ANALYSIS OF U.S. MARINE CORPS ANNUAL FITNESS TESTS AND THEIR EFFECTS ON PHYSICAL TRAINING PROGRAM DESIGN

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This exploratory research examines the U.S. Marine Corps (USMC) Physical Fitness and Combat Fitness tests to ascertain their effect on physical training program design. Physical training program design may be suboptimal because it places emphasis on fitness test preparation rather than preparing Marines for the rigors of combat and tasks found in the operational environment. In twenty-one years of service in the USMC the researcher has observed fitness programming is often designed to support the Physical Fitness Test (PFT) and Combat Fitness Test (CFT) rather than prepare an individual Marine for the demands of an operational environment. To find the best options, the author reviewed military fitness history, USMC fitness doctrine, and relevant private sector fitness regimens and found current tests award select fitness domains. As a result, the training most Marines undertake is potentially lacking in General Physical Preparedness (GPP). To determine the most appropriate USMC physical training program design the author recommends a future comprehensive study.

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

ANALYSIS OF U.S. MARINE CORPS ANNUAL FITNESS TESTS AND THEIR EFFECTS ON PHYSICAL TRAINING PROGRAM DESIGN, by Major Thomas M. Dunaway Jr., 89 pages.

This exploratory research examines the U.S. Marine Corps (USMC) Physical Fitness and Combat Fitness tests to ascertain their effect on physical training program design. Physical training program design may be suboptimal because it places emphasis on fitness test preparation rather than preparing Marines for the rigors of combat and tasks found in the operational environment. In twenty-one years of service in the USMC the researcher has observed fitness programming is often designed to support the Physical Fitness Test (PFT) and Combat Fitness Test (CFT) rather than prepare an individual Marine for the demands of an operational environment. To find the best options, the author reviewed military fitness history, USMC fitness doctrine, and relevant private sector fitness regimens and found current tests award select fitness domains. As a result, the training most Marines undertake is potentially lacking in General Physical Preparedness (GPP). To determine the most appropriate USMC physical training program design the author recommends a future comprehensive study.
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Finally, I am grateful to my children, Lydia, Levi, and Hud, and particularly my wife Sierra who supported me while I worked on “the paper” and always remained flexible. You are everything.

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ACRONYMS

BMI	Body Mass Index
CFT	Combat Fitness Test
CGSC	Command and General Staff College
CMC	Commandant Marine Corps
FFD	Force Fitness Division
FFI	Force Fitness Instructor
FM	Field Manual
HIFT	High Intensity Functional Training
HITT	High Intensity Tactical Training
MCMAP	Marine Corps Martial Arts Program
MCPFP	Marine Corps Physical Fitness
MCRD	Marine Corps Recruit Depot
PFT	Physical Fitness Test
USMC	United States Marine Corps

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CHAPTER 1

INTRODUCTION

> Nations have passed away and left no trace, and history gives the naked cause of it—one single, simple reason in all cases; they fell because their people were not fit.
>
> —Rudyard Kipling, *Land and Sea Tales*

The Commandant of the Marine Corps, General Robert B. Neller recently stated, "The ultimate goal of Marine Corps Physical Fitness is to optimize mental and physical performance and make all Marines more lethal, resilient, and more capable on the battlefield."[1] In twenty-one years of service in the United States Marine Corps (USMC) the researcher has observed fitness programming is often designed to support the USMC's two annual fitness evaluations, the Physical Fitness Test (PFT) and Combat Fitness Test (CFT) rather than prepare an individual Marine for the demands they may face in an operational environment. To find the best options, the author undertook an exploration of programs used by different armed services, law enforcement agencies, government agencies, training academies, and athletic teams to gain insight into the best options to meet the Commandant's vision.

This exploratory research included historical document analysis and a systematic review of alternative methodologies. Also, programming was evaluated to establish a link between annual testing, program design, and the subsequent effect on the lethality of Marines. The researcher considered whether USMC physical training program design is a by-product of the emphasis on the PFT and CFT or whether those tests are simply assessments, vital for understanding the current state of readiness for an individual Marine and subsequently the unit to which they belong. Because this research is

exploratory in nature, conclusions on effectiveness cannot be drawn. However, the researcher presents the findings of the research in Chapter 4 and recommendations for further research in Chapter 5. This introductory chapter provides an outline of the research beginning with background.

Background

If the ability to shoot, move, and communicate is the 3-legged stool that supports a United States Marine, the ability to train hard, eat appropriately, and sleep well are the hallmarks of someone maximizing physical performance. Seeking to improve or maximize human performance in an operational environment is not a challenge unique to the USMC and research suggests this challenge is found across the services within the Department of Defense (DoD). According to *Military Medicine*, "A new emphasis has been placed on the human as the most important weapon system in the Global War on Terrorism."[2] The USMC evaluates human performance capability within its ranks primarily through two tests conducted semi-annually, the PFT and CFT. (see Tables 1 & 2).

Observing a PFT does not conjure an image of a warrior. Marines are referred to as "professional warrior athletes" in the USMC's most recent physical fitness doctrine.[3] When applied to annual fitness tests, the name warrior athlete is potentially a misnomer, but a change in program design away from PFT and/or CFT preparation and more toward General Physical Preparedness (GPP) may correct the inaccuracy. GPP is a developed base of fitness from strong work-capacity across broad time and modal domains.[4]

Table 1. Marine Corps Physical Fitness Test		
Maximum Pull-ups	Maximum Crunches in 2 minutes	3-mile run

Source: Created by author using data from Commandant of the Marine Corps, Marine Corps Order 6100.13A, Subject: Marine Corps Physical Fitness and Combat Fitness Tests, Headquarters U.S. Marine Corps, Department of the Navy, Washington, DC, 2018.

Table 2. Marine Corps Combat Fitness Test		
880-yard Movement-to-Contact	Maximum Ammunition Can presses in 2 minutes	300-yard Maneuver-Under-Fire

Source: Created by author using data from Commandant of the Marine Corps, Marine Corps Order 6100.13A, Subject: Marine Corps Physical Fitness and Combat Fitness Tests, Headquarters U.S. Marine Corps, Department of the Navy, Washington, DC, 2018.

The annual fitness tests are two tools the USMC has along with the Remedial Conditioning Program (RCP) that provide a mutually supporting trinity for the Marine Corps Physical Fitness Program (MCPFP).[5] While the initiative to develop the MCPFP is noteworthy, the judgement for such programs resides in their ability to affect the combat readiness of warrior athletes. If a program is not contributing to the lethality of each individual Marine, it may not be best for the USMC. However, a fitness program provides for more than just lethality. In White Letter 2-16 to leadership across the Marine Corps, General Neller stated:

> The ultimate goal of Marine Corps Physical Fitness is to optimize mental and physical performance and make all Marines more lethal, resilient, and more capable on the battlefield. The program should also build resilience and prevent injuries to keep every Marine in the fight. With the growth in physical fitness training methods and a wealth of scientific research focused on health and fitness, it is time to update our approach to physical fitness training across the Corps.[6]

As part of an overall resiliency program, physical fitness should be a part of a command's fiber. Service member quality-of-life and options for continued service and thus, better morale, are developed because of a logically prescribed and designed fitness program. In addition, a better force in garrison, in the field, and particularly forward deployed is made ready for commanders to properly employ. Training specifically to increase PFT and/or CFT scores may not be a resiliency aid. In an April 2018 address to attendees of the DoD Readiness and Resiliency Workshop Army Command Sergeant Major and Senior Enlisted Advisor to the Chairman of the Joint Chiefs of Staff, John W. Troxell said, "some physical fitness training seems designed to prepare people to just pass the test."[7] The acknowledgment that some units or individuals may train to the test signals the need for a thorough review of military physical training.

A New Direction

The Commandant of the Marine Corps (CMC) has called for a professional, service-wide approach[8] to address improving the USMC's physical training program. He accordingly created the Force Fitness Division (FFD) under Training and Education Command (TECOM) to:

> be the service-level organization for development and implementation of policy, standards, guidance, and reporting of all matters related to general physical fitness, occupational fitness, performance nutrition, body composition, martial arts, water survival, and sports medicine/injury prevention based on requirements and direction from higher headquarters.[9]

The mission of the FFD is carried out by a small team of analysts, researchers, and administrative staff along with the Force Fitness Resource Center (FFRC).

The FFRC is where the Force Fitness Instructor (FFI) program is executed. Per a Marine Corps Administrative Message, "The FFI will serve as the commander's subject

matter expert on physical fitness and advise the commander on the design and implementation of a physical fitness training program,"[10] at each echelon of command down to the company level. Similarly, the U.S. Army already has Master Fitness Trainers, a Physical Fitness School, Physical Readiness Division, Human Performance Integrative Office, and Soldier Systems Center, among other offices devoted to fitness evaluation and best practices, as well. The U.S. Army's research and programs have determined the need for a new U.S. Army Combat Readiness Test (ACRT) and Occupational Physical Assessment Test (OPAT) for current soldiers and future enlistees respectively to replace the current U.S. Army Physical Fitness Test (APFT). With the research and assessments ongoing by the FFD and the practical application executed by the FFRC, perhaps the USMC may improve readiness by altering its own fitness tests.

Improved readiness increases the USMC's ability to accomplish missions in any clime or place. As former President Ronald Reagan said, "Our Armed Forces must be mentally and physically prepared at all times, leaving no doubt about this nation's will and ability to defend itself. For this reason, it is necessary to reaffirm the importance of physical fitness."[11] Periodically the *Marine Corps Times* has an article or sometimes an entire issue devoted to physical fitness. The subject is likewise well covered in the professional journal of the Marine Corps, *The Marine Gazette.* However, the way the USMC currently defines fitness may not equate to combat readiness.

Current Program Effectiveness

Despite the current attention given to the subject and myriad professionals and resources devoted to improving Marine physical fitness, a fraction of Marines are training functionally in pursuit of combat effectiveness, and perhaps an even smaller portion are

doing it well. Functional training is abandoned in pursuit of more PFT and CFT proficiency and the career-enhancing scores that come with doing well on those tests. Combat effectiveness is associated with operational readiness in accordance with functions performed in combat. Through functional fitness those functions can be woven into training through proper program design where movements may mimic job tasks or at least balance a full spectrum of fitness domains such as: endurance, stamina, strength, speed, power, and coordination.

The difference between combat readiness and general fitness requires further examination as stated by D.M. Day:

> Your physical fitness levels must be at a point where it is no longer a consideration. You are not fit in order to survive; you are not fit to excel at any physical task; you are fit because it allows you to bring to the battle that critical component of being a Commander and a Leader. You are fit because you must retain the greatest ability to lead, command, to inspire, to think, to plan, and to accomplish your mission. Everything else is for show, and therefore meaningless.[12]

Current program design is either non-existent across all echelons of USMC commands or tailored to improve PFT and CFT scores. The Initial Strength Test (IST), which substitutes the PFT's 3-mile run with a 1.5 mile run, is administered at an access point for future service and evaluates individuals for potential service in the USMC. Once in-service, Marines are administered the PFT and CFT, to screen and assess for future assignments and continued service. The PFT and CFT may be more applicable only if they are parts of a larger, more comprehensive physical training program design and not bound to the task of screening. Their current role place the tests on a career-enhancing pedestal that potentially leads to overtraining, unimaginative unit physical training program design, and a host of other misguided practices.

Misaligned Training Goals

So-called mirror or beach muscles, those anterior muscles that get the most attention from the preponderance of gym-goers, should only supplement posterior chain muscles and those lending themselves more to actual physical function. The workouts that became so popular during the height of the jogging and bodybuilding age in the 1970s, 1980s, and 1990s are comfortable to many. Not just comfortable in the amount of energy expended, but comfort from their routine nature. Routine is the enemy of adaptation. Human nature makes people hesitant to give up what is comfortable. The natural inclination is to continue doing what is familiar and relatively easy to pursue.

Programming may be either developed solely to increase PFT and CFT scores or not designed at all. Consider, how often is a Marine called on to run the current PFT distance of 3 miles? Furthermore, when and where would a Marine execute that task in harm's way wearing shorts and running shoes? Packs, vests and other gear are generally issued to Marines in the operating forces and throughout the supporting establishment and all Marines have boots, so perhaps a sustained force march for time, under a load, may be more applicable. The USMC endeavors to train the same way it intends to fight, but the fitness tests and the combination of training programs and unit physical fitness schedules they are built around may not support that pretense.

The problem of misaligned goals (PFT/CFT preparation or combat readiness) begins before a prospective Marine ever arrives at one of the USMC's entry-level training centers, Marine Corps Recruit Depot (MCRD) Parris Island and MCRD San Diego for potential enlisted Marines or Quantico's Officer Candidates School (OCS) for officer candidates. Enlisted prospects are given an IST consisting of the same elements

that comprise the PFT, but with the run portion cut in half from 3 down to 1.5 miles. The first step toward qualification for military service and subsequent retention in service is predicated on physical abilities. Unfortunately, too many prospects for military service are rejected or found physically unqualified before they are ever afforded the opportunity to serve. The result is overburdened Recruiters and Officer Selection Officers who invests significant time into finding and screening future Marines. More to the point, the applicant is given their first glimpse of the USMC's emphasis on the PFT and CFT and how both tests can shape careers.

Physical Training Consequences

Good order and discipline along with military appearance are strengthened by a well-rounded and appropriately prescribed training methodology. Without a doubt there are outliers. Some people with a very high Body Mass Index (BMI), which calculates weight against height, can move well whereas some people with a "good" BMI are exceptionally deconditioned. Aesthetic appeal and proper military appearance have their place, like the two annual USMC fitness tests, but those factors should only marginally play a role in physical training program design. The profession-of-arms should not be primarily concerned with vanity or fitness testing; rather the objective is the level of combat readiness for the individual servicemember and, by extension, the unit to which they belong. In addition to combat effectiveness, it is a serious matter because "In garrison, decreased physical and mental resilience can lead to increased rates of light or limited duty, nondeployable status, sexual assault and suicide."[13]

Once in uniform and graduated beyond entry-level training many service members become deconditioned or suffer injuries. Additionally, the current reactive

physical therapy measures in place adversely affect a service members ability to remain mission ready and are often cost prohibitive while neglecting to treat the root cause of the condition, which is often poorly programmed or performed physical training. The result is uniformed personnel with promising careers curtailed. More specifically, commanders are often left with less personnel available for mission accomplishment. Physical training that is properly designed and executed may mitigate these deleterious effects.

Purpose

The overarching purpose of this study was to investigate whether the MCPFP is designed to achieve optimal combat preparedness from Marines.

Problem Statement

Physical training program design in the USMC may be suboptimal because it places a disproportionate emphasis on annual fitness test preparation rather than preparing Marines for the rigors of combat and tasks found in the operational environment.

Research Questions

This paper sought to explore the primary question: Is the MCPFP designed to achieve optimal general physical preparedness for Marines? Secondary questions considered include:

1. Do the USMC's annual fitness tests (PFT and CFT) adversely affect overall USMC physical training program design?
2. Can a shift in physical training program design have a positive impact on readiness in the USMC?

To explore these questions, the researcher examined the history of military physical fitness, the background behind the current USMC PFT and CFT and alternative physical training program design options. Through a combination of historical document analysis and meta-analysis of primarily the MCPFP, High Intensity Tactical Training (HITT), and CrossFit, programming was evaluated to establish a link between annual testing, program design, and the subsequent effect on the lethality of Marines.

Study Design

The research design for this study was exploratory from the outset in consideration of the research questions posed above. A common goal of all exploratory research is to develop topics for future research. The methodology for this project was a structured analysis of relevant research and literature that the author describes in a Conceptual Framework (Chapter 3).

Assumptions

The following assumptions applied to completing the analysis of this research:

1. Research on U.S. Army physical readiness is generalizable to the USMC.
2. The USMC FFD recognizes the need for a holistic approach to physical readiness. Devoting funding and manpower to studying and improving physical readiness requires a paradigm shift in thinking among senior Marines in particular.
3. A breakdown of program design and testing across Military Occupational Specialties was not warranted here, keeping in mind the USMC ethos of "Every Marine a Rifleman."

Limitations

This study was exploratory in nature; as such it has some inherent limitations (such as causality) that may be addressed in future research.[14] The following limitations apply to this research:

1. Relevant historical research on the total Marine Force is limited.
2. The time available in the Command and General Staff College curriculum was insufficient for definitive research on this topic.
3. The results of this study might be limited by the researcher's bias, as an instructor and advocate for functional fitness.
4. The Command and General Staff College human research subject protections policies restrict methodology options when combined with the time limitation discussed above.

Importance

"The success of the Marine Corps hinges on the quality of our Marines. This is the foundation from which we make Marines, win our Nation's battles, and return quality citizens to American society."[15] To optimize the resiliency of Marines, research is necessary to discover what optimizes a Marine's physical capability. The budding field of study related specifically to military physical training and related performance could benefit from additional analysis. The results could show a way of more effectively and efficiently training Marines.

Summary

Fitter, more physically resilient Marines may increase retention, decreases costs, and improves mission capability for units across the force. The purpose of this exploratory research is to understand the role of physical fitness testing, training, and education in the USMC, specifically regarding program design. History has shown poorly designed tests do not increase soldierly proficiency; however, emphasizing realistic training as part of a holistic physical fitness program may aid a warrior athlete's preparation for battle.

This exploratory research originated from a Marine practitioner of functional fitness with a curiosity about the applicability of that type of physical training program design in a military environment. The researcher, as a career Marine and long-time fitness coach and trainer rhetorically asked: is the MCPFP designed to achieve optimal general physical preparedness from Marines? The subsequent examination transitioned into a formal research project where the researcher aimed to analyze USMC physical fitness.

Chapter 1 provided familiarization with the research topic for this study. The background of the topic was discussed, and the perceived problem was introduced. In addition, questions were raised that framed the research. Limitations were listed, and assumptions were explained along with the method. In the last section, the importance of the project was considered. In Chapter 2 the body of literature reviewed to develop the findings of the study is discussed.

[1] Commandant of the Marine Corps (CMC), White Letter 2-16, Headquarters U.S. Marine Corps, Department of the Navy, Washington, DC, 2016, 1.

[2] Patricia A. Deuster, Francis G. O'Connor, Kurt A. Henry, Valerie E. Martindale, Laura Talbot, Wayne Jonas, and Karl Friedl, "Human Performance Optimization: An Evolving Charge to the Department of Defense," *Military Medicine* 172, no. 11 (2007): 1133.

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[4] Greg Glassman, "What is Fitness?" *CrossFit Journal* 1, no. 3 (2002): 3.

[5] Commandant of the Marine Corps (CMC), Marine Corps Order (MCO) 6100.13 W/CH 2, Subject: Marine Corps Physical Fitness Program, Headquarters U.S. Marine Corps, Department of the Navy, Washington, DC, 2015, 1-1.

[6] CMC, White Letter 2-16, 1.

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[8] CMC, White Letter 2-16.

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[10] Robert S. Walsh, Marine Corps Administrative Bulletin 621-16, Subject: Marine Corps Physical Fitness Program and the Role of the Force Fitness Instructor, U.S. Marine Corps, Washington, DC, 2016.

[11] Matthew J. Brown, "Fitness and its Effects on the Military" (Strategy Research Project, U.S. Army War College, Carlisle Barracks, PA, 2005).

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[13] Deydre S. Teyhen, *Professional Soldier Athlete: The Cornerstone of Strategic Landpower's Human Dimension (104).* (Arlington, VA: Institute of Land Warfare, Association of the U.S. Army, 2014), 9.

[14] Robert R. Kiser, "An Exploratory Study of the Efficacy of the U.S. Army Civilian Education System Basic Course" (EdD diss., Kansas State University, Manhattan, KS, 2016).

[15] Commandant of the Marine Corps (CMC), "The Commandant's Posture of the United States Marine Corps President's Budget 2017," Headquarters, Marine Corps, March 2017, accessed April 17, 2018, https://www.hqmc.marines.mil/Portals/142/Docs/CMC%20PB17%20Posture%20Written%20Testimony%20Final.pdf.

CHAPTER 2

LITERATURE REVIEW

> The only thing harder than getting a new idea into a military mind is to get an old one out.
>
> —B. H. Liddell Hart, *Thoughts on War*

Chapter 1 discussed the background behind the current USMC annual fitness tests and their importance as means to structure physical training program design to increase test scores across the total force. This is one way to improve wellness, and ultimately fitness in the USMC, but there are other ways to achieve the desired end state of a more lethal force. History has shown physical fitness directly affects military readiness and this chapter provides a systematic review and analysis of physical fitness education. Chapter1 introduced the USMC's annual fitness tests, the PFT and CFT, to establish a link between how they are currently emphasized with the evaluation of their usefulness toward the desired end state of combat effectiveness. Chapter 1 also discussed the close relationship of physical training in the U.S. Army and USMC. The overarching question explored in this research is determining if a different approach to physical training program design can have a positive impact on readiness in the USMC. The following literature review identifies six types of sources used to explore this topic, primarily historical analysis of military and civilian physical training. The literature review also provides a foundation for the thesis. The items and topics reviewed include: historical analysis, historical military doctrine and testing, current military doctrine and publications, professional journals, exercise physiology, and physical training programs. Among the works

examined, the work of three authors: Dr. Whitfield B. East, Dan John, and Greg Glassman, stand out as most relevant.

Historical Analysis

The most thorough analysis of U.S. military physical training can be found in Dr. Whitfield B. East's seminal work "A Historical Review and Analysis of Army Physical Readiness Training and Assessment" which details the evolution of U.S. military physical readiness, particularly the continual changes to U.S. Army doctrine and testing through the years and the rationale for each adjustment. For a general understanding of the educational aspect of physiology, the foundational source for much of American physical education, *A World History of Physical Education: Cultural, Philosophical, Comparative* by Deobold Van Dalen and Bruce Lanyon Bennett was reviewed. Specifically, for understanding U.S. Army physical training, Dr. Joseph E. Raycroft's 1920 work published by the United States Infantry Association, *Mass Physical Training: For Use in the U.S. Army and the Reserve Officers' Training Corps* established a foundation for future physical readiness programs. Physical fitness of the USMC's forebears was reviewed in John Watney's 1987 *The Royal Marines Commandos Fitness & Survival Skills*. The LaSierra physical education program is also part of this historical analysis as well as an introduction to CrossFit, Inc.

CrossFit is defined as, "Constantly varied, high-intensity functional movement."[1] CrossFit's "World Class Fitness in 100 Words" ends with, "Regularly learn and play new sports." Dr. Raycroft reinforces CrossFit's admonition that new sports and activities should be tried. A substantial portion of his work was devoted studying and prescribing games (or sports) for conditioning and recreation also reinforced strategy and tactics. He

writes, “Experience has shown that no activity, except actual participation in battle, does so much as well-organized and conducted athletic competitions to build up *esprit de corps* and to instill into an organization a feeling of unity and loyalty.”[2] The shared hardships of close order drill for hours on an MCRD parade deck or formation runs through the Quantico woods may do more for esprit de corps than Dr Raycroft’s proposed competitions, but those experiences cannot be continually replicated in the operating forces due to time, necessity, and overtraining. Royal Marine Commandos know, “the reality is that everything a Marine does has a military context, most of it can be described equally in civilian language as advanced outdoor activities and adventure sports.” and physical fitness program design “should aim to be enjoyable so that it becomes a part of your lifestyle.”[3]

Beginning with the physical culture of the then Greeks, then with the prevalence of gymnastics and in European militaries and finally moving into modern western armies, physical fitness has been a constant force-multiplier within the profession-of-arms. In the early nineteenth century Prussian nationalist and educator Friedrich Jahn, pioneered a gymnastics movement throughout Germany then later in the same century French Navy officer Georges Hébert created the “natural method” which consisted of trail-running, climbing, and obstacle negotiation.[4] Their influence was found in the United States, through the nineteenth century and into the mid-twentieth century, where calisthenics were the foundation of military physical fitness along with a variety of foot march type activities. Dr. Raycroft then introduced readers to the Obstacle Course Run (OCR), the first obstacle course to be used as a part of fitness evaluation. Afterwards, a variety of OCRs became military mainstays. From there, popular mainstream fitness programs led

by the jogging and bodybuilding booms of the 1970s and 1980s created a bandwagon effect that led them into the armed services. However, gymnastics and calisthenics type movements more akin to military physical training remained in grade schools and resurfaced through myriad training programs in the 2000s, led by CrossFit.

A sterling example of physical education curriculum is the LaSierra High School program in Carmichael, California. While LaSierra has closed its doors, the physical training program developed there is still studied and practiced today by myriad schools and athletic teams all the way to health education centers like the one at the Medical University of South Carolina. Within the services, the move away from programs like LaSierra after the Vietnam-era toward inclusive civilian fitness trends reflected the rising popularity of running and isolated, single-joint movements. These approaches to training in the 1970s and 1980s with their appeal to aesthetics and low technical expertise barrier-to-entry were easy to mimic and did not require secondary instruction. As a result, long, slow running and body part specific training became popular. As 5 Kilometer races, marathons, figure competitions and "aerobics" came in vogue the fitness industry was increasingly commercialized and mass marketed. However, a shift over approximately the last fifteen years has produced a trend toward more functional fitness. Still, the question remains, are military training programs organic based off the changing needs of fighting men and women or are they merely a reflection of popular fitness trends? The results of this research can be used to increase the tempo of the paradigm shift underway in the military away from long, slow cardiovascular training to more functional combat readiness training.

While the needs of warrior athletes are unique to their mission, the competition for resources, in this case people to fill the USMC's ranks, is a challenge the requires bridging the civil-military divide. That challenge raises the question of how are recruiting and retention affected by current MCPFP standards? The U.S. Constitution mandated Congress raise and support armies and provide and maintain a Navy. The Army traditionally expands and contracts so the connection with the state of fitness to the general public is more important. As part of the standing naval force, the smaller USMC is a more stable branch of the armed forces regarding the maintenance of personnel end-strength for each year and forecasting needs for future human resources, but all branches of service find corrective measures necessary for prospects before and during service. In fact, "During the periods of rapid force mobilization military and civilian leaders bemoan the poor health and fitness of the civilian population and the extraordinary task of conditioning conscripts and volunteers for combat."[5] CMC, General Neller says, "Recruiting and retaining quality men and women of character in today's Corps is our friendly center of gravity and our highest priority."[6] The resulting challenge intensifies the need for future and current Marines to, "maintain a healthy lifestyle in the soft options' society in which we live."[7]

The societal problem making the tasks of USMC Recruiters and Drill Instructors more difficult is exacerbated by the waning over time of programs like the one at LaSierra. The connection between national and military readiness was observed in 1884 by United States Bureau of Education Commissioner, Dr. Edward Hartwell, M.D. "Hartwell was convinced that military superiority was predicated on the physical fitness of the individual soldier and that soldier fitness began at an early age through public

school physical education and training."[8] According to Historical Kinesiologist Ron Jones common threads with LaSierra's system are found in Jahn's design too such as: student leaders, ability grouping, quality of instruction to prevent injury, and motivation factors like uniform dress, cooperation and unity during exercises, badges (patches for LaSierra).[9] Even today, the German Armed Forces Proficiency Badge is awarded on a gold, silver, bronze scale by ability, creating incentive through wear of the badge itself versus incentive through making the test central to retention and advancement like the USMC does with the PFT and CFT. Motivation associated with segmenting physical training programming by current capacity and desired end state was supported in the 1975 University of Oregon dissertation Richard Chester Tucker, Ph.D. dissertation, "Self-Concept and Physical Achievment: Comparisons Between High School Boys in an Ability-Grouped Versus Traditional Physical Education Program" where Dr. Tucker studied LaSiera and other similar programs and confirmed placing trainees in easily identifiable ability groups was not only a more utilitarian way to train the entire group, but the color-coded shorts denoting each ability group stoked competitive spirits and enticed athletes to strive for a higher level of fitness. A similar approach exists in the world of martial arts and can be found in the existing Marine Corps Martial Arts Program (MCMAP).

Historical Military Doctrine and Testing

Three important milestones occurred across the middle of the twentieth century in 1936, 1941, and 1958 that helped shape military physical training. In 1936, the Army *Basic Field Manual* (BFM) was released guiding various tactical and operational field training requirements, to include physical training, in the years preceding World War II.

Of note in the BFM, "For the first time in a U.S. Army Manual the exercise running was accorded significant consideration." Later, "The BFM would ultimately be given the numerical designator 21-20, which would guide U.S. Army physical training for the next 70+ years."[10] With the, "publication of FM 21-20 in 1941, as the U.S. Army turned its attention from basic health-related fitness to functional fitness and combat readiness"[11] in preparation for the looming war. In the following years prior to the 1969 FM 21-20 revision, the U.S. Army learned costly lessons that still ring true today:

> Over a period of years and the course of several wars, the costly lessons learned from our past military experiences led to an increasing interest in the physical condition of the fighting man. With this interest has come the ever-increasing realization that our troops must be well conditioned to operate effectively. No longer can we afford emphasis on physical fitness during wartime and de-emphasis during peacetime. It is evident that, in spite of increased mechanization and modern weapons, physical readiness retains a vital place in the life of each individual solider and in every unit within the Army.[12]

FM 21-20 was revised by the USMC and exists today as Marine Corps Reference Publication 8-10B.4 (MCRP 8-10B.4), "Marine Physical Readiness Training for Combat."

In between the BFM and FM 21-20 and at the height of the Cold War in 1958, the U.S. Army Infantry School Ranger Department at Fort Benning, Georgia hosted a physical fitness seminar consisting of military and civilian leaders in physical education who were divided into separate committees to answer these four questions posed by Brigadier General Stanley Larsen: "(1) how does civilian fitness affect us?, (2) what should we be fit for?, (3) how do we attain fitness?, and (4) how do we measure fitness?"[13]

Among the committee's responses were:

1. Physical fitness is essential to total military fitness and should receive equal emphasis with the development of technical skills.

2. Benefits of physical fitness support emotional and mental fitness, physical aptitude is essential to military leadership.

3. Personnel who are continuously engaged in physical training will be physical fit for their job assignment.

4. The physical fitness program is for all military regardless of duty assignment.

Their recommendations included:

1. Ensure Command emphasis on physical education at all levels.

2. Establish a program of instruction to train military physical fitness supervisors.

3. Establish a Division/Post level physical training course to train unit instructors.

4. Increased motivation methods to include awards programs for individuals and units.

The analysis of historical military physical training doctrine and fitness testing has been documented by military field grade officers in a variety of intermediate level professional military education papers and projects. Three were theses in support of the Master of Military Art and Science degree awarded at the U.S. Army Command and General Staff College (CGSC). Major James E. Batchelor's 2008 thesis *The Applicability of the Army Physical Fitness Test in the Contemporary Operating Environment* proved particularly insightful, as did Major Thomas C. Lowman's 1999 thesis *Does Current Army Physical Fitness Training Doctrine Adequately Prepare Soldiers for War?* and Major Frederick M. O'Donnell's 1990 thesis *Physical training programs in light infantry units: are they preparing soldiers for the rigors of combat?* The 1987 CGSC's School of

Advanced Military Studies monograph by Major Mark P. Hertling *Physical Training for the Modern Battlefield: Are We Tough Enough*? is a sharp critique of the U.S. Army's emphasis on the APFT at the expense of combat readiness.[14] Hertling states, "Emphasis must be shifted from the PT test before physical training can become unit specific,"[15] and presumably more combat effective. Specifically, regarding the fallacy of training to the annual tests at the expense of increased readiness Hertling stated, "If we, as an army, don't subject ourselves to more physical and emotional stress than two minutes worth of pushups and situps and a 20 minute jog around the post, our best technology and doctrine may be wasted."[16] Hertling's analysis concluded with three recommendations: (1) the Army must deemphasize the current three-event PT tst as a measure of physical readiness; (2) researchers must provide field commanders PRT programs that will prepare soldiers for contingency missions; and (3) the Master Fitness Trainers Course should be expanded from four to five weeks to increase the emphasis on physical "readiness" versus physical "fitness."[17]

An additional noteworthy CGSC source is the project by a trio of Majors (Jeffrey Paine, James Uptgraft, and Ryan Wylie) *Command and General Staff College CrossFit Study 2010*, which compared two groups of CGSC students physical training program design. One group continued with traditional U.S. Army physical training while the other group solely trained via the CrossFit methodology. Among the study's findings, the Majors deemed making functional fitness the "primary physical fitness training program in a military unit" and during the transition the principle, "most important is that the unit commander supports the ideas contained in the plan and is willing to commit time,

personnel, and funds to achieve the transition to a functional fitness program."[18] Again, the need for a top-down paradigm shift is noted.

Of ten USMC papers considered, two were particularly informational. The first from Captain Andrew J. Thompson *Physical Fitness in the United States Marine Corps: History, Current Practices and Implications for Mission Accomplishment and Human Performance* was produced at the Naval Postgraduate School in 2005 to fulfill requirements for a Master of Business Administration degree. Captain Thompson writes, "The success and morale of a unit's PT program is directly proportional to the creativity and resourcefulness of its leadership. Predictability, repetition and mindless drills do nothing for the morale and competitive spirit of the participants. This kind of training, common among USMC units, is primarily geared to prepare Marines for the PFT."[19] Major Misty J. Posey's *Duped by the Frailty Myth: USMC Gender Based Physical Fitness Standards* was in fulfillment of the Master of Military Science degree at the Marine Corps Command and Staff College in 2012. Major Posey revealed another flaw in the USMC's annual fitness tests – gender inequality that arises when women train with focus on supposed relaxed female PFT and/or CFT standards versus combat conditioning. The result is, "Due to a lack of strength conditioning, female Marines are far from their physical potential and risk being a detriment to their unit."[20] Likewise, male warrior athletes train to the expectation or standard.

Gender-neutral physical training standards linkage to combat bias remains a relevant topic. In a recent "Military Review" article *Mission Before Comfort: A Mission Focused Approach to Gender in the Army* by Captain Molly Kovite. Captain Kovite contends, "Gender separation may provide comfort, but it does no often promote

efficacy. While increased gender mixing may be met with cultural resistance, history has shown repeatedly that when it comes to making the force more effective, the force will adapt."[21] It remains to be seen if the force will be given the opportunity to adapt to a single-sex physical fitness test in the USMC.

Current U.S. Army and USMC Doctrine and Publications

Modern militaries are in the middle of an ongoing cultural shift in their approach to fitness, but it is fragmented and only embraced by certain populations within the ranks. Proof of the shift is found in the Fiscal Year 2018 Command Training Guidance of U.S. Army Forces Command's General Robert B. Abrams. In a memorandum to his subordinate units General Abrams's directed, "Leaders must also shift the physical training culture from APFT preparation to combat preparedness. Combat tasks require movements coordinating several muscle groups and multiple joints through all planes of movement – this is functional fitness."[22]

Often functional fitness in the military is manifest in the ability of an individual to carry their weapon, ammunition, personal protective gear, food and water, clothing, and bedding over considerable distances. A Marine who cannot put on a pack with a basic combat load and cover a predetermined, measurable distance is arguably not fit for duty. This does not only relate to the injured, but equally to the deconditioned service member who can literally no longer pull their weight. Cary Russell the director defense capabilities and management at the Government Accountability Office (GAO), led a recently released GAO assessment, on how the USMC is working to reduce the 117 pounds of gear Marines carry into combat. By comparison, Roman Legionnaires carried a full combat load, "which weighted 50-60 lbs."[23] Per a recent article in the "Marine Corps

Times" the CMC, "told reporters at the National Defense Industrial Association, 'Weight is everything' but 'we keep putting more stuff on them.' The human body can only carry about 60 percent of its body weight, Neller explained. 'That means bigger people can carry more weight.'" The CMC's comments support the need for bigger and stronger warrior athletes on the modern battlefield in lieu of lithe and fragile men and women analogous to distance runners. However, bigger and stronger is understood to not be at the expense of an individual's ability to sustain themselves in unpredictable surroundings. The recent operating environment still requires the ability to generate power and move a load for distance over time. A U.S. Army company commander said of his time in Afghanistan from July 2008 to July 2009, "that many military operations failed because individual soldiers couldn't carry their combat loads in the rugged terrain."[24]

According to MCRP 8-10B.4, "Few physical fitness activities are as directly related to readiness for combat as foot marches under load."[25] S.L.A. Marshall's states in his classic, "The Soldier's Load and the Mobility of a Nation" that, "Man is better than we know; his tired body will rebound quicker than we think."[26] His contention is supported by Wolf's Law that bone in a healthy person or animal will adapt to the loads under which it is placed.[27] Quoting a soldier at Omaha Beach during the World War II Normandy landings Marshall wrote, "We overestimated the physical strength of men in the conditions of combat. This almost cost us the beachhead." The men 'lacked the physical strength the situation required'."[28]

Professional Journals

A considerable list of professional journal articles was reviewed with several common threads emerging. As far back as 1944, C.L. Brownell realized individual

physical fitness and unit combat readiness were not mutually exclusive when he wrote "We Learned about Fitness from Them" in *The Journal of Health and Physical Education* stating, "Leaders realize that the military wizard, but physical moron should be relegated to the same classification as the Samson who is a military dud."[29] Fast-forward seventy years and an *Institute of Land Warfare* article by Colonel Deydre S. Teyhen "Professional Soldier Athlete: The Cornerstone of Strategic Landpower's Human Dimension" claims, "The current costs to readiness, recruitment, retention, and health require a comprehensive strategic plan to ensure the military is able to meet future security needs of our nation." Additionally, several RAND corporation publicatons, with the preponderance related to U.S. Air Force, study the link between fitness testing and readiness.

Specific to Marine Corps physical readiness, the professional journal of the USMC, the *Marine Gazette* is the repository for the most pertinent information. Interestingly, articles a half-century ago read as if they were USMC current events. A 1956 article, "Physical Fitness" by Lieutenant William P. J. Drakeley was the first article reviewed to bemoan the physical readiness or Marines.[30] Drakeley's article was followed by another piece with the same name by Corporal Ray Wolf from 1969 describing the requirements and subsequent program-of-instruction at the Marine Corps Physical Fitness School.[31] The following year, Major H.L. Causey submitted an opinion piece, "Exercise for Physical Fitness" advocating a total revamp of the physical fitness test, with unit commanders responsible for developing their own, in-house tests. Soon after in 1973, Gunnery Sergeant R.D. Machesney wrote, "Using a Physical Fitness Staff" where he argued the commander's return-on-investment from the Physical Training Academy was

low because the priority of returning graduates remained their Military Occupational Skill (MOS) and their newfound physical training knowledge stagnated as a result.

More current *Marine Gazette* articles of note include two authored or co-authored by current Force Fitness Division Deputy Director Brian J. McGuire. In "Mobility: A Forgotten Component of Marine Corps PT" from 2001, then Major McGuire wrote about the misstep of training solely toward PFT improvement, "While we would like to think otherwise, many Marines and units have an overemphasis on training for the PFT."[32] While advocating the often-overlooked injury prevention benefits of mobility, McGuire went on to say, "What the PFT doesn't measure is mobility, and since the PFT remains a highly weighted and graded event, Marines will continue to train for it at the expense of mobility."[33] Later as a Colonel in 2012, McGuire co-wrote, "Marines are Professional Athletes: Linking Functional Fitness and Sports Medicine" with Colonel Lance A. McDaniel. Their article calls for Marines to have the facilities and support personnel necessary to train like skilled competitors and notes the relationships along the sickness-wellness-fitness continuum, "Sickness and health exist at opposite ends of the spectrum, and we believe that optimal health and ideal fitness are very much conjoined in practical terms."

A final *Gazette* piece from 2017 by Lieutenant Colonel Aaron C. Lloyd and Major E. Pete Abelson "Incentivizing Functional Fitness" discusses more flaws with the PFT and ways to use other means toward motivating Marines to increase their personal physical fitness. Lloyd and Abelson acknowledge, "The Marine Corps writ largely recognizes that the PFT is an imperfect tool . . . a tool to incentivize high physical fitness performance by ting PFT scores to retention and promotion. This characteristic

incentivization is perhaps the most important aspect of the PFT."[34] Furthermore, "As a tool to incentivize behavior, the current PFT fails to adequately drive Marines to prepare for combat."[35] Again, the connection between the PFT and its effects on physical training program design are seen along with the disconnect between the PFT and combat readiness.

Colleges and universities around the country are studying the link between military fitness tests, program design, injury prevention, and combat readiness. Indiana State University has the Tactical Athlete Project, Pittsburgh University houses the Warrior Human Performance Research Center, and Auburn University runs the Warrior Research Center. And of course, the Uniformed Services University of Health Sciences (USUHS), along with the Naval Health Research Center, Marine Corps Operational Test and Evaluation Activity, and National Strength and Conditioning Association, to name just a few, conduct ongoing research regarding warrior athlete performance. A leader in the research of functional fitness for the military is the Department of Kinesiology at Kansas State University.

Katie M. Heinrich, Ph.D., and her colleagues and students at the Kansas State University Functional Intensity Training (F.I.T.) Lab are in year four of a longitudinal study on the effects of High-Intensity Functional Training (HIFT) versus traditional U.S. Army physical training. The HIFT program is led by a CrossFit Level 4 coach (CF-L4 is CrossFit's highest level). Dr. Heinrich has co-authored several articles in *Military Medicine* and *BMC Public Health* about HIFT for military personnel. In "Mission Essential Fitness: Comparison of Functional Circuit Training to Traditional Army Physical Training for Active Duty Military" Heinrich et al analyzed a comparative study

of Mission Essential Fitness (MEF), a "mission specific comprehensive strength and conditioning program"[36] against a traditional Army Physical Readiness Training (APRT) program and concluded, "This study provides evidence that the MEF training program results in greater fitness gains than the APRT program."[37]

In, "The Benefits of High-Intensity Functional Training Fitness Programs for Military Personnel" the authors discuss the impact of HIFT programs such as CrossFit on physical training program design and combat readiness. Heinrich, et al recognize, "Distance running, in particular, has been a core training and assessment method for the military. In contrast, HIFT programs are designed to produce GPP across multiple fitness domains and general physical skills, including tasks required for combat."[38] The authors noted, "HIFT programs are specifically designed to promote GPP and to ensure that military personnel are physically prepared to face 'unknown and unknowable events, a crucial capability in combat."[39] They concluded with, "We believe that fitness approaches consistent with HIFT principles should become the standard for military physical training" and "HIFT training which promotes GPP for all personnel . . . would be maximally disseminable in the military."[40]

Exercise Physiology

A 1965 Naval Medical Field Research Laboratory report, "A Critical Analysis of Three Physical Fitness Tests" conducted by Philip J. Rasch, Ph.D. and Captain Mark Brown, USMC compared the former IST with the defunct USMC Physical Readiness Test and Fleischman Tests. The principle lesson learned in the study was the ambiguity and unpredictability of physical stressors in combat is difficult, if not impossible to measure. Consider, "A test of physical condition is of value only if it has been

demonstrated that it correlates highly with physiological performance in the event which it is desired to test."[41] The lack of testing related to combat directly translates to a dearth in programming designed to make Marines combat ready. "There is no general agreement as to what kinds of fitness and what levels of fitness are needed by combat troops. Until a decision has been reached on this point, it will be impossible to develop meaningful test batteries."[42]

Returning to the subject of gender-neutral training, Major Misty Posey's Marine Corps Command and Staff thesis argues for "synaptic facilitation" [43] that leads to increased efficiency. Her primary example regards regularly performing pull-ups to get better at pull-ups. The fallacy lies in not advocating breadth of upper-body strength through a variety of movements, but rather doing pull-ups for the sake of improving pull-ups and therefor scoring higher on an arbitrary test. This is a prime example of training to the test.

At each MCRD future Marines spend time "snapping-in" on targets without firing any shots in preparation for qualifying with their service rifle at the known-distance rifle range course-of-fire. In addition, throughout recruit training various muscle memory is learned by recruits and reinforce by Drill Instructors regarding shooting positions. In the case of marksmanship training, synaptic facilitation is warranted, but it is not applicable to physical training program design if the desired result is combat readiness. According to Dan John, adaption over time is inappropriate for the physical training program design of warrior athletes because increased efficiency of any movement leads to less effort exerted and potentially less training value.

Synaptic facilitation is the exact opposite of the unknown and unknowable. In other words, the opposite of combat. Synaptic facilitation is useful for skill-based movements of fitness related to actual tasks that may be performed as part of a Marine's job, such as the various disarming techniques found in the MCMAP program. In this case muscle memory and economy of movement enhance the Marine's lethality. As it applies to pull-ups, synaptic facilitation makes a Marine better at pull-ups but does not necessarily contribute to a greater ability for them to negotiate an obstacle or manipulate their own bodyweight in space.

However, the Marine Corps proved that the ability to pull one's own bodyweight up and presumably over an obstacle is not the priority of the movement by eliminating the kipping pull-up from the PFT in 1996. The kipping pull-up incorporated strength and speed, and therefore power, along with coordination to complete a repetition. The "dead-hang" pull-up used in the current PFT only measures strength. While the much stricter "dead-hang" should be a foundational element to any upper-body development program, the kipping version is more applicable to the unknown and unknowable.

Physical Training Methodologies

In his timeless work, "Battle Leadership" German Captain Adolf von Schell said, "War is governed by the uncertain and the unknown."[44] Marines are athletes preparing for random and unpredictable challenges. Their preparation for combat is not unlike a collegiate or professional athlete's preparation for his or her sport, but there are key differences. First among them is, Marines do not know the exact game they will play. They can plan for, but never know their opponent, the climate of their operations, the duration of their fights, and so on. About starting CrossFit, founder Greg Glassman said,

"We sought to build a program that would best prepare trainees for any physical contingency—prepare them not only for the unknown but for the unknowable as well."[45]

Training for the unknown and unknowable, is the bedrock of the CrossFit philosophy. In his CrossFit Journal article "Foundations" Glassman writes, "CrossFit is not a specialized fitness program but a deliberate attempt to optimize physical competence in each of ten recognized fitness domains. They are Cardiovascular and Respiratory endurance, Stamina, Strength, Flexibility, Power, Speed, Coordination, Agility, Balance, and Accuracy."[46] Conversely, training to improve PFT scores consists of extended aerobic conditioning, generally in the form of running and according to Glassman in his seminal Journal article "What is Fitness?" the consequences are, "Athletes engaged in sports or training where a preponderance of the training load is spent in aerobic efforts witness decreases in muscle mass, strength, speed, and power."[47] Glassman and CrossFit scorn specialization at the expense of general physical preparedness. For example, concerning the long-held belief that extended duration training leads to greater fitness Glassman says:

> There is a near universal misconception that long distance athletes are fitter that their short distance counterparts. The triathlete, cyclist, and marathoner are often regarded as among the fittest athletes on earth. Nothing could be farther from the truth. The endurance athlete has trained long past any cardiovascular health benefit and has lost ground in strength, speed, and power, typically does nothing for coordination, agility, balance, and accuracy and possesses little more than average flexibility. This is hardly the stuff of elite athleticism.[48]

Another exercise scientist advocating functional fitness is Rob Shaul, founder of the Mountain Tactical Institute (MTI). As an expert in tactical athlete training and program design, Shaul takes Glassman's admonition that non-specialized athletes should not limit their training to a few specific domains further in his recent article, "Fitness is a

Tactical Weapon as Important To A Soldier as His Rifle. But He Doesn't Have to Build His Own Rifle." Shaul concurs that breadth is crucial for a warrior athlete but maintains athletes in the profession of arms would do well to make endurance a priority. "Each athlete type needs a combination of physical endurance and stamina for long, grinding events or movements which can culminate in an intense, dangerous, violent confrontation, firefight or fire suppression. Then, in that dangerous situation, he or she needs work capacity, working strength, chassis integrity, tactical agility, stamina - to survive, and prevail over the enemy."[49] Shaul teaches that armed forces personnel are professional athletes and the primary weapon of a man or woman in the profession-of-arms is their own body. MTI's philosophy states, "If you are unfit or injured, you are a liability to your unit, not an asset . . . Your paycheck not only depends upon your fitness, but so too does your combat performance and survivability."[50]

Much has been written and reviewed regarding the physical fitness testing and corresponding readiness of warrior athletes. A gap in literature exists in analyzing the effects of annual fitness testing on physical training program design in the USMC. It remains to be observed whether training specially to increase annual tests scores is inefficient use of physical training time at the least or detrimental to the lethality of Marines at worst. Whether the repercussions of PFT and CFT focused training results in harmful practices is a matter of debate, but strong evidence exists supporting the substitute of prolonged endurance-centric training for more well-rounded functional programs throughout the year. These programs are largely in place but even in environments where they are encouraged and utilized, they are temporarily abandoned

twice annually in favor of PFT and CFT training. This momentary hiatus halts progress across multiple fitness domains and reduces the physical capabilities of Marines.

Chapter 2 introduced historical military and civilian analysis of a variety of fitness programs along with current and former related military doctrine as well as an overview of exercise physiology and programming options

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[47] Glassman, "What is Fitness?" 4.

[48] Glassman, "Foundations," 2

[49] Rob Shaul, "Fitness is a Tactical Weapon as Important to a Soldier as His Rifle, but he Doesn't have to Build His Own Rifle," Mountain Tactical Institute, April 19, 2018, http://mtntactical.com/knowledge/fitness-is-a-tactical-weapon-as-important-to-a-soldier-as-his-rifle-but-he-doesnt-have-to-build-his-own-rifle/.

[50] Ibid.

CHAPTER 3

RESEARCH METHODOLOGY

> It is impossible for a man to learn what he thinks he already knows.
> —Epictetus, quoted in G. Bell, *The Discourses of Epictetus: With the Encheiridion and Fragments*

Introduction

The overarching purpose of this study was to investigate whether the MCPFP is designed to achieve optimal general physical preparedness from Marines? In Chapter 2 the current sources of information related to the research topic were introduced and discussed. Chapter 3 will explain how the information was explored to gain insight using the research questions as guides.

Research Questions

This paper sought to explore the primary question: Is the MCPFP designed to achieve optimal general physical preparedness for Marines? Secondary questions considered include:

1. Do the USMC's annual fitness tests (PFT and CFT) adversely affect overall USMC physical training program design?
2. Can a shift in physical training program design have a positive impact on readiness in the USMC?

Study Design

The study design was based on a conceptual framework built over the course of the research to document the analysis (see figure 1). Kiser cited Berman (2013) supported by

Knight, Halkett, and Cross (2010) in describing the conceptual framework as a description of the research journey, more than a plan of any sort.[1] Figure 1 accurately portrays the researcher's journey. Each question was considered independently as well as how it related to the other research questions through a phased-approach. The researcher examined: the recent history of functional fitness programs and history of general military fitness, current and past military fitness doctrine, and alternative fitness methodologies utilizing qualitative research from secondary sources organized within the conceptual framework into three phases of comparative analysis. The first phase examined military physical fitness through a strictly military lens using history as the guide. Phase two continued by examining more current military training programs and along with current doctrine. The third phase started with a significant list of programs available to warrior athletes from the private sector along with those the author has used during his own training and coaching career.

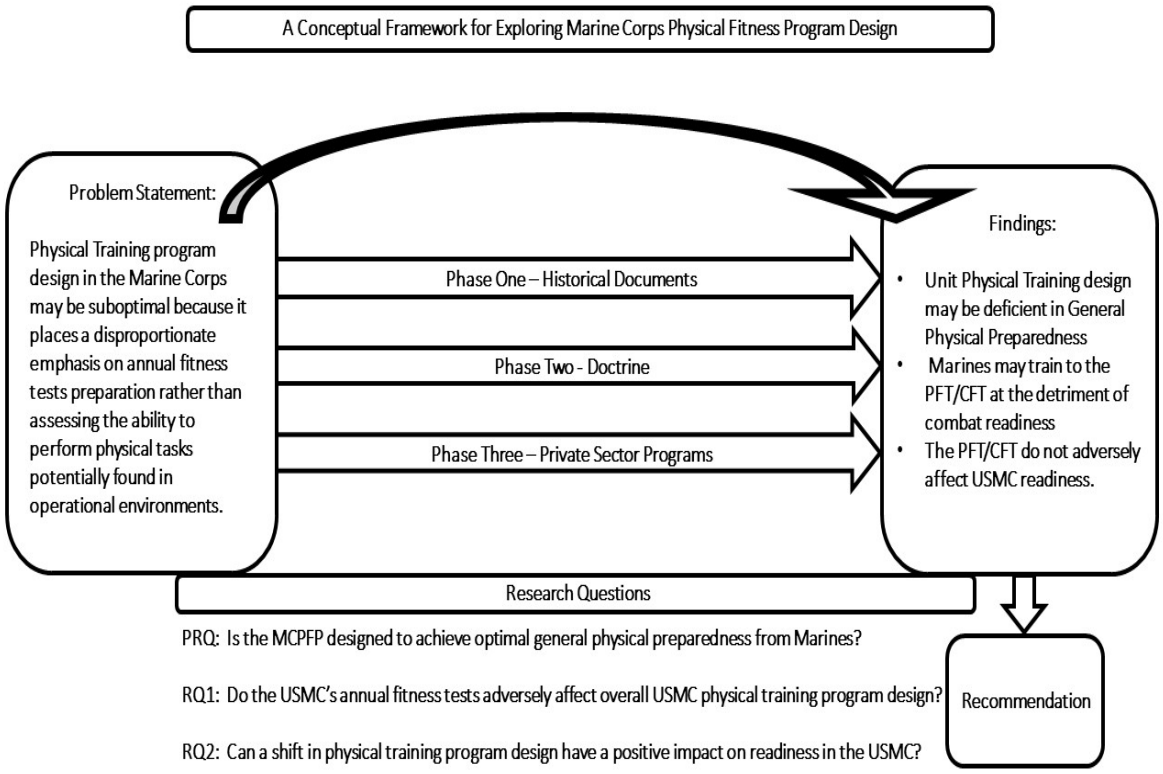

Figure 1. Conceptual Framework

Source: Created by author.

Primary Research Question

The Primary Research Question (PRQ) explored whether the MCPFP designed to achieve optimal general physical preparedness from Marines?

Phase 1

The *PRQ* was particularly well suited for exploration using historical documents. When considering the *PRQ* in this phase the researcher paid particular attention to past Marine Corps fitness tests (see Figure 2), Marine Corps Orders, U.S. Army Field

Manuals, U.S. Army Training Manuals, U.S. Army Regulations, and physical education programs. Multiple sources provided data points and insight including:

A Critical Analysis of Three Physical Fitness Tests (Rasch, 1965)

A Concept for Functional Fitness (USMC, 2006)

A Historical Review and Analysis of Army Physical Readiness Training and Assessment (East, 2013)

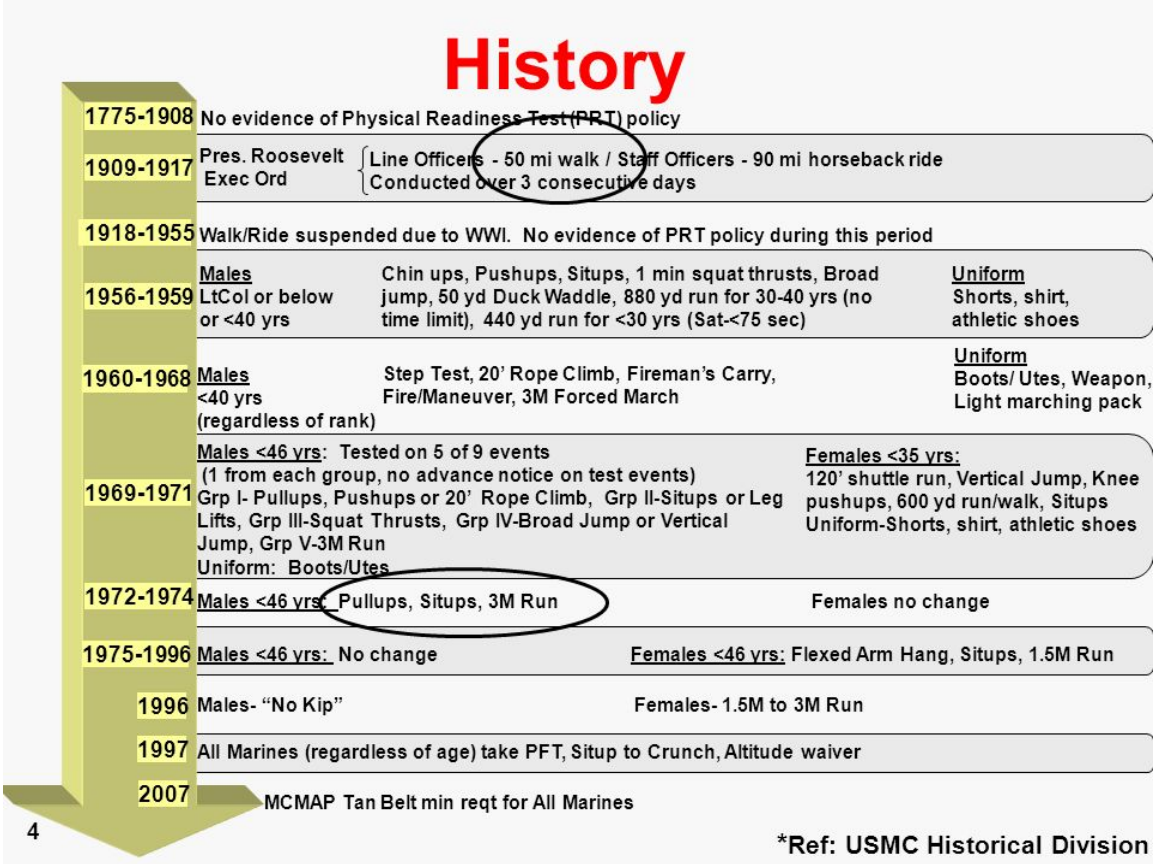

Figure 2. USMC Fitness Test History

Source: USMC Force Fitness Division and Force Fitness Readiness Center, "Marine Corps Physical Fitness Program Changes," U.S. Marine Corps, 2017, accessed September 12, 2017, https://www.fitness.marines.mil/.

Phase 2

As with Phase 1 (Historical), the *PRQ* lent itself to exploration using current military doctrine. When considering the *PRQ* in this phase the researcher paid particular attention to Marine Corps Orders.

Multiple sources provided data points and insight including:

Marine Corps Order 6100.13 CH2

Marine Corps Order 6100.13A

HITT Methodology (2018)

Phase 3

Because Phase 3 focuses on available private sector programs, the *PRQ* was well suited as a frame for examining current and emerging programs that may be adapted for use by the USMC. When considering the *PRQ* in this phase the researcher paid particular attention to civilian publications related to training methodologies that may suit a military audience.

Multiple sources provided data points and insight including:.

The Crossfit Journal

Mountain Tactical Institute articles and research

Secondary Research Question 1

Secondary Research Question 1 (RQ1) explored whether the USMC's annual fitness tests (PFT and CFT) adversely affect overall USMC physical training program design?

Phase 1

RQ1 was suitable for exploration using historical documents. When considering RQ1 in this phase the researcher paid attention to articles from military journal articles, with the *Marine Gazette* proving to be particularly insightful.

Phase 2

As with Phase 1 (Historical), *RQ1* lent itself to exploration using current military doctrine. When considering *RQ1* in this phase the researcher paid particular attention to theses from U.S. Military Intermediate Level Education programs.

Multiple sources provided data points and insight including:

U.S. Army CGSC Master of Military Arts and Sciences theses

USMC Command and Staff College Master of Military Studies theses

USMC Expeditionary Warfare School Contemporary Issues Papers

Phase 3

Because Phase 3 focuses on available private sector programs, *RQ1* was appropriate as a frame for examining current and emerging programs that may be adapted for use by the USMC. When considering RQ1 in this phase the researcher found *Can You Go?* By Dan John helpful.

Secondary Research Question 2

Secondary Research Question 2 (RQ2) explored whether a shift in physical training program design could have a positive impact on readiness in the USMC?

Phase 1

RQ2 was particularly well suited for exploration using historical documents. When considering *RQ2* in this phase the researcher paid attention again to past USMC and U.S. Army fitness directives along with CMC guidance.

Multiple sources provided data points and insight including:

FRAGO 01/2016 Advance to Contact

White Letter 02-16 Marine Corps Physical Fitness Program

A Historical Review and Analysis of Army Physical Readiness Training and Assessment (East, 2013)

Phase 2

As with Phase 1 (Historical), *RQ2* lent itself to exploration using current military doctrine. When considering *RQ2* in this phase the researcher paid particular attention to developing USMC doctrine with one source, Marine Corps Bulletin 6100 proving insightful.

Phase 3

Because Phase 3 focuses on available private sector programs, *RQ2* was well suited as a frame for examining current and emerging programs that may be adapted for use by the USMC. When considering *RQ2* in this phase the researcher paid particular attention to university research and private sector publications.

Multiple sources provided data points and insight including:

Articles form Dr. Katie M. Heinrich, Kansas State University

The CrossFit Journal

Summary

In Chapter 3, the research design and methodology were detailed. The conceptual framework for the exploratory study design used by the researcher was introduced and the primary and secondary research questions were reviewed through a phased approached. The study findings for each research question are found in Chapter 4.

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[1] Kiser, 23.

CHAPTER 4

FINDINGS

> Time spent in assessments will save time in treatment.
> —Dan John, *Can You Go? Assessments and Program Design for the Active Athlete and Everybody Else*

Introduction

The overall direction the USMC is going seems to be more geared toward functionality than before, but it remains to be seen if the annual fitness tests will remain the focal point of the MCPFP. Chapter 4 will be organized to present results from analyzing the research questions. The results are organized by phase followed by a summary of findings for each question.

Research Questions

This paper sought to explore the primary question: Is the MCPFP designed to achieve optimal general physical preparedness for Marines? Secondary questions considered include:

1. Do the USMC's annual fitness tests (PFT and CFT) adversely affect overall USMC physical training program design?
2. Can a shift in physical training program design have a positive impact on readiness in the USMC?

Primary Research Question

Is the MCPFP designed to achieve optimal general physical preparedness from Marines?

Findings

Phase 1

Analysis of the HITT program and historical military fitness testing suggests the current annual fitness tests are outdated.

Phase 2

There is no evidence that the USMC approach to Physical Training is optimized for Combat Readiness.

Evidence suggests the HITT program can aid Marines in achieving general physical preparedness.

Phase 3

A functional approach to fitness holds great promise for optimizing USMC Physical Training programming.

Functional training approaches currently found in the private sector may be appropriate for USMC physical training.

Discussion

With current tests that award only a portion of the established fitness domains, the training most units and individual Marines undertake is potentially lacking in GPP. GPP is a non-specialized approach to programming that finds and addresses weak links in an individual's current state of physical readiness. Training with GPP as the priority need not take substantial portions of a training schedule. Efficient anaerobic training can conceivably be used to replace inefficient aerobic exercise for some training cycles. Better training will require professionals who know their craft. Understanding the unique

nature of physical requirements of certain populations may necessitate modified training plans by unit type via Mission Essential Tasks Lists. GPP is the foundation, but warrior-athletes may require some degree of specialization. For example, long road marches under heavy loads are not necessarily a good prescription for the average athlete or fitness enthusiast, but they are essential for Marines.

GPP is not just essential to combat arms troops for practical reasons, but all Marines, due to the comradery and team-building derived from shared hardship that leads to esprit de corps. However, in regard to combat, Phillip J. Rasch, Ph. D. and Captain Mark Brown, USMC said in their report ""A Critical Analysis of Three Physical Fitness Tests" that "The primary problem i**s** to determine just what kind and how much fitness a combat Marine needs. The writers have heard one officer argue that he actually needs very little, because most of his time is spent crouching in a shell hole, from which he emerges only to run a few yards to another protected spot."[1] Although, the writers reference an officer from the Vietnam War era, the lesson still applies in today's operating environment; however, addressing what a warrior athlete needs to be physically ready for an operational environment is not an exact science measured in this study. The ultimate measure resides in the lethality of the individual Marine.

Secondary Research Question 1

Do the USMC's annual fitness tests (PFT and CFT) adversely affect overall USMC physical training program design?

Findings

Phase 1

There is no historical evidence that the USMC PFT and/or CFT adversely affect physical training program design or readiness.

Phase 2

Current doctrine does not indicate the PFT and/or CFT adversely affects USMC physical training program design.

Phase 3

No private sector research or fitness methodologies suggest there are adverse effects related to the USMC PFT and/or CFT.

Discussion

Despite an exhaustive review of the literature, there is nothing to suggests the PFT or CFT adversely affect physical training program design. The USMC recognizes the inexorable relationship between physical fitness and combat readiness/survivability.[2] Better performance on the battlefield, plus less light and limited duty, restoration of pride in previously injured Marines, and improved mental resilience are all part of the USMC's holistic approach to fitness. Twice a year, in preparation for the PFT and CFT, across the USMC individual Marines shift their training program to train toward those two tests to the detriment of their overall fitness. To do otherwise would be perilous for those who are deconditioned since there are career consequences attached to the tests, but for those who are maintaining their general physical preparedness, the biannual tests are likely nothing more than a mandated nuisance. For those in-between who are training consistently, but

without good program design, the temporary hiatus to focus on PFT/CFT preparation may do little to enhance their overall progress.

Secondary Research Question 2

Can a shift in physical training program design have a positive impact on readiness in the USMC?

Findings

Phase 1

Given the critical importance attributed to Physical Training by USMC Senior Leaders past and present, this subject has received remarkably little attention in the research literature.

Phase 2

There is no evidence in doctrine that indicates a paradigm shift would positively alter physical training program design.

Phase 3

Evidence suggests a shift in thought that would expose Marines to physical training programming more suitable for warrior athletes could have a positive impact on the USMC.

Discussion

The thought process behind the decision to utilize movements with high degrees of variability like ammunition can lifts and crunches along with inadvertently building an entire program around one single mode of exercise may require a change in approach.

One of this study's secondary research questions was, can a shift in physical training program design have a positive impact on readiness in the USMC? Presumably, there are men and women who could make great contributions to the USMC, but they were screened-out of a career enhancing course or passed over for promotion, not because they did not perform well as a Marine, but because they ran slow or ethically reported their PFT and CFT scores.

Athletes are not one size fits all and neither are Marines. Different positions on athletic teams often do not train together or the same way, but they are no less a team. For warrior athletes a baseline must be met, and adaptability is central to the ethos of every Marine a Rifleman, but there is a point where perhaps the program design feasibly works against the individual Marine versus with them to increase their lethality. This study was exploratory in nature and surveyed historical documents, but empirical evidence may substantiate the need for an institutional change. As S.L.A. Marshall wrote, "Completed data often may point to the existence of a pressing problem, but within a bureaucracy thousands of minds must be in tune to evolve the technical solution affording the bettering of a system. As Admiral A.T. Mahan said, this is the great evil."[3]

Summary

The researcher found no study that measured the effectiveness of the PFT and CFT against any other physical fitness methodology to confirm or deny if the USMC has historically utilized the most favorable approach to physical training or if the USMC is currently utilizing the best physical training program design. Chapters 4 disclosed the findings of the exploratory research. The primary and secondary research questions were

reviewed and underpinned by supporting evidence. Chapter 5 will lay-out conclusions drawn from the study and make recommendations for further research.

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[1] Rasch, 22.

[2] East, 42.

[3] Marshall, vi.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

I myself know nothing, except just a little, enough to extract an argument from another man who is wise and to receive it fairly.

—Plato, quoted in Scott Kramer, "Education and Digressions in Plato's Theaetetus"

Introduction

The preceding chapter revealed the findings from analysis of the primary and secondary research questions. In Chapter 5 the researcher draws conclusions from the analysis and offers recommendations in support of solutions to the problem statement: Physical training program design in the USMC may be suboptimal because it places a disproportionate emphasis on annual fitness test preparation rather than preparing Marines for the rigors of combat and tasks found in the operational environment. This final chapter begins with a review of research questions and closes with a reflection by the author.

Research Questions

This paper sought to explore the primary question: Is the MCPFP designed to achieve optimal general physical preparedness for Marines? Secondary questions considered include:

1. Do the USMC's annual fitness tests (PFT and CFT) adversely affect overall USMC physical training program design?
2. Can a shift in physical training program design have a positive impact on readiness in the USMC?

Conclusions

Without measuring, it is not possible to fully know the answers to the questions posed in this study. The Marine Corps Physical Fitness Program is not broken and therefore does not need to be fixed. Evidence shows Marines are excelling with the current assessments; however, there may be substantial room for improvement and/or a different approach to program design (see figure 3).

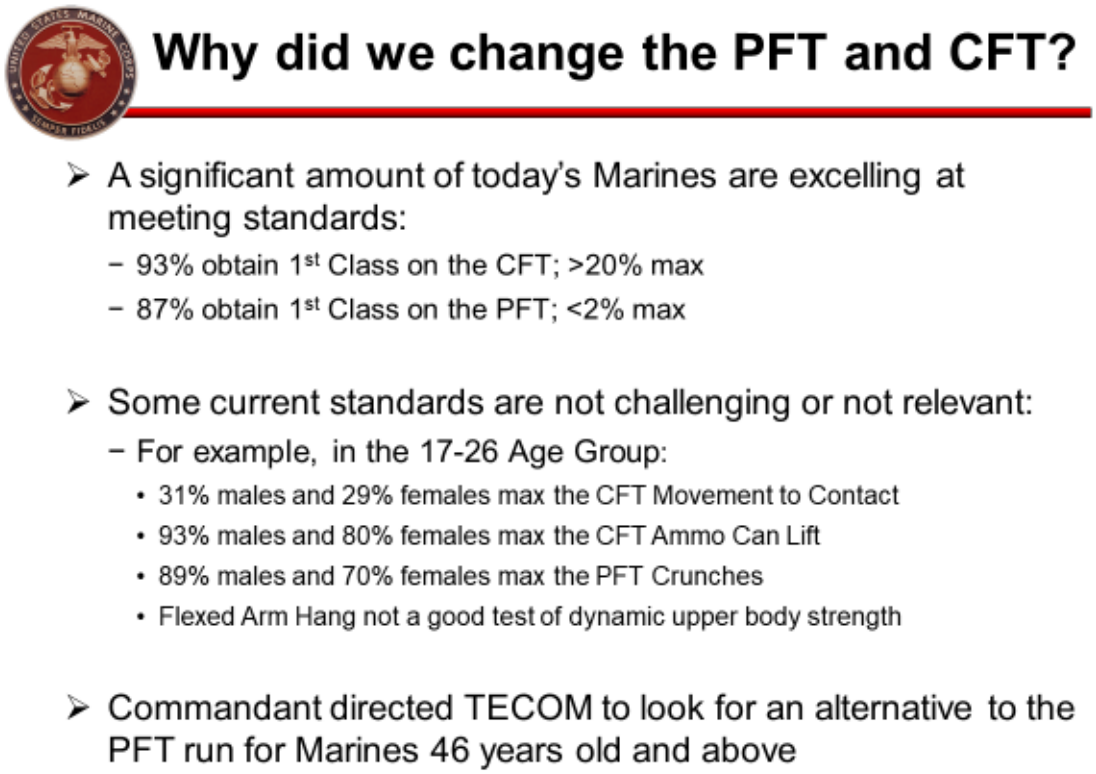

Figure 3. Why Did We Change the PFT and CFT?

Source: USMC Force Fitness Division and Force Fitness Readiness Center, "Marine Corps Physical Fitness Program Changes," U.S. Marine Corps, 2017, accessed September 12, 2017, https://www.fitness.marines.mil/.

A significant amount of review and updates to official Marine Corps fitness policy is continually underway. During this project, MCO 6100.13A *Marine Corps Physical Fitness and Combat Fitness Tests* was published by the CMC on 17 January 2018, effectively cancelling MCO 6100.13 W/CH 2 *Marine Corps Physical Fitness Program.* MCO 6100.13 W/CH 2 was previously published by the CMC on 30 January 2015. The relatively short turnaround between orders updates is good evidence that the USMC is leaning forward regarding fitness training and education and trying at the highest echelons to supply Marines with the best, most current physical training information available. Unfortunately, for all the effort, we cannot say that the Marine Corps Physical Fitness Program is optimized to prepare Marines for combat.

Primary Research Question

Is the MCPFP designed to achieve optimal general physical preparedness from Marines?

There is no credible evidence that the MCPFP has been designed to achieve optimal GPP because there is no definitive research comparing the MCPFP to the vast array of other programming options. An in-depth study comparing the HITT with other known program designs marketed to warrior athletes would better answer the primary research question. With current tests that award only a portion of the established fitness domains, the training most units and individual Marines undertake is potentially lacking in GPP.

GPP is a non-specialized approach to programming that finds and addresses weak links in an individual's current state of physical readiness. Training with GPP as the

priority need not take substantial portions of a training schedule. Efficient anaerobic training can conceivably be used replace inefficient aerobic exercise for some training cycles. Better training will require professionals who know their craft. Understanding the unique nature of physical requirements of certain populations may necessitate modified training plans by unit type via Mission Essential Tasks Lists. GPP is the foundation, but warrior-athletes may require some degree of specialization. Long road marches under heavy loads are not necessarily a good prescription for the average athlete or fitness enthusiast, but they are essential for Marines. Not just combat arms troops for practical reasons, but all Marines, due to the comradery and team-building derived from shared hardship that leads to esprit de corps.

Secondary Research Question 1

Do the USMC's annual fitness tests (PFT and CFT) adversely affect overall USMC physical training program design?

There is not enough information gathered in this study to answer this question. A conclusion could be drawn if USMC sanctioned testing for different control groups of either PFT/CFT centric training or a private sector training methodology was conducted over a designated period of time (e.g. six months) as part of a unit training plan. Once the training, to include a train-the-trainer component was complete the Marines could then be monitored for a longer period of time to study the lasting impacts of the different program designs on their USMC career.

Secondary Research Question 2

Can a shift in physical training program design have a positive impact on readiness in the USMC?

The exploratory research conducted in this study cannot make a hard conclusion that a paradigm shift in the approach taken toward physical training program design may have a positive impact on USMC readiness. If a paradigm shift is to occur, it must originate at the highest levels. Management expert John Kotter's research indicates, "75 percent of leaders must believe change is essential and 25 percent of the members of the organization must be willing to go beyond the normal call of duty to produce a significant change. Leaders must internally create this sense of urgency. If the sense of urgency is from an outside source, it is reactive in nature." Currently, the FFD operates a six weeks courses to certify FFIs and FFITs. In mid-19th century Prussia, "a select cadre of approximately 200 infantry officers attended a 5-month course"[1] for training in military gymnastics. During the same period each French regiment ordered one sergeant or corporal to gymnastics school for six months of training.[2]

In a U.S. Army War College Strategy Project Paper, Bradley C. Nindl, Ph.D. acknowledged, "The need for a strategic paradigm shift in the military's approach to physical readiness policies, training and doctrine is clear and has been increasingly acknowledged."[3] The USMC has a long, illustrious history with repeated examples of forward-thinking that kept the mission of the small, unique service applicable through periods of peace, a variety of conflicts, and a series of wars. Service culture necessitated and encouraged adaption and, "Marine innovations . . . literally changed the character of war."[4] The ongoing adaptations and innovations that are hallmarks of the USMC should be

encouraged as the FFD presumably works to make Marines better warfighters, as directed in the foundation of USMC doctrine, Marine Corps Doctrinal Publication-1 Warfighting that states, "As the situation changes continuously, we are forced to improvise again and again."[5]

Recommendations

As Dr. Nindl alluded, a paradigm shift requires letting go of what is comfortable, what a person may be good at, and possibly what they have trained toward or used as a personal barometer for years. In this regard, senior Marines have the biggest challenge with embracing physical training that does not focus on the PFT and CFT. Organizational leaders often underestimate how difficult it is to move members out of their comfort zones by developing a proactive sense of urgency to effectively lead change. Change in this case may be toward a more functional fitness related program. As stated in *A Concept for Functional Fitness*, endorsed by former CMC, General John F. Amos, "Combat demands a fitness that follows function, based on core strength and total body stamina. An unsophisticated exercise routine based almost entirely on mono-structural metabolic conditioning cannot provide the sort of training stimulus necessary to build General Physical Preparedness."[6] As the effort across the USMC to increase physical training significance continues with the increase in FFIs and FFITs, the result may not be more warrior athletes, rather Marines of all ranks could potentially remain fixated on improving their test-taking ability at the expense of GPP.

The primary recommendation of the researcher, after exhaustive review of the available research and literature and careful consideration of the findings is the Marine Corps embark on a comprehensive study of USMC Physical Fitness programming

utilizing rigorous experimental methodology in order to develop the best possible options for the MCPFP in preparing Marines for combat. Additional recommendations include:

Develop and implement a fitness test that rewards GPP across a range of fitness domains.

Make appropriate physical training a priority on the training schedule.

Reflection

For approximately forty years, military physical training program design mirrored the civilian bodybuilding and running hybrid. This hybrid is found in commercial gyms and Morale, Welfare, Recreation (MWR) facilities throughout the DoD and consists of isolated lifts performed in a way to achieve the goal of hypertrophy mixed-in with antagonistic slow cardio training, typically on alternating days. “This paradigm shift was reinforced by secular advances in fitness development during the 1970 and 1980s with the emergence of Dr. Kenneth Cooper’s aerobic movement and Arthur Jones’ Nautilus movement.”[7] The convergence of Cooper’s movement and the development of Nautilus machines produced what is found today on USMC installations when Marines conduct physical training on their own; they usually are running or standing in front of a mirror performing an exercise that is based more on vanity than vigor.

Is the civilian or military community the better authority on the needs of a warrior athlete? Part of the dilemma lies with the specialization some programs bring with a focus on just strength and endurance that naturally takes a warrior athlete away from the more suitable training their profession requires with an emphasis on general physical preparedness that comes from training a wide range of fitness domains. Although the previous trends in military fitness are currently being eroded by the infiltration of

functional fitness, a paradigm shift in thought from senior officer and enlisted leaders requires Marines to do as CrossFit founder Greg Glassman advised in 2002. In his landmark "CrossFit Journal" article *What is Fitness?* Glassman stated, "Strive to blur distinctions between "cardio" and strength training. Nature has no regard for this distinction or any other."[8]

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[1] East, 14.

[2] Ibid., 27.

[3] Bradley C. Nindl, "Strategies for Enhancing Military Physical Readiness in the 21st Century" (Strategy Research Project, U.S. Army War College, Carlisle Barracks, PA, 2012), 15.

[4] Victor H. Krulak, *First to Fight* (Annapolis, MD: United States Naval Institute Press, 1984).

[5] Headquarters, U.S. Marine Corps, Marine Corps Doctrinal Publication (MCDP) 1, *Warfighting* Washington, DC: Headquarters, U.S. Marine Corps, 1997), 20.

[6] Erik Doyle and L. McDaniel, "A Concept for Functional Fitness" (Marine Corps Combat Command, Washington, DC, 2006), 7.

[7] East, 150.

[8] Glassman, "What Is Fitness?" 8.

GLOSSARY

Body Mass Index. Measure of body fat based on height and weight that applies to men and women. [1]

Combat Fitness. Physical Training that simulates combat related demands.[2]

Combat Readiness. Synonymous with operational readiness, with respect to missions or functions performed in combat.[3]

Combat and Operational Stress Control. Programs developed, and actions taken by military leadership to prevent, identify, and manage adverse combat and operational stress reactions in units; optimize mission performance; conserve fighting strength; prevent or minimize adverse effects of combat and operational stress on members' physical, psychological, intellectual and social health; and to return the unit or Service member to duty expeditiously.[4]

CrossFit. Constantly varied, high-intensity functional movement.[5]

Exploratory Research. Investigation into a problem or situation which provides insights to the researcher. The research is meant to provide details where a small amount of information exists.[6]

Force Health Protection. Measures to promote, improve, or conserve the behavioral and physical well-being of Service members to enable a healthy and fit force, prevent injury and illness, and protect the force from health hazards. Also called FHP. See also force; protection.[7]

Functional Fitness. A correctly designed program where the repetitive performance of movement patterns improves an individual's performance of job specific tasks and will balance physical capacities such as strength, power, speed, agility and endurance while reducing the likelihood of injuries and overtraining syndromes.[8]

General Physical Preparedness. A developed base of fitness from strong work-capacity across broad time and modal domains.[9]

Health Service Support. All services performed, provided, or arranged to promote, improve, conserve, or restore the mental or physical well-being of personnel, which include, but are not limited to, the management of health services resources, such as manpower, monies, and facilities; preventive and curative health measures; evacuation of the wounded, injured, or sick; selection of the medically fit and disposition of the medically unfit; blood management; medical supply, equipment, and maintenance thereof; combat and operational stress control; and medical, dental, veterinary, laboratory, optometric, nutrition therapy, and medical intelligence services. Also called HSS.[10]

HITT (High Intensity Tactical Training). comprehensive combat-specific strength and conditioning program that is essential to a Marine's physical development, combat readiness and resiliency.[11]

Human Performance. Accomplishment of a task in accordance with agreed upon standards of accuracy, completeness, and efficiency.[12]

Light Duty. A period when a member reports to their work space, but during the period the member is excused from the performance of certain aspects of military duties. Placing a member on light duty does not require the convening of an MEB (Medical Evaluation Board). [13]

Limited Duty (LIMDU). A properly convened MEB at an MTF (Medical Treatment Facility) may recommend that a member be placed on a documented period of medically restricted duty as a result of illness, injury, or disease process. LIMDU is a period when the member reports to their work space, but during the period the member is excused from the performance of certain aspects of military duties.[14]

Operational Approach. A commander's description of the broad actions the force must take to achieve the desired military end state.[15]

Operational Art. The creative thinking used to design strategies, campaigns, and major operations and to organize and employ military force.[16]

Operational Design. Employs various elements to develop and refine the commander's operational approach.[17]

Operational Readiness. The capability of a unit/formation, ship, weapon system, or equipment to perform the missions or functions for which it is organized or designed. Also called OR. See also combat readiness.[18]

Population Health. The health outcomes of a group of individuals, including the distribution of such outcomes within the group.[19]

Readiness. The ability of military forces to fight and meet the demands of assigned missions. See also national military strategy.[20]

Wellness. Force health protection program that consolidates and incorporates physical and mental fitness, health promotion, and environmental and occupational health.[21]

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[1] U.S. Department of Health and Human Services: National Heart, Lung, and Blood Institute. Accessed April 6th, 2017. https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmicalc.htm.

[2] Commandant of the Marine Corps (CMC), Marine Corps Order (MCO) 1500.59, Subject: Marine Corps Martial Arts Program, Headquarters U.S. Marine Corps, Department of the Navy, Washington, DC, 2010, 1-2.

[3] Joint Chiefs of Staff (JCS), Joint Publication (JP) 1-02, *Department of Defense Dictionary of Military and Associated Terms* (Washington, DC: Government Printing Office, 2001), 99.

[4] Joint Chiefs of Staff (JCS), Joint Publication (JP) 4-02, *Joint Health Services* (Washington, DC: Government Printing Office, 2017), III-3.

[5] Glassman, "CrossFit Level 1 Training Guide," 4.

[6] Business Dictionary, "Exploratory Research," accessed April 17, 2018, http://www.businessdictionary.com/definition/exploratory-research.html.

[7] JCS, JP 4-02, GL-9.

[8] Commandant of the Marine Corps (CMC), *HITT Methodology* (Washington, DC: Department of the Navy, Headquarters U.S. Marine Corps, 2016), 1.

[9] Tony Leyland, "CrossFit and GPP," *CrossFit Journal* 11, no. 9 (2012): 3.

[10] JCS, JP 4-02, GL-10.

[11] CMC, *HITT Methodology,* 1.

[12] Business Dictionary, "Human Performance," accessed April 17, 2018, http://www.businessdictionary.com/definition/human-performance.html.

[13] Department of the Navy, NAVMEDP-117-12, *Manual of the Medical Department* (Washington, DC: Department of the Navy, 2005), 18-14.

[14] Ibid., 18-15.

[15] Joint Chiefs of Staff (JCS), Joint Publication (JP) 5-0, *Joint Planning* (Washington, DC: Government Printing Office, 2017), IV-16. 6

[16] Ibid., IV-17.

[17] Ibid., IV-6.

[18] Joint Chiefs of Staff (JCS), Joint Publication (JP) 1-0, *Joint Personnel Support* (Washington, DC: Government Printing Office, 2016), GL-8.

[19] David Kindig and Greg Stoddart, "What is Population Health?" *American Journal of Public Health* 93, no. 3 (2003): 380.

[20] JCS, JP 1-02, 451.

[21] Ibid., 585.

APPENDIX A

MMAS A221 PRESENTATION

Questions/comments below followed a half-hour presentation on 12 February 2018 to CGSC peers in the MMAS program. Only two U.S. officers were part of the group: one USA and one USANG officer. The remaining eleven officers were international students, plus class instructor Dr. Prisco Hernandez, USA (LTC, ret.).

1. How do you measure power?
2. Why are all 10 domains of fitness necessary?
3. Have you considered graduated testing scales by occupational specialty?
4. An explanation of how a variety of fitness modal domains translates to performance and combat readiness is beneficial.
5. Why does this matter to the military?
6. Has the U.S. ever considered joint physical fitness tests?
7. Among the servicemembers separated annually for physical reasons, what percentage is truly preventable and what percentage is a factor of the inherent risks of the job?
8. What is the fiscal correlation between health care and physical training?
9. What is the role of leadership in enhancing physical preparedness?
10. Is the prevalence of "junk food" in the U.S., to include on military bases, a part of the problem?
11. Are units or commanders allowed to present and enforce unofficial standards? For example, does the Commanding Officer project his personal routine onto the unit? If so, what are the repercussions for non-compliance?
12. How does the military determine if a person is physically trainable?

APPENDIX B

CURRENT AND HISTORICAL USMC PFT AND CFT DATA

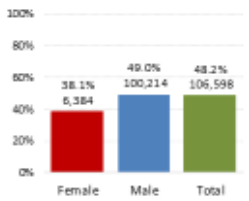
New PFT Standards

MALE	Male	17-20	21-25	26-30	31-35	36-40	41-45	46-50	51+	Female	17-20	21-25	26-30	31-35	36-40	41-45	46-50	51+	FEMALE
	Max	18:00	18:00	18:00	18:00	18:00	18:30	19:00	19:30	Max	21:00	21:00	21:00	21:00	21:00	21:30	22:00	22:30	
	Min	27:40	27:40	28:00	28:20	28:40	29:20	30:00	33:00	Min	30:50	30:50	31:10	31:30	31:50	32:30	33:30	36:00	
3 Mile Run	18:00	100	100	100	100	100				21:00	100	100	100	100	100				3 Mile Run
	18:10	99	99	99	99	99				21:10	99	99	99	99	99				
	18:20	98	98	98	98	98				21:20	98	98	98	98	98				
	18:30	97	97	97	97	97	100			21:30	97	97	97	97	97	100			
	18:40	96	96	96	96	96	99			21:40	96	96	96	96	96	99			
	18:50	95	95	95	95	95	98			21:50	95	95	95	95	95	98			
	19:00	94	94	94	94	94	97	100		22:00	94	94	94	94	94	97	100		
	19:10	93	93	93	93	93	96	99		22:10	93	93	93	93	94	96	99		
	19:20	92	92	92	92	93	95	98		22:20	92	92	92	92	93	95	98		
	19:30	91	91	91	91	92	94	97	100	22:30	91	91	91	91	92	95	97	100	
Crunches	Max	105	110	115	115	110	105	100	100	Max	100	105	110	105	105	100	100	100	Crunches
	Min	70	70	70	70	70	65	50	40	Min	50	55	60	60	60	55	50	40	
	115			100	100					110			100						
	114			99	99					109			99						
	113			97	97					108			98						
	112			96	96					107			96						
	111			95	95					106			95						
	110		100	93	93	100				105		100	94	100	100				
	109		99	92	92	99				104		99	93	99	99				
	108		97	91	91	97				103		98	92	97	97				
	107		96	89	89	96				102		96	90	96	96				
	106		94	88	88	94				101		95	89	95	95				
	105	100	93	87	87	93	100			100	100	94	88	93	93	100	100	100	
Pull-ups	Max	20	23	23	23	21	20	19	18	Max	7	9	10	9	8	6	4	3	Push-up / Pull-up Hybrid
	Min	4	5	5	5	5	5	4	3	Min	1	1	1	1	1	1	1	1	
	23		100	100	100					10			100						
	22		97	97	97					9		100	96	100					
	21		93	93	93	100				8		95	91	95	100				
	20	100	90	90	90	96	100			7	100	90	87	90	94				
	19	96	87	87	87	93	96	100		6	94	85	83	85	89	100			
	18	93	83	83	83	89	92	96	100	5	87	81	78	81	83	92			
	17	89	80	80	80	85	88	93	96	4	81	76	74	76	78	84	100		
	16	85	77	77	77	81	84	89	92	3	74	71	70	71	72	77	87	100	
	15	81	73	73	73	78	80	85	88	2	68	66	65	66	67	69	74	81	
	14	78	70	70	70	74	76	81	84	1	60	60	60	60	60	60	60	60	
	13	74	67	67	67	70	72	78	80	Pushups	70	70	70	70	70	70	70	70	

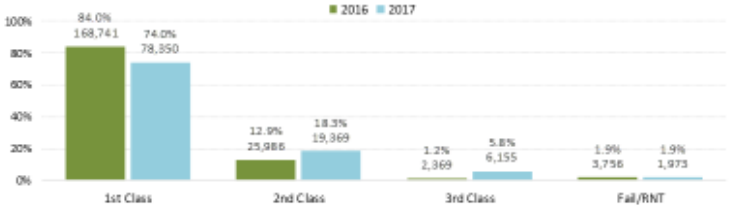
Total Force PFT Status

1 Jan 2017- 24 May 2017

Percent of PFTs Complete



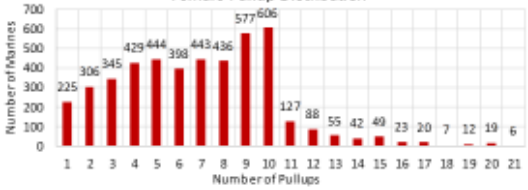
PFT Performance



Pushup/Pullup Preference of those who have taken PFT

	Pushups		Pullups		Total
Male	1,994	2%	98,220	98%	100,214
Female	1,710	27%	4,674	73%	6,384
Total	3,704	3%	102,894	97%	106,598

Female Pullup Distribution



Performance of those who have taken PFT

		Max	Avg
Male	**Pushups**	270	208.2
	Pullups	300	252.2
Female	**Pushups**	270	217.0
	Pullups	300	260.0

Rowing/Running preference of those who have taken PFT

Run	530	73%
Row	199	27%
Total	729	100%

Performance of 46+ age group

	Max	Avg	Min
Run	300	255.1	143
Row	300	274.7	132

Performance Changes From 2016

Average Number of Pull-ups

	Females 2017 Baseline	Males 2016	Males 2017	Males Change	
17-20	5.4	15.5	15.9	2.7%	0.4 More
21-25	7.1	16.6	17.6	6.4%	1.1 More
26-30	7.7	17.5	19.1	9.1%	1.6 More
31-35	7.4	17.5	19.2	9.7%	1.7 More
36-40	6.8	17.0	18.0	5.8%	1.0 More
41-45	5.9	16.1	16.8	4.6%	0.7 More
46-50	4.2	15.5	15.8	2.0%	0.3 More
51+	5.5	14.9	15.1	1.9%	0.3 More

PFT changes achieved their intended effect:

Demonstrated increased in Upper Body and Core Performance with minimal impact on Running

Average Number of Crunches

	Females 2016	Females 2017	Females Change		Males 2016	Males 2017	Males Change	
17-20	92.3	94.9	2.8%	2.6 More	97.9	107.2	9.5%	9.3 More
21-25	95.0	100.0	5.3%	5.0 More	98.5	108.8	10.5%	10.4 More
26-30	96.2	104.7	8.8%	8.4 More	98.7	110.8	12.3%	12.1 More
31-35	96.8	103.7	7.2%	7.0 More	98.8	111.1	12.5%	12.3 More
36-40	96.6	102.2	5.7%	5.5 More	98.3	107.1	9.0%	8.8 More
41-45	95.1	98.7	3.8%	3.6 More	96.8	101.5	4.9%	4.8 More
46-50	90.5	94.5	4.4%	4.0 More	94.9	95.6	0.8%	0.7 More
51+	93.3	97.3	4.3%	4.0 More	93.4	92.5	-0.9%	-0.9 Fewer

"Aggregation of marginal gains… result in remarkable improvement"
Sir David Brailsford

Average 3-mile Run Times

	Females 2016	Females 2017	Females Change		Males 2016	Males 2017	Males Change	
17-20	25:30	25:58	1.8%	0:28 Slower	21:53	22:22	2.2%	0:28 Slower
21-25	25:50	25:59	0.6%	0:09 Slower	22:41	23:00	1.4%	0:19 Slower
26-30	25:14	25:20	0.4%	0:06 Slower	22:46	22:50	0.3%	0:05 Slower
31-35	25:29	25:30	0.1%	0:01 Slower	22:55	22:58	0.2%	0:03 Slower
36-40	26:02	25:50	-0.8%	0:12 Faster	23:15	23:21	0.4%	0:06 Slower
41-45	26:14	25:52	-1.4%	0:22 Faster	23:46	23:43	-0.2%	0:03 Faster
46-50	26:45	26:08	-2.3%	0:37 Faster	24:11	23:48	-1.6%	0:23 Faster
51+	28:46	30:23	5.6%	1:37 Slower	24:48	24:59	0.7%	0:11 Slower

Slower run times in some age groups may indicate a desired deemphasis of long distance running which may lead to a reduction in injuries

Total Force Age Breakout

1 Jan 2017- 24 May 2017

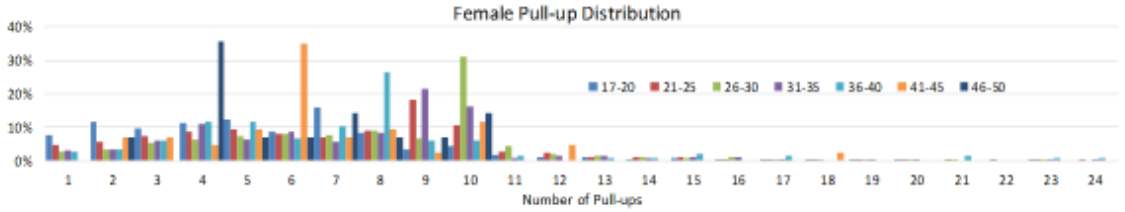
Average PFT Score by Age and Gender

	17-20	21-25	26-30	31-35	36-40	41-45	46-50	51+	All ages
Male	252.4	248.6	254.0	257.0	256.6	255.2	260.1	266.2	251.4
Female	241.3	249.4	257.3	258.7	259.1	262.8	250.4	260.3	249.3

PFT Class by Age and Gender

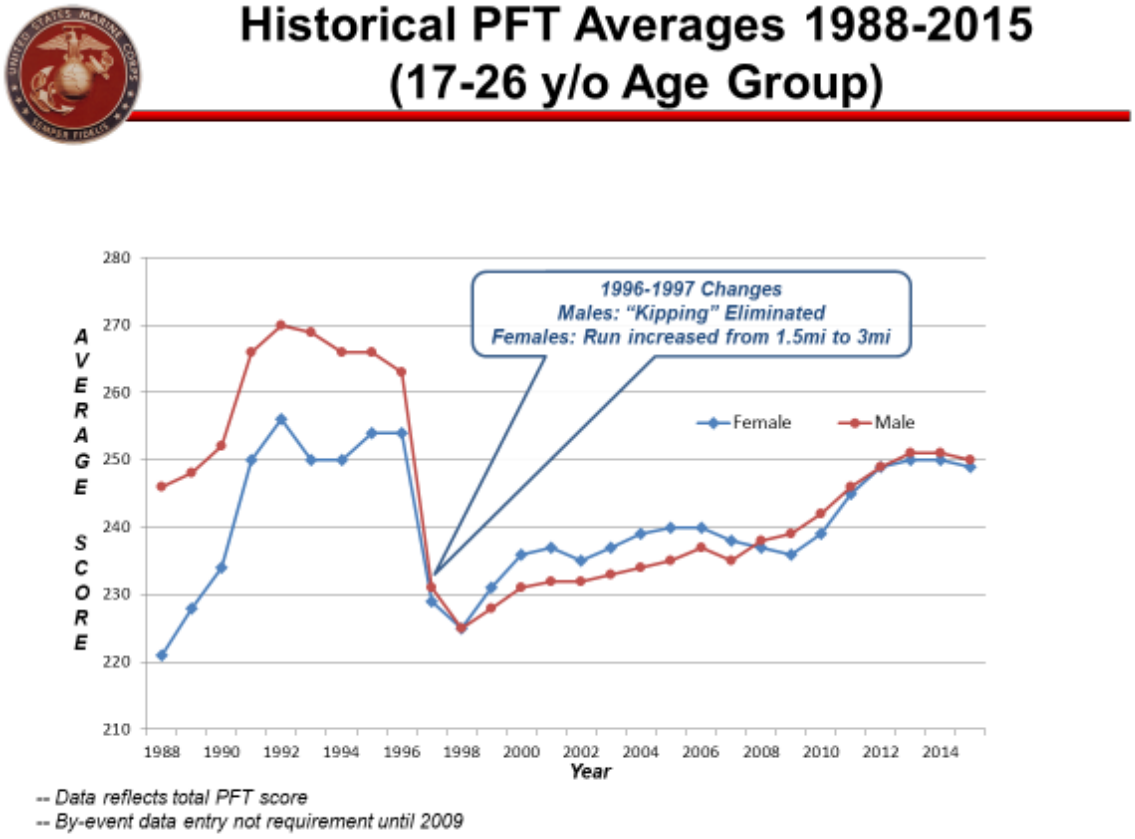
Age	Males				Females			
Group	1st	2nd	3rd	Fail/RNT	1st	2nd	3rd	Fail/RNT
17-20	75%	18%	5%	1%	62%	26%	11%	1%
21-25	70%	21%	7%	3%	69%	21%	7%	2%
26-30	78%	15%	5%	1%	79%	14%	5%	2%
31-35	83%	13%	4%	0%	83%	13%	4%	0%
36-40	83%	13%	4%	0%	86%	11%	3%	0%
41-45	80%	14%	5%	0%	84%	9%	5%	2%
46-50	81%	13%	5%	1%	78%	4%	17%	0%
51+	86%	12%	2%	0%	67%	0%	33%	0%
Total	74%	18%	6%	2%	70%	20%	8%	2%

Age	Female Pushup/Pullup Preference				
Group	Pushups		Pullups		Total
17-20	683	38%	1127	62%	1810
21-25	684	24%	2207	76%	2891
26-30	176	18%	817	82%	993
31-35	88	22%	317	78%	405
36-40	51	26%	147	74%	198
41-45	17	28%	43	72%	60
46-50	10	42%	14	58%	24
51+	1	33%	2	67%	3
Total	1710	27%	4674	73%	6384



Rowing/Running preference of those who have taken PFT

	Male					Female				
	46-50		51+		Total	46-50		51+		Total
Run	434	73%	79	73%	513	15	63%	2	67%	17
Row	160	27%	29	27%	189	9	38%	1	33%	10



Source: All figures from USMC Force Fitness Division and Force Fitness Readiness Center, "Marine Corps Physical Fitness Program Changes," U.S. Marine Corps, 2017, accessed September 12, 2017, https://www.fitness.marines.mil/.

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