

Section III

HUMAN PERFORMANCE OPTIMIZATION

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Army astronauts COL Andrew “Drew” Morgan and LTC Anne McClain, both from the astronaut class of 2013, prepare to be promoted while underwater following required training in the Neutral Buoyancy Laboratory at the Sonny Carter Training Facility in Houston, Texas, September 27, 2018. (NASA Neutral Buoyancy Laboratory photo)
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Chapter 19

THE EVOLUTION OF HUMAN PERFORMANCE OPTIMIZATION AND TOTAL FORCE FITNESS

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INTRODUCTION

Service members and their families are the most valuable assets to accomplish the mission of defending the country. This complex mission has resulted in unparalleled operational demands with multiple deployments and strains on the US armed forces. While extensive resources have always been expended to ensure equipment and materials are both state-of-the-art and in good repair, resources for maintaining and improving human performance, health, and resilience have been more limited. By 2006, it had become clear that operational demands were degrading the capabilities, health, and resiliency of military communities.

To address this problem, the terms “human performance optimization” (HPO) and “total force fitness”

(TFF) emerged as conceptual frameworks within the Department of Defense (DoD) to preserve the capabilities, health, and well-being of service members and their families. The performance, health, and well-being of the whole person, the family, and the community were viewed as fundamental to accomplishing the mission. Since that time, HPO and TFF have become recognized as cornerstones of an effective and efficient military, and the terms have become ingrained throughout the DoD. This chapter will define terms, provide a brief historical background, describe the holistic framework of TFF and the underpinnings of HPO, relate the terms to the role of a military medical officer (MMO), and then provide resources for the MMO relating to both HPO and TFF.

DEFINITIONS

- **Human performance optimization.** The process of applying knowledge, skills, and emerging technologies to improve and preserve the capabilities of military personnel to execute essential tasks. A number of related terms have been used to describe various aspect of HPO, for example, performance enhancement, performance sustainment, performance restoration, and human performance modification. The terms “enhancement,” “sustainment,” and “restoration” are aligned with phases of military missions.
 - **Performance enhancement.** Optimizing and enhancing every system to the fullest degree possible before deployment.
 - **Performance sustainment.** Sustaining performance at predeployment levels during deployment.
 - **Performance restoration.** Restoring or returning performance to predeployment levels postdeployment.
- **Human performance modification.** “Encompasses actions ranging from the use of “natural” materials such as caffeine or khat

as stimulants, to the application of nanotechnology as a drug delivery mechanism or an invasive brain implant.¹ Although the literature on human performance modification typically addresses methods that enhance performance, another possible focus is methods that degrade performance or negatively affect a military force’s ability to fight.”^{1(p1)} HPO is the preferred term because it is all encompassing—optimal is the end result—either through enhancement, modification, sustainment, or restoration. Human performance should be optimized whenever possible.

- **Total force fitness.** A holistic conceptual framework for understanding, assessing, and maintaining the fitness of the armed forces. The TFF framework starts with eight domains (medical/dental, nutritional, social, behavioral, environmental, psychological, spiritual, and physical) that can be tailored to the unique cultural framework of each military community. The interrelated functionality of TFF is informed by five overarching tenets as shown in Exhibit 19-1.

BACKGROUND

Historical Context

The concept of HPO, and its critical role for military success on the battlefield, has been appreciated for a long time. During the Civil War, Dr Jonathan Letterman, considered by many to be the “father of battlefield medicine,” recognized the importance of

HPO, stating that “the leading idea [for the medical corps], which should be constantly kept in view, is to strengthen the hands of the Commanding General by keeping his Army in the most vigorous health, thus rendering it, in the highest degree, efficient for enduring fatigue and privation, and for fighting.”² In 1933 US Army General (then Colonel) George S.

EXHIBIT 19-1

THE TENETS OF TOTAL FORCE FITNESS

- Total fitness extends beyond the service member. Total fitness should enhance performance and preserve capabilities, improve health, and strengthen resilience in families, communities, and organizations.
- A service member's family's health plays a key role in sustained success and must be incorporated into any definition of total fitness.
- Total fitness metrics must measure positive and negative outcomes, and must show movement toward total fitness.
- Total fitness is linked to the fitness of the society from which the service members are drawn and to which they will return.
- Leadership is essential in achieving total fitness.

Patton wrote, "Wars may be fought with weapons, but they are won by men. It is the spirit of the men who follow and of the man who leads that gains the victory."³ After World War II, General Dwight D. Eisenhower said, "Guns and tanks and planes are nothing unless there is a solid spirit, a solid heart, and great productiveness behind it."⁴ In 1987 US Army Special Forces Colonel John Collins emphasized that "hardware" is only a tool and that it is the person who determines success or failure. He is credited with developing the Special Operations Forces five truths, of which is "Humans are more important than hardware and their quality is more important than quantities."⁵

It was not until 2006 that the term HPO actually emerged with energy within the DoD. An Office of Net Assessment report came out in 2005 challenging the DoD to take a look at how the most important resource—the service members—were being looked after.⁶ In June 2006, the Consortium for Health and Military Performance (CHAMP) at the Uniformed Services University of the Health Sciences hosted a workshop called Human Performance Optimization: An Evolving Charge to the Department of Defense, with the findings published in *Military Medicine*.⁷ This workshop changed the course of HPO in the DoD, and resulted in the development of the Human Performance Resource Center (HPRC), a DoD website for all information relating to the improvement and preservation of human performance (hprc-online.org).

Total Force Fitness Model

In December 2009, CHAMP hosted a workshop on TFF that resulted in an instruction from the chairman of the Joint Chiefs of Staff, which can be found on the HPRC website.⁸ This guidance extended the

concept of "physical fitness" to include body, mind, social, and spiritual domains; it created a more comprehensive and holistic framework to support and integrate joint and service-specific efforts that seek to promote health, enhance the resilience of service personnel, and improve effectiveness and efficiency of the force.⁹⁻²² TFF integrates all aspects of health, well-being, and performance—and recognizes the important contributions of families, friends, communities, and units. In its application, the TFF framework and its tenets are designed to keep service members and their families performing at an optimal level: healthy, resilient, and flourishing in the environment of sustained deployment and combat operations. Thus, TFF and HPO are synergistic and complementary. They go together and must be considered as a unit. Figure 19-1 presents the eight original domains of TFF.

Any evaluation of TFF must be context specific because teams, units, families, and communities may be very effective at particular tasks, and less effective at others. For example, a combat unit may be very successful with mission efforts, but encounter problems when it returns from a deployment or during reintegration. Although the TFF framework identifies eight mind-body domains, social fitness has been highlighted as particularly critical for unit fitness because it is a robust resilience factor.²³ A 2013 Rand report²⁴ identified social support as a key factor that can affect an individual's resilience. Social fitness also is very important for unit, family, peer, and community fitness. These are key signatures of military culture and operational success because people are primary drivers for effectiveness. Overall TFF is conceptualized in terms of healthy relationships among people and teams that contribute to optimal unit, family, and community well-being, resilience, and performance.

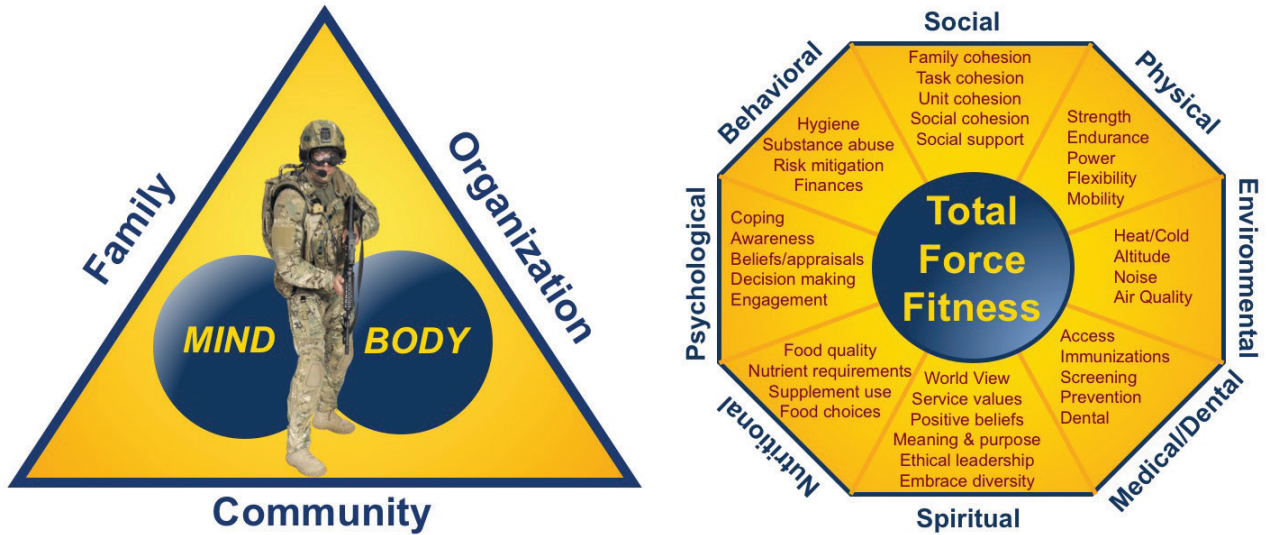


Figure 19-1. The total force fitness (TFF) framework identifying the critical influence of the family, community, organization, and the eight overarching domains of TFF.

Role of Total Force Fitness in Force Health Protection and Readiness

All eight TFF domains are important and require attention from leaders at multiple levels to ensure TFF of all units, an essential factor in force health protection, readiness, and preservation. The TFF conceptual framework places the service member at the center of the eight interrelated TFF domains and identifies the critical influence of the family, organization, and community (see Figure 19-1). This framework assumes that family, organizational, and community factors have a significant impact on individual fitness. The model also assumes that individual fitness has an important reciprocal relationship with fitness of larger social structures (eg, family, unit, community, and enterprise).²⁵ This is not surprising or unexpected, given that military culture emphasizes teamwork and group cohesion rather than individuals.²⁶

Proposed Human Performance Optimization Model

HPO builds on the framework of TFF with an orientation on performance. Figure 19-2 provides an understanding of HPO in comparison with traditionally offered healthcare delivery. The spectrum begins at left and movement to the right indicates degradation of capabilities, health, and resiliency. Traditional healthcare is considered “right-sided”: the driving force for engagement is centered on illness/pathology. Sustained HPO requires a holistic “left of the bang” engagement and orientation. Leveraging HPO sustainment and

improvements should be directed by the primary groups noted in the lower section of the figure. The MMO’s role and function in this process (“left” sided) will be different in comparison to that of working in a clinical/hospital setting (“right”-sided care). A deeper understanding of the need for a paradigm shift and community involvement is offered later in this chapter.

HPO requires military cultural competency and a greater appreciation for the complexities of diverse service member communities and their missions. The demands/resources model (Figure 19-3) is an ideal tool to compliment the HPO-oriented framework and TFF model because it was developed to evaluate work performance.²⁷⁻²⁹ The model proposed in Figure 19-3 allows for performance metrics in multiple venues: family, relationships, and work. This model also includes multiple resources (individual, family, and external environment) and well-established demands (eg, work, family, financial, social). Overall, the concept is that optimal performance will be sustained when resources (individual, family, and external) match or exceed demands. HPO is resource focused.

Figure 19-4 presents an overview of the multiple and competing individual, family, and other resources by various categories that contribute to performance in diverse venues. Although not complete, these various factors and environmental issues demonstrate the holistic approach: from cognitive to genetic and physiologic, from behavioral and individual skills and practices to social and physical environmental factors. Some of the contributors are inherent, whereas others may be state- or situation-dependent. As new evidence

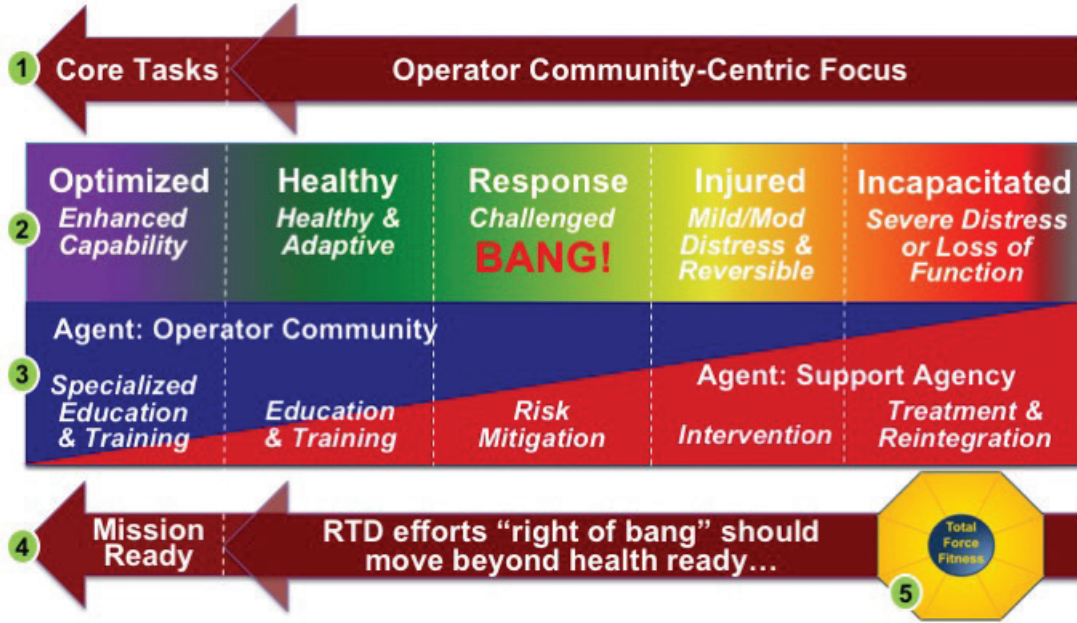


Figure 19-2. The human performance optimization (HPO) demands/resources model. From top to bottom: (1) An orientation that focuses on the needs of each operator community and their mission essential tasks. (2) The rainbow spectrum begins at left (performance = purple), and movement to the right indicates degradation of capabilities, health, and resiliency. Traditional healthcare is considered “right of bang,” with its driving force for engagement centered on illness/pathology. Sustained HPO requires a holistic “left of bang” engagement and orientation. (3) Leveraging HPO sustainment and improvements should be directed by the primary agents with corresponding service types. (4) An orientation that moves beyond medical readiness toward mission readiness. (5) The holistic and integrative total force fitness framework is key to targeting resources and efforts and the delivery of precision care. RTD: return to duty

and information becomes available, it can be inserted into the model. In addition to the resources indicated in Figure 19-4, other social support networks may be available to operational communities and commands.

The intricacies, interactions, and intersections of how and what impacts performance are numerous.

Human Performance Optimization/Total Force Fitness: A Paradigm Shift

The traditional model of care delivery is fragmented and illness centered. *Think back to your medical training. How many courses offered allowed you to work with a healthy individual? What about a high-performing athlete where your job was to keep them performing at the top of their game and prevent performance degradation?* The complexities and evolving operational needs of the battlefield require an approach that aids combatant commanders in sustaining the health, performance, and resiliency of their unit so performance degradation is minimized. In addition, each military community requires a tailored framework given their diverse mission, skill sets, and operational risks. TFF and the capability-focused orientation provided by HPO offer this conceptual framework. The instruments described above are powerful tools to aid in the MMO’s ability to deliver soldier-centric care.

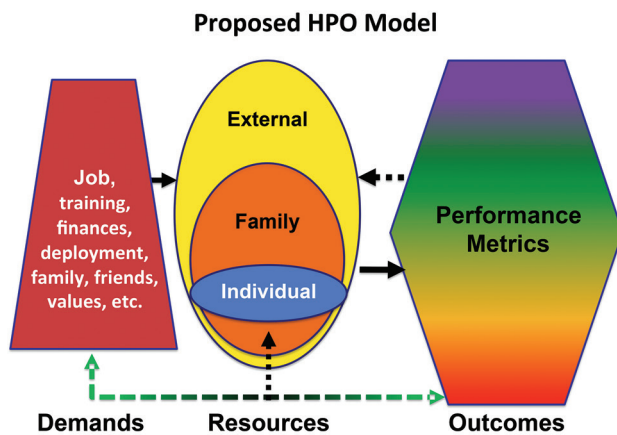
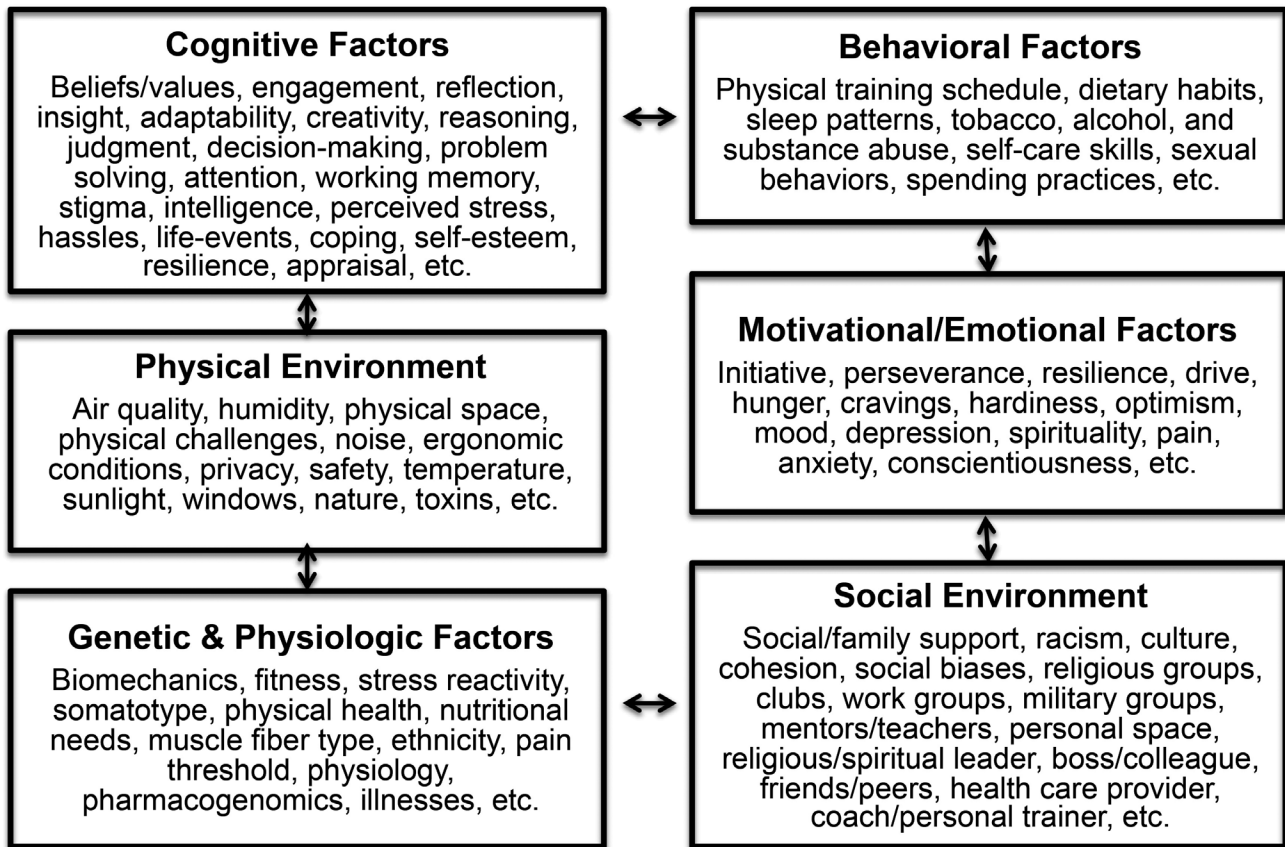


Figure 19-3. The human performance optimization demands/resources model.



Factors that serve as Demands and/or Resources

Figure 19-4. An overview of the multiple and competing individual, family, and other resources by various categories.

HUMAN PERFORMANCE OPTIMIZATION AND THE MILITARY MEDICAL OFFICER

Role of the Military Medical Officer

The MMO is key to the successful employment of HPO and TFF and maximizing the health, well-being, and performance of the military community in which they serve. HPO and TFF require the MMO to assume a number of roles (eg, consultant, student, expert, coach, liaison) with a relationship built on trust and credibility. If an MMO can relate to the operational community on key topics and learn to see the mission through the service member’s eyes, they will be welcomed “into the fold.” Keeping service members fit and performing at their best is a high priority; thus, the following characteristics of the MMO are key:

- being able to modulate between expert and student; military community cultural competency;
- establishing presence and role modeling;

- being well versed in the language of HPO;
- having a “holistic” orientation;
- being skilled in adapting the TFF domains to fit the unique needs of each military community; and
- being up to date on the latest available technologies for enhancing performance.

Perhaps one of the most important issues is being a responsible leader. This demands both setting an example and mentoring in a team-like way. To engage operational service members, MMOs must be a learner first to understand their unique unit culture. MMOs must be able to listen and hear what the unit members see as their most critical needs. MMOs must also be a role model, which includes maintaining physical fitness, nutritional fitness, medical/dental fitness, and fitness for the other domains, as well as being versed in all other aspects of TFF and HPO. MMOs should

EXHIBIT 19-2

ONLINE RESOURCES FOR HUMAN PERFORMANCE OPTIMIZATION AND TOTAL FORCE FITNESS

The websites listed below are Department of Defense (DoD) human performance optimization resources for service members and providers. The first two are hosted by the Consortium for Health and Military Performance (CHAMP), the DoD Center of Excellence for Human Performance. The third site, Military OneSource, complements CHAMP resources.

- Human Performance Resource Center (<http://hprc-online.org/>)
- Operation Supplement Safety (<http://opss.org>)
- Military OneSource (<http://www.militaryonesource.mil/>)

not tell service members what to do; rather, they must live the role and know where to get the information they seek.

An MMO's behaviors, attitudes, and overt actions must demonstrate the value of health, well-being and HPO, but MMOs must also be able to speak and hear the language of the operational communities. One important aspect of HPO for the MMO is being able to listen. HPO is the end result of being proactive in achieving, embracing, supporting, and living the tenets and goals of TFF. The behavior and actions of an MMO make a statement, and that statement must be positive: it must resonate as: "I believe in health and HPO. I embrace HPO and support the TFF and HPO frameworks and expectations."

However, each unit or operational community may have very concrete strengths and vulnerabilities, and the MMO must help them identify gaps through listening and observing, not just telling. An MMO must assist the DoD in achieving the goal of being an enterprise that welcomes, supports, and promotes the framework that all service members and family members, retirees,

and civilians can live and embrace the concepts and behaviors of TFF—a holistic framework that supports the culture of each unit, group, and community.

Guidance to Commanding Officer

The MMO, when in direct support of the line, functions as a special staff officer to the commander. In this function, the MMO serves as a subject matter expert in many arenas, including physical fitness, as Letterman put forth in his original mandate for the Medical Corps. Although the commander has the ultimate responsibility for what their unit does and fails to do, the MMO has the requirement and obligation to assist the commander with the execution of current relevant guidance. TFF is currently written into joint doctrine as a CJCSI 3405.01, published on September 1, 2011.⁸ This doctrine is authoritative and should be the principal resource utilized to guide the commander in assuring their service members are totally fit and resilient for combat and all other operations. Other resources can be found online (Exhibit 19-2).

SUMMARY

Leaders recognized that sustained combat operations for over a decade generated the need for a new paradigm for understanding, developing, and assessing fitness. HPO and TFF emerged from thoughtful discussions and innovative actions; they reflect the vision and reality that people represent the military's most valuable resource. Therefore, a holistic approach to fitness and performance must be and is the foundation for such a vision. TFF is now published in joint military doctrine and represents a desired end state for current service members and their families. HPO is the process whereby TFF can be achieved as knowledge, skills, and emerging technologies are leveraged to improve and preserve the capabilities of military

personnel to execute essential tasks. In the execution of any HPO program to achieve TFF, the demands/resources model specifically provides a framework with the principal concept that performance will be optimized when resources (individual, family, and external) match or exceed demands. The MMO is uniquely, and importantly, postured in the military chain of command to directly influence the shaping of a fit and ready force. The ultimate goal of TFF and HPO is not only to enhance individual and unit performance and wellness, but also to ensure a ready force to win the nation's present and future battles. The remaining chapters in this section should build upon the concepts described here.

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