

MEASURING MOTIVATION AND PERFORMANCE ON THE ARMY PHYSICAL
FITNESS TEST IN NORTH DAKOTA ARMY NATIONAL GUARD SOLDIERS

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ABSTRACT

OBJECTIVE: To determine the relationships between a soldiers' type of motivation to complete the Army Physical Fitness Test (APFT) and their performance on the APFT. In research most self-determined (MSD) forms of motivation have been associated with more positive performance outcomes than least self-determined (LSD) forms of motivation.

METHODS: 208 soldiers completed a survey regarding motivation and performance on the APFT. A Pearson's Product-Moment Correlation was performed between motivation and APFT performance outcomes. Significance was set at $\alpha \leq 0.05$ **RESULTS:** As participants' MSD scores increased, the following variables improved: current APFT score, current APFT passing status, and APFT failure history. Additionally, as MSD motivation increased the following variables decreased: number of APFT's failed, and LSD motivation. Finally, as participants LSD motivation increased their current APFT score decreased. **CONCLUSIONS:** Participants who report higher levels of internal motivation towards the AFPT show more positive performance outcomes on the APFT.

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LIST OF ABBREVIATIONS

APFT.....	Army Physical Fitness Test
CFT.....	Combat Fitness Test
FA.....	Fitness Assessment
LSD.....	Least Self-Determined
MOS.....	Military Occupational Specialty
MSD.....	Most Self-Determined
NCOER.....	Non-Commissioned Officer Evaluation Report
NDANG.....	North Dakota Army National Guard
OER.....	Officer Evaluation Report
PFA.....	Physical Fitness Assessment
PFT.....	Physical Fitness Test
PRT.....	Physical Readiness Training
SIMS.....	Situational Motivation Scale

CHAPTER 1. INTRODUCTION

Regardless of the branch, physical fitness is a vital component of service in the US military. The physical demands placed on a soldier in the United States Army to perform strenuous tasks without tiring are incredibly high.¹⁻⁶ Whether for physical readiness,^{5,7} injury prevention^{1,8-12} or career progression,^{13,14} soldiers must maintain high levels of physical fitness at all times.

The US Army has identified 3 primary components of physical fitness; strength, muscular endurance, and cardiorespiratory endurance. Each component is essential for the soldier to operate optimally in both combat and non-combat environments, a concept known as physical readiness. Soldiers require strength to move external loads, pack heavy equipment, and lift casualties.^{2,4,5,15} Muscular endurance ensures that soldiers are able to sustain operations like loading vehicles, climbing rough terrain, and transporting casualties over long distances without tiring. Cardiorespiratory endurance allows soldiers to traverse long distances over potentially uneven or irregular terrain, which may be required by their mission.

On top of being important for physical readiness, physical fitness is an essential component of injury prevention. Because of the considerable loss of training time, disability, and decreased unit combat readiness that are owed to musculoskeletal injuries the benefits of physical fitness on injuries is highlighted. Researchers have observed that high fitness levels are related to increased resistance to injury and decrease injury rates in soldiers.^{8,9,11,12,16}

Furthermore, APFT scores are a component of all soldier evaluations that determine eligibility for promotion. If a soldier fails to meet the standards set forth by Army regulation, not only are they hurting their career by missing promotions, they are subject to administrative disciplinary action by their chain of command.

In order to track the improvement and maintenance of physical fitness, all service branches utilize some instrument with various tests to measure physical fitness levels.^{5,17-19} Since the 1850's the Army has used a number of instruments to measure physical fitness, all of which have been based on the operating environment at the time, lessons learned from previous combat operations, and the state of scientific knowledge.²⁰ In 1992 the Army developed the current physical fitness instrument in use Army wide, the Army Physical Fitness Test (APFT). Army commanders use the APFT to get a snapshot of the physical fitness of their soldiers and to measure the effectiveness of their unit's physical training program.⁵ The APFT uses maximum repetitions in 2 minutes of push-ups and sit-ups to measure muscular endurance and a 2-mile run to measure cardiorespiratory endurance. These events are scored based on an age and gender specific scale.

Many researchers criticize the relevancy of these events in relation to military relevant tasks due to the limited ability of them to measure physical capability.^{1,3,6,12,21} Because of this poor relevancy, many soldiers may also view APFT results as a poor indicator of physical readiness. Theoretically, this attitude could then have an effect on their motivation toward the test. Motivation is a complex issue with multiple theories attempting to explain it. One theory in particular that has received much attention is the self-determination theory. The self-determination theory explores internal and external sources of motivation and the effect it can have on performance.^{22,23}

Researchers have observed that motivation can have both a positive and negative effect on performance²⁴⁻²⁹ including physical performance outcomes. Intrinsic motivation, motivation coming from internal sources, has been associated with positive outcomes^{25,27,29-31} while extrinsic motivation, motivation from external sources, has been associated with negative outcomes.²⁶⁻³⁰

Though these outcomes are primarily studied in settings like physical education, education, and sports, they may link to motivating factors for soldiers as well. Soldiers experience many powerful intrinsic and extrinsic motivators when it comes to physical fitness, including the desire to be physically competent and healthy, requirements for military service, avoiding punishment, and career progression.

Little research exists on the effects of motivation towards physical fitness testing and performance results in military populations. One study of airmen in the US Air Force found that those who perform physical activity because of their military obligation are more likely to score lower on the Air Force Fitness Assessment than those who are intrinsically motivated for health purposes.³⁰ This study supports previous research conducted in other settings that associate extrinsic motivation with negative outcomes.

In the US Army, reserve component soldiers like those in the National Guard, are held to the same physical fitness standards as their active duty counterparts. Because of this, an accurate measure of physical fitness is vital, especially considering the benefits of physical fitness in military personnel to include physical readiness,⁵⁻⁷ injury prevention,^{1,8-12} and career progression.^{13,14} Additionally, commanders primarily rely APFT scores to give them a snapshot of their soldiers' fitness; therefore an accurate assessment is critical. Furthermore, as a member of the 1st Battalion, 188th Air Defense Artillery Regiment of the North Dakota Army National Guard (NDANG), I have casually observed a trend of decreasing pass rates on the APFT for my unit. If soldiers are primarily motivated by extrinsic factors to perform on the APFT it may have a detrimental impact on their performance in line with observations in other settings. With information regarding APFT motivation and performance leaders could begin to internalize soldier motivation towards the test and reap the positive outcomes associated with it.

Purpose

The purpose of this study was to determine if a relationship exists between the type of motivation NDANG soldiers have to perform on the APFT and their performance outcomes on the APFT.

Research Questions

- 1) What types of motivation do NDANG soldiers have to perform on the APFT?
- 2) How well do soldiers in the NDANG perform on the APFT?
- 3) Does a relationship exist between a soldier's type of motivation towards the APFT and their performance on the APFT?

By answering these questions the research team was able to provide commanders with the information that may allow them to improve physical fitness test performance in their units. This internalization could also potentially be obtained by developing a fitness measure that soldiers confidently feel indicates their level of physical readiness. Finally, while conducting this study, researchers found the need for a universally used military physical fitness database, which could be used to collect and compare APFT information for soldiers.

Inclusion Criteria

- 1) Participants were members in good standing of the NDANG.
- 2) Participants were 18 years of age or older at time of survey administration.

Exclusion Criteria

- 1) Participant had a current APFT taken within the last 12 months.
- 2) Participant's current APFT contained alternate events as designated by a permanent medical profile.

Limitations

- 1) APFT results were self-reported.
- 2) Time since last APFT varied significantly between participants.
- 3) Response rate from unit commanders to participate was low

Delimitations

- 1) Participants were only selected from NDANG.
- 2) Not all Army branches, Military Occupational Specialties (MOS's), or ranks were represented.
- 3) The survey used is a modified version of the Situational Motivation Scale (SIMS). Modification can affect the validity of the instrument.
- 4) Survey used is situational, meaning it relies on the participant's current state. Results may have depended on length of time since last APFT.

Definition of Terms

Physical Readiness is a soldier's ability to meet the intense physical demands of military service, this includes activities in their regular duty position or in a combat environment in order to complete one's mission.⁵

Military Occupational Specialty (MOS) identifies a duty position, or a group of duty positions that require a similar level of technical skills.³²

A temporary medical profile is a document that can restrict or exempt a soldier from certain physical activities when recovering from an illness, injury, or other condition that is considered temporary.³³

A permanent medical profile is a document that also can restrict or exempt a soldier from certain physical activities but for conditions that have stabilized, the course of recovery is

relatively predictable, or it is reasonably determined the soldier will not likely be capable of performing the duties of their position. The soldier may be retained in the military but blocked from certain MOS's or positions due to restrictions and physical restraints.³³

Muscular strength is the maximum force produced by a muscle or muscle group in a single contraction.^{4,6,21,34-39}

Muscular endurance is the ability of a muscle or muscle group to exert force repeatedly or hold a fixed contraction over long periods of time.^{4,5,36-40}

Cardiorespiratory endurance is the body's ability to efficiently deliver oxygen to tissues in order to endure periods of sustained physical effort.^{21,36-39}

Mobility is what allows a soldier to move their body efficiently and effectively through a variety of conditions safely. Mobility includes a variety of abilities such as agility, coordination, flexibility, posture, stability and power.⁵

Autonomy refers to an individual acting in regards to their inner set of values and beliefs.²³

Motivation, in the context of physical activity, refers to the disposition of an individual that appears when they undertake some activity for which the individual is responsible for the outcome of, they are being evaluated in, or are competing with others in.⁴¹

Intrinsic motivation comes from sources within the individual such as love of the activity.^{22,23,27,29,42}

Extrinsic motivation is motivation that comes from external sources and is often seen as some kind of reward.^{22,27,29,42}

Integrated regulation is motivation that is highly self-determined but still considered extrinsic. Activities or behaviors that are regulated through integration still align with the individual's values, goals, and needs though they are done to attain some outcome.^{22,23}

Identified regulation is still considered a more self-determined form of motivation though it can still be removed from the individual's values and beliefs.^{22,23}

Introjected regulation occurs when an individual has relatively little self-determination towards an activity or behavior and performs it in order to avoid guilt, shame, or to enhance their sense of worth.²³

External regulation is the least self-determined form of extrinsic motivation. Here, the individual is motivated entirely by outside sources, such as to obtain a reward or avoid a punishment.^{22,23}

Amotivation occurs when an individual lacks any motivation towards an activity.^{22,23,29}

The most self-determined forms of motivation in this study include intrinsic motivation, integrated regulation, and identified regulation.

The least self-determined forms of motivation in this study include introjected regulation, external regulation, and amotivation.

CHAPTER 2. REVIEW OF LITERATURE

Introduction

The purpose of this study was to determine if a relationship exists between the motivation of soldiers in the North Dakota Army National Guard (NDANG) towards the Army Physical Fitness Test (APFT) and their performance on the APFT. The following research questions guided this study: (1) What types of motivation do NDANG soldiers have to perform on the APFT? (2) How well do soldiers in the NDANG perform on the APFT? (3) Does a relationship exist between a soldier's type of motivation towards the APFT and their performance on the APFT? This information could better allow Army leaders to not only improve performance on physical assessments, but also potentially lead towards developing a new or revised instrument to measure physical fitness in a manner that is relevant to soldiering tasks.

This literature review is organized into the following areas: Importance of Physical Fitness, Components of Physical Fitness, Physical Readiness Training, Measures of Physical Fitness in the Military, Motivation, and Summary.

Importance of Physical Fitness

The physical demands placed on a soldier in the United States Army are significant.¹⁻⁶ Because of this, soldiers need a high level of physical fitness to perform strenuous tasks without tiring.^{5,6,8,21,34,40} In fact, an emphasis on the importance of a high level of physical capability of soldiers is reiterated from military leaders since before the Civil War.²⁰ The health benefits of being physically fit and active are readily available in literature⁴³⁻⁴⁵ however, the nature of military related tasks put an even higher physical burden on the soldier than the average American. The necessity of high levels of physical fitness in soldiers stems from a few major factors: physical readiness, injury prevention, and career progression.

Physical Readiness

Physical fitness forms the basis for physical readiness, or the ability of soldiers to meet the intense physical demands of any combat or duty position. Physical readiness, also referred to as combat readiness, is essential in ensuring victory and survivability of soldiers. Physical readiness is considered one of the most central concepts in training among military personnel, along with occupational proficiency. The current focus of the Army in physical readiness is to create a force that is more agile, versatile, lethal, and therefore survivable on today's battle field.⁵

Though some physical requirements may be unique to different soldiers with various military occupations, there are many physical demands that are universal among soldiers. It is well known that to be successful in a combat environment, soldiers may be challenged to march for long distances with an external load,^{2,5,7,12,46} exert quick bouts of speed,^{5,7,12,46} jump,^{5,7,46} change directions quickly, crawl, climb, and carry heavy loads with speed.^{5,46} This success in a combat environment can be measured not only in the completion of one's mission, but in the survival of them and their comrades.

A number of studies and reviews have also determined that success in a training environment can be improved with higher fitness levels.^{4,12,34} Individuals with higher fitness levels have been observed to have a lower dropout rate than those with lower fitness levels in Basic Combat Training^{4,34} and Australian Army Special Forces selection courses.¹²

Injury Prevention

In addition to ensuring the readiness of individuals and units in the Army, physical fitness is a significant component of injury prevention for soldiers. Musculoskeletal injuries are a considerable cause of lost training time, disability, increased healthcare costs, and decreased combat readiness for the Army,^{10,12} with lower extremity musculoskeletal injuries making up a

majority of injuries that require soldiers to seek medical attention.¹⁰ Furthermore, musculoskeletal injuries result in hundreds of thousands of medical profiles and thousands of lost or limited duty days annually for the military.¹⁰ Moreover, billions of dollars are paid to service members seeking disability for musculoskeletal system disorders.¹⁰

Studies have found a number of injury related benefits to higher fitness level. Higher physical fitness levels are related to both increased resistance to injury³ and decreased injury rates in military members.^{8,9,11,12,16} Additionally, high physical fitness levels confer a number of non-performance related benefits such as lower disease risk, anxiety, and depression levels.³ Likewise, certain fitness risk factors have been identified that can have a negative impact of injury risks. Cardiorespiratory endurance, as measured through higher maximum effort run times, as well as extremely high and low degrees of flexibility have been found to be predictive of injury risk in military personnel.¹

Furthermore, low fitness levels are related to increased risk of musculoskeletal injuries^{1,4,12} increased risk for cardiovascular and other fitness related problems.³⁷ One of the only published studies examining Army National Guard soldiers observed that low fitness levels were associated with higher body mass index, cholesterol, and lipid levels.³⁷ Furthermore, low fitness levels were found to be predictive of ten-year coronary heart disease risk.³⁷

Career Progression

In addition to readiness and injury prevention being major factors justifying adequate physical fitness in Army personnel, the effect of fitness levels on a soldier's career progression must be examined. Comments about soldier physical fitness are mandatory on a variety of performance evaluations including the Non-Commissioned Officer Evaluation Report (NCOER)¹³ and the Officer Evaluation Report (OER).¹⁴ Leaders use these reports to evaluate a

soldier's performance over a given period of time. Promotion boards, which rate soldiers based on these reports, determine which soldiers will be selected for promotion. In light of this, maintaining a high level of physical fitness is a critical component for soldiers who wish to be promoted.

Components of Physical Fitness

Following the discussion on the importance of physical fitness, it is essential to understand how the Army defines and operationalizes physical fitness and the components that make it up. There are 3 components that Department of Defense directive and Army doctrine outlines as being essential to physical fitness; strength, muscular endurance, and cardio-respiratory endurance.^{3-6,16,47}

Strength

Strength is generally defined as the force generated by a muscle or muscle group, specifically the maximum amount of force a muscle can generate in a single maximum contraction.^{4,6,21,34-39} Army doctrine describes muscular strength as the muscles ability to overcome resistance, but that it exists as a continuum between absolute muscular strength (maximum force generated In a single contraction) and muscular endurance (repeated contractions).

Soldiers require strength in order to complete occupational tasks and withstand the rigors of continuous operations under load.⁵ Tasks that require muscular strength include completing troop movements while carrying an external load, loading vehicles with heavy pieces of equipment, and transporting casualties.^{2,4,5,15,40}

Muscular Endurance

Soldiers will be called upon to generate considerable muscular strength for certain tasks, but other tasks will require that they maintain these movements for sustained periods. Muscular endurance is the ability of a muscle or group to exert force in a repetitive manner or to hold a fixed contraction over long periods of time.^{4,36,38-40,43} Continuously loading equipment into vehicles, holding a fixed position while climbing, and carrying a load for extended periods of time all require periods of repetitive and/or sustained muscular contraction.

Cardio-Respiratory Endurance

In addition to muscular strength and endurance, the body requires efficient delivery of oxygen to tissues in order to endure periods of sustained physical effort; this concept is known as cardiorespiratory, or aerobic, endurance.^{21,36-39} However, aerobic endurance alone is not sufficient to prepare a soldier for the rigors of sustained operations.⁵ According to Army doctrine endurance refers to both aerobic and anaerobic endurance.⁵ A soldier must have the ability to perform moderate activity for a long duration (aerobic) as well as be able to perform high-intensity activities for a short duration (anaerobic).^{5,21,37,40}

The physical demands of soldier's endurance capabilities can be extreme. Performing individual movements for long distances on rough terrain, hand-to-hand combat, reacting to enemy contact, and movement under fire all require an adequate amount and balance of both aerobic and anaerobic endurance. In order to enhance these aspects of physical fitness and readiness, the Army has developed a program that stresses the improvement and maintenance of physical fitness in a way that is relevant to soldiers.

Physical Readiness Training (PRT)

The PRT program utilizes the performance of strength and endurance activities that mimic physical requirements soldiers face in a combat environment.^{2,5,21} Using soldiering tasks as the basis for physical activity highlights the Army concept of “train as you fight”,⁵ where every effort should be made to train as closely as possible to real life situations. Though unit commanders are directed to focus fitness on achieving mission-related physical readiness, this end-state also works to improve unit APFT pass rate.

Mobility is emphasized in both the strength and endurance facets of PRT as being vital for physical fitness and readiness.⁵ However, it is not necessarily held as an independent tenant of fitness as strength and endurance are. Mobility is a variety of skills applied to activities that allow the soldier efficiently and effectively to move their body through a variety of conditions without injury. Some of the components of mobility include agility, coordination, flexibility, posture, stability and power.⁵

Strength and Mobility Training

Both components of muscular activity, that is strength and endurance, are trained in conjunction with mobility in PRT through a wide variety of activities. A strict prescription of exercises focused on intensity, duration, and volume progression are applied when performing strength and mobility training. This concept is applied early in the soldier’s career starting at Basic Combat Training. PRT is used to develop a foundation of fitness through teaching proper functional movement patterns and functional strength, moving to total muscular strength and plyometric activities.⁵

Endurance and Mobility Training

In PRT, the endurance and mobility training activities focus on enhancing aerobic and anaerobic capacity. As with strength and mobility training, soldiers conduct endurance and mobility training in a progressive manner, starting with speed and sustained running drills. Training in aerobic and anaerobic endurance continues with these running activities but also progress to include more demanding movements such as terrain running and speed running under an external load.^{5,40} This strength and endurance training mimics tasks in an operational environment and are applied in a precise sequence, optimizing gains and minimizing injury risk.^{2,3,5}

Physical Training in the Reserve Component

National Guard and Army Reserve units have limited collective training time; therefore relatively little time is spent on physical training compared to their active duty counterparts. By regulation, reserve component units are only required to complete 1 hour of fitness training for every 16 hours of collective training. Having this amount of time for physical training is not intended to have a training effect. Rather, the goal of PRT in the reserve component units is to establish motivation and teach techniques to be used outside of training time.⁵ It is the responsibility of the individual soldier to maintain their health and fitness at all times¹⁰ using the techniques and progression laid out in Army doctrine.

Measures of Physical Fitness in the Military

Now that it has been established what components make up physical fitness for the Army, it is essential to look at what assessments exist to measure physical fitness in military populations. Every branch emphasizes the need for physical fitness and each uses different instruments to measure fitness levels for its service members. Here, the history of Army fitness

testing will be discussed in detail, followed by the current standards used by Army officials, the relevancy of these standards, consequences for failing the Army fitness test, and a description of the measures used by the other US military services branches; Air Force, Navy, and Marine Corps.

Army

History of Army Fitness Testing

The first attempt at creating a protocol for physical training began at the US Military Academy in 1851.²⁰ It wasn't until 1858 that the first physical assessment was established. This test consisted of climbing a wall, vaulting onto a horse, jumping a ditch, running a long distance (1-2 miles), and marching with an external load. This testing didn't last long though, as it was halted in 1861 with the onset of the Civil War. Since then there have been many modifications to physical fitness testing. With the release of new physical fitness publications it has been advised that fitness testing be conducted at regular intervals to monitor the fitness improvements and monitor the effectiveness of training programs.⁴⁸ Different assessments have focused on general physical fitness, physical readiness, or both at various times throughout the 20th century.

The 1920's, 1940's, and 1960's saw a higher emphasis on physical readiness for soldiers. In the late 1950's and into the 1960's there were even separate tests designed with different occupational tasks of soldiers in mind. Units designated as "Combat Units" or those with strictly combat related tasks were required to take a different test than service personnel such as technicians or those in administrative roles. The 1970's saw the first introduction of the age-adjusted scale for soldiers 40 and over, which were not required to test.

In 1978 women were finally fully integrated into the regular Army, therefore a gender-integrated test, one that was easily administered and required little equipment, was implemented.

The push-up, sit-up, and a distance run were selected as measures for upper body muscular endurance, trunk muscular endurance, and cardiorespiratory endurance, respectively. This new format was standard for all soldiers regardless of age or gender, however the grading scales were adjusted for these factors. Through the 1980's the standards for these events went through some adjustments until the current standard used by the Army was introduced in 1992; the Army Physical Fitness Test.

The Army Physical Fitness Test (APFT)

The APFT is used to ensure that all soldiers maintain a minimum level of physical fitness required to accomplish military relevant tasks and measure the effectiveness of a units PRT program.⁵ The APFT is comprised of events; 2 minutes timed push-ups, 2 minutes timed sit-ups, and a 2-mile timed run, in that order. The goals of the push-up and sit-up events are to achieve as many repetitions in the time allotted, whereas the goal of the run is to complete the required distance in as little time as possible. The events are scored on a gender and age specific scale with 100 points being the maximum score attainable per event. Soldiers must score at least 60 points in each event to pass the APFT. There is no maximum time limit for the completion of the entire test period, however regulations state that soldiers be allowed a minimum of 10 minutes and a maximum of 20 minutes to rest in between each event. The APFT is required annually for reserve component soldiers and semi-annually for active duty soldiers.

Relevancy of APFT Events

Because of the far reaching implications of a soldier's performance on the APFT, it would stand to reason that the events of the APFT should be relevant to the physical demands required of soldiers. The push-up event is intended to measure the endurance of the chest,

shoulder, and triceps muscles⁵ and has been found to be an effective measure of both chest and triceps activation.¹⁵

The sit-up event is designed to measure the endurance of the abdominal and hip-flexor muscles. There is much debate between researchers who have studied sit-up techniques to determine which method is optimal, some advocating methods similar to Army standards whereas others promote considerably different methods.^{49,50} It should be noted that much of the research detailing effectiveness of push-up and sit-up techniques are more concerned with their application as an exercise, not as a testing measure.

Aerobic fitness and endurance of the leg muscles is measured through the use of the timed 2-mile run. There are other measures such as the VO₂ Max that can test cardiorespiratory capacity, however these require extensive equipment and training to accurately complete, making it difficult for the Army to employ to a large number of soldiers. No research could be found that argues the distance run tests ability to measure aerobic endurance.

Overall, the events of the APFT are viewed a poor measure of physical fitness and readiness by some researchers due to the limited scope of abilities tested.^{3,6,12,16,21} Muscular endurance and aerobic are the only components of fitness that are assessed by the APFT and the Army recognizes that there are other factors involved in physical fitness that need to be addressed. Researchers suggest events be included that measure upper and lower body muscular strength, power, and anaerobic capacity. Unfortunately, there have been multiple unsuccessful attempts to develop and integrate more accurate physical readiness events into APFT procedures through the late '90's and into the 2000's.

Consequences for APFT Failure

Even though the events of the APFT are viewed by many as poor measures of physical fitness, this is the only test currently fielded by the Army, so good performance is important for soldiers. One reason for good performance is due to consequences faced due to a failed APFT.

It wasn't until 1965 that soldiers could face retesting procedures and personnel actions for failed physical assessments. Currently, there are a variety of consequences a soldier will face if they fail to meet the standards set forth for physical fitness. Soldiers who fail the APFT may retake the test as soon as they feel ready to, but are required to do so within a specific time from the initial failure date; no longer than 90 days for active duty and 180 days for reserve component soldiers.

Additionally soldiers who do not have a passing APFT score will not be allowed to attend any Army institutional training. Soldiers who are attending an Army training course that requires an APFT at some time throughout the course who do not meet APFT standards will not be allowed to graduate from the course until they pass or will be sent home with an unsatisfactory rating in the course.

Furthermore, according to Army regulation, soldiers who fail the APFT will be issued a suspension of favorable actions, also known as a flag.⁵¹ Soldiers who are flagged face several consequences that can have a very detrimental effect not only on their professional, but personal lives. Flagged soldiers will be barred from reenlisting or extending their military contract, lose civilian educational incentives including tuition assistance, have payment of enlistment/reenlistment bonuses halted, be prevented from receiving promotions, and possibly separated from the military.

It should be noted that these consequences do not affect soldiers who have an authorized temporary or permanent medical profile limiting their physical activity or ability to complete an APFT due to injury or illness.⁵

Though the APFT is not intended to be an exact measure of soldiers' physical and combat readiness, rather just a snapshot of their fitness level, it is the only physical assessment that has been integrated into units Army wide.

Similarly, all other US military service branches emphasize the fitness of their service members. To track fitness levels and ensure physical readiness of their forces these branches all regularly perform fitness testing. The following sections will detail the methods used by Air Force, Navy, and Marine Corps officials when carrying out fitness testing.

Air Force

Air Force command also emphasizes the need for physical fitness as a requirement to meet their mission demands. The instrument used by both reserve and active Air Force components is known as the Fitness Assessment (FA).¹⁷ Specific measurements taken to determine physical fitness are body composition measured by abdominal measurement, aerobic fitness measured through a 1.5 mile timed run, and muscular fitness, which is measured through 1 minute, timed trials each of push-ups and sit-ups.

Much like Army procedures, scoring for these events is age and gender specific. The FA differs from the APFT in that the order of events can be changed, with the run taking place before or after the muscular fitness assessments. Overall, the FA is worth 100 points, with 60 total points coming from the run, 10 points each from push-ups and sit-ups, and 20 points coming from the body composition measurements.

Airmen then fall into fitness categories based on their overall score on the FA; the categories are Excellent (>90 points), Satisfactory (75-89.9 points) and Unsatisfactory (<75 points).

Navy

Sailors in the Navy must also maintain a prescribed minimum level of fitness in order to complete their missions whenever and wherever necessary.¹⁸ Navy regulations mandate that the Physical Fitness Assessment (PFA) be completed semi-annually and is comprised of several instruments. In the PFA there is a body composition assessment through height and weight measurements, a medical screening, and the Physical Readiness Test. This readiness test is designed to assess muscular strength, endurance, and cardiorespiratory fitness. The events prescribed for the test include 2 minute trials each of curl-ups and push-ups where the sailor completes as many repetitions as possible in the time allotted. Additionally, a timed 1.5-mile run is conducted. Of all service branches, the Navy's assessment instruments are the closest to the Army however scoring is significantly different. Events are still scored on an age and gender basis, each event is worth 100 points. However, to obtain the overall score the points from each event are added up and divided by 3 to determine the sailor's final score. Much like the Air Force, Naval Physical Readiness Test scores are categorized in the way; Outstanding (90-100 points), Excellent (75-89 points), Good (60-74 points), Satisfactory (45-59 points), and Failure (<44 points). Sailors must achieve at least a satisfactory rating in each event regardless of total score in order to pass.

Marine Corps

In line with all other branches, it is required that every marine must be physically fit, regardless of age, rank, or occupation. However, the Marine Corps is the only branch that utilizes a Combat Fitness Test (CFT) in addition to a Physical Fitness Test (PFT).¹⁹

The 3 events that make up the PFT include pull-ups, abdominal crunches, and a 3-mile run. The pull-up event does not have a time limit, the marine must simply complete as many as possible. The goal of the abdominal crunches is to complete as many repetitions as possible in 2 minutes. As with other branches, the cardiorespiratory event, a 3-mile run, is to be completed as quickly as possible. In line with other branches, these events are scored based on age and gender. Each event is worth 100 points and marines are placed into one of 3 classes (1st, 2nd, 3rd class) based on their overall score and age.

The Marine Corps recognizes that every marine may be called upon to perform in combat, so an assessment has been designed to test combat physical capabilities; the CFT. Strength, stamina, agility, coordination and overall anaerobic capacity are evaluated through 3 events in the CFT. The first event is Movement to Contact, a timed 880-yard run that the marine must complete as quickly as possible. Next the marine completes the Maneuver Under Fire event. This event consists of several drills that represent requirements of a marine in combat, including shuttle sprints, agility drills, negotiating obstacles, carrying equipment, rescuing a casualty, and engaging targets with grenades. This event is timed with the marine attempting to complete it as quickly as possible. The final event, the Ammunition Lift, requires the marine to repetitively lift a full (simulated) ammunition can weighing 30 pounds from shoulder level overhead as many times as possible in 2 minutes. The individual events of the CFT are each worth 100 points and are age and gender specific. However, the CFT is unique in that the classifications (1st, 2nd, 3rd class) are based only on score, regardless of age or gender.

Comparisons between Branches

As it has been shown, all service branches have relatively similar measures of determining physical fitness in their ranks. However, the Marine Corps is the only branch that is

currently fielding an assessment of physical capacity in an array of combat relevant tasks.¹⁹ Additionally, it should be noted that while all service branches score their assessments differently, it is universal that all are scored based on age and gender of the service member. Because of this, similar service members, who have the same rank and occupation in the military, are held to different standards of what determines if they are physically fit or not because of gender differences. It would stand to reason that individuals who are expected to perform at the same level in an operational environment would be held to the same standard regardless of age or gender; however this is not the case.

Soldiers, while not held to the same standards, are accountable to the same consequences and rewards of their performance on the APFT. This external factor, along with other internal factors is what will define a soldier's motivation towards performance on the APFT in both positive and negative ways.

Motivation

Researchers agree that motivation affects the outcome of physical performance and goal achievement in a number of settings.^{25,27,29,52} Motivation, in relation to physical activity and fitness, is the psychological disposition that stimulates performance when an individual takes part in an activity that they feel responsible for the outcome.⁴¹ A significant amount of literature that exists in motivation and physical activity and fitness has studied civilian populations in physical education settings,^{25,27,29,52,53} however, little literature exists studying motivation and physical activity in a military population.^{30,31} Motivation has been observed in both populations to have both positive and negative effects on physical performance, and can be shaped by both internal and external sources.^{25,27,29} While there are a number of psychological theories that

explore the relationship between motivation and performance outcomes, one in particular has received considerable attention among researchers, the self-determination theory.

Self-Determination Theory

This motivation theory examines factors both within an individual, and in their surrounding environment that motivate their actions and behaviors. Though this might be an overly simplified description of the self-determination theory is that individuals can be motivated in 3 ways: internally, known as intrinsic motivation; externally, known as extrinsic motivation, or not at all, known as amotivation. The concept of self-determination that underlies this theory relates the level of internalization, or personal connectedness, an individual has towards an activity or behavior.^{22,23} These categories lie on a continuum from most to least self-determined and will be discussed in that order.

Intrinsic Motivation

Motivation for physical activity and performance stemming from internal sources is known as intrinsic motivation; this includes ones inherent love, enjoyment, or interest for the activity.^{22,23,29,42} With intrinsic motivation, the activity is undertaken by choice and is most internalized and integrated with the individual's values. This is the most self-determined form of motivation.^{22,23,42} Though some soldiers may have an inherent interest or find enjoyment from the APFT, there are a number of externally imposed motivators as well.

Extrinsic Motivation

Motivation that comes from sources outside the individual is known as extrinsic motivation, and is determined based on a variety factors.^{22,23,25,27,29} There are 4 subcategories of motivation within extrinsic motivation. These subcategories also fall along the continuum of most to least self-determined and will be discussed in that order.

Integrated Regulation

While still a form of extrinsic motivation, identified regulation is a highly self-determined form of motivation, allowing a considerable level of autonomy to the individual. Here, the activity is congruent with the values of the individual and supports their personal values, goals, and needs. However, an activity where the motivation is regulated through integration is still considered extrinsic motivation because it is done to attain some outcome, not because it is out of inherent interest or enjoyment in the task.^{22,23}

The following example can help clarify integrated regulation; a soldier is well aware of the many health benefits that go along with being physically fit, so fitness is a very important part of her life. This soldier also sees the APFT as a great way to objectively measure her physical fitness, though she does not exactly enjoy taking it. Regardless, the soldier pushes herself on the APFT because she relates the outcome of her performance with being fit and healthy. In this example, the task is fully assimilated into the individual's set of values and beliefs.

Identified Regulation

When an individual values a behavioral goal or accepts a behavior as personally important that motivation is known as regulated through identification, or identified regulation.

How identified regulation differs from integrated regulation is that while it (identified regulation) can be considerably self-determined, the individual is still able to remove the behavior or activity from their values and beliefs. When one personally sanctions the activity or behavior we see that they are moving away from external sources of motivation and internalizing the activity, bringing it higher on the self-determination continuum and the positive outcomes that are seen there.^{22,23}

An example of identified regulation for motivating one on the APFT could look like this: A reserve component soldier knows that in order to be effective in his unit and complete their mission, he must be physical fit. This soldier also knows that the APFT is used to measure fitness levels in soldiers. Even though he does not enjoy taking the test, the soldier pushes himself on every APFT to perform his best because he truly believes that his performance relates to his fitness and therefore occupational efficiency.

However, this behavior can be compartmentalized and removed from his values when he returns to his civilian life after completing his monthly military training requirements. So, while the task is still personally important to the individual, it can still be removed from their set of values and beliefs. For the purposes of this study, intrinsic motivation, integrated regulation, and identified regulation will be referred to as the most self-determined forms of motivation.

Introjected Regulation

As we move into the less self-determined forms of motivation it is observed that the activity or behavior becomes much less integrated into the individuals' values and beliefs. Additionally, these types of activities and behaviors are theorized as having much stronger controlling factors. With introjected regulation, the activity is often performed to avoid guilt, shame, or to enhance their sense of worth.²³

For example, if there is a soldier that really does not like taking the APFT, he could think the events are useless and the score doesn't matter. However, the other members of his squad are very physically fit and place a high emphasis on APFT performance. Because of this, the soldier works hard to get a good score in order to avoid the embarrassment and shame of having the lowest score in the squad. Here, the individual does not identify with the task nor has he integrated it into his personal set of values and beliefs.

External Regulation

The least self-determined form of extrinsic motivation is known as external regulation. This type of motivation is driven entirely by an outside entity, where the individual is motivated to obtain some reward or avoid a punishment.^{22,23,27}

There are numerous external sources of motivation for soldiers to undergo physical fitness testing. First and foremost, it is required. Every soldier must take the APFT at least once, twice for active duty soldiers, per year. Secondly, there are rewards of good performance including positive ratings in evaluations, recognition from superiors, and even earning a badge for a perfect score of 300 points.⁵ In the most extreme form of external motivation there are significant punishments that can be applied to individuals who fail to perform to the standard on the APFT. These previously discussed punishments include counseling, flagging, losing benefits.

Amotivation

On the lowest end of the self-determined continuum is amotivation. When an individual is amotivated, they do not internalize the activity or behavior and lacks any motivation at all to perform.^{22,23} Here, the individual feels no sense of personal control towards engaging in the activity and are not effected by extrinsic factors.

This feeling can stem from the individual being unable to achieve their desired outcomes, lacking perceived competence towards the task, or simply not valuing the activity itself or any outcomes that go with it.

An example of amotivation towards the APFT could be as follows; lately, a soldier has begun to question why she even bothers to take the APFT. She hates taking the test and does not see the value of the results or even the events themselves. She knows that if she does not pass the test that she will be counseled and flagged, but she does not care. When the time comes to

complete the APFT she performs the activity but is simply going through the motions, not putting in any real effort.

With amotivation there is no internalization of the activity or behavior and it does not align with the individuals' values or beliefs. Amotivation is on the lowest end of the self-determined continuum. For the purposes of this study introjected regulation, external regulation, and amotivation will be referred to as the least self-determined forms of motivation.

Importance of Internalization

Intrinsic motivation is strongly connected to an individuals need for autonomy, competence, and connectedness. By promoting an environment that relates an activity or behavior to one of these needs the activity or behavior can be more internalized and moved up the self-determination continuum towards intrinsic motivation. On the other hand, by blocking this internalization the individual moves towards amotivation.²³

A study that has examined this attempted to control the negative effects of extrinsic motivation. This study (Simmons et al 2003) involved college students in a physical education class who were instructed on a dribble-shoot basketball drill.

The students either received instructions that emphasized the obligatory nature of the task (they would only need this skill for class grading) or instructions that emphasized personal relevancy of the task (they would be able to utilize this beneficial skill throughout their life). When students internalized the task by the added personal relevancy were more intrinsically motivated, spent more time practicing, and generally had better outcomes than did those who were stressed on the obligatory nature of the task.⁵²

No definitive evidence could be found examining the potential positive or negative effects on motivation of obligatory physical activities in a military setting. However, it is

believed that fostering an environment focusing on the health benefits of high fitness levels, though difficult, can improve an individual's well-being and capacity to effectively serve in the military.⁵⁴

Additionally, if the Army utilized a test that promoted a soldiers' perceived level of competence, it could be theorized that their motivations would be more internalized. It is agreed among some researchers that by internalizing extrinsic motivations the outcomes can be similar to those of intrinsic motivation and the other most self-determined forms of motivation.^{52,55-57}

Outcomes of the Most Self-Determined Forms of Motivation

Research in the physical education setting has shown that intrinsic motivation has been associated with positive outcomes,^{25,29} improved concentration, effort, persistence, and negatively associated with anxiety and fatigue.²⁹

One study completed with active duty Air Force personnel observed the relationship between obligatory versus health motives for exercising.³⁰

By using a modified version of the Reasons for Exercise Inventory⁵⁸ researchers found that those who were motivated to exercise for health related reasons, which have a higher level of internalization, tend to score higher on the Air Force fitness test than those who exercise for obligatory reasons.³⁰

Another study conducted with Norwegian soldiers on a peacekeeping mission found similar results. Using the Situational Motivation Scale (SIMS)⁵⁹ and documentation of physical training sessions, researchers concluded that intrinsic motivation is key to increasing training volume in the soldiers.³¹ Though scarce, the literature on military populations, motivation appears to be more highly associated with positive rather than negative outcomes.^{30,31}

Outcomes of the Least Self-Determined Forms of Motivation

Researchers find that extrinsic motivation can increase stress in individuals²⁸ and is more highly associated with negative outcomes. These negative outcomes have been observed as diminished performance in some activities driven by external motivation compared to internal sources of motivation.^{27,29} The presence of extrinsically motivating factors like controlling rewards can undermine the intrinsic motivation that an individual may already have and even decrease it.^{22,23,59} This could be seen in college athletes who love their sport but are also pressured to perform in order to maintain an athletic scholarship.²⁶ If there is a strong, persisting external motivator on an individual, over time that motivator can start having less and less of an effect on the person, as has been observed in some athletic settings.²⁹

This could potentially be an issue with repeated APFT failures in the Army. Soldiers who fail consecutive APFT's are subject to a number of increasingly severe disciplinary actions.

If these punishments persist without the soldier internalizing their motivation, then the impact of these punishments can begin to have a diminished effect. If this cycle continues the soldier may become entirely amotivated towards the APFT.

Outcomes of Amotivation

Lacking any motivation towards an activity or behavior is known as amotivation and can stem from an individual feeling incompetent to act or feel little to no control over their actions.^{22,23} When an individual must perform an activity or behavior due to obligatory reasons but is amotivated, they can be said to be just going through the motions with no real intention to attain any particular outcome.

Soldiers must realize that the success of a mission and their survival in combat can depend on their ability to complete very physically demanding tasks. Even though the APFT is

designed only to be a brief window into a soldier's physical fitness many soldiers may view this test as a measure of their physical and combat readiness, or competence because it is the only standardized physical performance measure in the Army. However, if they do not have confidence in the APFT as measure of competence then it is failing to meet that need for them and may push their motivation towards amotivation on the self-determined continuum and the negative outcomes associated with it.

Summary

Physical fitness is vital for soldiers in today's Army for a number of reasons, especially in improving and maintaining physical readiness, preventing injury, and advancing the soldier's career. The components that comprise physical fitness according to Army officials, and are the focus of PRT include: strength, muscular endurance, and cardiorespiratory endurance.

The PRT program utilizes exercises that mimic combat relevant tasks to improve these components as well as mobility in soldiers. To ensure service members maintain fitness, all branches use some method of measuring physical fitness. Most tests involve a muscular endurance and cardiorespiratory endurance component with only the Marine Corps employing a combat relevant physical fitness assessment.

The fitness assessment used by the Army, the APFT is an indicator of only 2 components of fitness; muscular endurance and cardiorespiratory endurance. Many researchers agree the APFT is lacking as a measure of fitness for soldiers and a new tool is needed to gauge physical readiness.^{1,3,6,12,21} Motivation, which can come from both internal and external sources, has been observed to have effects on the outcome of physical performance. In a variety of settings those with better internalization of motivation towards task tend to have more positive outcomes than those who have external motivation.^{25,29,30,52,54}

To date, little research has looked at motivation and physical activity in a military population. Still less research has been done with soldiers in regards to physical fitness and none regarding motivation and fitness. Reserve and National Guard component soldiers have been particularly ignored, despite the fact that these soldiers are held to the same standard as their active duty counterparts and are repeatedly called upon to perform in combat operations.

If soldiers in the NDANG lack internal motivation and confidence in the APFT as a measure of fitness, and instead rely heavily on external motivator to perform, they could be subject to the negative outcomes discussed previously. Additionally, it is vital a commander have an accurate assessment of their soldiers' fitness levels.

This study aimed to collect performance outcomes on the APFT and motivation information for soldiers in the NDANG towards the APFT guided by the following research questions: (1) What type of motivation do NDANG soldiers have to perform on the APFT? (2) How well do soldiers in the NDANG perform on the APFT? (3) Does a relationship exist between a soldier's motivation towards the APFT and their performance on the APFT? Providing this information to Army leaders will allow them to see the overall state of physical performance and improve performance on physical assessments. This improvement can be done by either by creating an environment that allows soldiers to internalize their motivations for the APFT or by developing a fitness measure that soldiers confidently feel indicates their level of physical readiness.

CHAPTER 3. METHODOLOGY

Research Design

The design of this non-experimental study was survey based. The goal was to determine if a relationship between a participants Army Physical Fitness Test (APFT) performance and their motivation type towards the APFT.

Population of Study

The sample of soldiers was collected from North Dakota Army National Guard (NDANG) units surrounding Fargo, North Dakota. This group was selected because of the density of soldiers and variety of military occupations present as well as their proximity to the researchers location. The selected area provided a diverse group of soldiers in both combat and combat service-support roles.

Preliminary email invitations were sent to the commanders of the pre-determined units detailing the purpose and method of research as well as inquiring about their interest in being involved. A copy of this email invitation is available in Appendix A. Inclusion criteria involved participants being 18 years of age or older and a member in good standing in the NDANG. Exclusion criteria included individuals who do not have a record APFT in the past 12 months and those on a permanent or temporary medical profile that has prevented them from taking a full APFT in the last 12 months. The goal of this research study was to obtain a minimum of 200 completed surveys.

Instrumentation

The instrument used to determine a soldiers motivation towards the APFT was a modified version of the Situational Motivation Scale (SIMS).⁵⁹. The SIMS is a measure that was developed to be a self-report measure of an individual's situational, or current state, motivation

towards an activity.⁵⁹ The items in this survey were modified to make them specific to the APFT. These new items asked the participants to relate motivational statements with how strongly it corresponds with their own motivations behind performing on the APFT. The responses ranged from 1, where the statement corresponds not at all to the soldiers motivation towards the APFT, all the way to a 5, where the statement responds exactly to the soldier’s motivation.

The responses provided in this study were used to define how self-determined the participants motivations are toward the APFT. Specifically, each item fell into one of 2 categories: Most Self-Determined (MSD) and Least Self-Determined (LSD). The most self-determined category includes intrinsic motivation, integrated regulation, identified regulation items. Higher scoring responses to these items indicate strong self-motivation and a high level of integration of the activity (the APFT) into the individual’s values and beliefs.

The least self-determined category includes introjected regulation, external regulation, and amotivation. Higher scoring responses to these items indicate a stronger external pressure to perform and less integration of the activity (again, the APFT) into the individual’s values and beliefs. The scores for items falling into the most and least self-determined categories were summed up within their respective categories.

Table 1. Motivation Items Categorized

Item Number	Self-Determined Category	Total Items	Lowest Possible Score	Highest Possible Score
1,2,7,8,9,13,14,15,18,19,20,23	Most	12	12	60
3,4,5,6,10,11,12,16,17,21,22,24	Least	12	12	60

Whichever category an individual scored higher in determined whether they are most self-determined (MSD) or least self-determined (LSD) towards the APFT. The soldier’s most or least self-determined status was then correlated with their score on the APFT, which was

collected via self-reporting. This method of APFT data collection was found reliable in studies by comparing self-reported AFPT information to unit APFT records.^{60,61} By evaluating this correlation we found significant relationships between a soldier's level of self-determined motivation and performance outcomes on the APFT.

Finally, demographic information was collected. This information allowed the research team to find other relationships between soldier demographics such as rank, age, gender, or military occupation and APFT performance. Refer to Appendix B for a complete copy of the survey used in this study.

Pilot Study

A pilot study was conducted using 30 soldiers from Headquarters and Headquarters Battery, 1-188th Air Defense Artillery. This pilot consisted of soldiers taking the survey and providing feedback afterwards through a cognitive group interview with a think aloud protocol. Further modifications were made to this survey after the analysis of interviews and suggestions provided by participants.

Procedure

Data collection with individual units took place during training periods so that maximum soldier participation was obtained. An announcement was made during one of the unit's formations informing soldiers of the purpose of the study, as well as when and where the study will take place.

Group administration was used for administration of the survey. Once potential participants are all present for the study, they were read an oral script detailing the purpose of the study, their rights and responsibilities for the study, and the procedure on how information will be collected. This oral script included a consent statement stating that by participating, all

individuals consent the research team to use information provided in the study. For a copy of this oral script please see Appendix C. Participants were given the opportunity to ask any questions they may have regarding their participation in the research study. All that chose to participate were included in a drawing for a prize with a value of \$20.00. Each survey administration took 15-20 minutes.

Statistical Analysis

A Pearson's Product-Moment Correlation was performed between self-determined scores and APFT performance outcomes. Significance was set at $\alpha \leq 0.05$. Data processing was completed using IBM SPSS statistics software version 23.

CHAPTER 4. MANUSCRIPT

Introduction

Physical fitness is a vital component of service in the military, regardless of branch or occupation. The physical demands placed on a soldier in the United States Army to perform strenuous tasks without tiring are incredibly high. Whether for physical readiness,^{5,7} injury prevention,^{1,8-12} or career progression,^{13,14} soldiers must maintain high levels of physical fitness at all times.

Physical activity tasks in both operational and training environments include moving and loading heavy equipment, lifting casualties, traversing rough terrain, and marching for long distances.¹⁻⁶ The Army recognizes 3 primary components of physical fitness to promote success in these trying tasks: strength, muscular endurance, and cardiorespiratory endurance.⁵ To ensure soldiers are maintaining physical fitness levels, commanders army wide rely on the Army Physical Fitness Test (APFT). The APFT, conducted bi-annually for active duty soldiers and annually for reserve component soldiers, uses push-up, sit-up, and run events to measure strength and endurance. The events of this test are scored on an age and gender specific scale.

The results of this test not only give commanders a view on the physical fitness levels of their soldiers, but also can have both positive and negative effects on a soldier's career. Soldiers who fail to meet the minimum physical fitness standard are met with a number of administrative punishments including being barred from attending any Army institutional training or reenlisting, extending their military contract, losing civilian education incentives, and even being removed from the military.

Because of the far reaching effects of a soldiers APFT performance, it is important soldiers perform as best as possible on the test. Performance motivation is one area that has been

researched for its affect on physical performance and goal achievement.^{22,24-28,30,59} Motivation, in relation to physical activity and fitness, is the psychological disposition that stimulates performance when an individual takes part in an activity that they feel responsible for the outcome. One psychological theory that has been used to study motivation and performance outcomes is the Self-Determination Theory.^{22,23} Here, more self-determined motivation indicates the individual's performance stems from internal sources, such as enjoyment of the activity, whereas less self-determined motivation stem from external sources, like seeking a reward or avoiding punishment. Research related to motivation and performance outcomes has observed that more self-determined forms of motivation are associated with more positive outcomes,²⁶⁻³¹ improved concentration, effort, persistence, and more negatively associated with anxiety, fatigue,²⁸ and stress,²⁷ than less self-determined forms of motivation. Furthermore, the presence of externally motivating factors (e.g., rewards and punishment) can undermine the more self-determined forms of motivation in an individual and even decrease them.^{22,23}

To date, little research has been conducted evaluating motivation and physical activity in a military population.^{30,31} Specifically the Reserve and National Guard component soldiers have not been evaluated. The goal of this article was to determine if any relationships existed between the types of motivation a soldier has to perform on the APFT and their performance outcomes on the test. This study was guided by the following research questions: (1) What type of motivation do NDANG soldiers have to perform on the APFT? (2) How well do soldiers in the NDANG perform on the APFT? (3) Does a relationship exist between a soldier's motivation towards the APFT and their performance on the APFT?

Methods

This study was conducted using a paper and pencil survey administered in person by the principal investigator. The purpose of this survey was to collect motivation, APFT, and demographic information from North Dakota Army National Guard (NDANG) soldiers.

Participants

In total 6 NDANG units took part in the study. Surveys were administered to a total of 225 participants during one of their respective units training periods. Participants were read a consent statement stating that by completing and turning in a survey they agree to take part in the study. To be included participants must be a member in good standing of the NDANG and be 18 years of age or older. After first review 17 of these participants met exclusion criteria participant either: (1) having an APFT over 12 months old or (2) holding a permanent medical profile. In the end 208 participants were included in the final data analyzation (185 male, 23 female; mean age: 26.3 ± 6.46 years).

Instrumentation

Motivation information

The instrument used to collect motivation information was a modified version of the Situational Motivation Scale (SIMS). The SIMS is measure that was developed to be a self-report measure of an individual's situational, or current, motivation towards an activity.⁵⁹

The items in this survey were modified to make them specific to the APFT and the sample of interest (military members). Participants were asked to relate motivational statements to how strongly it corresponds with their own motivations behind performing on the APFT.

The effort I put into the APFT is because... (Circle corresponding response)	
1. I think the test itself is interesting	1 2 3 4 5
2. It is for my own good	1 2 3 4 5
3. I am supposed to do it	1 2 3 4 5
4. I personally don't see any reasons to perform well, though there may be some good ones	1 2 3 4 5
5. I feel guilty if I do not perform well on the APFT	1 2 3 4 5
6. I want to avoid being counseled or flagged	1 2 3 4 5
7. The APFT is important to me for measuring fitness	1 2 3 4 5
8. I think the APFT is pleasant	1 2 3 4 5
9. I think the APFT is good for me (health/fitness)	1 2 3 4 5
10. It is something that I am required to do	1 2 3 4 5
11. I am not sure if it is worth it to try hard	1 2 3 4 5
12. I feel ashamed if I do not perform well on the APFT	1 2 3 4 5
13. My service in the military relies on my performance, and that service is important to me	1 2 3 4 5
14. I find the APFT fun	1 2 3 4 5
15. My performance is my personal decision	1 2 3 4 5
16. I don't have any choice	1 2 3 4 5
17. I don't know; I don't see what this activity brings me	1 2 3 4 5
18. My performance indicates my fitness level, and fitness is important to me	1 2 3 4 5
19. I feel good when taking the APFT	1 2 3 4 5
20. My performance is personally important to me	1 2 3 4 5
21. Others are making me	1 2 3 4 5
22. I'm not sure it's a useful thing to really try on (the APFT)	1 2 3 4 5
23. My performance on the APFT is important to me for my position in the military (MOS, rank, duty position, etc)	1 2 3 4 5
24. I want to get good ratings on my evaluations (Appraisal, NCOER, or OER, whichever applies to you)	1 2 3 4 5

Key

1. Corresponds Not at all

2. Corresponds a little

3. Corresponds moderately

4. Corresponds a lot

5. Corresponds exactly

Figure 1. Survey items measuring motivation towards performance on the APFT

The responses utilized a 5-point Likert scale ranging from 1, where the statement “corresponds not at all” to 5, where the statement “corresponds exactly” to the soldiers’ motivation towards APFT performance. See Figure 1 below for copy of motivation items.

The motivation statement in the item was categorized as being either most self-determined (MSD) or least self-determined (LSD). Participants who scored high on MSD items indicate strong self-motivation and higher levels of integration of the APFT into the participant’s values and beliefs compared to those who scored higher on the LSD items.

Physical fitness and demographic data

Participants self-reported the most recent total APFT score and individual events. One study reported that while self-reported scores are often over-reported, the values are adequate for military studies with a larger sample size.⁶¹ Additionally, the survey collected demographic information about the participants including military occupation and experience, age, and gender.

The survey items underwent one-iteration using the Partial Credit Model to evaluate response options and item fit. The final survey had 24 items; each with 5 response options ranging from “corresponds not at all” to “corresponds exactly” wherein the participant responds to how well a statement relates to their motivation for performance on the APFT. The Wright item-person map revealed that participants levels were fairly evenly distributed ($M \pm SD = 0 \pm 0.64$ logits). The easiest item had a difficulty of -1.08 logits while the hardest item had a difficulty of 0.98 logits. The separation index for the items was 8.86 with a reliability of 0.99 while the separation index for the persons (theta) was 1.34 with a reliability of 0.90 . With this item separation value we see that the items are spread along the continuum of the construct appropriately. This implies how well the participants can distinguish the items on the survey. However, the person separation values above do not fall within acceptable ranges, implying that the items have difficulty separating the participants into subgroups. Refer to Appendix B for a complete copy of the survey used in this study.

Statistical Analysis

A Pearson’s Product-Moment Correlation was performed between self-determined scores and APFT performance outcomes. Significance was set at $\alpha \leq 0.05$. Data processing was completed using IBM SPSS statistics software version 23.

Results

Of the 208 participants, 48.6% (n=101) fell into the MSD motivation category while 47.6% (n=99) fell into the LSD motivation category (3.8% missing data, n=8). 81.7% of participants reported currently having a passing APFT score (n=170) and 15.9% (n=33) reporting a failing APFT score (2.4% missing data, n=5). The mean APFT score reported was 238.65 points with the mean of each event reported as follows: Push-Up 82.46 points, Sit-Up 80.14 points, and 2-Mile Run 74.29 points.

Table 2. Correlations between Motivation Type and APFT Performance

Motivation Type	Current APFT Score	Have you ever failed an APFT? ^a	# of APFT's ever failed	Current APFT pass/ fail status ^b
Most Self-Determined (MSD)	0.399*	-0.290*	-0.377*	-0.217*
Least Self-Determined (LSD)	-0.187*	0.102	0.094	0.165*

r-values reported for Pearson's product moment correlation

* indicates significant relationship (p< 0.01)

^a "no" response coded as 0, "yes" response coded as 1

^b "passing" response coded as 0, "failing" response coded as 1

No significant relationship was found between soldiers LSD motivation score and the following variables: current APFT pass/ fail status, number of APFT's ever failed, or whether or not the soldier has ever failed an APFT.

Discussion

Relationships between APFT Motivation and Performance

The results of this study agree with similar research that has found an association between more self-determined forms of motivation and positive performance outcomes.^{30,31} As

soldiers MSD item scores increased, the instances of these positive outcomes increased. Soldiers who agreed more strongly with MSD items scored higher on the APFT, had a better current APFT pass rate, had a lower number of failed attempts, and a lower instance of ever failing an APFT.

Additionally, this study found a negative association between a soldiers LSD motivation item score and APFT score. As the score on LSD motivation items increased, APFT score decreased. These results suggest that there is a need to focus on the environment surrounding motivation towards physical fitness and the APFT. Currently there is a focus on external factors like avoiding administrative punishment or gaining good evaluation comments. However, leaders should try to have the soldiers internalize their motivation towards core components of physical fitness itself (e.g., strength, muscular and cardiorespiratory endurance). A similar study observed Air Force personnel found that those who exercise for personal reasons tended to score higher on the Air Force fitness assessment compared to those who exercise for obligatory reasons.³⁰ Therefore, if commanders can get soldiers to relate these concepts to the soldiering lifestyle, we may begin to see more self-determined motivation towards physical fitness.

Soldier APFT Performance

A total of 15.9% of soldiers surveyed reported having a failing current APFT score. This is information, along with the scope and parameters of this study, was provided to commanders included in the study. See Table 3 for APFT score data. While this is valuable information to provide commanders of units that were included in the study, it would be beneficial to compare this fail rate with similar populations within the military. However there is currently no fitness record keeping system that is universally utilized by the US military.

In 2003, Williamson et al. collected body composition and fitness information from nearly 700 soldiers with the goal of highlighting the need for such a database and promoting the viability of a computer tracking system they had field-tested.⁶² However, while the implementation of such a database would allow commanders to compare fitness data to other units, care would have to be taken to ensure such comparisons are appropriate. This author agrees that the implementation of such a database would allow commanders to compare fitness data to that of other units, giving them a better understanding of the overall state of fitness of their soldiers. Future research should be conducted to provide evidence to government agencies about the practicality of such a system.

Table 3. APFT score data

	Mean	Min	Max	Range	SD
APFT Score (n=203)	238.65	120	300	280	42.29
Push-Up (n=192)	82.46	10	100	90	15.20
Sit-Up (n=192)	80.14	40	100	60	15.17
2-Mile Run (n=193)	74.29	0	100	100	20.83

Soldier Motivation towards the APFT

The results of this study show that more soldiers' motivation towards the APFT was found to be slightly more self-determined as indicated by more soldiers recording higher scores on the MSD items on the survey than LSD items. No other studies completed relating motivation towards physical fitness and performance outcomes categorized participants based on their motivation type (internal versus external).^{30,31} Because of the current study is unique in this categorization, comparisons cannot be made between other military populations in this respect.

A moderate negative correlation existed between participants MSD score and their LSD score ($r = -0.319$, $p < 0.01$). This finding supports the concept that externally motivating factors that we see in less self-determined forms of motivation may undermine and decrease internal

motivation. In this study, as a participant's LSD (or external) motivation increases, their MSD (or internal) motivation decreases. This finding supports placing less emphasis on externally motivating factors (presence of awards and punishments for performance) and moving toward internalizing soldiers' motivation towards fitness and the APFT. Again, this could be accomplished by relating fitness concepts to components of common soldiering tasks.

Limitations

It should be noted that because of how little the number of participants fell into each motivation category differed (101MSD participants and 99 LSD participants), the state of soldier motivation towards the APFT is inconclusive. Future research should be conducted to determine the state of soldier motivation towards the APFT. The sample of this study was comprised of only soldiers in the North Dakota Army National Guard. Because of this, generalizability is limited. Future research should focus on obtaining a wider variety of participants from multiple units. Finally, while the survey shows strong potential for its ability to collect motivation information towards the APFT, if this survey is to be administered again, the items should undergo more extensive testing to improve their ability to separate the sample into distinct subgroups (MSD and LSD).

Conclusions

This study highlights the need to focus on the environment leaders are promoting to improve motivation towards physical fitness and the APFT. Emphasizing internalization of physical fitness and APFT performance may lead to improved outcomes on the APFT and the positive effects of enhanced physical fitness. While this study is unique in its study of motivation in military personnel towards physical activity, it supports conclusions found by other research in this area. Like these other studies, this research has shown that focusing on externally motivating

factors like the presence of an award for good performance and punishment for poor performance may have negative consequences on performance and should be limited.

Acknowledgements

I would like to acknowledge CSM Jason Magnuson, and CPT Ryan Schulz, who contributed to the development of survey items and provided valuable perspective on military physical fitness and soldier motivation. The M.S. in Advanced Athletic Training program, North Dakota State University, provided funding for this study.

CHAPTER 5. RESULTS AND DISCUSSION

Results

This study was a survey-based study administered to soldiers in the North Dakota Army National Guard (NDANG). The purpose of this survey was to collect motivation, Army Physical Fitness Test (APFT) performance, and demographic information to evaluate the relationship between a participant's motivation to perform on the APFT and their performance on APFT. For this study, Most Self-Determined (MSD) motivation towards an activity includes motivation that stems from within the individual such as genuine enjoyment of the activity. Conversely, Least Self-Determined (LSD) motivation includes motivation that stems from external sources, such as performing to avoid punishment or to obtain a reward. In total, 225 voluntary participants completed surveys, 17 of those were excluded for analysis because participants either did not have an up to date APFT score or had a permanent medical profile. Of the 208 valid participants (185 male, 23 female) the mean age was 26.3 ± 6.46 years.

Of the valid participants, 48.6% (n=101) fell into the MSD motivation category while 47.6% (n=99) fell into the LSD motivation category. Surveys that had incomplete items on the motivation item section were excluded from analyzation (3.8%, n=8). In total, 81.7% of participants reported currently having a passing current APFT score (n=170) and 15.9% (n=33) reporting a failing APFT score (2.4% missing data, n=5).

A number of significant relationships were found between type of motivation and APFT data. Moderate correlations were observed between the following variables; soldiers MSD motivation score and their current APFT score ($r= 0.399$, $p<0 .01$), soldiers MSD motivation score and number of APFT's failed ($r= -0.377$, $p< 0.01$). Additionally, a moderate correlation existed between soldiers' MSD score and their LSD score ($r= -0.319$, $P<0.01$), which indicates

that as a participants MSD score goes up, their LSD score goes down. Small correlations were observed between the following variables: soldiers MSD motivation score and whether or not they have ever failed an APFT ($r = -0.290, p < 0.01$), soldiers MSD motivation score and their current APFT pass or fail status ($r = -0.217, P < 0.01$), and soldiers LSD motivation score and current APFT score ($r = -0.187, p < 0.01$). No significant relationship was found between soldiers' LSD motivation score and the following variables: current APFT pass/ fail status, number of APFT's ever failed, or whether or not the soldier has ever failed an APFT.

Discussion

Relationships Between APFT Motivation and Performance

Positive Performance Outcomes

The results of this study agree with other research that has found association between more self-determined forms of motivation and positive performance outcomes.^{26,28-31} We found that soldiers who more strongly agree with MSD statements tend to have higher scores on the APFT. This is observed in the moderate positive correlation found between MSD score and self-reported APFT score ($r = 0.399, p < 0.01$).

Other positive performance outcomes were also found to be associated with MSD scores. Positive associations were observed between soldiers MSD scores and current APFT pass rate, number of failed APFT's, and history of failing an APFT. The trend seen was that as MSD item scores increased, positive physical performance outcomes on the APFT improved.

Research has found similar results when relating motivation and performance outcomes. Active duty Air Force personnel have been observed to score higher on the Air Force fitness test when they exercise for health related reasons as opposed to exercising for obligatory reasons.³⁰

In other settings, similar trends are seen as well. The Norwegian military found that training volume increased in soldiers when they had more self-determined forms of motivation behind the activity.³¹ Therefore, we must recognize how important internalization is to promoting positive performance outcomes on physical fitness tasks.

Importance of Internalization

One step that leaders in the military can do to improve performance on the APFT is to focus on the environment surrounding motivation towards physical fitness. Instead of focusing on the external factors like avoiding administrative punishments or gaining good evaluation comments, leaders should try to have the soldiers internalize their motivation towards core components of physical fitness itself (e.g., strength, muscular and cardiorespiratory endurance). If commanders can get soldiers to relate these concepts to the soldiering lifestyle, we may begin to see more self-determined forms of motivation towards fitness.

Soldiers must also recognize that this responsibility does not fall on commanders alone. Leaders at every level should be challenged to emphasize the implications physical fitness has on their soldiers' health, training, and combat role. Finally, soldiers must realize that because the APFT is the only measure currently in use to indicate fitness levels and that good performance has some indication on their ability to complete demanding physical soldier skills. For example, if soldiers are not able to meet the minimum standards on the APFT they may lack the physical capability to complete strenuous and physically demanding tasks that training and combat operations require.

This concept may not be popular due to the fact that there is criticism of the relevancy of the APFT events. Some researchers have suggested that the APFT is a poor measure of physical fitness and operational readiness due to the limited scope of abilities tested.^{3,6,12} However the

APFT is the only physical fitness assessment implemented Army wide, so it would benefit soldiers to have the best performance possible on it. Future research should be conducted to determine if soldiers perceive the APFT as being relevant to the physical demands of training and combat operations. This information could then be valuable to the development of a fitness assessment that accurately evaluates the physical capability of soldiers to complete soldiering tasks. Not only has this study demonstrated relationships between internal motivation and positive outcomes observed elsewhere in literature,^{26,29} the negative outcomes associated with external motivation present in other literature was also observed.

Negative Performance Outcomes

This study found a negative association between a soldier's LSD motivation score and APFT score ($r = -0.187$, $p < 0.01$). As soldier's LSD scores increased, corresponding APFT scores decreased. This indicates that participants who corresponded stronger with external motivation statements tended to score lower on the APFT than those who corresponded stronger with internal motivation statements. This relates to the idea of promoting internalization of the APFT as a means of improving performance. As soldier's motivation becomes more self-determined, they may move away from these negative outcomes and experience the more positive ones discussed previously (improved score, better pass rate, lower number of failed tests). In addition to providing important information regarding the affect of motivation on APFT performance, this study also produced substantial data on the state of APFT performance in the NDANG.

Soldier Performance on the APFT

When evaluating APFT performance data, it may be useful to compare a sample with another group of similar soldiers. Unfortunately, there is currently no fitness record keeping system that is universally utilized by the US military that can be used to compare the results of

this study. In 2003 Williamson et al collected body composition and fitness information from 684 soldiers to pilot a digital record keeping system⁶². This type of system would allow commanders in the NDANG to have continuity with body composition and fitness data in order to make valuable comparisons with other units.

Surveying soldiers in the NDANG found that 15.9% of participants reported having a failing current APFT score. Failing a record APFT has a number of serious implications for a soldier's personal and professional life, as discussed previously. We have seen that soldier's face losing benefits, missing promotions, and risking separation with APFT failures. Even without normative data to compare to, a nearly 16% failure rate on the APFT appears high and should be concerning to leaders at all levels.

Mean score of all participants on the APFT was 238.65 points (SD=42.29). Men tended to score higher than women in total APFT score. This finding is contrasted by a 2003 study of active duty medical soldiers that found females out performed males in 4 out of 5 APFT's conducted over a 2 year period.⁶² Scores on the APFT for NDANG soldiers surveyed differed in all events between men and women. On average, men scored higher on the sit-up event (mean=80.95) compared to women (mean=73.57). This difference, 7.38, 95% CI (0.518,14.234) was significant $t(190)=2.121$, $p=.035$. No significant differences were observed between men and women's scores on the push-up or 2-mile run event. Refer to Table 3 for APFT score data.

While authors have found that self-reporting APFT scores tends to result in over reporting scores, they agree that it is still an adequate way to collect and report APFT information^{61,62}. However, researchers should take care when selecting and reporting their method used to collect APFT information, especially when it will be compared to different populations.

Soldier Motivation towards the APFT

The results of this study show that more soldiers' motivation towards the APFT was found to be more self-determined. This finding was indicated by more soldiers being labeled as having more self-determined motivation towards the APFT because they recorded higher scores on the MSD items than LSD items.

It was observed that there was a moderate negative correlation between participants MSD score and their LSD score ($r = -0.319$, $p < 0.01$). This finding supports the concept that externally motivating factors that we see in less self-determined forms of motivation may undermine and decrease internal motivation. In this study, as a participant's LSD (or external) motivation increases, their MSD (internal) motivation decreases. This finding also supports placing less emphasis on these externally motivating factors (presence of awards and punishments for performance) and moving toward internalizing soldiers' motivation towards fitness and the APFT (emphasizing personal relevancy of the test and their performance).

However, it should be noted that because of how little these groups differed from each other (101 MSD soldiers and 99 LSD soldiers), the state of soldier motivation towards the APFT is inconclusive. Future research needs to be conducted to determine the state of soldier motivation towards the APFT. A larger sample to include those from other states and with different military occupation backgrounds would be beneficial.

Instrumentation

The survey items underwent one-iteration using the Partial Credit Model to evaluate response options and item fit. The final survey had 24 items; each with 5 response options ranging from "corresponds not at all" to "corresponds exactly wherein the participant responds to how well a statement relates to their motivation for performance on the APFT. The Wright item-

person map revealed that participant's levels were fairly evenly distributed ($M \pm SD = 0 \pm 0.64$ logits). The easiest item had a difficulty of $=1.08$ logits while the hardest item had a difficulty of 0.98 logits. The separation index for the items was 8.86 with a reliability of $.99$ while the separation index for the persons (theta) was 1.34 with a reliability of 0.90 . With this item separation value we see that the items are spread along the continuum of the construct appropriately. This implies how well the participants can distinguish the items on the survey. However, the person separation values above do not fall within acceptable ranges, implying that the items have difficulty separating the participants into subgroups. Refer to Appendix B for a complete copy of the survey used in this study.

Limitations

This author would like to acknowledge some limitations this study faced. There was a 40% response rate from commanders with the initial email invitation. All 6 of these units whose commanders replied to the email invitation took part in the data collection process, allowing the study to recruit 200 participants. Only one of these units came from outside of the air defense artillery battalion. Because of this, 32.2% of participants had a primary military occupation that directly relates to air defense (1.4% missing military occupation data). Therefore, the results of this study should not be generalized for other military populations. In future studies, researchers may consider using electronic survey administration sent through military email accounts to collect data, potentially improving variety of participants and response rate.

Another limitation of this study was the survey that was used. The author utilized an altered version of the SIMS. The SIMS was developed as a brief self-report measure of situational intrinsic motivation, identified regulation, external regulation, and motivation. Because this survey is situational, it measures a person's motivation at that given point in time.

This situational motivation may change based on the persons current mood or state of mind. Where this may limit the current study is that a person with recent bad experiences with physical training or an APFT (i.e., poor performance on most recent APFT, recently failed an APFT) could be responding based on those recent experiences, not their overall motivation towards the test. In the future, researchers could look at how long it has been since the participants last APFT and whether it was passing or failing, then compare this to their situational motivation to look for any relationships that exist.

Future Research Considerations

During the course of this study a number of possible future research considerations have been discovered. (1) Research on how to internalize motivation towards an activity. (2) Further testing and evaluating of instrument items, improving their ability to separate participants into motivation subgroups (MSD and LSD). (3) Develop and employ a system of data collection with which commanders can collect and compare fitness data. (4) Study soldiers confidence in the APFT as a measure of physical fitness, capability, and readiness.

Conclusion

This study highlighted the need to focus on what kind of environment leaders are promoting when it comes to motivation towards physical fitness. Emphasizing internalization of physical fitness and APFT performance may lead to improved outcomes on the APFT and the positive effects of physical fitness. The results of this study supports other research that has shown that focusing on externally motivating factors like the presence of an award for good performance and punishment for poor performance may have negative consequences on performance and should be limited.

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APPENDIX A. E-MAIL PARTICIPATION INVITATION

Greetings [**commanders name and title**],

My name is SSG Andrew Carlson, squad leader with HHB, 1-188th Air Defense Artillery (ADA) of the North Dakota Army National Guard. I am currently a Certified Athletic Trainer and graduate student pursuing a Master's of Science degree in Advanced Athletic Training at North Dakota State University. I am contacting you to request the participation of you and your unit, [**insert commanders unit**], in a research study being conducted as a part of my thesis project. I would like to administer a survey to your unit in order to assess motivation towards the Army Physical Fitness Test (APFT) and determine if any relationship exists between motivation and performance on the APFT in soldiers of the North Dakota Army National Guard.

The purpose of this study is to determine if soldiers who are motivated more by internal sources (health and fitness related reasons) or by external sources (avoid punishment, mandatory) perform better on the APFT. The goal of this study is to create an environment that improves APFT performance or even provide evidence to support a new version of the APFT that soldiers are more motivated to perform on. Additionally, the high level of emphasis that has been placed on APFT performance for reenlistment and retaining incentives (GI Bill, tuition assistance, and student loan repayment) underscores the importance of this research. You will be provided with the final results of the study upon completion. All results will be entirely confidential, only my research team at NDSU will have access to completed surveys. HHB, 1-188th ADA has been instrumental in the development of this survey, attached is a memorandum of endorsement by HHB Commander CPT Ryan Schulz for your review.

If you agree to participate, coordination's will be made with you to administer the survey with your unit during a drill weekend or annual training session with the least impact on your training schedule. The survey will take no more than 30 minutes; all participation by the soldiers is voluntary. Additionally, all participants will be entered into a drawing for a chance to win a \$20 pre-paid gift card for their efforts.

Please reply by e-mail with your response by 01 April 2015 in order to set up the time and place for survey administration. If you have any questions or concerns please feel free to contact me, I can be reached through my contact information below.

Thank you for your consideration,

Andrew Carlson, ATC, LAT (SSG, NDANG)
Graduate Assistant, North Dakota State University
Department of Health, Nutrition, and Exercise Science
andrew.carlson2@ndsu.edu
(701) 317-1473

APPENDIX B. SURVEY PACKET DOCUMENTS

Army Physical Fitness Test Motivation Scale

Purpose: To determine if a relationship exists between a soldiers' motivation and their performance on the Army Physical Fitness Test (APFT). For the purposes of this study, all questions, unless otherwise stated, are referring to an APFT for record.

Directions: Read each item carefully. Using the key to the right side of the paper please circle the number that best corresponds to the reason why you exert the amount of effort you do on the APFT.

The effort I put into the APFT is because... (Circle corresponding response)

- | | |
|--|-----------|
| 1. I think the test itself is interesting | 1 2 3 4 5 |
| 2. It is for my own good | 1 2 3 4 5 |
| 3. I am supposed to do it | 1 2 3 4 5 |
| 4. I personally don't see any reasons to perform well,
though there may be some good ones | 1 2 3 4 5 |
| 5. I feel guilty if I do not perform well on the APFT | 1 2 3 4 5 |
| 6. I want to avoid being counseled or flagged | 1 2 3 4 5 |
| 7. The APFT is important to me for measuring fitness | 1 2 3 4 5 |
| 8. I think the APFT is pleasant | 1 2 3 4 5 |
| 9. I think the APFT is good for me (health/fitness) | 1 2 3 4 5 |
| 10. It is something that I am required to do | 1 2 3 4 5 |
| 11. I am not sure if it is worth it to try hard | 1 2 3 4 5 |
| 12. I feel ashamed if I do not perform well on the APFT | 1 2 3 4 5 |
| 13. My service in the military relies on my performance,
and that service is important to me | 1 2 3 4 5 |
| 14. I find the APFT fun | 1 2 3 4 5 |
| 15. My performance is my personal decision | 1 2 3 4 5 |
| 16. I don't have any choice | 1 2 3 4 5 |
| 17. I don't know; I don't see what this activity brings me | 1 2 3 4 5 |
| 18. My performance indicates my fitness level, and fitness
is important to me | 1 2 3 4 5 |
| 19. I feel good when taking the APFT | 1 2 3 4 5 |
| 20. My performance is personally important to me | 1 2 3 4 5 |
| 21. Others are making me | 1 2 3 4 5 |
| 22. I'm not sure it's a useful thing to really try on | 1 2 3 4 5 |
| 23. My performance on the APFT is important to me for my position
in the military (MOS, rank, duty position, etc) | 1 2 3 4 5 |
| 24. I want to get good ratings on my evaluations
(Appraisal/ NCOER/OER) | 1 2 3 4 5 |

<u>Key</u>
1. Corresponds Not at all
2. Corresponds a little
3. Corresponds moderately
4. Corresponds a lot
5. Corresponds exactly

APFT Information

Directions: Please read each question thoroughly and provide the most accurate information you can. Your individual responses will not be available to your chain of command, only the research team will have access to responses.

Do you have a temporary medical profile that has prevented you from taking an APFT for record in the last 12 months? Yes No

Do you have a permanent medical profile that requires you to perform alternate events on the APFT? Yes No

How long ago was your last record APFT? _____ Months

Have you ever failed a record APFT? Yes No

If yes, how many APFT's have you failed? (best estimate #) _____

What was your total score on the last APFT you took for record? (Fill in the blank)
_____ points

What was your score on the following individual events on the last APFT you took for record? (Fill in points for each event)

Push-Ups: _____ points Sit-Ups: _____ point Two-Mile Run: _____ points

Demographic Information:

What is your gender? Male Female
What is your age? _____ years old
What is your current Grade? E1-E4 E5-E9 O1-06
What is your time in service? _____ years and _____ months
What is your height? _____ feet _____ inches
What is your weight? _____ lbs.

What is your civilian employment? If a student, please also state your major/ field of study.

Please rank 1-10 which fitness or performance parameters you think are important for your duties within the National Guard (1=most important, 10=least important)

- _____ Cardiovascular endurance
- _____ Muscular endurance
- _____ Muscular strength
- _____ Explosive muscular Power
- _____ Mobility
- _____ Flexibility
- _____ Fine motor skills
- _____ Body fat composition
- _____ Agility
- _____ Balance

Please rank 1-10 which fitness or performance parameters you would like your fellow National Guard members to possess if activated for duty (1=most important, 10= least important)

- _____ Cardiovascular endurance
- _____ Muscular endurance
- _____ Muscular strength
- _____ Explosive muscular Power
- _____ Mobility
- _____ Flexibility
- _____ Fine motor skills
- _____ Body fat composition
- _____ Agility
- _____ Balance

Gift Card Entry Form

Please remove this sheet following completion of the survey. This entry form will be collected separately from the survey. Your name will not be connected in any way to your responses on the survey.

Your contact information will not be used to solicit any future products or services.

Name: _____

Email address: _____

APPENDIX C. ORAL SCRIPT FOR RESEARCHER

[Researcher Reads]

Good afternoon [unit name here] soldiers,

My name is Andrew Carlson; I am a Certified Athletic Trainer and graduate student at North Dakota State University. As part of my master's thesis I am conducting research to determine if a relationship exists between a soldier's motivation to perform on the Army Physical Fitness Test and their performance on the test.

The purpose of this study is to determine if soldiers who are motivated more by internal sources, such as health and fitness related reasons, or external sources, to avoid punishment or because it is mandatory, perform better on the APFT. By studying this relationship there is the possibility to improve the pass rate of soldiers on the APFT or even provide evidence to support a new version of the APFT that soldiers are more motivated to perform on. Additionally, the large emphasis that has been placed on APFT scores for the purpose of retention of benefits, reenlistment, and promotions underscores the importance of this research. Your participation is requested to get the widest sample, comprised of a variety of MOS's and military experiences.

This study uses a survey consisting of three segments; the first segment is the questions measuring motivation; the second segment asks you to provide information regarding your current APFT score; and the final segment asks you to provide demographic information, to include civilian employment and military service. Your responses are entirely confidential. This study is being conducted entirely by an outside entity so there will be no retribution for your participation or responses. None of the information provided will be used to identify you and no one in your chain of command will have access to your responses. Also, responses will not be individually reported, but analyzed and reported as a whole.

To further protect confidentiality, the motivational survey and demographic information will be collected and stored separately. These 2 forms will be linked by the numeric code on the upper right corner of sheet. Then upon completion of this study, the survey will be turned into the folder marked "**Survey**" and the demographic sheets will be turned into the folder marked "**APFT/Demographic Information**".

Are there any questions at this time?

If you are not interested in participating you are free to leave at this time. By completing the survey you agree to participate in the study and grant consent the research team to use any and all information provided in my survey; to include for publication purposes. Furthermore, if you agree to participate you will be entered to win one of ten \$20.00 pre-paid Visa gift cards.

[Those not interested will leave now]

For your part, we are asking that you read the directions thoroughly before beginning each section of the survey. Please provide the most accurate responses possible. Again, your chain of command will not have access to responses. Your participation is entirely voluntary. You can quit at any time once the survey has started without the risk of losing your chance to win a gift card.

The sheet that is not connected to the packet is your entry form for the gift card raffle. When you are finished with the survey please provide your name and contact information on the sheet marked **Gift Card Entry Form**. This form will go into the tray marked “**Entry Form**”. Your name and contact information will not be connected in any way to your responses.

If you have any questions or concerns about research participants rights or to file a complaint regarding the research you can reach the NDSU Human Research Protection Office at (701) 231-8908 or toll-free at 1-855-800-6717.

Additionally, if you have any questions or concerns about your participation in this study I can be contacted at the following sources; andrew.carlson2@ndsu.edu (701) 317-1473

[This contact information will also be written on the whiteboard at front of room]

Are there any questions or concerns about our expectations for this study?

When I say, you may begin the survey. When you are finished, please bring your response sheets up to the front to turn in.

You may begin.