at Field Training, I received the Distinguished Graduate Award or Superior Performance Award… (yes, no)</td>
</tr>
<tr>
<td></td>
<td>In feedback I have received from cadre, I have usually been ranked… (top-third, middle-third, bottom-third, not known)</td>
</tr>
<tr>
<td></td>
<td>In feedback I have received from AFROTC peers, I have usually been ranked… (top-third, middle-third, bottom-third, not known)</td>
</tr>
<tr>
<td></td>
<td>Thinking about my performance in AFROTC – including attributes such as leadership, followership, physical fitness, aerospace studies classes, and AFROTC extracurriculars – I would rate my performance as a cadet, in comparison to my AS-class peers, as… (top 10%, top 25%, top 50%, bottom 50%, bottom 25%, bottom 10%)</td>
</tr>
<tr>
<td>Communication</td>
<td>I communicate clearly with my AFROTC teammates and supervisor</td>
</tr>
<tr>
<td></td>
<td>I listen attentively when others on my AFROTC team are speaking to me</td>
</tr>
<tr>
<td></td>
<td>I think about how others from my AFROTC team might react to what I say</td>
</tr>
<tr>
<td></td>
<td>I take notes during AFROTC activities for later review</td>
</tr>
<tr>
<td>Decision-Making</td>
<td>I know when to delegate decisions to others when faced with a problem in AFROTC</td>
</tr>
<tr>
<td></td>
<td>I gather essential information before making a decision in AFROTC</td>
</tr>
<tr>
<td></td>
<td>I can make decisions quickly in rapidly-changing situations during AFROTC activities</td>
</tr>
<tr>
<td></td>
<td>I make decisions that lead my AFROTC team to be successful</td>
</tr>
<tr>
<td>Delegation</td>
<td>I share work with my AFROTC team members</td>
</tr>
<tr>
<td></td>
<td>I follow up on tasks that I have delegated to AFROTC team members</td>
</tr>
<tr>
<td></td>
<td>I ask my AFROTC team members if they understand tasks I have assigned to them</td>
</tr>
<tr>
<td></td>
<td>I set clear expectations for specific results when delegating tasks to others on my AFROTC team</td>
</tr>
<tr>
<td></td>
<td>I spend more time focusing on the “big picture” issues than the details when leading a team in AFROTC</td>
</tr>
<tr>
<td>Empathy</td>
<td>I know the strengths and weaknesses of members of my AFROTC team</td>
</tr>
<tr>
<td></td>
<td>I seek out ways to help members of my AFROTC team</td>
</tr>
<tr>
<td></td>
<td>I know about my team members’ lives outside of AFROTC</td>
</tr>
<tr>
<td></td>
<td>I am sensitive to the individual goals of AFROTC team members</td>
</tr>
<tr>
<td>Job Knowledge</td>
<td>I know the mission and goals of my AFROTC team</td>
</tr>
<tr>
<td></td>
<td>I strive to improve my job knowledge to perform my AFROTC duties better</td>
</tr>
<tr>
<td></td>
<td>I support my team members with my knowledge of their AFROTC duties</td>
</tr>
<tr>
<td></td>
<td>I perform the duties of my AFROTC cadet job well</td>
</tr>
</tbody>
</table>

| Motivation                          | I generate enthusiasm about our tasks for the day when in my AFROTC team |
|                                     | I recognize the members of my AFROTC team for outstanding effort |
|                                     | I am optimistic even when my AFROTC team is facing challenges |
|                                     | I share my vision with my AFROTC team |

| Responsibility                      | I take responsibility for my actions in AFROTC, even if something goes wrong |
|                                     | I exercise initiative to help fix problems that confront my AFROTC team |
|                                     | I often ask others in AFROTC for feedback |
|                                     | I take action to correct mistakes within my AFROTC cadet job area of responsibility |
|                                     | I take responsibility for my AFROTC team’s success or failure |

| Role Model                          | I am always early to AFROTC events |
|                                     | I act professionally when interacting with other AFROTC cadets and cadre |
|                                     | I believe that I am a role model that my AFROTC peers look up to |
|                                     | I demonstrate all the behaviors that I expect from other cadets during AFROTC training |

### 3.3.2 Online Survey

For ease-of-use and to help ensure anonymity, the online survey software Qualtrics was used to administer the survey. A link to the Qualtrics survey was included in the recruitment email sent to potential research participants. Survey settings in Qualtrics were specifically selected to not save any respondent information.

### 3.4 Survey Administration

#### 3.4.1 Participant Selection and Recruitment

Cadets at several universities with AFROTC units in the western United States were asked to complete the survey. Because AFROTC cadets must be enrolled in a degree-awarding program at
an institution, the entire participant population was composed of college students. An Institutional Review Board (IRB) approval for human subjects research was sought and received for the study and the survey instrument. The IRB protocol and approval are included in Appendix H. Following IRB approval, AFROTC units were sent an introductory email asking if they would be willing to distribute the study recruitment email to their cadets. This introductory email is included in Appendix I. AFROTC units at the following universities were contacted and agreed to participate:

- California State University, Sacramento
- Central Washington University
- Oregon State University
- San Jose State University
- University of California, Berkeley
- University of Portland
- University of Washington
- Washington State University

AFROTC cadets at the participating universities received a recruitment email that included a link to the study consent form and the online survey. Cadets were required to be the age of majority in their state in order to participate. In all states where cadets were recruited (California, Oregon, and Washington), the age of majority is 18 years old. The recruitment email and consent form are included in Appendices J and K, respectively. Surveys, once completed, were submitted electronically using the Qualtrics software.

### 3.4.2 Survey Administration Timeline

The survey recruitment email was initially distributed in mid-January 2020. A reminder email was sent in early February 2020. The deadline for responses was mid-February 2020.
3.5 Data Analysis

The following section describes the methods used to analyze the survey data used in this study. First, the data was analyzed to test for normality using the Kolmogorov-Smirnov test. Second, internal reliability of variables was assessed by calculating Cronbach’s Alpha values. Third, Spearman’s rank correlation was used to examine the hypotheses by testing for relationships between the independent variables and dependent variables. Finally, post hoc analysis was done to determine if there were internal correlations within the dependent variables using Spearman’s rank correlation and the Kruskal-Wallis one-way analysis of variance. All data analyses were conducted using IBM® SPSS Statistics® version 26 and Microsoft Excel® version 16.0.

3.5.1 Kolmogorov-Smirnov Test

The Kolmogorov-Smirnov goodness of fit test was used to assess each variable for normality prior to conducting hypothesis testing. The Kolmogorov-Smirnov goodness of fit test is based on the maximum difference between the cumulative distribution function (CDF) of the data sample and the CDF of a standard normal distribution. The Kolmogorov-Smirnov test statistic is calculated as shown in Equation 1 (Massey, Jr., 1951).

$$D = \sup_x |F_0(x) - F(x)|$$  \hspace{1cm} (1)

Where:

$$\sup_x$$ = the supremum, or least upper bound, of the distances between $$F_0(x)$$ and $$F(x)$$

$$F_0(x)$$ = the data sample CDF

$$F(x)$$ = the CDF of a standard normal distribution
D, the test statistic, is then used to determine whether or not to reject the null hypothesis. The null hypothesis in Kolmogorov-Smirnov tests is that the data are normally distributed, so a rejection of this hypothesis indicates that the data are not normally distributed.

### 3.5.2 Cronbach’s Alpha

Cronbach’s alpha values were calculated and used to test for internal reliability prior to conducting correlation testing. As the present study created new scales – appropriate for the AFROTC environment – to measure leadership attributes like communication, decision-making, etc., a measure of reliability for these scales was needed. Cronbach’s alpha results provide a “coefficient of reliability” between 0 and 1, with higher values indicating higher internal consistency (Connelly, 2011). The formula for Cronbach’s alpha is outlined in Equation 2 (Bland & Altman, 1997, p. 572).

\[
\alpha = \frac{k}{k - 1} \left(1 - \frac{\sum s_i^2}{s_T^2}\right)
\]  

Where:

- \( k \) = the number of items,
- \( s_i^2 \) = the variance of the \( i \)th item,
- \( s_T^2 \) = the variance of the total score formed by summing all the items.
3.5.3 Bonferroni Correction

Because multiple comparisons were conducted for each hypothesis, a Bonferroni correction was utilized to correct the significance level. This correction helps avoid spurious positive results and, therefore, minimizes Type I errors. As the value of $n$ varies between hypotheses, so does the value of the Bonferroni correction. The Bonferroni correction can be calculated using Equation 3 (Bland & Altman, 1995, p. 170).

$$\frac{\alpha}{n}$$  

(3)

Where:

$\alpha = \text{alpha value},$

$n = \text{number of comparisons conducted}.$

3.5.4 Spearman’s Rank Correlation

Spearman’s rank correlation was used to test the study hypotheses and for post hoc analysis testing for correlations between the various dependent variables. Spearman’s rank correlation tests the association between two ranked variables to determine if the variables covary. Unlike linear regression, Spearman’s rank correlation does not assume that data are normally distributed (McDonald, 2014). The common formula for Spearman’s rank correlation can only be used in data that does not have tied ranks. This formula is shown in Equation 4 (Myers, Well, & Lorch, Jr., 2010, p. 486).
\[ r_s = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)} \]  

(4)

Where:

\[ d_i = \text{the difference between the X and Y ranks for the } i\text{th case}, \]

\[ n = \text{the number of observations (and, therefore, the number of ranks without ties).} \]

However, if there are ties in the ranks, all the scores in the group of ties are given the mean of the ranks in question (e.g., a four-way tie at rank 10 would result in each tied score being given the rank of 11.5, which is the mean value of 10, 11, 12, and 13). In this case, the full Spearman’s formula – derived from Pearson’s r correlation formula – should be used, which is shown in Equation 5 (Myers, Well, & Lorch, Jr., 2010).

\[ r_s = \rho_{R_x,R_y} = \frac{\frac{1}{n} \sum_{i=1}^{n} \left( (R_{x_i} - \overline{R_x})(R_{y_i} - \overline{R_y}) \right)}{\sqrt{\frac{1}{n} \sum_{i=1}^{n} (R_{x_i} - \overline{R_x})^2} \ast \sqrt{\frac{1}{n} \sum_{i=1}^{n} (R_{y_i} - \overline{R_y})^2}} \]  

(5)

Where:

\[ \rho = \text{Pearson’s correlation coefficient, but applied to rank variables } R_x \text{ and } R_y, \]

\[ R_{x_i} \text{ and } R_{y_i} = \text{rank variables for the } i\text{th case,} \]

\[ \overline{R_x} \text{ and } \overline{R_y} = \text{mean ranks,} \]

\[ n = \text{the number of observations.} \]
3.5.5 Kruskal-Wallis One-Way Analysis of Variance

The Kruskal-Wallis one-way analysis of variance test was used to perform post hoc analysis of the potential for relationships between the cadet performance variables. The Kruskal-Wallis test is a nonparametric equivalent to the one-way analysis of variance (ANOVA) test, which tests whether independent samples originate from the same distribution. The Kruskal-Wallis test is based upon ranks and can be used with more than two independent samples (Feir-Walsh & Toothaker, 1974). The Kruskal-Wallis test statistic can be calculated using Equation 6 (Kruskal & Wallis, 1952, p. 586).

\[
H = \frac{12}{N(N+1)} \sum_{i=1}^{C} \frac{R_i^2}{n_i} - 3(N + 1)
\]  

(6)

Where:

\( C \) = the number of samples,

\( n_i \) = the number of observations in the \( i \)th sample,

\( N = \sum n_i \), the number of observations in all samples combined,

\( R_i \) = the sum of the ranks in the \( i \)th sample.
4 Results

This chapter discusses the results of the analyses conducted. Several steps were used to analyze the data. First, the data was analyzed to assess for normality using the Kolmogorov-Smirnov test. Second, internal reliability was analyzed by calculating Cronbach’s Alpha values. Third, Spearman’s rank correlation values were calculated for each hypothesis. Finally, post hoc analysis was conducted to determine if significant correlations among dependent variables existed, using Spearman’s rank correlation and the Kruskal-Wallis test.

4.1 Data Characteristics

In total, 103 surveys were submitted electronically. 71 (69%) of the surveys submitted were complete, while 32 (31%) were incomplete. Including both complete and incomplete surveys, the mean percentage of questions completed on surveys was 77%. No respondents stopped midway through their responses to an individual construct; all attrition occurred when respondents were moving from one construct to the next. For this reason, survey data from incomplete surveys was still utilized in analyses. The median response time was 6 minutes, 19 seconds.

4.1.1 Variable Descriptive Statistics

The data analysis began with an evaluation of the descriptive statistics for each variable. These statistics are summarized in Table 4-1 and Table 4-2.

The value of all independent variables, except for “time exposed to core values,” used 7-point Likert survey responses, which are numerically represented as follows:
7 = Strongly agree
6 = Agree
5 = Somewhat agree
4 = Neither agree nor disagree
3 = Somewhat disagree
2 = Disagree
1 = Strongly disagree

The “time exposed to core values” variable is represented in months and varied from 1 month (a cadet who joined AFROTC in winter 2020, immediately before the survey was conducted) to 53 months (a cadet who had extended past the traditional four years to a fifth year, and was approximately halfway through their fifth year when the survey was completed). One respondent indicated that they were enlisted in the Air Force prior to joining AFROTC. The measure of time exposed to core values for that respondent was based upon the month that they enlisted.

Table 4-1. Independent Variable Descriptive Statistics

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>Median</th>
<th>Std Dev</th>
<th>Range</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Comprehension of &quot;Integrity First&quot;</td>
<td>95</td>
<td>6.78</td>
<td>7.00</td>
<td>0.41</td>
<td>2.00</td>
<td>5.00</td>
<td>7.00</td>
</tr>
<tr>
<td></td>
<td>Comprehension of &quot;Service Before Self&quot;</td>
<td>90</td>
<td>6.78</td>
<td>7.00</td>
<td>0.42</td>
<td>1.67</td>
<td>5.33</td>
<td>7.00</td>
</tr>
<tr>
<td></td>
<td>Comprehension of &quot;Excellence in All We Do&quot;</td>
<td>90</td>
<td>6.85</td>
<td>7.00</td>
<td>0.36</td>
<td>2.00</td>
<td>5.00</td>
<td>7.00</td>
</tr>
<tr>
<td></td>
<td>Application of &quot;Integrity First&quot;</td>
<td>84</td>
<td>6.30</td>
<td>6.40</td>
<td>0.74</td>
<td>3.20</td>
<td>3.80</td>
<td>7.00</td>
</tr>
<tr>
<td></td>
<td>Application of &quot;Service Before Self&quot;</td>
<td>82</td>
<td>6.19</td>
<td>6.40</td>
<td>0.91</td>
<td>3.80</td>
<td>3.20</td>
<td>7.00</td>
</tr>
</tbody>
</table>
The dependent variables communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, and role model use the same 7-point Likert scale as the independent variables.

The rating scales for cadet performance varied from variable to variable. Cumulative Grade Point Average (CGPA) is based upon the 4.0 grading scale common in universities. Physical Fitness Assessment is based upon the number of points scored on the official Air Force Fitness Assessment out of a maximum score of 100. Comprehensive measures of cadet performance are often rated in thirds – top-third, middle-third, or bottom-third – with a single cadet rated against their peers. Therefore, Field Training Flight Rank and Field Training Overall Rank, with approximately 16 cadets in a Field Training Flight and approximately 400 cadets in a Field Training session overall, alongside Cadre Feedback and Peer Feedback, are numerically represented as follows:

3 = Top-third
2 = Middle-third
1 = Bottom-third

Field Training Award is determined based on whether a cadet earned an award for high performance (top 10%) at the conclusion of Field Training, with 0 = “No” and 1 = “Yes.” Finally, the Self-Rating variable is numerically represented as follows:

6 = Top 10%
5 = Top 25%
Table 4-2. Dependent Variable Descriptive Statistics

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>Median</th>
<th>Std Dev</th>
<th>Range</th>
<th>Min</th>
<th>Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td></td>
<td>73</td>
<td>6.09</td>
<td>6.25</td>
<td>0.67</td>
<td>3.00</td>
<td>4.00</td>
<td>7.00</td>
</tr>
<tr>
<td>Decision-Making</td>
<td></td>
<td>75</td>
<td>6.05</td>
<td>6.00</td>
<td>0.64</td>
<td>2.75</td>
<td>4.25</td>
<td>7.00</td>
</tr>
<tr>
<td>Delegation</td>
<td></td>
<td>74</td>
<td>5.77</td>
<td>5.90</td>
<td>0.76</td>
<td>3.40</td>
<td>3.60</td>
<td>7.00</td>
</tr>
<tr>
<td>Empathy</td>
<td></td>
<td>75</td>
<td>5.72</td>
<td>5.75</td>
<td>0.84</td>
<td>4.00</td>
<td>3.00</td>
<td>7.00</td>
</tr>
<tr>
<td>Job Knowledge</td>
<td></td>
<td>72</td>
<td>6.14</td>
<td>6.33</td>
<td>0.70</td>
<td>3.00</td>
<td>4.00</td>
<td>7.00</td>
</tr>
<tr>
<td>Motivation</td>
<td></td>
<td>72</td>
<td>5.97</td>
<td>6.00</td>
<td>0.73</td>
<td>3.50</td>
<td>3.50</td>
<td>7.00</td>
</tr>
<tr>
<td>Responsibility</td>
<td></td>
<td>72</td>
<td>6.24</td>
<td>6.20</td>
<td>0.57</td>
<td>2.40</td>
<td>4.60</td>
<td>7.00</td>
</tr>
<tr>
<td>Role Model</td>
<td></td>
<td>72</td>
<td>6.02</td>
<td>6.00</td>
<td>0.64</td>
<td>2.75</td>
<td>4.25</td>
<td>7.00</td>
</tr>
<tr>
<td>CGPA</td>
<td></td>
<td>69</td>
<td>3.36</td>
<td>3.45</td>
<td>0.45</td>
<td>1.60</td>
<td>2.40</td>
<td>4.00</td>
</tr>
<tr>
<td>Physical Fitness Assessment</td>
<td></td>
<td>67</td>
<td>94.85</td>
<td>96.10</td>
<td>4.47</td>
<td>16.30</td>
<td>83.70</td>
<td>100.00</td>
</tr>
<tr>
<td>Field Training Flight Rank</td>
<td></td>
<td>30</td>
<td>2.37</td>
<td>2.50</td>
<td>0.72</td>
<td>2.00</td>
<td>1.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Field Training Overall Rank</td>
<td></td>
<td>29</td>
<td>2.28</td>
<td>2.00</td>
<td>0.65</td>
<td>2.00</td>
<td>1.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Field Training Award</td>
<td></td>
<td>31</td>
<td>0.10</td>
<td>0.00</td>
<td>0.30</td>
<td>1.00</td>
<td>0.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Cadre Feedback</td>
<td></td>
<td>40</td>
<td>2.68</td>
<td>3.00</td>
<td>0.57</td>
<td>2.00</td>
<td>1.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Peer Feedback</td>
<td></td>
<td>48</td>
<td>2.65</td>
<td>3.00</td>
<td>0.64</td>
<td>2.00</td>
<td>1.00</td>
<td>3.00</td>
</tr>
<tr>
<td>Self-Rating</td>
<td></td>
<td>71</td>
<td>4.86</td>
<td>5.00</td>
<td>0.99</td>
<td>5.00</td>
<td>1.00</td>
<td>6.00</td>
</tr>
</tbody>
</table>

4.1.2 Tests for Normality

The Kolmogorov-Smirnov test was used to assess whether or not variables were normally distributed. The null hypothesis of the Kolmogorov-Smirnov tests is that the data originates from a normal distribution. Therefore, results of $p < 0.05$ indicate a rejection of the null hypothesis and indicate that the data are not normally distributed. Based upon the test results, none of the variables
could reasonably have originated from a normal distribution, as shown in Table 4-3 and Table 4-4. Histograms of each variable are shown in Figure 4-1 through Figure 4-3. Both the results from the Kolmogorov-Smirnov tests and histograms present a strong rationale for using nonparametric data analysis.

Table 4-3. Independent Variable Kolmogorov-Smirnov Test Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Kolmogorov-Smirnov Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehension of &quot;Integrity First&quot;</td>
<td>0.000</td>
</tr>
<tr>
<td>Comprehension of &quot;Service Before Self&quot;</td>
<td>0.000</td>
</tr>
<tr>
<td>Comprehension of &quot;Excellence in All We Do&quot;</td>
<td>0.000</td>
</tr>
<tr>
<td>Application of &quot;Integrity First&quot;</td>
<td>0.000</td>
</tr>
<tr>
<td>Application of &quot;Service Before Self&quot;</td>
<td>0.000</td>
</tr>
<tr>
<td>Application of &quot;Excellence in All We Do&quot;</td>
<td>0.000</td>
</tr>
<tr>
<td>Time Exposed to Core Values</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 4-4. Dependent Variable Kolmogorov-Smirnov Test Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Kolmogorov-Smirnov Test Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>0.003</td>
</tr>
<tr>
<td>Decision-Making</td>
<td>0.028</td>
</tr>
<tr>
<td>Delegation</td>
<td>0.000</td>
</tr>
<tr>
<td>Empathy</td>
<td>0.003</td>
</tr>
<tr>
<td>Job Knowledge</td>
<td>0.000</td>
</tr>
<tr>
<td>Motivation</td>
<td>0.005</td>
</tr>
<tr>
<td>Responsibility</td>
<td>0.010</td>
</tr>
<tr>
<td>Role Model</td>
<td>0.000</td>
</tr>
<tr>
<td>CGPA</td>
<td>0.021</td>
</tr>
<tr>
<td>Physical Fitness Assessment</td>
<td>0.003</td>
</tr>
<tr>
<td>Field Training Flight Rank</td>
<td>0.000</td>
</tr>
<tr>
<td>Field Training Overall Rank</td>
<td>0.000</td>
</tr>
<tr>
<td>Field Training Award</td>
<td>0.000</td>
</tr>
<tr>
<td>Cadre Feedback</td>
<td>0.000</td>
</tr>
<tr>
<td>Peer Feedback</td>
<td>0.000</td>
</tr>
<tr>
<td>Self-Rating</td>
<td>0.000</td>
</tr>
</tbody>
</table>
Figure 4-1. Histograms of Independent Variable Data
Figure 4-2. Histograms of Non-Performance Dependent Variable Data
Figure 4-3. Histograms of Performance-Related Dependent Variable Data
### 4.2 Cronbach’s Alpha

Cronbach’s alpha values were calculated and used to ensure that each construct was internally consistent prior to conducting correlation testing. The Cronbach’s alpha results, along with the identification of survey items that were removed and the resulting Cronbach’s alpha, are summarized in Table 4-5 and Table 4-6.

**Table 4-5. Cronbach’s Alpha Results for Independent Variables**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Initial Number of Items</th>
<th>Initial Cronbach’s Alpha Value</th>
<th>Items Removed</th>
<th>Improved Cronbach’s Alpha Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehension of &quot;Integrity First&quot;</td>
<td>4</td>
<td>0.819</td>
<td>1</td>
<td>0.860</td>
</tr>
<tr>
<td>Comprehension of &quot;Service Before Self&quot;</td>
<td>4</td>
<td>0.754</td>
<td>1</td>
<td>0.832</td>
</tr>
<tr>
<td>Comprehension of &quot;Excellence in All We Do&quot;</td>
<td>4</td>
<td>0.870</td>
<td>1</td>
<td>0.904</td>
</tr>
<tr>
<td>Application of &quot;Integrity First&quot;</td>
<td>5</td>
<td>0.780</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Application of &quot;Service Before Self&quot;</td>
<td>5</td>
<td>0.889</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Application of &quot;Excellence in All We Do&quot;</td>
<td>5</td>
<td>0.910</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Time Exposed to Core Values</td>
<td>1</td>
<td></td>
<td>N/A</td>
<td></td>
</tr>
</tbody>
</table>

Each of the three “comprehension” variables had the equivalent survey item removed: “I can recite the [first, second, third] Air Force core value.” The removal of this survey item increased the internal reliability of each variable and kept the survey items within the three “comprehension” variables consistent.
The “communication” variable had the lowest internal reliability with a Cronbach’s alpha of 0.414. Removal of individual survey items did not increase Cronbach’s alpha above 0.5. The low internal reliability of this variable must be kept in mind when conducting any subsequent analyses.

Additionally, one survey item was removed from “job knowledge:” “I know the mission and goals of my AFROTC team.” This survey item focused more on knowledge, unlike other survey items within the variable that involved taking action. As a result, the removal of this survey item seemed appropriate.
4.3 Hypothesis Testing

As none of the variables being tested could be assumed to follow a normal distribution, Spearman’s rank correlation was used. A Bonferroni correction with alpha value $\alpha = 0.05$ was utilized to avoid spurious positives.

4.3.1 Comprehension of Core Values

Hypothesis H1 posited relationships between comprehension of “integrity first” and communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, being a role model, and measures of cadet performance (CGPA, Physical Fitness Assessment, Field Training flight rank, Field Training overall rank, Field Training awards, cadre feedback, peer feedback, and self-rating).

As 16 comparisons were conducted to test this hypothesis, the Bonferroni correction was calculated to be:

$$\frac{\alpha}{n} = \frac{0.05}{16} = 0.003125$$

meaning that each individual comparison was evaluated using a p-value of 0.003125. The results of these tests are summarized in Table 4-7.

<table>
<thead>
<tr>
<th></th>
<th>Correlation Coefficient</th>
<th>Significance (2-tailed)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>-0.044</td>
<td>0.712</td>
<td>73</td>
</tr>
<tr>
<td>Decision-Making</td>
<td>0.253</td>
<td>0.029</td>
<td>75</td>
</tr>
<tr>
<td>Delegation</td>
<td>0.271</td>
<td>0.019</td>
<td>74</td>
</tr>
<tr>
<td>Empathy</td>
<td>0.261</td>
<td>0.024</td>
<td>75</td>
</tr>
</tbody>
</table>
Only the leadership attribute “responsibility” was found to have a significant correlation with comprehension of “integrity first.” Scatterplots for hypothesis H1 are shown in Appendix L.

It is also worth noting that for several of the performance variables (Field Training performance variables, cadre feedback, and peer feedback), notably fewer responses were received. This is likely due to many respondents not having attended Field Training yet and/or not received specific performance feedback from cadre and peers to report. As a result, finding significant sets of relationships with these variables is more challenging. The other hypothesis analyses in this study are similarly affected.

Hypothesis H2 posited relationships between comprehension of “service before self” and communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, being a role model, and measures of cadet performance (CGPA, Physical Fitness Assessment, Field Training flight rank, Field Training overall rank, Field Training awards, cadre feedback, peer feedback, and self-rating).

As 16 comparisons were conducted to test this hypothesis, the Bonferroni correction was calculated to be:
\[ \alpha = \frac{0.05}{16} = 0.003125 \]

meaning that each individual comparison was evaluated using a p-value of 0.003125. The results of these tests are summarized in Table 4-8.

Table 4-8. Hypothesis H2 Results: Comprehension of “Service Before Self”

<table>
<thead>
<tr>
<th>Comprehension of “Service Before Self”</th>
<th>Correlation Coefficient</th>
<th>Significance (2-tailed)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>0.167</td>
<td>0.161</td>
<td>72</td>
</tr>
<tr>
<td>Decision-Making</td>
<td>0.270</td>
<td>0.020</td>
<td>74</td>
</tr>
<tr>
<td>Delegation</td>
<td>0.289</td>
<td>0.013</td>
<td>73</td>
</tr>
<tr>
<td>Empathy</td>
<td>0.221</td>
<td>0.058</td>
<td>74</td>
</tr>
<tr>
<td>Job Knowledge</td>
<td>0.146</td>
<td>0.224</td>
<td>71</td>
</tr>
<tr>
<td>Motivation</td>
<td>0.384*</td>
<td>0.001</td>
<td>71</td>
</tr>
<tr>
<td>Responsibility</td>
<td>0.196</td>
<td>0.102</td>
<td>71</td>
</tr>
<tr>
<td>Role Model</td>
<td>0.035</td>
<td>0.772</td>
<td>71</td>
</tr>
<tr>
<td>CGPA</td>
<td>0.222</td>
<td>0.067</td>
<td>69</td>
</tr>
<tr>
<td>Physical Fitness Assessment</td>
<td>0.042</td>
<td>0.737</td>
<td>67</td>
</tr>
<tr>
<td>Field Training Flight Rank</td>
<td>-0.121</td>
<td>0.526</td>
<td>30</td>
</tr>
<tr>
<td>Field Training Overall Rank</td>
<td>-0.241</td>
<td>0.208</td>
<td>29</td>
</tr>
<tr>
<td>Field Training Award</td>
<td>0.160</td>
<td>0.391</td>
<td>31</td>
</tr>
<tr>
<td>Cadre Feedback</td>
<td>0.092</td>
<td>0.574</td>
<td>40</td>
</tr>
<tr>
<td>Peer Feedback</td>
<td>-0.090</td>
<td>0.545</td>
<td>48</td>
</tr>
<tr>
<td>Self-Rating</td>
<td>-0.096</td>
<td>0.428</td>
<td>70</td>
</tr>
</tbody>
</table>

* Significant at p-value \( \leq 0.003125 \)

Only the leadership attribute “motivation” was found to have a significant correlation with comprehension of “service before self.” Scatterplots for hypothesis H2 are shown in Appendix M.

Hypothesis H3 posited relationships between comprehension of “excellence in all we do” and communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, being a role model, and measures of cadet performance (CGPA, Physical Fitness Assessment,
Field Training flight rank, Field Training overall rank, Field Training awards, cadre feedback, peer feedback, and self-rating).

As 16 comparisons were conducted to test this hypothesis, the Bonferroni correction was calculated to be:

\[ \frac{\alpha}{n} = \frac{0.05}{16} = 0.003125 \]

meaning that each individual comparison was evaluated using a p-value of 0.003125. The results of these tests are summarized in Table 4-9.

Table 4-9. Hypothesis H3 Results: Comprehension of “Excellence in All We Do”

<table>
<thead>
<tr>
<th></th>
<th>Correlation Coefficient</th>
<th>Significance (2-tailed)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Communication</strong></td>
<td>-0.069</td>
<td>0.562</td>
<td>73</td>
</tr>
<tr>
<td><strong>Decision-Making</strong></td>
<td>0.134</td>
<td>0.252</td>
<td>75</td>
</tr>
<tr>
<td><strong>Delegation</strong></td>
<td>0.109</td>
<td>0.357</td>
<td>74</td>
</tr>
<tr>
<td><strong>Empathy</strong></td>
<td>0.167</td>
<td>0.153</td>
<td>75</td>
</tr>
<tr>
<td><strong>Job Knowledge</strong></td>
<td>0.073</td>
<td>0.543</td>
<td>72</td>
</tr>
<tr>
<td><strong>Motivation</strong></td>
<td>0.136</td>
<td>0.254</td>
<td>72</td>
</tr>
<tr>
<td><strong>Responsibility</strong></td>
<td>0.258</td>
<td>0.029</td>
<td>72</td>
</tr>
<tr>
<td><strong>Role Model</strong></td>
<td>0.067</td>
<td>0.573</td>
<td>72</td>
</tr>
<tr>
<td><strong>CGPA</strong></td>
<td>-0.122</td>
<td>0.319</td>
<td>69</td>
</tr>
<tr>
<td><strong>Physical Fitness Assessment</strong></td>
<td>-0.002</td>
<td>0.986</td>
<td>67</td>
</tr>
<tr>
<td><strong>Field Training Flight Rank</strong></td>
<td>-0.054</td>
<td>0.777</td>
<td>30</td>
</tr>
<tr>
<td><strong>Field Training Overall Rank</strong></td>
<td>-0.028</td>
<td>0.887</td>
<td>29</td>
</tr>
<tr>
<td><strong>Field Training Award</strong></td>
<td>0.175</td>
<td>0.346</td>
<td>31</td>
</tr>
<tr>
<td><strong>Cadre Feedback</strong></td>
<td>-0.182</td>
<td>0.260</td>
<td>40</td>
</tr>
<tr>
<td><strong>Peer Feedback</strong></td>
<td>-0.174</td>
<td>0.236</td>
<td>48</td>
</tr>
<tr>
<td><strong>Self-Rating</strong></td>
<td>-0.066</td>
<td>0.586</td>
<td>71</td>
</tr>
</tbody>
</table>

* Significant at p-value ≤ 0.003125
There were no significant correlations found with comprehension of “excellence in all we do.” Scatterplots for hypothesis H3 are shown in Appendix N.

### 4.3.2 Application of Core Values

Hypothesis H4 posited relationships between the ability to apply “integrity first” and communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, being a role model, and measures of cadet performance (CGPA, Physical Fitness Assessment, Field Training flight rank, Field Training overall rank, Field Training awards, cadre feedback, peer feedback, and self-rating).

As 16 comparisons were conducted to test this hypothesis, the Bonferroni correction was calculated to be:

\[
\frac{\alpha}{n} = \frac{0.05}{16} = 0.003125
\]

meaning that each individual comparison was evaluated using a p-value of 0.003125. The results of these tests are summarized in Table 4-10.

### Table 4-10. Hypothesis H4 Results: Application of “Integrity First”

<table>
<thead>
<tr>
<th>Application of “Integrity First”</th>
<th>Correlation Coefficient</th>
<th>Significance (2-tailed)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>0.466*</td>
<td>0.000</td>
<td>73</td>
</tr>
<tr>
<td>Decision-Making</td>
<td>0.419*</td>
<td>0.000</td>
<td>75</td>
</tr>
<tr>
<td>Delegation</td>
<td>0.402*</td>
<td>0.000</td>
<td>74</td>
</tr>
<tr>
<td>Empathy</td>
<td>0.246</td>
<td>0.034</td>
<td>75</td>
</tr>
<tr>
<td>Job Knowledge</td>
<td>0.499*</td>
<td>0.000</td>
<td>72</td>
</tr>
<tr>
<td>Motivation</td>
<td>0.379*</td>
<td>0.001</td>
<td>72</td>
</tr>
<tr>
<td>Responsibility</td>
<td>0.509*</td>
<td>0.000</td>
<td>72</td>
</tr>
<tr>
<td>Role Model</td>
<td>0.270</td>
<td>0.022</td>
<td>72</td>
</tr>
</tbody>
</table>
Application of “integrity first” was shown to be significantly correlated with leadership attributes communication, decision-making, delegation, job knowledge, motivation, responsibility, and the Physical Fitness Assessment cadet performance measure. Relationships found with “communication” should be interpreted cautiously, as the internal reliability of the communication variable was low. Scatterplots for hypothesis H4 are shown in Appendix O.

Hypothesis H5 posited relationships between the ability to apply “service before self” and communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, being a role model, and measures of cadet performance (CGPA, Physical Fitness Assessment, Field Training flight rank, Field Training overall rank, Field Training awards, cadre feedback, peer feedback, and self-rating).

As 16 comparisons were conducted to test this hypothesis, the Bonferroni correction was calculated to be:

\[
\frac{\alpha}{n} = \frac{0.05}{16} = 0.003125
\]

meaning that each individual comparison was evaluated using a p-value of 0.003125. The results of these tests are summarized in Table 4-11.
Table 4-11. Hypothesis H5 Results: Application of “Service Before Self”

<table>
<thead>
<tr>
<th>Application of “Service Before Self”</th>
<th>Correlation Coefficient</th>
<th>Significance (2-tailed)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>0.329</td>
<td>0.004</td>
<td>73</td>
</tr>
<tr>
<td>Decision-Making</td>
<td>0.535*</td>
<td>0.000</td>
<td>75</td>
</tr>
<tr>
<td>Delegation</td>
<td>0.416*</td>
<td>0.000</td>
<td>74</td>
</tr>
<tr>
<td>Empathy</td>
<td>0.406*</td>
<td>0.000</td>
<td>75</td>
</tr>
<tr>
<td>Job Knowledge</td>
<td>0.485*</td>
<td>0.000</td>
<td>72</td>
</tr>
<tr>
<td>Motivation</td>
<td>0.453*</td>
<td>0.000</td>
<td>72</td>
</tr>
<tr>
<td>Responsibility</td>
<td>0.481*</td>
<td>0.000</td>
<td>72</td>
</tr>
<tr>
<td>Role Model</td>
<td>0.278</td>
<td>0.018</td>
<td>72</td>
</tr>
<tr>
<td>CGPA</td>
<td>-0.195</td>
<td>0.109</td>
<td>69</td>
</tr>
<tr>
<td>Physical Fitness Assessment</td>
<td>0.312</td>
<td>0.010</td>
<td>67</td>
</tr>
<tr>
<td>Field Training Flight Rank</td>
<td>0.103</td>
<td>0.588</td>
<td>30</td>
</tr>
<tr>
<td>Field Training Overall Rank</td>
<td>0.069</td>
<td>0.722</td>
<td>29</td>
</tr>
<tr>
<td>Field Training Award</td>
<td>0.164</td>
<td>0.379</td>
<td>31</td>
</tr>
<tr>
<td>Cadre Feedback</td>
<td>0.194</td>
<td>0.230</td>
<td>40</td>
</tr>
<tr>
<td>Peer Feedback</td>
<td>0.102</td>
<td>0.492</td>
<td>48</td>
</tr>
<tr>
<td>Self-Rating</td>
<td>-0.011</td>
<td>0.930</td>
<td>71</td>
</tr>
</tbody>
</table>

* Significant at p-value ≤ 0.003125

Application of “service before self” was shown to be significantly correlated with leadership attributes decision-making, delegation, empathy, job knowledge, motivation, and responsibility. Scatterplots for hypothesis H5 are shown in Appendix P.

Hypothesis H6 posited relationships between the ability to apply “excellence in all we do” and communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, being a role model, and measures of cadet performance (CGPA, Physical Fitness Assessment, Field Training flight rank, Field Training overall rank, Field Training awards, cadre feedback, peer feedback, and self-rating).

As 16 comparisons were conducted to test this hypothesis, the Bonferroni correction was calculated to be:
\[ \alpha = \frac{0.05}{n} = 0.003125 \]

meaning that each individual comparison was evaluated using a p-value of 0.003125. The results of these tests are summarized in Table 4-12.

Table 4-12. Hypothesis H6 Results: Application of “Excellence in All We Do”

<table>
<thead>
<tr>
<th>Application of “Excellence in All We Do”</th>
<th>Correlation Coefficient</th>
<th>Significance (2-tailed)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication</td>
<td>0.381*</td>
<td>0.001</td>
<td>73</td>
</tr>
<tr>
<td>Decision-Making</td>
<td>0.393*</td>
<td>0.000</td>
<td>75</td>
</tr>
<tr>
<td>Delegation</td>
<td>0.362*</td>
<td>0.002</td>
<td>74</td>
</tr>
<tr>
<td>Empathy</td>
<td>0.248</td>
<td>0.032</td>
<td>75</td>
</tr>
<tr>
<td>Job Knowledge</td>
<td>0.500*</td>
<td>0.000</td>
<td>72</td>
</tr>
<tr>
<td>Motivation</td>
<td>0.524*</td>
<td>0.000</td>
<td>72</td>
</tr>
<tr>
<td>Responsibility</td>
<td>0.560*</td>
<td>0.000</td>
<td>72</td>
</tr>
<tr>
<td>Role Model</td>
<td>0.379*</td>
<td>0.001</td>
<td>72</td>
</tr>
<tr>
<td>CGPA</td>
<td>-0.138</td>
<td>0.258</td>
<td>69</td>
</tr>
<tr>
<td>Physical Fitness Assessment</td>
<td>0.272</td>
<td>0.026</td>
<td>67</td>
</tr>
<tr>
<td>Field Training Flight Rank</td>
<td>0.100</td>
<td>0.598</td>
<td>30</td>
</tr>
<tr>
<td>Field Training Overall Rank</td>
<td>0.074</td>
<td>0.701</td>
<td>29</td>
</tr>
<tr>
<td>Field Training Award</td>
<td>0.085</td>
<td>0.651</td>
<td>31</td>
</tr>
<tr>
<td>Cadre Feedback</td>
<td>0.275</td>
<td>0.086</td>
<td>40</td>
</tr>
<tr>
<td>Peer Feedback</td>
<td>0.200</td>
<td>0.172</td>
<td>48</td>
</tr>
<tr>
<td>Self-Rating</td>
<td>0.266</td>
<td>0.025</td>
<td>71</td>
</tr>
</tbody>
</table>

* Significant at p-value ≤ 0.003125

Application of “excellence in all we do” was shown to be significantly correlated with leadership attributes communication, decision-making, delegation, job knowledge, motivation, responsibility, and being a role model. Relationships found with the communication variable should be viewed cautiously, as the internal reliability of the communication variable was low. Scatterplots for hypothesis H6 are shown in Appendix Q.
4.3.3 Time Exposed to Core Values

Hypothesis H7 posited relationships between the length of time that a cadet was exposed to core values and comprehension of “integrity first,” “service before self,” and “excellence in all we do”; application of “integrity first,” “service before self,” and “excellence in all we do”; communication, decision-making, delegation, empathy, job knowledge, motivation, responsibility, and being a role model; and measures of cadet performance (CGPA, Physical Fitness Assessment, Field Training flight rank, Field Training overall rank, Field Training awards, cadre feedback, peer feedback, and self-rating).

As 22 comparisons were conducted to test this hypothesis, the Bonferroni correction was calculated to be:

\[
\frac{\alpha}{n} = \frac{0.05}{22} = 0.0022727 \ldots
\]

meaning that each individual comparison was evaluated using a p-value of 0.00227. The results of these tests are summarized in Table 4-13.

<table>
<thead>
<tr>
<th>Time Exposed to Core Values</th>
<th>Correlation Coefficient</th>
<th>Significance (2-tailed)</th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comprehension of “Integrity First”</td>
<td>0.025</td>
<td>0.811</td>
<td>94</td>
</tr>
<tr>
<td>Comprehension of “Service Before Self”</td>
<td>0.038</td>
<td>0.723</td>
<td>89</td>
</tr>
<tr>
<td>Comprehension of “Excellence in All We Do”</td>
<td>0.023</td>
<td>0.832</td>
<td>89</td>
</tr>
<tr>
<td>Application of “Integrity First”</td>
<td>-0.055</td>
<td>0.622</td>
<td>83</td>
</tr>
<tr>
<td>Application of “Service Before Self”</td>
<td>0.087</td>
<td>0.439</td>
<td>81</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------------------------</td>
<td>-----</td>
<td>-----</td>
<td>----</td>
</tr>
<tr>
<td><strong>Application of “Excellence in All We Do”</strong></td>
<td>-0.121</td>
<td>0.302</td>
<td>75</td>
</tr>
<tr>
<td><strong>Communication</strong></td>
<td>-0.150</td>
<td>0.209</td>
<td>72</td>
</tr>
<tr>
<td><strong>Decision-Making</strong></td>
<td>0.126</td>
<td>0.284</td>
<td>74</td>
</tr>
<tr>
<td><strong>Delegation</strong></td>
<td>0.398*</td>
<td>0.000</td>
<td>73</td>
</tr>
<tr>
<td><strong>Empathy</strong></td>
<td>0.279</td>
<td>0.016</td>
<td>74</td>
</tr>
<tr>
<td><strong>Job Knowledge</strong></td>
<td>0.043</td>
<td>0.721</td>
<td>71</td>
</tr>
<tr>
<td><strong>Motivation</strong></td>
<td>-0.094</td>
<td>0.437</td>
<td>71</td>
</tr>
<tr>
<td><strong>Responsibility</strong></td>
<td>-0.031</td>
<td>0.794</td>
<td>71</td>
</tr>
<tr>
<td><strong>Role Model</strong></td>
<td>0.042</td>
<td>0.726</td>
<td>71</td>
</tr>
<tr>
<td><strong>CGPA</strong></td>
<td>0.054</td>
<td>0.659</td>
<td>68</td>
</tr>
<tr>
<td><strong>Physical Fitness Assessment</strong></td>
<td>0.065</td>
<td>0.605</td>
<td>66</td>
</tr>
<tr>
<td><strong>Field Training Flight Rank</strong></td>
<td>0.195</td>
<td>0.301</td>
<td>30</td>
</tr>
<tr>
<td><strong>Field Training Overall Rank</strong></td>
<td>0.067</td>
<td>0.730</td>
<td>29</td>
</tr>
<tr>
<td><strong>Field Training Award</strong></td>
<td>0.131</td>
<td>0.482</td>
<td>31</td>
</tr>
<tr>
<td><strong>Cadre Feedback</strong></td>
<td>0.032</td>
<td>0.844</td>
<td>39</td>
</tr>
<tr>
<td><strong>Peer Feedback</strong></td>
<td>-0.201</td>
<td>0.176</td>
<td>47</td>
</tr>
<tr>
<td><strong>Self-Rating</strong></td>
<td>-0.099</td>
<td>0.413</td>
<td>70</td>
</tr>
</tbody>
</table>

* Significant at $p$-value ≤ 0.00227

Only the delegation variable was significantly correlated with time exposed to core values.
Scatterplots for hypothesis H7 are shown in Appendix R.

### 4.4 Post Hoc Analysis

Following hypothesis testing, analyses were conducted to determine if there were correlations within the dependent variables. The leadership attribute dependent variables (communication, decision-making, etc.) were analyzed using Spearman’s rank correlation. The cadet performance dependent variables (CGPA, Physical Fitness Assessment, etc.) were analyzed using the Kruskal-Wallis test.
4.4.1 Analysis of the Leadership Attribute Variables

As with the hypothesis testing, analysis of the leadership attribute dependent variables was conducted using Spearman’s rank correlation. Because multiple comparisons were conducted, a Bonferroni correction was also applied using $\alpha/n$, with alpha value $\alpha = 0.05$ and $n$ representing the number of comparisons. As 7 comparisons were conducted for each variable, the Bonferroni correction was calculated to be:

$$\frac{\alpha}{n} = \frac{0.05}{7} = 0.007143$$

meaning that each individual comparison was evaluated using a p-value of 0.007143. The results of these tests are summarized in Table 4-14.

Table 4-14. Spearman’s Correlation Analysis of Leadership Attribute Dependent Variables

<table>
<thead>
<tr>
<th></th>
<th>Communication</th>
<th>Decision-Making</th>
<th>Delegation</th>
<th>Empathy</th>
<th>Job Knowledge</th>
<th>Motivation</th>
<th>Responsibility</th>
<th>Role Model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Coefficient</strong></td>
<td>1</td>
<td>.332*</td>
<td>.301</td>
<td>0.112</td>
<td>.343*</td>
<td>.332*</td>
<td>.343*</td>
<td>.282</td>
</tr>
<tr>
<td>Sig. (2-tail)</td>
<td>0.004</td>
<td>0.010</td>
<td>0.347</td>
<td>0.003</td>
<td>0.004</td>
<td>0.004</td>
<td>0.003</td>
<td>0.016</td>
</tr>
<tr>
<td>N</td>
<td>73</td>
<td>73</td>
<td>73</td>
<td>73</td>
<td>72</td>
<td>72</td>
<td>72</td>
<td>72</td>
</tr>
</tbody>
</table>

| **Decision-Making** | Coefficient | .332* | 1 | .668* | .564* | .641* | .543* | .420* | .371* |
| Sig. (2-tail)       | 0.004       | .000  | .000 | .000  | .000  | .000  | .000  | .000  | .001  |
| N                   | 73          | 75    | 74  | 75    | 72    | 72    | 72    | 72    | 72    |

| **Delegation**      | Coefficient | .301  | .668* | 1 | .554* | .533* | .438* | .463* | .363* |
| Sig. (2-tail)       | 0.010       | .000  | .000  | .000  | .000  | .000  | .000  | .000  | .002  |
| N                   | 73          | 74    | 74  | 74    | 72    | 72    | 72    | 72    | 72    |

| **Empathy**         | Coefficient | .112  | .564* | .554* | 1 | .392* | .355* | .338* | .308  |
| Sig. (2-tail)       | 0.347       | .000  | .000  | .000  | .001  | .002  | .004  | .009  |
| N                   | 73          | 75    | 74  | 75    | 72    | 72    | 72    | 72    | 72    |

<p>| <strong>Job Knowledge</strong>   | Coefficient | .343* | .641* | .533* | .392* | 1 | .491* | .588* | .491* |
| Sig. (2-tail)       | .347        | .000  | .000  | .001  | .002  | .004  | .009  | .016  | .016  |
| N                   | 73          | 75    | 74  | 75    | 72    | 72    | 72    | 72    | 72    |</p>
<table>
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<th>Sig. (2-tail)</th>
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<tr>
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<td>.543*</td>
<td>.438*</td>
<td>.355*</td>
<td>.491*</td>
<td>1</td>
<td>.600*</td>
<td>.518*</td>
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<td>Responsibility N</td>
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<td>Role Model N</td>
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<td>Coefficient</td>
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<td>.371*</td>
<td>.363*</td>
<td>.308</td>
<td>.491*</td>
<td>.518*</td>
<td>.412*</td>
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</table>

* Significant at p-value ≤ 0.007143

These data indicate that there are correlations between nearly all leadership attribute variables. Relationships found with the communication variable should be viewed cautiously, as the internal reliability of the communication variable was low.

### 4.4.2 Analysis of Cadet Performance Variables

Since most of the cadet performance variables are bimodal or trimodal, analysis of these variables was completed using the Kruskal-Wallis test. Because multiple comparisons were conducted, a Bonferroni correction was also applied using $\alpha/n$, with alpha value $\alpha = 0.05$ and $n$ representing the number of comparisons. As seven comparisons were conducted for each variable, the Bonferroni correction was calculated to be:

$$\frac{\alpha}{n} = \frac{0.05}{7} = 0.007143$$

meaning that each individual comparison was evaluated using a p-value of 0.007143. The results of these tests are summarized in Table 4-15.
Table 4-15. Kruskal-Wallis Analysis of Cadet Performance Dependent Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>CGPA</th>
<th>Physical Fitness Assessment</th>
<th>Field Training Flight Rank</th>
<th>Field Training Overall Rank</th>
<th>Field Training Award</th>
<th>Cadre Feedback</th>
<th>Peer Feedback</th>
<th>Self-Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Field Training Flight Rank</strong></td>
<td>Kruskal-Wallis H</td>
<td>5.893</td>
<td>6.121</td>
<td><strong>17.697</strong>*</td>
<td>3.222</td>
<td><strong>11.095</strong>*</td>
<td>8.369</td>
<td>6.694</td>
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<td>2</td>
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<td>2</td>
<td>2</td>
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<tr>
<td>Asymp. Sig.</td>
<td>0.053</td>
<td>0.047</td>
<td>0.000</td>
<td>0.200</td>
<td>0.004</td>
<td>0.015</td>
<td>0.035</td>
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<tr>
<td><strong>Field Training Overall Rank</strong></td>
<td>Kruskal-Wallis H</td>
<td>4.668</td>
<td>7.756</td>
<td><strong>17.978</strong>*</td>
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<td>7.919</td>
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<td><strong>Field Training Award</strong></td>
<td>Kruskal-Wallis H</td>
<td>0.755</td>
<td>2.793</td>
<td>2.935</td>
<td><strong>4.633</strong></td>
<td>1.428</td>
<td>1.963</td>
<td>0.899</td>
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<tr>
<td>Asymp. Sig.</td>
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<td>0.095</td>
<td>0.087</td>
<td>0.031</td>
<td>0.232</td>
<td>0.161</td>
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<tr>
<td><strong>Cadre Feedback</strong></td>
<td>Kruskal-Wallis H</td>
<td>1.039</td>
<td>11.725*</td>
<td>8.617</td>
<td>6.966</td>
<td>1.449</td>
<td><strong>29.268</strong>*</td>
<td><strong>21.357</strong>*</td>
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<tr>
<td>Asymp. Sig.</td>
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<tr>
<td><strong>Peer Feedback</strong></td>
<td>Kruskal-Wallis H</td>
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<td>12.120*</td>
<td>7.326</td>
<td>7.983</td>
<td>2.038</td>
<td><strong>29.268</strong>*</td>
<td><strong>23.978</strong>*</td>
</tr>
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<td>0.361</td>
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<tr>
<td><strong>Self-Rating</strong></td>
<td>Kruskal-Wallis H</td>
<td>5.632</td>
<td>18.609*</td>
<td>8.530</td>
<td>11.834</td>
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<td><strong>27.116</strong>*</td>
<td><strong>27.152</strong>*</td>
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<td>4</td>
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<td>3</td>
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</tr>
<tr>
<td>Asymp. Sig.</td>
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<td>0.001</td>
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<td>0.019</td>
<td>0.489</td>
<td>0.000</td>
<td>0.000</td>
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</tbody>
</table>

* Significant at p-value ≤ 0.007143

These data indicate that there are correlations between some of the tested cadet performance variables. In particular, Field Training flight rank was influenced by Field Training overall rank and cadre feedback and Field Training overall rank was influenced by Field Training flight rank. Physical Fitness Assessment influenced cadre feedback, peer feedback, and self-rating. Cadre feedback, peer feedback, and self-rating all influenced each other.
5 Discussion & Conclusions

This chapter summarizes significant findings and discusses study limitations, implications, and recommendations for future work.

5.1 Summary of Significant Findings

Comprehension of organizational values was found to have a significant relationship with two leadership attributes: responsibility and motivation. No significant relationships were found between comprehension and cadet performance.

There were multiple instances of statistically significant relationships between the ability to apply all three organizational values and leadership attributes included in this study. However, the application of core values was not found to be related to any of the cadet performance measures included in this study.

The length of time that individuals are exposed to organizational values showed no relationship with cadet’s comprehension of values or ability to apply values. A statistically significant relationship was identified between the length of time exposed to the core values and the leadership attribute of delegation. A post hoc analysis indicated that there were strong correlations between the various leadership attributes tested in this study. Only a limited number of correlations were identified between the different cadet performance variables.

5.1.1 Discussion of Hypotheses H1, H2, and H3

Hypotheses H1, H2, and H3 postulated relationships between comprehension of core values, leadership attributes, and cadet performance. There was evidence of relationships between
comprehension of “integrity first” with the leadership attribute “responsibility” as well as comprehension of “service before self” with the leadership attribute “motivation.” Comprehension of “excellence in all we do” showed no significant relationships with leadership attributes. There were no significant relationships found between comprehension of core values and cadet performance. The significant relationships found for hypotheses H1, H2, and H3 are summarized in Table 5-1.

The results suggest that simple comprehension of values likely does not have a large-scale impact on most leadership attributes. This may mean that comprehension of values is not enough to change individuals’ behaviors, influence skill proficiency, or develop leaders. Comprehension of values likely does not have an impact on AFROTC cadet performance, suggesting again that understanding the core values is not enough to influence individuals’ behaviors or significantly change their level of performance.

The results show a link between “integrity first” and the leadership attribute responsibility. This link points to a logical connection between leaders who understand integrity and leaders who feel a sense of responsibility for their own actions and initiative as well as the success or failure of their teams. This finding aligns with prior research indicating a relationship between integrity and responsibility in leaders (De Hoogh & Den Hartog, 2008; Waldman, Sully de Luque, Washburn, & House, 2006). Transformational leadership has also been found to be a mediator between leaders’ integrity and their behaviors of responsibility (Veríssimo & Lacerda, 2015).

The link between “service before self” and motivation is less clear. It is possible that a link between service and motivation is a result of cadets eagerly anticipating serving in the military. Excitement and commitment to public service is common in individuals who choose a career in government or the military (Brewer, Selden, & Facer II, 2000; Paarlberg & Lavigna, 2010). In this case,
enthusiasm for the military’s unique mission may lead to higher self-motivation that, in turn, motivates others.

Finally, the finding that there was no relationship between comprehension of the third Air Force core value, “excellence in all we do,” and leadership attributes suggests that this core value may be more difficult to understand than the other core values. Cadets may find it challenging to understand what the core value is asking of them. For example, how can someone be excellent at everything they do? How does one define excellence in different or unique situations? What if people define excellence differently? Finding no significant relationships between comprehension of “excellence in all we do” and leadership attributes or cadet performance may be indicative that the value itself is ambiguous and does not provide cadets a clear sense of what “excellence in all we do” means.

5.1.2 Discussion of Hypotheses H4, H5, and H6

Hypotheses H4, H5, and H6 postulated relationships between the application of core values, leadership attributes, and cadet performance. There were significant relationships found between the application of each core value and a variety of leadership attributes. However, only application of “integrity first” showed a relationship with cadet performance, specifically with the Physical Fitness Assessment. The significant relationships found for hypotheses H4, H5, and H6 are summarized in Table 5-1.

The results suggest that the application of organizational values has a much larger impact than comprehension of values on a cadet’s demonstration of leadership attributes. The positive correlations between application of organizational values and leadership attributes indicate that as cadets have more opportunities to practice and demonstrate the core values, their leadership skills
improve. A link between values congruence and charismatic leadership has been identified in previous research; as leaders apply values, followers are apt to adopt those values as well (Brown & Treviño, 2009). As individuals practice applying values, they also gain more leadership experience by influencing followers. This is particularly important for a leadership training context like AFROTC. Other research has shown that value congruence between leaders and followers also impacts follower satisfaction and organizational commitment (Meglino, Ravlin, & Adkins, 1989). Therefore, as leaders practice and demonstrate values, followers begin to adopt those values; as followers’ values become more congruent with the leaders’ and organization’s values, followers become more satisfied and committed. Previous research has also shown that when leaders are practicing charismatic leadership by espousing values, not only does their managerial performance improve, so too does followers’ extra effort and organizational citizenship behavior (Sosik, 2005). In short, applying values not only improves individuals’ leadership skills (as shown in this study) but also drives a host of other benefits.

Like comprehension of core values, application of values was not found to have a direct relationship with cadet performance. This may be due to the lower number of responses collected for some of the performance variables and, therefore, the heightened difficulty of identifying statistically significant correlations. Many cadets had not received performance feedback from cadre or peers, lowering the number of responses for those items. Likewise, only respondents who were upperclassmen cadets could submit responses regarding Field Training performance, as underclassmen had not yet attended the Field Training evaluation.

Although previous research has found that the application of values can be a predictor of leader performance and influence (Cha & Edmondson, 2006; Liedtka, 1989; Lord & Brown, 2001), the definition of “performance” varies in each study and is generally focused on qualitative managerial
skills, not the quantitative academic, fitness, and training variables evaluated in this study. Therefore, these results indicate it may be possible that cadets can be high or low performers in AFROTC regardless of their individual application of the core values. Limited research has been done on the relationship between organizational values and performance in trainees, specifically. However, a study by Kim, Hahn, and Lee (2015) showed that organizational identification, which includes how much an individual personally identifies with an organization’s values, was a strong predictor of success in a skills-based training program. It should be emphasized that military training programs such as AFROTC are unique environments with unique performance measures, and it is unknown how well other study results would translate to the AFROTC context being evaluated in this study.

The relationship found between application of “integrity first” and the Physical Fitness Assessment was surprising. This finding may align with previous research that has provided evidence of links between physical health and strong character traits, implying that physical fitness may be a secondary effect of traits like integrity (Proyer, Gander, Wellenzohn, & Ruch, 2013). Another possibility is that cadets who participated in sports programs, either as children or in college, were more apt to maintain a level of fitness and that those cadets had stronger character and integrity (i.e., the “sports build character” theory) than their peers who did not participate in sports programs. However, the theory that sports build character has received little scientific support (Doty, 2006; Rees & Howell, 1990). In one study done at the U.S. Military Academy (West Point), which is a similar context to AFROTC, intercollegiate team athletes scored lower on the Hahm-Beller Values Choice Inventory – an instrument designed to evaluate moral reasoning – than other students at the institution who were not involved in intercollegiate sports (Doty, 2006). While an underlying theory is not yet established, physical fitness has been linked to strong leadership skills
in a variety of contexts, including the military training context (Atwater, Dionne, Avolio, Camobreco, & Lau, 1999; Proyer, Gander, Wellenzohn, & Ruch, 2013). Finally, caution is needed when interpreting results with the leadership attribute communication due to its lower internal reliability.

5.1.3 Discussion of Hypothesis H7

Hypothesis H7 postulated relationships between the length of time exposed to core values, the comprehension of core values, the application of core values, leadership attributes, and cadet performance. There were no significant relationships between the amount of time exposed to core values and comprehension or application, nor strength of leadership attributes. The only significant relationship found with length of time exposed to core values was the leadership attribute “delegation” as summarized in Table 5-1.

The results suggest that the length of time a cadet is exposed to core values does not influence the level to which they comprehend the core values. New cadets generally learn the Air Force core values during one of their first training sessions in AFROTC, but it is surprising that cadets do not seem to develop a deeper understanding of the core values, even over several years. Previous research indicates that individuals tend to view an organization’s values with greater clarity as they are part of the organization for a longer period of time (Posner, 2010). This contrasting finding in the AFROTC context may be because in most AFROTC programs, the core values are learned by new cadets once and then never again. Senior cadets generally do not undergo any supplemental training on the core values, which may limit any greater level of understanding or clarity on the core values.
Similarly, the results also suggest that the length of time a cadet is exposed to core values does not influence the level to which they apply the core values. This is a somewhat surprising result, given that previous research indicates that individuals adopt an organization’s core values and express greater congruency between individual values and organizational values over time (Posner & Schmidt, 1992; Posner, 2010). It is possible that application of values and congruency of values are not related. In this case, an individual could feel an increased sense of congruency with organizational values, but yet not apply them any more or less than previously; indeed, congruency results from mental state and self-image whereas application is an action (Posner & Schmidt, 1993).

The results also indicate that delegation improves in cadets who have been exposed to the core values for longer. This suggests that cadets who have been in the AFROTC program longer tend to be better delegators. As delegation is an important part of the leadership learning process emphasized in AFROTC, this result is sensible. For example, while a first-year cadet is only responsible for making sure they themselves are learning and attentive, fourth-year cadets are charged with planning and executing all cadet operations, from training to recruiting to public affairs to special events and more. As cadets’ scope of responsibility widens as they progress through the program, their delegation skills are forced to improve as a result of the work they are required to do within the program.

The results did not support any other relationships between the tested leadership attributes and the length of time cadets have been exposed to core values. This is a somewhat surprising finding. Given the emphasis on leadership development, it would be reasonable to expect cadets who have been in AFROTC longer to be more skilled leaders. One possible explanation for this finding is that since the leadership attribute scores are based upon cadets’ self-appraisals, newer AFROTC
cadets may overrate their leadership abilities compared to more experienced cadets. It is also possible that cadets rated their leadership attributes within the context of their scope of responsibility: newer cadets may find a certain challenge in personal leadership while senior cadets may find that high-level organizational leadership brings a similar challenge. Although their leadership strengths almost certainly differ (the senior cadets likely employ stronger leadership attributes to effectively lead an organization), both groups judge their leadership skill against their current scope of responsibility.

Additionally, the results did not indicate any relationship between time exposed to core values and cadet performance. There are several possible explanations for this finding. One possibility is simply that cadets demonstrate a relatively stable level of performance throughout the AFROTC program. At first glance, this may seem unlikely, as the AFROTC program is designed to improve individuals’ performance to produce quality military officers. There is also a strong performance incentive in that AFROTC can remove any cadet at any time for substandard performance. It is plausible, though, that cadets who earn high GPAs and Physical Fitness Assessment scores early in their cadet careers will continue to do so as they progress through the program. Further, almost all cadet performance metrics (Field Training flight rank, Field Training overall rank, Field Training award, cadre feedback, peer feedback, and self-rating) are based upon an individual’s performance relative to their peers in the same class level (year group). Even though an individual cadet may improve their performance throughout the program, their class level peers are also improving, so the improvements of an individual within the peer group is less noticeable.

Another possible explanation is that upperclassmen cadets may experience burnout from the stress of AFROTC’s high expectations and the significant time commitment on top of the normal university workload. Previous research has shown that burnout in military recruits is common –
often resulting from the additional stress – and that stress-coping mechanisms can stave off burnout (Alessandri, et al., 2018; Novaco, Cook, & Sarason, 1981). Further, the major hurdles for an AFROTC cadet are generally in the first two years of the program. By the time cadets enter the upperclassmen ranks, they have completed Field Training and have signed a contract to serve in the Air Force. After the first two years working to demonstrate their viability as an officer candidate, cadets are apt to experience some degree of burnout. This is likely combined with a newfound sense of security in their upperclassmen status, because – barring any highly extraordinary circumstances – upperclassmen cadets are virtually guaranteed to commission as Second Lieutenants. Additionally, experiencing a mental “progress marker” (such as Field Training, the major progress marker signifying halfway through the AFROTC program) can also generate complacency, decrease motivation, and decrease performance (Amir & Ariely, 2008). AFROTC may also be viewed as less of a priority for upperclassmen cadets due to other, competing priorities like more challenging academic courses or roles in other extracurriculars. Indeed, students who are involved in more than two different academic or extracurricular activities tend to perform worse in terms of GPA, perhaps as a result of challenges prioritizing (Knifsend & Graham, 2012). This collection of burnout, security and complacency, and shifting priorities may result in lower performance for more senior cadets. Although the exact explanation is unknown, the results of this study indicate that the comprehension and application of Air Force core values do not impact cadet performance in a significant way.
Table 5-1. Summary of Significant Relationships for Study Hypotheses

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<th></th>
<th>Communication</th>
<th>Decision-Making</th>
<th>Delegation</th>
<th>Empathy</th>
<th>Job Knowledge</th>
<th>Motivation</th>
<th>Responsibility</th>
<th>Role Model</th>
<th>Physical Fitness Assessment</th>
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<td>Comprehension of “Excellence in All We Do”</td>
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<td>Application of “Excellence in All We Do”</td>
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5.1.4 Discussion of Post Hoc Findings

The post hoc analysis indicated that there were strong relationships between the various leadership attributes tested in this study. This finding implies that leadership attributes tend to be highly correlated. Previous research tends to agree that leadership skill originates from the complex interaction of many factors, but there are no definitive insights on what factors are involved or how they correlate (Day, Fleenor, Atwater, Sturm, & McKee, 2014). One model posits that leadership attributes span creative, academic, practical, and wisdom-based facets (Sternberg, 2008). Another model lists creativity, interactivity, vision, empowerment, passion, ethics, and being a catalyst for change as critical aspects of transformational leadership (Hernon & Rossiter, 2006). Another study showed that the five factor model (including neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) had a strong link to leadership performance (Judge, Bono, Ilies, & Gerhardt, 2002). It is unknown how the leadership attributes measured in this study fit into the broader set of leadership studies. In fact, while research has found that individual traits influence performance (Chen, Gully, Whiteman, & Kilcullen, 2000), there remains little widespread agreement on what even distinguishes a trait as a “leadership trait” (Barker, 1997).

Additionally, previous research has indicated that the leadership development process likely begins at a young age (Day, Fleenor, Atwater, Sturm, & McKee, 2014), so it is possible that leadership attributes develop concurrently over the span of years. While the specifics remain unknown, it is clear that the concept of leadership is a complex web of interconnected traits, abilities, and skills, and that the importance of certain traits may vary situationally (Sternberg, 2008; Waldman, Ramirez, House, & Puranam, 2001). The findings of the present study contribute to ongoing research in this area by showing evidence of significant correlations amongst leadership attributes in trainees.
A limited number of correlations were identified between the different cadet performance variables. Field Training flight rank and Field Training overall rank were correlated with each other. Specific aspects of Field Training performance are included in the ranking for both Field Training flights and Field Training overall, so it is expected that these two variables correlate.

Cadre feedback was shown to impact Field Training flight rank. This likely indicates that the feedback cadre provide to cadets at their home units is similar to feedback and evaluations performed by other officers at Field Training. Active duty Air Force officers fill the role of home unit cadre during the academic year and serve as Field Training evaluators during the summers. Because they are filling both roles, it makes sense that these officers are providing similar feedback to cadets at home units and at Field Training.

It is perplexing that Field Training performance (flight rank, overall rank, or earning awards) is not impacted by CGPA or Physical Fitness Assessment scores. These two performance metrics are stressed heavily by cadre as keys to success at Field Training. Cadets are subjected to fast-paced academic learning and execution of skills-based knowledge throughout Field Training as well as a standalone Physical Fitness Assessment. All of these are incorporated into final Field Training performance rankings. However, neither CGPA nor Physical Fitness Assessment scores were indicative of performance at Field Training.

Cadre feedback, peer feedback, and self-rating were all influenced by Physical Fitness Assessment scores. An emphasis on physical fitness is a significant and unique aspect of a military career and is reinforced by research findings that physical fitness is a predictor of leadership emergence and effectiveness in a military environment (Atwater, Dionne, Avolio, Camobreco, & Lau, 1999). These results, as reflected in feedback from cadre and peers as well as cadets’ self-appraisals, are consistent with the findings reported in other studies.
It is interesting that no significant relationships with CGPA were observed in this study, given the emphasis placed on CGPA by cadre and AFROTC at large. This may indicate that cadre, peers, and cadets themselves view performance independent of CGPA. This may be a side-effect of academic majors having varied levels of difficulty and therefore having different average CGPAs, while the cadre emphasis serves to push cadets to maintain at least a minimum CGPA in order to graduate and commission.

Cadre feedback, peer feedback, and self-rating were correlated with one another. It is possible that external feedback received from cadre and peers was similar (as noted previously) and may influence cadets’ self-appraisal. At a surface level, the lack of relationships between cadre feedback, peer feedback, self-ratings, and any aspect of Field Training performance would seem to imply that cadre, peers, and cadets alike do not view Field Training performance as a significant indicator of success. However, this result could also be due in part to the small amount of variation in these variables observed in the data collected for this study. For example, both cadre feedback and Field Training flight rank have three discrete modes (top-third, middle-third, and bottom-third, all rated against peers), thus there are nine possible outcomes for each respondent. Cadre feedback, peer feedback, Field Training flight rank, and Field Training overall rank each only have three discrete options. Field Training award has two (yes/no) and self-rating has six. Having so few possible outcomes results in less variability, creating less opportunity for identifying significant relationships between variables.
5.2 Discussion

5.2.1 Study Limitations

Some limitations were identified that may have impacted the ability to make reliable conclusions regarding the variables and hypotheses studied. The first limitation to this study was the sample size used for the analyses. Although there are thousands of cadets in AFROTC across the United States, only eight universities were involved in the study, and only 103 responses were collected via the survey instrument. Not all survey submissions were complete. Some survey items, such as the Field Training items, only applied to upperclassmen cadets, so the number of responses for those items was lower. Low numbers of responses make it more difficult to identify significant relationships, particularly when variability is limited, as was the case with some of the variables tested in this study.

The second limitation was that the study only incorporated AFROTC units at universities in the western United States, specifically in Washington, Oregon, and California. As a result, it is possible that the study findings are less generalizable to AFROTC more broadly. A larger study that incorporates AFROTC units around the country may produce more generalizable results.

The third limitation was that the survey instrument was entirely self-reported. Respondents appraised their own level of comprehension and application of the core values, as well as the strength of leadership attributes. Respondents’ self-appraisals may be inaccurate. Although all but one of the performance variables were based upon a previously assigned, non-self-appraised rating, there is no guarantee that respondents provided actual ratings versus those they drew from recollection.
The fourth limitation was that the survey instrument included new, unvalidated constructs. These constructs were intended to measure comprehension and application of core values as well as leadership attributes. Even though demonstrating high internal reliability, additional studies and testing are needed to fully validate the survey items and the constructs measured in this study.

Finally, the communication construct had low internal reliability. Although communication was not removed from the study, results involving the communication construct should be interpreted cautiously.

### 5.2.2 Future Work

Opportunities for future work have been identified as a result of this study. First, an expanded study with a more representative sample of AFROTC cadets across the United States, along with a larger number of respondents, could provide more generalizable results. Second, a related study on the differences in performance between AFROTC class levels may provide insight into how cadets’ performance changes throughout a training program. This may help answer questions about whether cadets individually improve within their class cohorts and whether overall cohort performance improves over time. For example, do cadets in their third year of the program perform at a higher level than cadets in their first year? Third, a study to determine the impact of leadership attributes on cadet performance would likely bring some additional clarity to the relationships between the two sets of variables. Fourth, a similar study with more specific measures for Field Training performance would likely show clearer relationships, or lack thereof, between Field Training performance and cadre feedback, peer feedback, and self-ratings. This can be done using the numerical rankings provided for flight rank and overall rank upon completion of Field Training, rather than the more common top-third, middle-third, bottom-third descriptors used in this study.
5.2.3 Implications

The findings from this study contribute to the body of knowledge on the impact that organizational values have on individual performance. The focus of this study was on military trainees, an organizational context where little previous research has been undertaken. This study contributes to work being done by military research groups, specifically the USAFA CCLD, as they continue to study how to create capable and effective military leaders. This study also contributes to the wider engineering management body of knowledge by providing additional evidence of the impact of organizational values on individuals, leadership, and performance.

There are several important practical implications from this study. These results suggest that simply comprehending organizational values is not enough to have a major impact on leadership skills or performance. Rather, opportunities to apply organizational values appeared to be more important in developing leadership skills. Practitioners should incorporate opportunities for trainees to practice applying values throughout training programs. These opportunities should be designed to provide trainees with increasingly deeper and more comprehensive understanding of how to apply the values in their lives. In AFROTC, cadets should review the core values multiple times throughout the length of the program, not just once when cadets first join. Each time the core values are reviewed, emphasis should be placed on developing greater breadth or depth of the cadets’ knowledge about the core values. For example, an early core value review session may focus on case studies and discussion while a later review session may focus on how cadets can incorporate the core values into their leadership styles. As cadets integrate core values into their approaches to leadership over time, they have more opportunities for experiential learning through applying the core values and, therefore, leadership growth.
Within the military training context specifically, although the application of values is correlated with leadership skills, this study found only one relationship between the application of values and cadet performance. This finding raises questions about possible correlations between leadership skills and performance, perhaps through a mediated model. However, practitioners should acknowledge that applying the core values may produce stronger leaders but may not produce higher performers. If trying to help cadets improve performance, practitioners should avoid directing the conversation to the core values and instead provide more actionable tips.

Additionally, practitioners may want to take a second look at the third Air Force core value, “excellence in all we do.” Cadets may be unclear about what this core value is asking from them and how to successfully incorporate it into their lives.

This study found no correlation between CGPA and any other tested performance variable. Although cadets must maintain a minimum CGPA to stay in AFROTC and must graduate with a college degree to commission as a military officer, these results suggest that a focus on CGPA may not be a particularly fruitful mechanism for identifying officer potential.

The Physical Fitness Assessment was the only variable tested in this study that influenced cadre feedback, peer feedback, and self-ratings. The importance of physical fitness on leadership and stress-reduction in the military has been confirmed by previous research (Atwater, Dionne, Avolio, Camobreco, & Lau, 1999; Taylor, et al., 2008) and is further underscored here. Practitioners at every level should emphasize the importance of physical fitness and devote time and resources into improving the physical fitness of cadets. Cadre and cadet leadership should also emphasize how physical fitness is strongly correlated with leadership performance to further increase cadet motivation.
Counterintuitively, Physical Fitness Assessment scores did not influence any aspect of Field Training performance. Although physical fitness is clearly important in the military, both as a cadet and into active duty, this finding indicates that physical fitness may not be important for success at Field Training. Cadre and cadet leadership are cautioned to not frame physical fitness as a predictor of Field Training performance. AFROTC leaders are also encouraged to better understand why there is a disconnect between physical fitness, which has been found to influence leadership, and Field Training evaluations, which are designed to measure leadership.

Finally, practitioners should seek out opportunities to provide ample feedback to cadets, both from cadre and peers. This feedback seems to influence cadets’ self-appraisal and likely shows them specific areas to improve.

The findings from this research can assist military and civilian leaders in developing more effective training programs. The relationships between organizational values, leadership skills, and performance in a training context are undoubtably complex, but this research sheds light on some of the significant relationships between various elements included within a training context. AFROTC leaders can use these findings to guide the evaluation and development of curriculum. Cadre and cadet leadership can also use these findings to focus unit priorities throughout training. Finally, civilian leaders can use the findings from this study to create content for values-based training programs.

Ultimately, the findings of this study emphasize the importance of applying organizational values throughout training. These study results indicate that while stronger application of values is correlated to increased levels of leadership skills (using self-assessment data), the link between comprehending and applying organizational values and individual performance was not supported, indicating that additional research is needed to further untangle this web of relationships.
Bibliography


Appendix A: Study Hypothesis H1

Comprehension of “Integrity First”

- H1a
- H1b
- H1c
- H1d
- H1e
- H1f
- H1g
- H1h
- H1i

- Communication
- Decision Making
- Delegation
- Empathy
- Job Knowledge
- Motivation
- Responsibility
- Role Model
- Cadet Performance
Appendix B: Study Hypothesis H2

Comprehension of “Service Before Self”

- H2a Communication
- H2b Decision Making
- H2c Delegation
- H2d Empathy
- H2e Job Knowledge
- H2f Motivation
- H2g Responsibility
- H2h Role Model
- H2i Cadet Performance
Appendix C: Study Hypothesis H3

Comprehension of “Excellence in All We Do”

H3a
H3b
H3c
H3d
H3e
H3f
H3g
H3h
H3i

Communication
Decision Making
Delegation
Empathy
Job Knowledge
Motivation
Responsibility
Role Model
Cadet Performance
Appendix D: Study Hypothesis H4

Application of “Integrity First”

H4a
H4b
H4c
H4d
H4e
H4f
H4g
H4h
H4i

Communication
Decision Making
Delegation
Empathy
Job Knowledge
Motivation
Responsibility
Role Model
Cadet Performance
Appendix E: Study Hypothesis H5

Application of “Service Before Self”

- Communication
- Decision Making
- Delegation
- Empathy
- Job Knowledge
- Motivation
- Responsibility
- Role Model
- Cadet Performance
Appendix F: Study Hypothesis H6

Application of “Excellence in All We Do”

- Communication
- Decision Making
- Delegation
- Empathy
- Job Knowledge
- Motivation
- Responsibility
- Role Model
- Cadet Performance

H6a → Communication
H6b → Decision Making
H6c → Delegation
H6d → Empathy
H6e → Job Knowledge
H6f → Motivation
H6g → Responsibility
H6h → Role Model
H6i → Cadet Performance
Appendix G: Study Hypothesis H7

Time Exposed to Core Values

Comprehension of “Integrity First”
- H7a

Comprehension of “Service Before Self”
- H7b
- H7c
- H7d
- H7e
- H7f

Comprehension of “Excellence in All We Do”
- Application of “Integrity First”
- Application of “Service Before Self”
- Application of “Excellence in All We Do”
- Communication
- Decision Making
- Delegation
- Empathy
- Job Knowledge
- Motivation

Application of “Integrity First”
- H7g

Application of “Service Before Self”
- H7h
- H7i

Application of “Excellence in All We Do”
- H7j
- H7k
- H7l

H7m

Cadet Performance

Role Model

Responsibility
Appendix H: Institutional Review Board Protocol & Approval

HRPP and IRB Application and Protocol (Version 1.1)

1.0 General Information

*Please enter the full title of your study:

A Study of the Impact of Core Values on Leadership Development and Performance in Military Trainees

*Short Title:

ROTC Core Values

* This field allows you to enter an abbreviated version of the Study Title to quickly identify this study.

Anticipated study review level:

Flex

2.0 Add Department(s)

2.1 Add the PI’s primary department if you do not see it listed below:

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<th>Department Name</th>
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<tr>
<td>OSU - WHC - University Honors College</td>
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</tbody>
</table>

3.0 Study Team

3.1 *Name of Principal Investigator (FAQ: Who can be a Principal Investigator (PI)):

Doolen, Toni L

3.2 Additional Study Team Members:

Additional Investigators:
(Do not list individuals who will receive IRB approval at their own external institution or whose institution has determined that they are not engaged.)

To remove a study team member prior to submitting the application, check the box next to their name and click the "remove" button.

Laumann, Nathan R
Student

Non-Research Support Staff:
(No access to participants, data, or specimens)
To remove a study team member prior to submitting the application, check the box next to their name and click the "remove" button.

3.3 *Please add a Study Contact:

Doolen, Toni L  
Lausmann, Nathan R  

The Protocol Contact(s) will receive all important system notifications. The Principal Investigator cannot be removed as a study contact, however, additional study contact(s) can be added. All protocol contacts must be listed in 3.2 above.  

To remove a study team member from the "protocol contact" section, check the box next to their name and click the "remove" button.

3.4 If required by the PI's department, please select the Designated Department Approval(s):

Add the name of the individual required to approve and sign off on this protocol from your department (e.g. the Department Chair or Dean). Skip if none.

4.0  

Help Text  

4.1 Do you wish to see the application help text, examples, and links to additional information in this form?  

☐ Yes  ☐ No

5.0  

Submission Type  

5.1 Select One:  

☐ New submission, not previously reviewed or approved by OSU  
☐ Re-submission of previously approved protocol (expired or migration into iRIS)  
☐ Request for .118 Determination  
☐ Convert .118 Determination to a new application

6.0  

Study Summary  

6.1 Using lay language, briefly describe the study purpose or primary research question:

50 words or fewer. You will be asked for aims, background justification, and specific methods and procedures in later sections.

This study seeks to identify the impact that the U.S. Air Force core values have on the leadership development and overall performance of Air Force ROTC cadets.

7.0  

Determination of Whether the Project Requires IRB Review  

7.1 "Research" is defined as a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge. Does the project involve research at OSU or elsewhere?  

☐ Yes  ☐ No
**Systematic Investigation**
Typically predetermined method for studying a specific topic, answering a specific question(s), testing a specific hypothesis, or developing theory. A scientific or scholarly activity involving qualitative or quantitative data collection and/or data analysis that sets forth an objective(s) and a set of procedures intended to reach the objective(s), i.e., to acquire knowledge, develop a theory, or to answer a question.

**Includes:** Observational studies, interview or survey studies, group comparison studies, pilot studies, test development and interventional research.

**Generalizable Knowledge**
The intent or purpose of the systematic investigation is dissemination of findings (publication or presentation) outside of OSU. Intended to have an impact (theoretical or practical) on others within one’s discipline. Dissemination with the intent to influence behavior, practice, theory, future research designs, and the like, are contributing to generalizable knowledge.

**Research does NOT include:** Class projects, some program evaluation, or an examination of just one person. Scholarly and journalistic activities (e.g., oral history, journalism, biography, literary criticism, legal research, and historical scholarship), including the collection and use of information, that focus directly on the specific individuals about whom the information is collected.

**Does your study require IRB review?**

7.2 “Human subject” is defined as obtaining data about, or specimens from, one or more living individuals through intervention, OR interaction, OR the collection of identifiable private information. Does the project involve human subjects at OSU or elsewhere?

- Yes  
- No

**Human Subject**
A living individual about whom an investigator conducting research obtains:

i. Obtains information or biospecimens through intervention or interaction with the individual, and uses, studies, or analyzes the information or biospecimens; or

ii. Obtains, uses, studies, analyzes, or generates identifiable private information or identifiable biospecimens.

**Intervention:** Includes both physical procedures by which information or biospecimens are gathered (e.g., venipuncture) and manipulations of the subject or the subject’s environment that are performed for research purposes.

**Interaction:** Includes communication or interpersonal contact between investigator and subjects. The interaction may be as remote as an anonymous, online survey.

**Private information:** Private information includes information about behavior that occurs in a context in which an individual can reasonably expect that no observation or recording is taking place, and information that has been provided for specific purposes by an individual and that the individual can reasonably expect will not be made public (e.g., a medical, education, or employment record).

**Identifiable private information:** Identifiable private information is private information for which the identity of the subject is or may readily be ascertained by the investigator or associated with the information.

The threshold for what may be considered identifiable continues to evolve. For example, NIH [NOT-OD-17-109] now defines “identifiable, sensitive information” as information about an individual that is gathered or used during the course of biomedical, behavioral, clinical, or other research, where the following may occur:

- An individual is identified; or
- For which there is at least a very small risk, that some combination of the information, a request for the information, and other available data sources could be used to deduce the identity of an individual.

**Identifiable biospecimen:** An identifiable biospecimen is a biospecimen for which the identity of the subject is or may readily be ascertained by the investigator or associated with the biospecimen.
Anonymous or coded biological specimens to be used in genetic research: Oregon law requires IRB review prior to research on DNA samples, genetic testing, or genetic information even when the sources of specimens is not individually identifiable. If the project will include genetic research, check "yes" to item 1 in this section and contact the HRPP for additional instructions.

NOT considered to include human subjects: Projects limited to pre-existing data or samples that were (1) not collected for the current project, and (2) not collected by the team members on this project, and (3) de-identified by someone who is not associated with the current project.

7.3 OSU Engagement:

Are any of the following true?

- OSU is the only institution participating in this study
- OSU is the primary awardee on the funding
- OSU employees or students are obtaining consent from participants
- OSU employees or students will have access to individually identifiable data or samples

☐ Yes  ☐ No

Note: If "no" to research, human subjects, OR engagement, only the 'Funding' and 'Application Questions Complete' sections will be visible. Once those sections are completed, submit this form to the HRPP office for a formal determination of whether IRB oversight is required. Please also attach any test instruments, including survey or interview questions, if applicable. Attachments are uploaded in a single section at the end of this form.

8.0 Extent of the Review Required by OSU

8.1 Are OSU-affiliated individuals the only people conducting study activities; including recruitment, obtaining consent, data collection, data analysis, data or sample sharing or storage?

☐ Yes  ☐ No

Note: If any of the study team members have an appointment at OSU as well as an external institution, check "no" here and identify the additional institution as the "external site".

FAQ: IF I am collaborating with researchers at external institutions, which IRB reviews my study?

9.0 OSU will be the RESPONSIBLE Institution but Review External Documents

9.1 Will OSU be asked to approve this study based on review of documents that have already been approved by another IRB?

☐ Yes  ☐ No

Example: The Washington State University (WSU) IRB has reviewed and approved this study but OSU will also review this study and issue a separate approval notice. In this case, the PI can submit copies of the documents that have been approved by WSU and skip many sections of this form.

10.0 Regulatory Flexibility

10.1 Instructions:

The requirement to comply with some regulations and policies can be waived for eligible studies. Your answers to the questions in this section will assist us in determining whether this study is eligible for a flexible application of the regulations.
If "no" to all of the questions in this section, the study may be eligible for "flex" review. Flex studies will not be assigned an exempt or expedited category. When applicable, subsequent sections will contain special instructions related to these studies.

If "yes" to one or more of the questions in this section, regulatory flexibility cannot be applied to this project and the study will be reviewed using an exempt, expedited, or full board process.

**Information about Regulatory Flexibility**

### 10.2 Does the study involve more than minimal risk to participants?

- ☐ Yes  ☑ No

**Note:** Risk is minimal when the probability and magnitude of harm or discomfort anticipated in the proposed research are not greater, in and of themselves, than those ordinarily encountered in daily life or during the performance of routine physical or psychological examinations or tests.

### 10.3 Will any of the participants be prisoners or parolees? This refers to the target population, not incidental enrollment.

- ☒ Yes  ☐ No

**Information about research with prisoners**

### 10.4 Does the study involve federally classified research procedures and/or results that are legally knowable only by individuals with US government security clearance?

- ☒ Yes  ☐ No

### 10.5 Does the study include any clinical interventions?

- ☒ Yes  ☐ No

**Note:** For the purposes of OSU policy, clinical intervention is defined as one that is intended to change or assess a health-related processes and/or endpoint. Examples include the use of drugs, dietary supplements, devices, blood draws, imaging (e.g., DXA, x-ray), delivery systems (e.g., telemedicine, face-to-face), diet, cognitive therapy, exercise, and any intervention that includes treatment, prevention, or diagnostic strategies.

### 10.6 Is there federal funding or a plan for future federal sponsorship for this study?

- ☐ Yes  ☒ No

**Note:** Research funded or otherwise regulated by a federal agency that has signed on to the Common Rule, including all agencies within the Department of Health and Human Services. Included are proof of concept studies for federal RFPs, pilot studies intended to support a federal grant application, training and program project grants, no-cost extensions.

### 10.7 Are there contractual obligations or restrictions triggered by a non-federal award that require the application of the federal regulations or which require that annual review be conducted by an IRB?

- ☒ Yes  ☐ No

### 10.8 Is there an NIH-issued or pending Certificate of Confidentiality?
115

11.0 Conflicts of Interest and Competing Relationships

11.1 Does a researcher or family member have a financial or other business interest in an entity that is supplying funding, materials, products, equipment, research participants, or the site of data collection for the current research project?

- Yes
- No

Family member is defined as anyone having a relationship to a person as a spouse or domestic partner; the parent, child, or sibling of the individual or domestic partner; or any person for whom the individual has a legal support obligation.

Examples of conflicting or competing relationships:
- A researcher or family member participates in research on a technology, process or product owned by a business in which the faculty member holds a financial interest.
- A researcher participates in research on a technology, process, or product developed by that researcher.
- A researcher or family member has a financial or other business interest in an entity that is supplying funding, materials, products, equipment, research participants, or the site of data collection for the current research project.
- A researcher or family member is employed by or otherwise affiliated with the organization under study.
- A researcher has an existing relationship with potential research participants recruited for this project.
- A researcher or family member serves on the Board of Directors of a business that is supplying funding, materials, products, equipment, research participants, or the site of data collection for the current research project.
- A researcher receives consulting income from an entity that is funding the current research project.

12.0 Sources of Funding and Support for this Project

12.1 Is funding for the project pending/awarded?

- Yes (Internal or External)
- No (Unfunded)
12.6 Is an external (non-OSU) organization or company providing material, equipment, drugs, supplements, or devices for this study?

- Yes  - No

### Study Overview

#### 13.1 List the study aims or research questions and a general description of the participant population:

This study seeks to better understand whether the Air Force’s core values, which are required knowledge in Air Force military training programs, have any influence on the leadership development or overall performance of Air Force military trainees.

The participant population will be currently-enrolled U.S. Air Force ROTC cadets. Because ROTC cadets must be enrolled in a degree-awarding institution, the entire participant population will be college students.

Provide survey questions, questionnaires, interview and focus group guides, references/citations, etc., as separate attachments. Attachments are uploaded in a single section at the end of this form.

#### 13.2 Provide details of where data will be collected:

Data will be collected via a Qualtrics survey emailed to Air Force ROTC cadets at several universities on the west coast. The survey is the extent of the research activities; therefore, all research activities will be conducted online.

**Examples:** Online, OSU campus, K-12 classrooms, U.S. parks, senior living communities in Denmark.

**Note:** If the study involves data collection outside of the US, review the guidelines related to international research, include information about local context in this section and other sections (as appropriate). All faculty, students and staff members are required to register their university-related travel with the Office of International Affairs.

#### 13.3 Provide background justification:

Background justification should support the objectives of the research as well as the knowledge that is anticipated from the research results. Explain the need for the study and what gap in knowledge the results are expected to fill. Summarize relevant existing data, literature, past and ongoing studies, and how your study ties in with these.

Provide specific methods and procedures in a later section.

When strong organizational values are congruent with the values of employees, performance outcomes have been shown to improve. This impact is more notable when the organizational values are clearly defined and communicated. This has led to organizations developing new organizational values. The United States military has adopted a focus on organizational values, termed “core values,” over the last two decades. All branches of the United States military have developed core values. These values are meant to guide mission execution and individual conduct. Usually one of the very first topics presented to new military recruits is their branch’s core organizational values. The branch’s core values are then reviewed and retrained countless times throughout a military career. The U.S. Navy explains that their core values are a key aspect of initial recruit training, or “boot camp”: “The goal of military training is to instill and reinforce the Navy’s Core Values of Honor, Courage, and Commitment with the basic skills of training in a team environment.” The U.S. Air Force clearly prioritizes retraining of their core values: “All education and training in the Air Force will address the Core Values. This goal is to educate all officers, enlisted personnel, and civilians throughout their careers.” However, despite the military’s focus on core values, it is unclear if these values are truly understood and applied by military recruits and, further, if strong organizational values are significantly correlated with strong leadership skills and/or overall performance in a military training environment.

One of the primary goals of the U.S. Air Force Academy’s Center for Character and Leadership Development is to determine how military training can most effectively develop recruits into high-performing, professional, honorable leaders of character. Other military research groups, including the
Arroyo Center, U.S. Army’s Center for the Army Profession and Leadership, and U.S. Navy’s Naval Leadership and Ethics Center examine similar questions.

Currently, teaching and reinforcing organizational values early and often is a foundational piece of U.S. military training, regardless of branch of service. However, there is little data or evidence to understand how exposure to core values in the context of various training activities impacts recruits. This research is focused on finding evidence to determine whether or not a focus on organizational values during initial military training is effective in improving leadership skills and performance.

### 13.4 Does the study involve any of the following?

Check all that apply:

- [ ] Education Records: Does the study involve the use of student education records?
- [ ] Food or Beverage: Does the study involve providing participants with commercially purchased food intended as a courtesy or compensation?
- [ ] Does the study involve participants ingesting, tasting, or smelling a food, a beverages, or a component thereof for the purpose of research?
- [ ] Drugs or Biologics: Are one or more drugs or biologics being studied as part of this project?
- [ ] Dietary Supplements: Are one or more dietary supplements being studied as part of this project?
- [ ] Devices: Are one or more medical devices being studied as part of this project?
- [ ] Radiation: Does the study involve exposing participants to radiation?
- [ ] Biological Samples: Does the study involve the collection or receipt of biological samples?
- [ ] Limited to chart review or analysis of large, pre-existing datasets.
- [x] None of the above

- Guidance on Drugs and Dietary Supplements
- Guidance on Medical Devices
- Decision Trees

### 14.0 Target Enrollment

#### 14.1 What is the target enrollment number?

750

- [ ] N/A

**Note:** A target enrollment number is not applicable for studies limited to chart review or review of large, pre-existing datasets.

If the study is determined to be exempt, expedited, or eligible for flexibility in the application of the regulations, an approximate number is sufficient for the evaluation of risk. The PI will not be required to report enrollment numbers to the IRB over the course of the study. However, if the study involves more than minimal risk or is FDA-regulated, an exact number is required and cannot be exceeded without prior approval.

**FAQ:** What is the “total target” enrollment number?

#### 14.2 Provide scientific justification for the target enrollment number:

The following universities will be contacted and Air Force ROTC cadets asked to participate in the study:

- Oregon State University
- University of Portland
- University of Washington
- Washington State University
- Central Washington University
- San Jose State University
- University of California, Berkeley
- California State University, Sacramento
- University of Hawaii

There is a national average of 107 cadets per Air Force ROTC unit. Assuming near-100% participation with the above universities, the resulting target enrollment number is approximately 900. Accounting for cadets that leave the AFROTC program between the start of the academic year (where the 107 average was calculated) and the time of survey administration, some university AFROTC units choosing not to distribute the recruitment email to their cadets, and less than 100% cadet participation, the target number of 750 is more reasonable.

## 15.0 Participant Demographics

### 15.1 Instructions:

Justification must be provided for excluded populations. Excluding certain categories of people may reduce generalizability. For example: Study results may not be applicable to the general population of adults in the US if pregnant women, people who do not speak English, and Native Americans are excluded which may, in turn, reduce the scientific benefit of the overall study.

The IRB will not approve a study that fails to provide adequate scientific and ethical justification for excluding persons who might benefit from the research, nor will the IRB approve a study that fails to provide scientific and ethical justification for targeting a category of participants who are vulnerable to coercion or undue influence.

### 15.2 Age ranges:

Check all that apply:

- [ ] 0-7
- [ ] 8-17
- [x] 18-89
- [ ] 90+

Provide scientific justification for limiting enrollment to this age range:

All participants will be enrolled in a college or university. Air Force ROTC places a restriction on the maximum age of participants: all cadets must graduate prior to their 39th birthday. There may be a small percentage of people responding to the recruitment materials who are under the age of majority in their state; because of this, our recruitment documents explain that participants must be at least 18 years old.

**Note:** If the study is intended to be limited to adults, all enrolled participants must have attained the legal age to consent to research under the applicable law of the jurisdiction in which the research will be conducted. Not all states or countries consider 18 years to be the age of majority; in Oregon it is 18. Describe nuances related to participant age in the inclusion and exclusion criteria sections below.

**Sample recruitment or consent language:** “In order to be in this study you must be of legal age to consent; which is 18 in most states.”

### 15.3 Will people from any of the following populations be permitted to enroll?

- [ ] Pregnant women AND the study involves more than minimal risk OR a physical intervention
- [ ] Children
- [ ] People in the European Union or the European Economic Area (EEA) (regardless of citizenship)

### 15.4 Will you intentionally recruit and enroll from any of the following populations?

- [ ] Economically or educationally disadvantaged persons
15.5 Will any of the following OSU-affiliated groups be permitted to enroll?

**Check all that apply:**
- Students
- Students currently enrolled in a class or lab instructed by a study team member
- Employees
- Employees who report to or are otherwise supervised by a study team member
- Any of the study team members

*Provide scientific justification for permitting these individuals to enroll and a plan for mitigating the potential for actual or perceived coercion:*

All Air Force ROTC cadets are enrolled as college/university students, so students must be allowed to participate for this study to occur. Language will be placed in the consent form explaining that participation or non-participation in this study will not affect grades, relationship with professors, or standing at any university. No Air Force personnel, either at ROTC universities or the larger Air Force, are directly involved with this study. No identifying information will be collected about participants.

**Guidance on Students and Employees as Research Subjects**

**Guidance on self-experimentation**

15.6 Will people who do not speak or read English be permitted to enroll?

- Yes  
- No

**Does the target population include non-English speakers?**

- Yes  
- No

15.7 Are people of any sex, gender/gender identity eligible to participate?

- Yes  
- No

15.8 Are people of any race or ethnicity eligible to participate?

- Yes  
- No

15.9 List any inclusion criteria not addressed above and explain why this is a scientifically appropriate population for the study:

<table>
<thead>
<tr>
<th>Criteria:</th>
<th>Explain (If not obvious):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Must be currently enrolled in an Air Force ROTC program</td>
<td></td>
</tr>
</tbody>
</table>

15.10 List any exclusion criteria not addressed above and the reason for the exclusion:
16.0 Identification and Recruitment of Participants

16.1 How will potential participants be identified and recruited?

Potential participants will be contacted through a recruitment email. This email will be composed by the research team, sent to universities along the west coast, and then mass-emailed from individual Air Force ROTC units to cadets within the ROTC units at their respective colleges/universities. Along with other required background information, the recruitment email will provide a link to the Qualtrics survey. Prior to the recruitment email being sent to other AFROTC units for distribution, the host universities will be contacted to ensure there are no additional approvals required to conduct research on their campus.

Note: Letters of support are generally required for studies that involve vulnerable populations. However, the IRB may request that you provide letters of support or permission under additional circumstances to ensure that appropriate safeguards are in place and/or that the study is feasible. Examples of supporting documents include school district permission forms or letters from local organizations attesting to feasibility or cultural appropriateness of international studies.

Information on Recruitment of Research Participants

16.2 The recruitment materials should include the following information: a) Study title b) Name of the Principal Investigator c) A clear statement that this is research d) Contact information for study personnel.

If you will not include one or more of the above elements, provide justification for the omission:

Attach advertisement or other recruitment material (including content of electronic posts or email). Attachments are uploaded in a single section at the end of this form.

17.0 Informed Consent

17.1 Consent Process:

"Respect for persons requires that subjects, to the degree that they are capable, be given the opportunity to choose what shall or shall not happen to them. This opportunity is provided when adequate standards for informed consent are satisfied." Belmont Report, 1979

Required elements of consent

Will consent be sought from participants?

☐ All of the participants: Consent will be sought from each participant and all of the basic elements of consent will be presented to subjects

☐ Some of the participants: Seeking a waiver of consent, or of one or more of the elements of consent, for some participants or study activities (for example, eligibility screening)

☐ None of the participants: Seeking a waiver of consent, or of one or more of the elements of consent, for all participants

Indicate where and when consent will be obtained (e.g., in a location that protects the participants’ privacy, prior to involvement in any study activities):

Consent will be obtained within the Qualtrics survey. Participants will click the survey link within the recruitment email, be directed to Qualtrics, and immediately presented with the consent form prior to beginning the survey. If the participant consents, they may begin the survey. Signatures/names of consenting participants will not be recorded in order to protect participants’ privacy.
**Note:** Agreement without understanding is not informed consent. Open-ended questions are one useful tool for assessing comprehension and can be utilized even when conducting online surveys.

Explain how comprehension of consent information will be assessed and what questions will be asked of the participants to determine comprehension of the study information:

**Examples:** What questions can I answer for you? To ensure that you understand what the study involves, would you please tell me what you think we are asking you to do? In your own words, can you tell me what the biggest risk to you might be if you enroll in this study?

Will consent be obtained in a web-based environment?

- Yes
- No

**Note:** If the process must comply with FERPA, participants must give consent in an authenticated environment, like myOSU.

Will there be a mechanism provided for participants to directly and privately communicate questions or concerns to a study team member?

- Yes
- No

Will all participants sign consent documents?

- Yes
- No

### 17.3 Request a waiver of the requirement to obtain signatures on consent documents:

You are seeing this section because you indicated above that some or all of the participants will not be asked to sign consent documents. If this process will vary across cohorts, phases, or activities, add one entry for each.

<table>
<thead>
<tr>
<th>Entry 1</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Participant Group or Activity Name:</th>
<th>All participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>For example: Group 1 – Teachers; Group 2 – Parents of children being interviewed; OR Phase 1 participants; Phase 2 participants; OR All participants</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Will this participant group be asked to sign and date written consent forms?</th>
<th>There is no IRB-related requirement for signed consent forms if the study is exempt or eligible for regulatory flexibility. However, other laws or regulations, such as FERPA, may require that a signature be obtained.</th>
</tr>
</thead>
</table>
| - Yes
- No |

<table>
<thead>
<tr>
<th>If not, which of the criteria below does this study meet?</th>
<th>The only record linking the subject and the research would be the informed consent form and the principal risk would be potential harm resulting from a breach of confidentiality. Each subject (or legally authorized individual) will be asked whether the subject wants documentation linking the subject with the research, and the subject’s wishes will govern;</th>
</tr>
</thead>
</table>
| - Yes
- No |

Check all that apply:

- The research presents no more than minimal risk of harm to subjects and involves no procedures for which written consent is normally required outside of the research context; or
- Study is exempt or eligible for a flexible application of the regulations.
- Written consent will be obtained for the primary research activities but not for eligibility screening.
18.0 Eligibility Screening

18.1 Will participants be screened for eligibility?

- Yes  
- No

19.0 Methods and Procedures

19.1 Provide a description of the methods and procedures to be followed during this research project:

- If the study involves accessing student education records, list all data to be used (e.g., course grades, assignments, GPA, video-recordings of class activities, etc.)
- Identify any surveys or questionnaires that are being tested or validated instruments that have been modified for the purposes of this study
- Identify any novel or modified experimental activities that are being tested the purposes of this study
- Specific information related to the use of drugs, devices, biologics, food, biospecimens, and radiation will be requested later in this document.

Subject Identification and Recruitment

The subjects of this research will be cadets currently participating in the U.S. Air Force Reserve Officer Training Corps (AFROTC) program. AFROTC cadets at several universities along the west coast will be invited to participate in the study. The following universities will be contacted:

- Oregon State University
- University of Portland
- University of Washington
- Washington State University
- Central Washington University
- San Jose State University
- University of California, Berkeley
- California State University, Sacramento
- University of Hawaii

After contacting the university, the recruitment email will be provided to the AFROTC unit and asked to be disseminated to the AFROTC cadets at that unit. Cadets in all four training years of the AFROTC program will be invited to participate.

Online Survey

The recruitment email will contain a link to a single online survey hosted through Qualtrics. After reviewing the informed consent, participants will be asked a series of anonymous questions about their knowledge and understanding of the U.S. Air Force’s core values, their ability to apply those core values in training, their self-assessment of various leadership skills, and AFROTC performance metrics. No personal information will be collected at any point in the research. Specific survey items are included as an attachment. Survey data will then be translated to quantitative data and analyzed using correlational analyses.
19.2 If any of the activities would be conducted regardless of the research, briefly describe those activities here:

Example: Grant is funding the expansion of an existing training program. Research will be conducted to compare outcomes between participants from the original program and those participating in the expanded program. In this scenario, the program would be administered regardless of the research question and should be briefly described in this section.

19.3 Will participants be audio or video recorded?

☐ Yes  ☐ No

19.4 Does the study involve conducting research activities online?

☐ Yes  ☐ No

19.5 Is the study designed to be implemented in phases, where fully describing one phase is dependent upon the outcome of another?

☐ Yes  ☐ No

Note: IRB approval must be obtained prior to initiating each phase.

19.6 Describe each study team members’ role on the project and their qualifications to safely and appropriately to conduct these activities (e.g., related academic degree(s), previous professional experience in a relevant area, applicable certification, specialized skills):

Principal Investigator: Dr. Toni L. Doolen will serve as the principal investigator for this study. Dr. Doolen is a Professor in the School of Mechanical, Industrial, and Manufacturing Engineering at OSU. Dr. Doolen has extensive experience in conducting research studies in innovation to improve organizational performance. She has over 50 publications in these areas and has supervised over 25 students in their graduate studies in this area. She has great familiarity with studies that involve human subjects, since nearly all of her research includes surveys and interviews of organizational members. In addition, she spent 11 years in manufacturing engineering and management roles at Hewlett-Packard Company. She received a BS in Electrical Engineering and in Materials Science and Engineering from Cornell University, an MS in Manufacturing Systems Engineering from Stanford University, and a Ph.D. in Industrial Engineering from Oregon State University.

Student Researcher: Nathan R. Lausmann is a senior industrial engineering student at OSU. He has been in Air Force ROTC for over three years and has participated in a variety of training and professional development activities through the U.S. Air Force.

20.0 Compensation

20.1 Describe any compensation or incentives for participants:

Note: Include details concerning the conditions under which research participants would receive partial payment or no payment at all (e.g., withdrawing early from the study).

There will be no compensation to participants.

Note: If you are providing monetary compensation - please consider using the Research Subject Payment Log for tracking purposes.
### 21.0 Costs

**21.1 Describe any costs to participants that are associated with the study (e.g., parking, travel, etc.):**

**Note:** This section should not include costs incurred by the study team or the study.

There will be no required cost to participants in the study.

### 22.0 Privacy and Confidentiality

**22.1 Instructions:**

Many of the terms used in this section are defined in the glossary under the heading "Privacy, Confidentiality, and Identifiers".

**22.2 Privacy, in the context of a research protocol, means respecting an individual’s right to be free from unauthorized or unreasonable intrusion, including control over the extent, timing, and circumstances of obtaining personal information from or about them. Explain how privacy will be respected when identifying and recruiting potential participants:**

No personal information will be requested or collected from participants. A pool of Air Force ROTC cadets will be invited to participate anonymously. There will be no recruitment of specific individuals. Qualtrics settings have been updated to ensure there will be no collection of identifying information (specifically, the "Anonymize Response: Do NOT record any personal information and remove contact association." setting has been enabled and there are no survey questions requesting personal information from participants).

**22.3 Check all that apply:**

- [x] Direct and/or indirect identifiers will be requested or recorded
- [ ] Data will be collected anonymously or provided to researchers without identifiers
- [x] Researchers will know the identity of participants but will not record identifying information
- [ ] Other

**22.9 Will a copy of the consent form, test results, or other research study information be placed in the participants’ record (e.g., medical, personnel, or education record)?**

- [ ] Yes
- [x] No

### 23.0 Record Retention

**23.1 Will the Principal Investigator store research records in a secure and audit accessible manner for a minimum of three years post-study termination?**

- [ ] Yes
- [x] No

**23.2 Will the student researcher also store research records after the study has closed?**

- [ ] Yes
- [ ] No
- [ ] N/A
23.3 If the study is FDA-regulated, confirm the PI will also comply with the following relevant records retention requirements:

In accordance with 21 CFR 312 (drugs), an investigator or sponsor shall retain the records and reports for 2 years after a marketing application is approved for the drug; or, if an application is not approved for the drug, until 2 years after shipment and delivery of the drug for investigational use is discontinued and FDA has been so notified:

☐ Yes
☒ N/A

Comments:

In accordance with 21 CFR 812 (devices), an investigator or sponsor shall maintain the records required by this subpart during the investigation and for a period of 2 years after the latter of the following two dates: The date on which the investigation is terminated or completed, or the date that the records are no longer required for purposes of supporting a premarket approval application or a notice of completion of a product development protocol:

☐ Yes
☐ No
☒ N/A

Comments:

23.4 Will a link between study code numbers and direct identifiers be retained after data collection is complete?

☐ Yes  ☒ No

23.5 If audio and/or video recording, indicate whether these files will be destroyed after transcripts and/or coding is verified. If A/V files will be retained, provide justification for retention:

No audio/video recording.

23.6 Will data be stored for future studies?

☐ Yes  ☒ No

24.0 Sharing Data and Biological Samples

24.1 Will data and/or samples be shared with individuals or entities external to OSU (e.g., made public, shared with sponsor, sent to collaborators, given to people at the site of research, etc.)?

☐ Yes  ☒ No

25.0 Publication

25.1 Could any of the participants be identifiable in publication or presentation (e.g., results will be reported using direct quotes, group or tribe name, company name and position title)?
25.2 Is the study student-driven (for the purpose of a thesis, dissertation, or other)?
- Yes  - No

25.3 Will manuscripts, presentation materials, theses, or dissertations be stored in Scholars Archive?
- Yes  - No

25.4 Will individually identifiable data or specimens be stored in an archive or repository?
- Yes  - No

26.0 Data Security

26.1 What is the data security level for this study?

<table>
<thead>
<tr>
<th>Level 1</th>
</tr>
</thead>
</table>

Use this matrix to determine the data security level and related requirements for this study.

<table>
<thead>
<tr>
<th>Are data and/or subjects:</th>
<th>De-Identified or anonymous?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Identifiable or coded?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Breach of confidentiality</th>
<th>No Risk</th>
<th>Minimal Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Level 1</td>
<td>Level 1</td>
</tr>
<tr>
<td></td>
<td>Level 1</td>
<td>Level 2</td>
</tr>
</tbody>
</table>

26.2 Data Security Level 1:

Will the following security requirements be met:

- Information will be shared and stored in a manner that provides access only to authorized individuals.
- If information is stored on a computer, the system will have fully patched operating systems and applications, and current virus definitions. Information may be stored in cloud-based servers.

- Yes  - No

Will the following security recommendation be met?

- A plan for routine back-ups of all data will be in place.

- Yes  - No

Outline any additional safeguards that will be taken:

Data will be stored by Qualtrics and will be backed-up by them.

27.0 Potential Reporting Obligations
27.1 Study includes collection of information regarding child abuse or neglect OR it is reasonable to expect that child abuse or neglect could be observed or revealed to the researchers?

- Yes
- No

**Note:** Typically, intent to report should be disclosed to participants as part of the consent process.

**Reporting requirements related to child abuse or neglect.**

27.2 Study includes collection of information regarding sexual harassment or sexual violence OR it is reasonable to expect that such information could be revealed to the researchers?

- Yes
- No

**What do I do if a research participant tells me about an experience with sexual harassment or sexual violence?**

**Reporting requirements related to sexual assault or misconduct**

**What is the impact of mandatory reporting legislation on IRB-approved research?**

27.3 Study includes collection of information regarding harm to self or others OR it is reasonable to expect that such information could be observed or revealed to the researchers?

- Yes
- No

28.0 Certificate of Confidentiality

28.1 A Certificate of Confidentiality has been automatically deemed issued because this study is NIH-funded and includes individually identifiable data?

- Yes
- No
- N/A

**Certificate of Confidentiality**

28.2 A Certificate of Confidentiality from the NIH has been obtained or will be sought for this study because it includes the collection of individually identifiable, “sensitive” data?

- Yes
- No
- N/A

29.0 Risks

29.2 Describe all reasonably foreseeable risks to study participants:

There are no discernible risks to participating individuals. No personally identifiable information will be requested; however, there is a risk that we could disclose information that identifies participants indirectly. Involvement is voluntary.
**Note:** It is not sufficient to describe the risks as "minimal" without identifying what those risks are. Include risks of potential harm that are physical, mental/emotional, legal, financial, insurance, employment, or social and reputational risks.

In all cases where participants are known to the investigators, there is the chance of a breach of confidentiality. However, if there is no potential for harm associated with such a breach, it need not be listed in this section. The ways in which the potential for a breach of confidentiality will be minimized should be articulated in the anonymity and confidentiality section.

### 29.3 Describe all steps taken to minimize risks:

No personally identifiable information will be requested from participants. Involvement is voluntary. Qualtrics will securely maintain all survey data. A data security breach will carry minimal risk as all collected data is anonymous.

Consider whether it is appropriate to provide participants with contact information for one or more resources during the recruitment or consent process (e.g., CAPS if OSU students, EAP if OSU employees, suicide prevention hotlines, address of local shelters, etc.).

### 30.0 Benefits

#### 30.1 Describe potential benefits to the individual participants, to society, and to science:

This study is not designed to benefit study participants directly but may benefit future military trainees through a better understanding of the influence of core values in military training.

### 31.0 Training and Oversight

#### 31.1 Is the PI the only member of the study team?

- [ ] Yes  - [ ] No

#### 31.2 Describe the plan for confirming or providing training related specifically to the study activities and for supervising all study team members:

The PI has supervised multiple projects involving the use of surveys. The student researcher has completed ethics training for research with human subjects through CITI. The student researcher will be supervised with frequent meetings and electronic communication with the PI throughout the study setup, data collection, analysis, and final thesis preparation stages.

#### 31.3 Describe the plan for training related specifically to obtaining informed consent and maintaining confidentiality:

The student researcher has completed ethics training through CITI that encompasses informed consent, privacy, and confidentiality, amongst other training topics.

#### 31.4 Explain how oversight of study team members will be handled during PI absences (sabbaticals, non-contract months, etc.):

During PI absences, the PI and student researcher will continue communicating via email. Progress will continue to be made whenever possible.

### 32.0 Application Questions Complete

#### 32.1 Having completed the application questions, please return to section 1.0 to confirm that you have selected the appropriate review level, then return to this section to complete the application.
<table>
<thead>
<tr>
<th>32.2  Click the box below to close all help text notes (required):</th>
</tr>
</thead>
<tbody>
<tr>
<td>If the application is complete and ready to be submitted, please click &quot;Close Help Text, Examples, Links&quot;. If you are revising the application in response to submission corrections or review response, you can click &quot;Re-open Help Notes&quot; to make all help notes visible again.</td>
</tr>
<tr>
<td>☑ Close Help Text, Examples, Links</td>
</tr>
<tr>
<td>☐ Re-open Help Text, Examples, Links</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>32.3 Please click Save &amp; Continue to proceed to the Initial Review Submission Packet.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Initial Review Submission Packet is a short form filled out after this application has been completed. This is where you will attach documents.</td>
</tr>
</tbody>
</table>
### Date of Notification
December 16, 2019

### Notification Type
Approval Notice

### Submission Type
- Initial Application
- Study Number
- IRB-2019-0435

### Principal Investigator
Toni L Doolen

### Study Team Members
Lausmann, Nathan R

### Study Title
A Study of the Impact of Core Values on Leadership Development and Performance in Military Trainees

### Review Level
FLEX

### Waiver(s)
Documentation of Informed Consent

### Risk Level for Adults
Minimal Risk

### Risk Level for Children
Study does not involve children

### Funding Source
None

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**APPROVAL DATE:** 12/16/2019  
**EXPIRATION DATE:** 12/15/2024

A new application will be required in order to extend the study beyond this expiration date.

**Comments:** Waiver of documentation of informed consent under Institutional Policy.

The above referenced study was approved by the OSU Institutional Review Board (IRB). The IRB has determined that the protocol meets the minimum criteria for approval under the applicable regulations pertaining to human research protections. The Principal Investigator is responsible for ensuring compliance with any additional applicable laws, University or site-specific policies, and sponsor requirements.

Study design and scientific merit have been evaluated to the extent required to determine that the regulatory criteria for approval have been met [45CFR46.111(a)(1)(i), 45CFR46.111(a)(2)].

**Adding any of the following elements will invalidate the FLEX determination and require the submission of a project revision:**

- Increase in risk
- Federal funding or a plan for future federal sponsorship (e.g., proof of concept studies for federal RFPs, pilot studies intended to support a federal grant application, training and program project grants, no-cost extensions)
- Research funded or otherwise regulated by a federal agency that has signed on to the Common Rule, including all agencies within the Department of Health and Human Services
- FDA-regulated research
- NIH-Issued or pending Certificate of Confidentiality
- Prisoners or parolees as subjects
- Contractual obligations or restrictions that require the application of the Common Rule or which require annual review by an IRB
- Classified research
- Clinical Interventions
Principal Investigator responsibilities:

- Keep study team members informed of the status of the research.
- Obtain IRB approval for project revisions prior to implementing changes as required by section 8.6 of the Policy Manual.
- Report all unanticipated problems involving risks to participants or others within three calendar days.
- Use only approved consent document(s).
Appendix I: Introductory Email

Good Morning,

My name is Nathan Lausmann and I am an undergraduate industrial engineering student and Air Force ROTC cadet at Oregon State University. I am conducting a research study for my Honors thesis titled "A Study of the Impact of Core Values on Leadership Development and Performance in Military Trainees." This study is approved by the research authorities at Oregon State University and your university.

I am researching whether the U.S. Air Force's core values have an impact on cadet development or cadet performance. To conduct this study, I am distributing an anonymous online survey to AFROTC Detachments at universities in the western United States. I am hoping to involve cadets at your Detachment.

Would your cadre or cadet leadership be willing to send an email to your Wing with information and a link to the survey? If so, I will send you the pre-written email to distribute. Cadets of all AS-levels are welcome to participate as long as they are at least 18 years old.

Thank you for your consideration. Please let me know if you have any questions or concerns.

Very Respectfully,

NATHAN R. LAUSMANN, C/Col, AFROTC
Commander, 685th Operations Group
Oregon State University
685OG.CC@oregonstate.edu
lausmann@oregonstate.edu
Appendix J: Recruitment Email

Dear AFROTC Cadet,

Your help is needed for an important research study. Nathan Lausmann, an Air Force ROTC cadet and Oregon State University engineering student working on his Honors College thesis, is conducting research to better understand the impact of Air Force core values on the leadership development and overall performance of AFROTC cadets. Nathan is working under the direction of Dr. Toni Doolen, who is a Professor of Industrial Engineering at Oregon State University. Your responses will help identify links between these concepts and hopefully benefit future cadets through better training.

Participation in this study involves an anonymous, online survey that will take approximately 15 minutes to complete. You must currently be an Air Force ROTC cadet and be at least 18 years old to participate.

If you are interested in participating, please access the consent form and survey HERE. The deadline to complete this survey is 20 February 2020.

This research study is titled “A Study of the Impact of Core Values on Leadership Development and Performance in Military Trainees.” If you have questions about this research study, please contact Nathan Lausmann at lausmann@oregonstate.edu or Dr. Toni Doolen, who is the principal investigator, at toni.doolen@oregonstate.edu. If you have questions about your rights as a participant, please contact the Oregon State University Institutional Review Board office at (541) 737-8008 or irb@oregonstate.edu.

Very Respectfully,

Nathan Lausmann, H.B.S. Candidate
AFROTC Cadet, Det 685
Oregon State University
Appendix K: Consent Form

RESEARCH CONSENT FORM

Study Title: A Study of the Impact of Core Values on Leadership Development and Performance in Military Trainees
Principal Investigator: Toni L. Doolen, PhD
Study team: Nathan Lausmann
Version: December 10, 2019

We are inviting you to take part in a research study.

Purpose: This study seeks to better understand any influence that the U.S. Air Force core values may have on the leadership development and overall performance of Air Force ROTC cadets. We are asking you to take part in this study because you are a currently-enrolled Air Force ROTC cadet. The research will be used as the basis for an honors thesis. In order to be in this study you must be of legal age to consent, which is 18 in most states.

Voluntary: You do not have to participate if you do not want to. You can also decide to be in the study now and change your mind later without any penalty. You are free to skip any survey questions that you would prefer not to answer. Your decision to take part or not take part in this study will not affect your grades, your relationship with your professors or AFROTC cadre, or your standing at your university or in your AFROTC program.

Activities: The study activities include an online survey regarding your viewpoints and thoughts on the U.S. Air Force core values and how they have influenced your military training experience.

Time: Your participation in this study will last about 15 minutes.

Risks: There are no discernible risks to participating individuals. No personally-identifying information will be requested, however, there is a risk that we could disclose information that identifies you indirectly. Involvement is voluntary.

Benefit: This study is not designed to benefit you directly but may benefit future military trainees through a better understanding of the influence of core values in military training.

Confidentiality: Your participation in this study is anonymous. Due to the nature of the internet, the security and confidentiality of information collected from you online cannot be guaranteed.

Study contacts: We would like you to ask us questions if there is anything about the study that you do not understand. Please contact Dr. Toni Doolen at (541) 737-5974 or by email at toni.doolen@oregonstate.edu or Nathan Lausmann at (971) 241-6557 or by email at lausmann@oregonstate.edu.

You can also contact the Human Research Protection Program with any concerns that you have about your rights or welfare as a study participant. This office can be reached at (541) 737-8008 or by email at IRB@oregonstate.edu.
Appendix L: Scatterplots for Hypothesis H1
While at Field Training, I received the Distinguished Graduate Award for Superior Performance.

In feedback I have received from cadre, I have usually been ranked...
Thinking about my performance in AFROTC - including attributes such as leadership, followership, physical fitness, aerospace studies classes, and AFROTC extracurriculars - I would rate my performance as a cadet, in comparison to my AS-class peers, as

In feedback I have received from AFROTC peers, I have usually been ranked
Appendix M: Scatterplots for Hypothesis H2
150

In feedback, I have received from AFROTC peers, I have usually been ranked.

Comprehension of Service

Thinking about my performance in AFROTC, including attributes such as leadership, followership, physical fitness, and extracurriculars, I would rate my performance as a cadet, in comparison to my AS-class peers, as.

Comprehension of Service
Appendix N: Scatterplots for Hypothesis H3

[Two scatterplots showing the relationship between Comprehension of Excellence and Communication, and Comprehension of Excellence and Decision Making.]
In feedback I have received from AFROTC peers, I have usually been ranked

Thinking about my performance in AFROTC - including extracurriculars - I would rate my performance as a}
dedicated, in comparison to my AS-class peers, as
Appendix O: Scatterplots for Hypothesis H4
While at Field Training, I received the Distinguished Graduate Award or Superior Performance Award.

In feedback I have received from cadre, I have usually been ranked...

Application of Integrity
Thinking about my performance in AFROTC, including attributes such as leadership, followership, physical fitness, aerobics, studies, classes, extracurriculars, I would rate my performance as a cadet, in comparison to my AS-Club peers, as...
Appendix P: Scatterplots for Hypothesis H5
In feedback, I have received from AFROTC peers, I have usually been ranked.

Thinking about my performance in AFROTC - including attributes such as leadership, followership, physical fitness, aerospace studies classes, and AFROTC extracurriculars - I would rate my performance as a cadet, in comparison to my AS-class peers, as...
Appendix Q: Scatterplots for Hypothesis H6
Thinking about my performance in AFROTC - including attributes such as leadership, followership, physical fitness, aerospace studies classes, and AFROTC extracurriculars - I would rate my performance as a cadet, in comparison to my AS class peers, as

In feedback I have received from AFROTC peers, I have usually been ranked

Application of Excellence
Appendix R: Scatterplots for Hypothesis H7

[Scatterplot showing the relationship between time since first exposed to core values and comprehension of integrity and service.]
Time since first exposed to core values, in months
In feedback, I have received from AFROTC peers, I have usually been ranked...

Thinking about my performance in AFROTC - including attributes such as leadership, followership, physical fitness, aerospace studies classes, and AFROTC extracurriculars - I would rate my performance as a cadet, in comparison to my AS-CLASS peers, as...