

U.S. Army War College

Maximizing Senior Leader Health and Wellbeing



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MAXIMIZING SENIOR LEADER HEALTH AND WELLBEING

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FOREWARD

David C. Hill

Leadership at all levels is a privilege. Leaders have opportunities to inspire others to achieve shared goals. They enjoy increased autonomy and influence in their organizations. They are often rewarded for collective performance and success. At senior levels, these privileges are magnified – there is immense potential for senior leaders to contribute substantively while developing others in meaningful ways. Yet those fortunate enough to matriculate to the highest ranks face an extremely challenging environment that tests their constitution and can threaten their sense of wellbeing.

Senior leaders operate in challenging and dynamic environments that demand their full engagement. Work schedules are packed with meetings, travel, and administrative tasks. Leaders are inundated by information and sometimes overwhelmed by complexity. Time is at a premium, leaving little opportunity for physical training, reflection, and relaxation. Everyone expects senior leaders to be continuously “on,” and there is little room to have a bad day. Nearly every decision reflects the “least bad” option and will be the subject of intense scrutiny. Most importantly, senior leaders have immense responsibility to earn the trust and respect of their followers while simultaneously positioning their organization for competitive advantage. This is tough stuff – leading at the highest levels is not easy.

In order to perform at their best, earning the privilege to lead at the highest levels, and remain resilient to unrelenting stress, senior leaders should seek to optimize their health and wellbeing. Healthy, energetic leaders are best prepared to thrive in complex and demanding environments by being fully engaged with the tasks at hand and inspiring others to reach their potential. They are also more resilient to setbacks and set strong examples during periods of crisis and challenge. Fortunately, we now know how to best promote health and wellness, and this book offers deep insight into the science of health and wellness and offers practical recommendations for leaders to consider.

The book is set in the context of senior leadership – appreciating that challenges and opportunities for leaders in midlife are often qualitatively different from those younger leaders with reduced scopes of responsibility. Most senior leaders are in midlife and possibly encountering the first signs of aging. They negotiate multiple roles (e.g., leader, spouse, parent) and possibly assume new ones (e.g., elder caregiver, grandparent, retiree). Cog-

nitive and interpersonal demands at work likely increase while available time diminishes. These conditions require a deliberate and differentiated approach to health and wellness.

Following a discussion on the midlife context for senior leaders, the book begins with a deep dive into biological aspects of health and wellness. The authors suggest that leaders can best address their wellness needs by first appreciating physiological aspects of aging and the practices that slow inevitable decline. Chapters on nutrition, exercise, and sleep provide persuasive arguments for action and offer practical steps for increasing vigor and resilience. The book then approaches mental, emotional, and social aspects of wellness with engaging chapters on mindfulness, resilience, and the work-life interface. Together, they represent a holistic approach to wellness in midlife for senior leaders.

We owe it to our organizations, teammates, and families to be our best versions. Foundational to that is our health and wellness. The time is now to carefully consider the perspectives and advice shared in this volume. Let's go!

DAVID C. HILL
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Chapter 1

MIDLIFE AND THE MILITARY: OPPORTUNITIES AND OBSTACLES

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“Thirty years wearing the fabric of our nation. How in the world did I blink for 30 years? I’d become that which I had so much disdain for earlier in my career, the old man. How did this happen? One look in the mirror provided the cold, hard, truth. I stopped treating myself like a Soldier. I wasn’t eating, sleeping, or exercising smartly. I had a skewed focus putting mission over wellbeing. Then COVID hit the world. I decided there are two ways to exit the pandemic; fitter or fatter. It began with 100 burpees a day and transitioned to healthy eating, weight training, increased sleep, and brutal honesty. It is easy to work non-stop. It is hard to work and treat yourself as a pacing item. My work is far from over. I’ve now begun working on flexibility and mindfulness, which are both harder than anticipated. We get one life and one career with Soldiers. I’m striving to make each day count.”

– Brigadier General Richard R. Coffman

“You know you are in midlife when you start counting down.”
– Anonymous

Military senior leaders cannot take their health and wellbeing for granted. At the peak of their professional careers, senior leaders must simultaneously negotiate multiple roles, life transitions, and increased responsibilities while perhaps encountering the first signs of physical and cognitive decline. The period of midlife should be a rewarding period of development wherein leaders expand the positive impact of their knowledge and experience in the workplace, renegotiate relationships with friends and families, and increasingly contribute to the wellbeing of successive generations. Yet, the effects of biological aging, the accumulation of stress, and

challenging life events can derail even the most promising life course. We aim for this chapter and book to be a clarion call for senior leaders entering midlife to increase self-awareness and embark on a journey of health and wellbeing.

What is Midlife?

Midlife is roughly defined as the period between 40 and 65 years old and captures the transition from young adulthood to old age.¹ Biologically, this period reflects the change from youthful vitality to age-related decline. More importantly, it is the period when individuals encounter significant changes in professional, social, and familial roles with implications for personal wellbeing and interpersonal impact. Professionally, midlifers often transition from direct and organizational leadership roles to ones focused on long-term, institutional strategic challenges. In terms of social roles, many in midlife transition from self and childcare to include grandchildren and elder care (sandwich care²). This complex combination of changes brought on by biological aging, emerging and evolving roles, and the accumulation of a lifetime of stress suggests that senior leaders should deliberately approach this pivotal period to maximize its remarkable potential.

The changes associated with midlife are not exclusive to those in the military. Although not researched as comprehensively as other developmental periods across the lifespan, midlife has been increasingly explored and recognized as a dynamic and impactful period.³ On one hand, midlife generally brings about autonomy, financial stability, authority, and deep relationships. On the other hand, many midlife professionals experience chronic stress, mental health struggles, increased caretaking responsibilities, physiological changes such as menopause and decreasing testosterone and strength, and declining fluid intelligence.⁴ All of these changes have the potential to affect health and wellbeing negatively in older adulthood.

1. Frank J. Infurna, Denis Gerstorf, and Margie E. Lachman, "Midlife in the 2020s: Opportunities and Challenges," *American Psychologist* 75, no. 4 (2020): 470-485, <https://doi.org/10.1037/amp0000591>.

2. Emily Grundy and John C. Henretta, "Between Elderly Parents and Adult Children: A New Look at the Intergenerational Care Provided by the 'Sandwich Generation,'" *Ageing and Society* 26, no. 5 (January 2006): 707-722, <https://doi.org/10.1017/s0144686x06004934>.

3. Infurna, Gerstorf, and Lachman, "Midlife in the 2020s: Opportunities and Challenges", 470-485; Margie E. Lachman, "Mind the Gap in the Middle: A Call to Study Midlife," *Research in Human Development* 12, no. 3-4 (2015): 327-334, <https://doi.org/10.1080/15427609.2015.1068048>.

4. David M. Almeida et al., "The Speedometer of Life," *Handbook of the Psychology of Aging*, (2011), 191-206, <https://doi.org/10.1016/b978-0-12-380882-0.00012-7>.

Midlife military members also experience these midlife opportunities and challenges, yet the context of military service likely influences the transition period in particular ways. For example, military members benefit from years of physical fitness training and have improved cardiovascular health but may suffer from increased musculoskeletal deterioration and injuries due to wear and tear. Exposure to chronic and acute stress due to repeated combat deployments and family separations may also serve as another influential contextual factor related to midlife transitions in the military. Furthermore, retirement often occurs in midlife for military members and has its own, unique implications for health and wellbeing.

Midlife Development Perspectives

Exploring human development is truly a multi-disciplinary endeavor. The medical field focuses on physiological changes associated with health and aging. Psychologists examine individual cognitive, affective, and social aspects of development. Sociologists explore broader trends of development across groups and demographics. These and other fields provide valuable insights on development, with combined efforts becoming increasingly prevalent. One example of this multi-disciplinary approach to midlife development is the Midlife in the United States Study (MIDUS) that continues to demonstrate the importance of research in this pivotal period of human development.⁵ Another example is found in *The U.S. Army War College Guide to Executive Health and Fitness* published in 2000.⁶

Two primary approaches to studying and describing development across the life cycle have emerged: “Life Span” and “Life Course” perspectives.⁷ It is useful for leaders to understand and take both theories into consideration when addressing the midlife time period.

David L. Featherman, a leading developmental scientist, when describing the life span perspective, suggests that “developmental changes in human behavior occur from conception to death, and arise from a matrix of biological, psychological, social, historical, and evolutionary influences and from their timing across the lives of individuals.”⁸ The life span theory

5. Orville Gilbert Brim, Carol D. Ryff, and Ronald C. Kessler, “The MIDUS National Survey: An Overview,” in *How Healthy Army We Are?: A National Study of Well-being at Midlife*, eds. O. G. Brim, C. D. Ryff, & R. C. Kessler (Chicago: University of Chicago Press, 2004), 1-34.

6. William F. Barko and Mark A. Vaitkus, eds., *The US Army War College Guide to Executive Health and Fitness*, (Carlisle: Army War College Press, 2000).

7. Karl Ulrich Mayer, “The Sociology of the Life Course and Lifespan Psychology: Diverging or Converging Pathways?” In *Understanding Human Development*, eds. U. M. Staudinger & U. Lindenberger (Boston: Springer, 2003), 463-481.

8. David L. Featherman, “The Life-span Perspective in Social Science Research,” in *Life-span Behavior and Development*, vol. 5 (New York: Academic, 1983), 8.

recognizes development is an individual process varying by person across domains and occasions and is fundamentally multi-disciplinary.⁹ The life span theory is flexible and takes events, physiology, and individual experiences into consideration when evaluating development.¹⁰ This approach “takes note of the diversity of development” while simultaneously exploring similarities as well.¹¹

The life span approach is useful to military midlifers for anticipating developmental challenges associated with aging such as menopause, decreased testosterone, and sarcopenia, among others. While there are individual differences in the timing of these changes, most individuals experience them in the midlife period.¹² Knowledge gained through life span studies about these physical changes and associated compensatory strategies can help military midlifers negotiate them successfully. Aspects of health behaviors including nutrition, exercise, and sleep feature prominently in most strategies proven conducive to increased health and wellbeing in midlife.

The “life course” theory, on the other hand, takes a slightly different approach and applies a more “orderly fashion” to aging. Life course reflects a “sequence of socially defined events and roles that the individual enacts over time.”¹³ Like the life span perspective, the life course approach examines human development across all ages, but it examines human lives through assumed roles, social structures, and broader historical context. The social roles might include child, student, spouse, employee, caregiver, widow, and retiree. These stages are largely associated with certain age cohorts. Importantly, by examining these roles as shared developmental events in the associated cohort, researchers can compare experiences that may change based on other events (e.g., conflict, economic changes, geographic separation, etc.).

The life course perspective is also useful for military members navigating through midlife. Role transitions in midlife might include marriage, divorce, empty-nesting, and elderly care. Each of those transitions can have a substantial impact on wellbeing. Yet the military cohort might encounter other transitions unique to the military context. For example, transitions

9. Avron Spiro III, “The Relevance of a Lifespan Developmental Approach to Health,” in *Handbook of Health Psychology and Aging*, eds. C. M. Aldwin, C. L. Park, & A. Spiro III, (New York: Guilford, 2007), 75-96.

10. Spiro III, 76.

11. Spiro III, 78.

12. Julie A. Winterich and Debra Umberson, “How Women Experience Menopause: The Importance of Social Context,” *Journal of Women & Aging* 11, no. 4 (1999): 57-73, https://doi.org/10.1300/j074v11n04_05.

13. Janet Z. Giele and Glen H. Elder Jr., “Life Course Research: Development of a Field,” in *Methods of Life Course Research: Qualitative and Quantitative Approaches*, eds. Janet Z. Giele and Glen H. Elder Jr., (Thousand Oaks, CA: Sage Publications, 1998) 22.

associated with deployments, consistent changes of station, promotions, and midlife retirements also provide important considerations for military members attempting to negotiate midlife successfully.

This book addresses both approaches. Chapters on physiology, nutrition, sleep, and fitness emphasize aspects of health and wellbeing generally approached through the life span perspective. However, much of this chapter and aspects of others regarding resilience and work-family interaction better align with the life course approach in identifying midlife challenges, opportunities, and best practices.

Stress, Health, and Wellbeing

As mentioned previously, the first indications of age-related physical and cognitive decline often appear during midlife. Yet the timing and severity of decline varies considerably across individuals with numerous factors contributing to the differences. Similarly, perceptions of wellbeing vary widely across individuals and cohorts—differences driven by countless factors. Research suggests that stress plays a significant role in health, aging, and wellbeing and deserves mention in this chapter on midlife development.¹⁴ It deserves particular attention because individuals can modulate their exposure, reactivity, and resistance to stress with implications for their midlife health and wellbeing.

Despite decades of research, a common definition of stress remains elusive.¹⁵ In this chapter, we focus on psychological stress and use the definition by Lazarus and Folkman: “psychological stress is a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being.”¹⁶ This appraisal mobilizes physiological systems to deal with the stressor. For example, the body will respond to stressors by releasing adrenaline and cortisol and increasing the availability of glucose for

14. M. Martin, M. Grunendahl, and P. Martin, “Age Differences in Stress, Social Resources, and Well-Being in Middle and Older Age,” *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 56, no. 4 (January 2001), 214-222, <https://doi.org/10.1093/geronb/56.4.p214>; J. R. Piazza et al., “Frontiers in the Use of Biomarkers of Health in Research on Stress and Aging,” *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences* 65B, no. 5 (2010): 513-525, <https://doi.org/10.1093/geronb/gbq049>.

15. J.M. Koolhaas et al., “Stress Revisited: A Critical Evaluation of the Stress Concept,” *Neuroscience & Biobehavioral Reviews* 35, no. 5 (2011): 1291-1301, <https://doi.org/10.1016/j.neubiorev.2011.02.003>.

16. R. S. Lazarus and S. Folkman, *Stress, Appraisal, and Coping* (New York: Springer, 1984), 19.

quick action.¹⁷ This process is largely adaptive, providing ready resources for individuals to deal with threats in the short term. However, chronic activation of stress response systems can also have negative effects over time with implications for psychological and physical health.¹⁸ Research suggests that chronic exposure to stress increases the likelihood of cardiovascular disease, autoimmune diseases, and mental health challenges, among others.¹⁹ Indeed, stress has been called the “speedometer of life,” suggesting that it influences the rate of aging and quality of life.²⁰

Environmental conditions, events, or daily hassles may be perceived as stressors that strain individuals through a process of resource marshaling, effort, and recovery (see Chapter 7). Significant life events (e.g., combat exposure, death of significant other, retirement) are closely associated with stress. However, research suggests that chronic stress (consistent difficulty with life challenges; e.g., caring for an aging parent) and even daily hassles (minor challenges experienced in daily life e.g., household repair, interpersonal disagreement) significantly impact health and wellbeing as well.²¹

Individuals in midlife encounter all these forms of stressors, yet frequency, severity, and consequences vary considerably. Researchers suggest that exposure and reactivity play considerable roles in determining the effects of stress. Exposure captures the likelihood an individual experiences a stressor and is often driven by life circumstances.²² Due to increased control and autonomy, military members in midlife often have agency to reduce exposure to stressors like role ambiguity, financial instability, and daily hassles. However, this cohort will likely face other stressors associated with midlife (e.g., role overload, caring for ailing others, occupational transitions) and military service (e.g., combat deployments, retirement) that instigate the stress process and affect health and wellbeing. The second factor, reactivity, regards the emotional or physical reaction to the stressor.²³ Individuals react to stressors differently, and those more reactive are at greater risk

17. Margaret E. Kemeny, “The Psychobiology of Stress,” *Current Directions in Psychological Science* 12, no. 4 (2003): 124-129, <https://doi.org/10.1111/1467-8721.01246>.

18. Bruce S. McEwen, “Stress, Adaptation, and Disease: Allostasis and Allostatic Load,” *Annals of the New York Academy of Sciences* 840, no. 1 (1998): 33-44, <https://doi.org/10.1111/j.1749-6632.1998.tb09546.x>.

19. Kemeny, “The Psychobiology of Stress:” 124-129.

20. Hans Selye, *The Stress of Life* (New York: McGraw-Hill, 1956), 274.

21. B. Wheaton, “The Nature of Chronic Stress,” in *Coping with Chronic Stress*, ed. B. H. Gottlieb (New York: Plenum Press, 1997) 43-73; David M. Almeida, “Resilience and Vulnerability to Daily Stressors Assessed via Diary Methods,” *Current Directions in Psychological Science* 14, no. 2 (2005): 64-68, <https://doi.org/10.1111/j.0963-7214.2005.00336.x>.

22. Wheaton, “The Nature of Chronic Stress.”

23. Almeida, “Resilience and Vulnerability to Daily Stressors Assessed via Diary Methods.”

to incur negative health and wellbeing outcomes.²⁴ Fortunately, successful military midlifery likely learned and practice strategies to effectively deal with disparate stressful situations. Unfortunately, however, chronic exposure to stressors and age-related declines in physiological resilience to stressors reduce the effectiveness of reactive strategies. Taken together, military leaders in midlife likely have the autonomy and experience to mitigate the effects of certain stressors yet face increasing vulnerability to them due to reducing physiological defenses.

Negotiating the stress process is closely related to health and wellbeing in midlife. It is interdependent with aging, physical and mental health, nutrition, and sleep. Focusing on these aspects of health combined with implementing strategies building resilience, work-family balance, and mindfulness, among others will improve the likelihood of a productive and rewarding midlife period.

Role Transitions

Beyond physiological changes (e.g., menopause, sarcopenia), midlife development is often characterized by role transitions associated with the period. Raising and launching children, caring for elderly parents, and assuming professional positions of increased responsibility represent a sample of commonly experienced role transitions in midlife. The life course perspective emphasizes the importance of role transitions in understanding the complex relationship among life events, physical health, and wellbeing and the implications for development and identity. We suggest that individuals have agency in influencing the trajectories of their health and wellbeing by thoughtfully and deliberately preparing for and navigating midlife role and identity transitions.

Roles can be appreciated as “the shared expectations attached to social positions in society” such as parent, child, or leader.²⁵ The role of a senior leader, for example, has expectations such as long work hours, critical and systems thinking, risk management, and effective communication. As individuals assume these various roles, their identities often evolve as well. Identity reflects the meanings one attaches to their roles in society, groups to which they belong, and how they perceive themselves.²⁶ Identities can drive behavior, conflict with competing identities (e.g., work-family identities), and influence perceptions of wellbeing. Individuals assuming new

24. J. T. Cacioppo, (1998). “Somatic Responses to Psychological Stress: The Reactivity Hypothesis,” in *Advances in Psychological Science, Vol. 2. Biological and Cognitive Aspects*, eds. M. Sabourin, F. Craik, & M. Robert (Montreal: Erlbaum, 1998), 87-112.

25. Jan E. Stets and Richard T. Serpe, “Identity Theory,” in *Handbook of Social Psychology*, eds. J. DeLamater and A. Ward (Dordrecht: Springer, 2013), 38.

26. Stets and Serpe, 31-60

roles either by choice (e.g., changing jobs) or by circumstance (e.g., caring for ailing parent) embark on a process of exploring expectations of the role and verifying their congruity with the role through external feedback and personal judgement. Perceptions of incongruity with a desired identity can motivate behavior. For example, Ibarra, Snook, and Ramo conceptualize leader development as identity change.²⁷ They suggest that individuals transitioning into new leadership roles compare their current identity regarding role-related competencies with those of the new position. This comparison can motivate behavior in a positive fashion. Incongruities are addressed through development, experimental behavior, feedback, and incorporation. Ultimately, a successful transition results in an evolved identity that aligns with the new role's demands. Yet incongruity with role expectations can also have negative implications. For example, Eagly and Karau explore how gender and work role expectations often conflict for women in leadership positions.²⁸ They suggest that socially shared beliefs of appropriate feminine characteristics conflict with the more agentic, masculine characteristics associated with the leadership role. This conflict results in prejudice toward female leaders that can lead to increased harassment and turnover.²⁹

Eagly and Karau's treatment of role congruity explores one type of role stressor — role conflict. Role conflict describes situations where expectations of roles compete and conflict (e.g., work-family conflict). These challenging conditions are associated with decreased satisfaction, increased tension, and increased propensity to quit.³⁰ Role overload is a second type of role stressor and describes situations where expectations of the role exceed resources and capabilities. One can imagine any or all of the demands faced by midlifers to feel overwhelming and burdensome at times. Unfortunately, role overload can lead to negative outcomes such as burnout.³¹ Finally, role ambiguity, uncertainty about role expectations, is a role stressor asso-

27. Herminia Ibarra, Scott Snook, and Laura Guillen Ramo, "Identity-based Leader Development," in *Handbook of Leadership Theory and Practice*, eds. N. Nohria and R. Khurana (Boston: Harvard Business Press, 2010) 657-678.

28. Alice H. Eagly and Steven J. Karau, "Role Congruity Theory of Prejudice Toward Female Leaders," *Psychological Review* 109, no. 3 (2002): 573-598, <https://doi.org/10.1037/0033-295x.109.3.573>.

29. Jennifer Berdahl, "The Sexual Harassment of Uppity Women," *Journal of Applied Psychology*, 92, no. 2 (2007): 425-437.; Carra S. Sims, Fritz Drasgow, and Louise F. Fitzgerald, "The Effects of Sexual Harassment on Turnover in the Military: Time-Dependent Modeling," *Journal of Applied Psychology* 90, no. 6 (2005): 1141-1152, <https://doi.org/10.1037/0021-9010.90.6.1141>.

30. Daniel Örtqvist and Joakim Wincent, "Prominent Consequences of Role Stress: A Meta-Analytic Review," *International Journal of Stress Management* 13, no. 4 (2006): 399-422, <https://doi.org/10.1037/1072-5245.13.4.399>.

31. Gene M. Alarcon, "A Meta-Analysis of Burnout with Job Demands, Resources, and Attitudes," *Journal of Vocational Behavior* 79, no. 2 (2011): 549-562, <https://doi.org/10.1016/j.jvb.2011.03.007>.

ciated with lower satisfaction and increased tension.³² As midlifers transition out of old roles and into new ones, threats to identity and exposure to stressors are likely inevitable. Preparing for these transitions improves the chances of effectively navigating midlife.

Exemplar Military Midlife Roles

The Senior Leader. Students arrive at the U.S. Army War College (AWC) at a professional inflection point, poised to enter the strategic environment where responsibilities increase, time horizons expand, and complexity is endemic. A shared belief at the AWC is that the demands associated with senior leader roles are substantively different from those at the direct and organizational levels. While the knowledge, skills, and behaviors learned at lower levels often remain relevant and useful, new and evolved competencies gain prominence at the highest levels of organizations and institutions.

Foundational to an effective transition to senior leadership is self-awareness.³³ Individuals who understand their capabilities, preferences, and limitations can better appreciate their developmental needs to succeed in a senior leader role. An accurate comparison between current and aspirational selves reveals gaps for developmental opportunities. The gaps serve as motivation for change—driving developmental efforts and feedback seeking behaviors. A deliberate developmental approach during the transition to senior leadership likely reduces role ambiguity and overload and increases the probability of success.

Not all leaders experience a successful transition to senior leader roles. Many senior positions are exceptionally demanding and pose a risk of role overload and burnout. The demands of the position may cause conflict with other roles—especially with family roles (see Chapter 8). Some leaders will not make the transition effectively and may not be selected for desired, senior positions. Professional disappointments such as these can have negative effects on identity and influence relationships with others. For example, researchers found that candidates rejected for promotion perceived those who were selected as less likable and experienced feelings of envy.³⁴ Experiencing envy is proven to negatively affect “attention and

32. Ortqvist and Wincent, “Prominent Consequences of Role Stress: A meta-analytic review,” 399-422.

33. Michael P. Hosie, “Senior Leader Development,” in *Strategic Leadership: Primer for senior leaders, 4th Ed.*, eds T. Galvin and D. Watson, (Carlisle: U.S. Army War College Press, 2018): 83-92.

34. John Schaubroeck and Simon SK Lam, “Comparing Lots Before and After: Promotion Rejectees’ Invidious Reactions to Promotees,” *Organizational Behavior and Human Decision Processes* 94, no. 1 (2004): 33-47.

memory systems and deplete limited self-regulatory resources available for acts of volition.”³⁵

Making a productive transition to senior leadership positions likely requires an assessment and comparison of current and expected role competencies paired with an associated developmental strategy. Due to potential role overload and conflict at the senior levels, these leaders likely must renegotiate relationships and expectations with others, especially with their family, and determine their capacity to engage in their various roles. Despite challenges, this transition can also be extremely rewarding and offer opportunities for autonomy, institutional impact, and increased influence on successive generations.

The Care-Giver. While not universal, many in the military experience transitions in care-giving roles during midlife. Their children progress through adolescence and leave home for college or other opportunities. Their parents enter old age and potentially suffer illness and pass away. Relationships with partners evolve and responsibilities shift. While care-giving roles present opportunities for meaningful and rewarding impact on others, they can also create conditions for role conflict and overload and pose challenges for midlife development.

Research finds that 15% of middle-aged Americans care directly for their parents, and up to ten million Americans assist their parents from long distance.³⁶ Military midlifers are no different and often care for their aging parents while simultaneously caring for their own children. The phenomenon of caring for multiple generations was labeled as “sandwich care” by Dorothy Miller in 1981 as Baby Boomers were beginning to enter midlife. She asserted “adult children of the elderly, who are ‘sandwiched’ between their aging parents and their own maturing children, are subjected to a great deal of stress. As the major resource and support for the elderly, midlifers have a need for services that are only beginning to be met by the helping professions.”³⁷ Making the care-giving role even more demanding, the American Association of Retired People (AARP) reported in 2020 that 24% of caregivers care for more than one adult (compound care).³⁸

35. Sarah E. Hill, Danielle DelPriore, and Phillip W. Vaughan, “The Cognitive Consequences of Envy: Attention, Memory, and Self-regulatory Depletion,” *Journal of Personality and Social Psychology* 101, no. 4 (2011): 653–666, <https://pubmed.ncbi.nlm.nih.gov/21639650/>.

36. Alana M. Boyczuk and Paula C. Fletcher, “The Ebbs and Flows: Stresses of Sandwich Generation Caregivers,” *Journal of Adult Development* 23, no. 1 (June 2015): 51–61, <https://doi.org/10.1007/s10804-015-9221-6>.

37. Dorothy A. Miller, “The ‘Sandwich’ Generation: Adult Children of the Aging,” *Social Work* 26, no. 5, (September 1981), 419–423.

38. Amanda Singleton, “Tips for Caregiving for Multiple People at the Same Time,” AARP (AARP, August 29, 2022), <https://www.aarp.org/caregiving/life-balance/info-2020/caring-for-multiple-people.html>.

The impact of sandwich or compound care has been widely studied. Researchers warn of the negative impacts of compound care on sleep, relationship quality, work-family conflict and psychological distress.³⁹ Most military members are distanced from their extended families, further exacerbating those effects. Long distance monitoring increases the logistical complexity of caring for extended family and can add guilt and financial strain to the list of negative impacts of sandwich care. This added anguish of parental loss can be especially hard from a distance or when feelings of guilt are also present.⁴⁰ However, sandwich care is not inherently negative. The American Board of Family Practice noted sandwich care often improved family relationships, and the desire to care for elderly parents was frequently listed as a goal of many middle-aged people.⁴¹

Like many transitions in midlife, common changes in familial roles can be both rewarding and challenging. On one hand, parents of children successfully launching into young adulthood may experience feelings of accomplishment and pride. On the other hand, adjusting to an “empty-nest” may demand the adoption of new roles and even changes to one’s identity. Those in midlife may develop deeper and more meaningful relationships with aging parents as the care-giving roles switch. Yet role overload and threats to identity are potential stumbling blocks. Developing a robust support network, preparing for health contingencies, and prioritizing self-care are each important elements of an effective strategy for midlifers negotiating care-giving transitions.

The Midlife Retiree. Research suggests that retirement is not universally experienced as a negative transition.⁴² Indeed, retirement is often seen as an opportunity to explore new opportunities or focus more intently on others. In some cases, retirement can be a relief from job-related stressors. Yet, the military is a profession in which most of its personnel retire in midlife—necessitating career and identity changes at a life stage earlier than many other occupations. Fortunately, there are many resources available to retiring military members (and their spouses) that can help increase the likelihood of a successful transition.

39. Infurna, Gerstorf and Lachman, “Midlife in the 2020s: Opportunities and Challenges,” 476.

40. Margie E. Lachman, “Development in Midlife,” *Annual Review of Psychology* 55, no. 1 (January 2004): 305-331, <https://doi.org/10.1146/annurev.psych.55.090902.141521>.

41. American Board of Family Practice, *Perspectives on Middle Age: The Vintage Years* (Princeton, NJ: New World Decisions, 1990).

42. Raymond Bossé, Carolyn M. Aldwin, Michael R. Levenson, and Kathryn Workman-Daniels, “How Stressful Is Retirement? Findings From the Normative Aging Study,” *Journal of Gerontology* 46, no. 1 (1991): P9-P14, <https://doi.org/10.1093/geronj/46.1.P9>.

The perception that military members struggle with successfully navigating retirement is largely a myth. Many believe that military members may be so attached to their work roles and their service that they would struggle with the identity change brought on by retirement. However, in a study by Mary Anne Taylor and colleagues, military retiree attachment to their military occupation did not predict a decline in life satisfaction.⁴³ This corresponds with other studies that show that the relationship between work-role attachment and retirement transitions are mixed.⁴⁴ Others may suspect that combat exposure might negatively influence wellbeing later in life, but this, too, seems unsupported. In one study, Lee and colleagues found that those exposed to combat were more likely to report positive wellbeing in later life than those who had not.⁴⁵ In another study of 2961 veterans, no relationship between combat exposure and subjective wellbeing was found.⁴⁶

Yet challenges to successful transitions do exist.⁴⁷ Worrying about finances, future jobs, and health represent some of the concerns people have over retiring.⁴⁸ For example, researchers found that the extent to which military retirees met their financial, employment, and social goals in retirement affected perceptions of life satisfaction.⁴⁹ Specifically, those who had negative work experiences post-military retirement or were unhappy with their retirement location were particularly unsatisfied with life.

Fortunately, the nation invests heavily in retirement and transition programs for military members. Robust packages including retirement pay and medical care, among other benefits, provide a safety net and help make the transition less daunting for military retirees. To assist with the process, the Department of Defense (DoD) created Transition Assistance

43. Mary Anne Taylor and Lynn McFarlane Shore, "Predictors of Planned Retirement Age: An Application of Beehr's Model," *Psychology and Aging* 10, no. 1 (1995): 76.

44. Gary A. Adams, Julie Prescher, Terry A. Beehr, and Lawrence Lepisto, "Applying Work-role Attachment Theory to Retirement Decision-making," *The International Journal of Aging and Human Development* 54, no. 2 (2002): 125-137.

45. Hyunyup Lee et al., "Does Combat Exposure Affect Well-Being in Later Life? The VA Normative Aging Study," *Psychological Trauma: Theory, Research, Practice, and Policy* 9, no. 6 (2017): 672-678, <https://doi.org/10.1037/tra0000282>.

46. Mai See Yang and Jeffrey A. Burr, "Combat Exposure, Social Relationships, and Subjective Well-Being Among Middle-Aged and Older Veterans," *Aging & Mental Health* 20, no. 6 (2015): 637-646, <https://doi.org/10.1080/13607863.2015.1033679>.

47. Steven Pflanz and Scott Sonnek, "Work Stress in the Military: Prevalence, Causes, and Relationship to Emotional Health," *Military Medicine* 167, no. 11 (January 2002): 877-882, <https://doi.org/10.1093/milmed/167.11.877>.

48. Melissa Knoll, "Behavioral and Psychological Aspects of the Retirement Decision," *Social Security Bulletin* 71, no. 4 (2011). <https://www.ssa.gov/policy/docs/ssb/v71n4/v71n4p15.html>

49. Mary Anne Taylor et al., "Occupational Attachment and Met Expectations as Predictors of Retirement Adjustment of Naval Officers," *Journal of Applied Social Psychology* 37, no. 8 (2007): 1697-1725, <https://doi.org/10.1111/j.1559-1816.2007.00234.x>.

Programs (TAP) to help prepare military members for life beyond their service.⁵⁰ These programs explore benefits programs, build opportunities through education, training, and networking, and assist with bureaucratic challenges. An example of a DoD transition program is DoD Skillbridge.⁵¹ This program provides opportunities for retiring military members to focus on gaining civilian employment while still on active duty. Within 180 days of retirement, transitioning service members can join participating civilian organizations on an internship/fellowship basis to gain the knowledge, skills, and abilities valued by certain companies and industries. This is just a small sample of the many programs available to military members transitioning out of service. Preparation, support networks, and positive attitudes will go a long way in making the transition successful.

Pivoting toward improved health and wellbeing

We contend that midlife, while challenging, can and should be a dynamic and rewarding period of life for military members and their families. It is a period full of impactful work roles where authority and wisdom gained through experience combine to increase autonomy and influence. It is a period of evolving familial and social roles, offering opportunities for highly meaningful relationships. It is also a period of increased focus on generativity where individuals can invest in subsequent generations in consequential and rewarding ways.

Yet health and wellbeing in midlife and beyond are threatened by the onset of age-related decline, the accumulation of stress, and difficulty in navigating midlife role transitions. This book offers insight into best practices for nurturing health and wellbeing and increasing the probability of positive and meaningful development in midlife.

Hughes, Sipos, and Duque explore midlife physiology in Chapter 2. They present a succinct overview of physiological changes experienced in midlife, providing a foundational understanding of physical processes and age-related challenges. Fortunately, they also offer sound advice for delaying secondary aging, giving insight into best practices for maintaining the health and vigor required for optimal performance in work and social roles.

Building off foundational understanding of midlife physiology, the next section of the book contains chapters on familiar pillars of holistic health:

50. Office of the Chief of Staff, US Army, *Army Regulation 600-81: Soldier for Life- Transition Assistance Program*. (Washington, DC: Department of the Army, May 17, 2016).

51. "DOD Skillbridge," DOD SkillBridge, accessed September 22, 2022, <https://skillbridge.osd.mil/>.

physical fitness, nutrition, sleep, and mindfulness. In Chapter 3, Krammer, Nindl, and Sipos begin with an approach to physical fitness that is firmly influenced by midlife physiological changes and offer proven strategies to both delay and compensate for age-related changes. This chapter should resonate with leaders accustomed to the military's emphasis on physical fitness by offering a promising vision for health and vigor in midlife and beyond.

Emphasizing the centrality of nutrition for health and wellbeing, Olsen, Hosie, and Volpe offer informed, actionable recommendations to improve consumption habits in Chapter 4. The authors leveraged surprisingly negative health data from a cohort of military leaders to highlight the urgency associated with changing nutrition patterns. Readers will especially value their direct treatment of micro-nutrients, vitamins, and supplements – providing clarity to often misrepresented topics.

The next chapter by Hoffman, Sipos, and Capaldi ties health, aging, performance, and even intellectual overmatch to sleep, making a powerful case for leaders to improve their sleep patterns. The authors share data reflecting a sleep crisis in the military where only a small percentage reach appropriate daily thresholds. They follow this up with a rich description of sleep's role in health and wellbeing and complement it with practical, actionable advice to improve sleep hygiene.

The military has robust health services and its commitment to physical fitness is well known. However, the Army's efforts to optimize cognitive performance is less mature and widespread. In Chapter 6, Alessio, Hosie, and Jha offer mindfulness as a proven way to improve cognition, reduce emotional reactivity, and build wellness. The authors explicitly acknowledge the demands of senior leadership in building the case for mindfulness. They highlight the complexity, data saturation, and high stakes of leadership at the highest levels and describe the cognitive abilities needed to respond effectively to such demands. Then, they share mindfulness strategies, supported by empirical evidence, to build improved capacities. Overcoming skepticism to mindfulness is discussed and the chapter offers ways for leaders to both begin an individual practice and incorporate mindfulness into their organizations.

Following these chapters on healthful strategies, Adler, Britt, and Dwyer explore the concept of resilience in Chapter 7. Importantly, their well-grounded approach to the topic is focused on the unique environment of senior leaders and offers proven strategies to improve individual and team resilience. Best practices in recovery and coping are shared, providing useful tools for the military midlifer. However, their deft treatment of emotion regulation might best benefit individuals seeking to navigate chal-

lenging life events, daily hassles, and complex social roles simultaneously. Finally, the authors emphasize the importance of humility when grappling with inevitable challenges and disappointments in midlife. This refreshing approach acknowledges that even proven strategies associated with building and maintaining resilience require empathy and consistent adaptation for effectiveness.

Finally, the book concludes with a chapter by Steadman, Britt, and Hammer on work-life balance. At the Army War College, many students scoff at the idea of “balance,” believing that the overwhelming demands of senior leadership roles deny an equal effort toward familial roles. The authors reframe this proposition through an occupational health lens and emphasize the active management of personal resources to meet multiple role expectations in ways that support health and wellbeing. Their access to a current cohort of emerging senior leaders makes this chapter especially timely and relevant.

Taken together, the chapters in this book serve multiple objectives. First, each of the chapters are set in the midlife context where aging and role transitions interact with the unique military context. Second, the chapters all emphasize the importance of action—leaders must attend to their health and wellbeing in midlife for themselves and those for whom they care. Third, each of the topics are firmly grounded in science, avoiding the unsupported fads and trends popular in the health and wellbeing space. Finally, the authors all worked to provide best practices in their domains to make a positive difference in this important and valued cohort. Collectively, the hope is that aspiring senior leaders focus more deliberately on their health and wellbeing and maximize the rich opportunities of midlife.

Key Takeaways

- Midlife is a dynamic developmental period requiring deliberate and informed action to maximize its amazing potential to enrich health and wellness.
- Midlife is characterized by emerging physical and cognitive effects of aging and social role transitions offering both opportunities and challenges.
- Negotiating the stress process is closely related to health and wellbeing in midlife.
- Role changes (e.g., elder-care, promotion, retirement) in midlife influence wellness trajectories. The interaction among life events, health, and subjective wellbeing can be positively negotiated through thoughtful and proactive identity transitions.

Chapter 2

PHYSIOLOGICAL CHANGES IN MIDLIFE

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...intelligence and skill can only function at the peak of their capacity when the body is healthy and strong...hardy spirits and tough minds usually inhabit sound bodies.

John F. Kennedy¹

In Chapter 1, Hosie, Meredith, and Almeida defined the concept of midlife as the period between the ages of forty and sixty-five. This midlife period is when most senior leaders tend to move into more mentally demanding positions and, as a result, become increasingly sedentary while working longer hours. Unfortunately, changes in work and family environments commonly experienced in midlife can exacerbate physiological challenges and decline.² Since senior leaders hold critical billets within their respective services, they should adopt health and wellbeing practices to maximize their performance in support of the success of their units, agencies, and/or staffs.

Senior leader health and wellness is a strategic issue that impacts leader availability and productivity. Unfortunately, health and wellness indicators are declining across the force. According to the Centers for Disease

1. John F. Kennedy, "The Soft American," *Sports Illustrated*, December 26, 1960, 15-17, <https://vault.si.com/vault/1960/12/26/43278#&gid=ci0258c07fc00526ef&pid=43278---017---image>.

2. Lynn F. Cherkas et al., "The Association Between Physical Activity in Leisure Time and Leukocyte Telomere Length," *Journal of the American Medical Association Internal Medicine* 168, no. 2 (January 28, 2008): 154-58, <https://jamanetwork.com/journals/jamainternalmedicine/fullarticle/413815>.

Control, the Department of Defense spends about \$1.5 billion per year in obesity-related health care costs, with obese service members 33% more likely to experience musculoskeletal injuries. Overweight and obesity statistics increased among service members from 2011 to 2015 by 73%, and lost workdays related to these conditions cost the Department of Defense \$103 million a year.³ The incidence of heart disease, the leading cause of death in the United States, increased significantly in soldiers from 6.8% to 9.4% between 2007 to 2014.⁴ Contrary to expectations, the study found that active-duty troops had higher blood pressure than like-aged civilian counterparts. This troubling trend was also seen in the US Army War College (USAWC) student population. Fortunately, research suggests that wellness programs can be part of a solution, potentially increasing productivity and reducing absenteeism.⁵

The USAWC Senior Leader Sustainment Program provides resident students at Carlisle Barracks a holistic health and fitness assessment that includes bloodwork, body composition, strength, cardiovascular health, and diet. Participants receive personalized lifestyle recommendations and, if necessary, medical intervention.⁶ The average participant in Academic Year 2021 was 45 years old, squarely in midlife.⁷ Although the average participant had a 23.6% body fat, approximately 15% of them had a body fat percentage greater than 30% and 20% had a body mass index over 30, placing them at high risk for health issues.⁸ Similarly, the average total cholesterol level was 196.6 mg/dL, but 46% of the participants had high total cholesterol levels (over 200 mg/dL).⁹ Moreover, 30% of the participants had high low-density lipoprotein cholesterol levels (over 130 mg/

3. National Center for Chronic Disease Prevention and Health Promotion, "Chronic Diseases and Military Readiness," Chronic Disease Fact Sheets, Centers for Disease Control, last reviewed August 10, 2022, <https://www.cdc.gov/chronicdisease/resources/publications/factsheets/military-readiness.htm>.

4. "Army Troops Have Worse Heart Health than Civilian Population, Study Says," American Heart Association, June 5, 2019, . <https://www.heart.org/en/news/2019/06/05/army-troops-have-worse-heart-health-than-civilian-population-study-says>.

5. Jeffrey Hayzlett, "Do Wellness Programs Make Employees More Productive? The Obvious Answer Is Yes," Entrepreneur, March 2, 2018, <https://www.entrepreneur.com/article/309685>.

6. Robert Martin, "Senior Leader Sustainment Program - A Priority for the Army War College," News, U.S. Army War College, August 23, 2019, <https://www.armywarcollege.edu/news/article/1476>.

7. U.S. Army War College 2021 Senior Leader Sustainment Program, personal communication with David Hughes, 2021.

8. National Heart, Lung, and Blood Institute, "BMI Tools," National Institutes of Health, accessed on April 5, 2021, https://www.nhlbi.nih.gov/health/educational/lose_wt/bmitools.htm.

9. Rena Goldman, "The Recommended Cholesterol Levels by Age," Healthline, last updated August 24, 2021, <https://www.healthline.com/health/high-cholesterol/levels-by-age>.

dL), 8% had low high-density lipoprotein levels (less than 40 mg/dL), and 12.8% had high blood glucose levels (over 100 mg/dL).¹⁰ Finally, approximately 70% of the participants were categorized as having higher than normal blood pressure (over 120/80 mm Hg) according to the American Heart Association standards.¹¹ When considered as a whole, these numbers stress the importance of making critical lifestyle choices to reverse these warning signs and slow the physiological changes that occur during midlife, particularly in individuals facing the additional challenges associated with aging and senior leadership.

Aging is affected by both biological and environmental factors. Primary aging, or the age-related changes influenced by genetics, is less malleable than secondary aging, or age-related changes associated with lifestyle choices (e.g., physical activity levels and dietary choices).¹² Many adults in midlife misattribute their physical condition to primary aging and underestimate the role their own decisions play in the aging process.¹³ Several research studies, particularly those that followed twins across their lifespan, attribute 25% of longevity to heredity.¹⁴ Thus, environmental factors and lifestyle choices play a far more significant role in determining longevity and the resulting quality of life than people realize. That means senior leaders have the power to influence the aging process. By controlling the factors within their control, senior leaders can remain physically fit and avoid many of the unpleasant changes associated with secondary aging while mitigating the biological changes that lead to frailty later in life.¹⁵

As senior leaders age, their bodies' resources are taxed more to remain at rest (homeostasis) and have fewer resources available when needed to respond to challenges (a phenomenon called homeostenosis).¹⁶ The aging

10. Mayo Clinic Staff, "Diabetes," Diseases & Conditions, Mayo Clinic, last updated October 30, 2020, <https://www.mayoclinic.org/diseases-conditions/diabetes/diagnosis-treatment/drc-20371451>.

11. American Heart Association Editorial Staff, "Understanding Blood Pressure Reading," American Heart Association, accessed April 5, 2021, <https://www.heart.org/en/health-topics/high-blood-pressure/understanding-blood-pressure-readings>.

12. Ewald Busse and Eric Pfeiffer, "Theories of Aging," in *Behavior and Adaptation in Late Life* (Boston: Little, Brown and Company, 1969), 11-31.

13. Martha Lally and Suzanne Valentine-French, "8.1: Physical Development in Middle Adulthood" in *Lifespan Development: A Psychological Perspective* (The University of California, CA: Libre Texts, 2019), accessed on December 10, 2020, [https://socialsci.libretexts.org/Bookshelves/Human_Development/Book%3A_Lifespan_Development_-_A_Psychological_Perspective_\(Lally_and_Valentine-French\)/08%3A_Middle_Adulthood/8.01%3A_Physical_Development_in_Middle_Adulthood](https://socialsci.libretexts.org/Bookshelves/Human_Development/Book%3A_Lifespan_Development_-_A_Psychological_Perspective_(Lally_and_Valentine-French)/08%3A_Middle_Adulthood/8.01%3A_Physical_Development_in_Middle_Adulthood).

14. Giuseppe Passarino, Francesco De Rango, and Alberto Montesanto, "Human Longevity: Genetics or Lifestyle? It Takes Two to Tango," *Immunity & Ageing* 13, no. 12 (2016), <https://doi.org/10.1186/s12979-016-0066-z>.

15. Lally and Valentine-French, "8.1: Physical Development."

16. George Taffet, "Normal Aging," UpToDate, last updated April 19, 2019, <https://www.uptodate.com/contents/normal-aging>; The diminishing reserves are observed in decreased responsiveness in heart rate variability, blood pressure, and stress response to stimuli.

body's inability to respond to stressors increases disease and injury risk and culminates in frailty, where even the most minor challenges can overwhelm available resources.¹⁷ Despite this decline, senior athletes maintain more significant heart rate variability and exercise capacity than their sedentary counterparts, demonstrating that lifestyle choices can affect the rate of degeneration towards homeostasis.¹⁸ The following sections examine the effects of aging on different physiological systems and how lifestyle choices can affect them.

The Musculoskeletal System

The musculoskeletal system is comprised of the bones, muscles, tendons, ligaments, joints, cartilage, and other connective tissues that provide form, support, stability, and movement to the body.¹⁹ This section focuses on muscle and bone, both of which experience age-related decline significantly responsive to lifestyle choices. Frailty later in life is characterized by significant loss of muscle mass, strength, and changes in muscle composition. Sarcopenia, the age-related loss of lean muscle mass, is accompanied by a loss in power, progresses non-linearly, accelerating with advanced age.²⁰

Numerous factors contribute to sarcopenia, making it difficult to determine the specific rate of decline. For example, muscles are highly dependent upon the cardiovascular and nervous systems to function.²¹ Moreover, changes in basal metabolic rate, body composition, insulin resistance, hormone levels, and physical activity levels can also contribute to sarcopenia. On average, men lose 0.47% of their muscle mass per year beginning in their thirties, whereas women lose 0.37% of their muscle mass per year beginning in their thirties.²² This loss of mass translates to approximately

17. Taffet, "Normal Aging."

18. F. Galetta, et al., "Lifelong Physical Training Prevents the Age-Related Impairment of Heart Rate Variability and Exercise Capacity in Elderly People," *Journal of Sports Medicine and Physical Fitness* 45, no. 2 (June 2005): 217-21, <https://pubmed.ncbi.nlm.nih.gov/16355084/>.

19. Alexandra Villa-Forte, "Introduction to the Biology of the Musculoskeletal System" in *Bones, Joint, and Muscle Disorders*, Merck Manuals Consumer Version (Rahway, NJ: Merck & Co., December 2019), <https://www.merckmanuals.com/home/bone-joint-and-muscle-disorders/biology-of-the-musculoskeletal-system/introduction-to-the-biology-of-the-musculoskeletal-system>.

20. Patrick Siparsky, Donald Kirkendall, and William Garrett, "Muscle Changes in Aging: Understanding Sarcopenia," *Sports Health* 6, no. 2, (Jan/Feb 2014): 36-40, <https://doi.org/10.1177/1941738113502296>.

21. Timothy Doherty, "Invited Review: Aging and Sarcopenia," *Journal of Applied Physiology* 95 (2003):1717-19, <https://doi.org/10.1152/jappphysiol.00347.2003>.

22. W. Kyle Mitchell et al., "Sarcopenia, Dynapenia, and the Impact of Advancing Age on Human Skeletal Muscle Size and Strength: A Quantitative Review," *Frontiers in Physiology* 3, no. 260 (July 11, 2012), <https://www.frontiersin.org/articles/10.3389/fphys.2012.00260/full>.

one-half pound of muscle per year from thirty to sixty years while simultaneously gaining a pound of fat per year.²³ Coincidentally, men lose 3-4% of their muscular strength per year, and women lose 2.5-3% of their muscular strength per year.²⁴ Sarcopenia is most dramatic and observable in later adulthood, particularly the seventh decade. In contrast, the slower rate of decline before and during midlife may not affect daily activities and may only be apparent under significant stress.²⁵

Nevertheless, healthy lifestyle choices during midlife reduce functional impairment later in life, reinforcing the importance of lifestyle choices.²⁶ Sedentary individuals lose muscle mass and corresponding strength at higher rates than physically active individuals. For example, immobilized patients and patients on bed rest lost substantial skeletal muscle mass and between 0.3% and 4.2% muscle strength per day.²⁷

Age-related decreases in muscle mass and strength also coincide with changes in muscle composition. Type I muscle fibers, or slow-twitch muscles, are associated with muscular endurance. The number of type I muscle cells remains relatively static throughout adulthood and decreases in volume by 25% or less throughout the lifespan.²⁸ The relatively fixed number of type I cells explains, in part, how older athletes can continue to compete in endurance events, often setting personal bests during midlife.²⁹

On the other hand, type II muscle fibers, or fast-twitch muscles associated with peak strength and explosive power, decline significantly with age.³⁰ The number and size of type II muscle fibers peak before the age of

23. Taylor J. Marcell, "Sarcopenia: Causes, Consequences, and Preventions," *The Journals of Gerontology Series A* 58, no. 10 (October 2003), M911-M916, <https://doi.org/10.1093/gerona/58.10.M911>.

24. Mitchell et al., "Sarcopenia."

25. Richard G. Stefanacci, "Physical Changes with Aging" (Rahway, NJ: Merck & Co., December 2019), Merck Manual Professional Version, last modified September 2022, <https://www.merckmanuals.com/professional/geriatrics/approach-to-the-geriatric-patient/physical-changes-with-aging#v1130874>.

26. Stefanacci, "Physical Changes with Aging."

27. Michael Tieland, Inez Trouwborst, and Brian C. Clark, "Skeletal Muscle Performance and Aging," *Journal of Cachexia, Sarcopenia and Muscle* 9, no. 1 (November 19, 2017): 3-19, <https://doi.org.usawc.idm.oclc.org/10.1002/jcsm.12238>.

28. Doherty, "Invited Review," 1721.

29. Ben Opipari, "Even in Middle Age, Your Best Running Days May Still be Ahead of You," *Wellness, The Washington Post Online* (March 8, 2017), https://www.washingtonpost.com/lifestyle/wellness/even-in-middle-age-your-best-running-days-may-still-be-ahead-of-you/2017/03/07/5bf54696-fddc-11e6-99b4-9e613afeb09f_story.html.

30. Pete McCall, "Muscle Fiber Types: Fast-Twitch vs. Slow-Twitch," *Exercise Science, American Council on Exercise*, October 30, 2015, <https://www.acefitness.org/education-and-resources/professional/expert-articles/5714/muscle-fiber-types-fast-twitch-vs-slow-twitch/>.

thirty and gradually decrease after that.³¹ The age-related decline in type II muscle fibers plays a significant role in strength loss and is evident in the National Football League and the National Basketball Association players. Both sports require significant explosive power and bursts of speed, and, in both cases, the average age of players is twenty-six years old.³² The average age of National Football League and the National Basketball Association players mirrors the decline in fast-twitch muscles that begins around thirty and demonstrates the relationship between fast-twitch muscle fibers and age-related losses in general muscle strength.³³

Although the average age in the National Football League demonstrates the impacts of aging, several players seem to defy the effects of aging. Max Kellerman, a commentator on ESPN's *First Take*, famously stated in 2016 that quarterback Tom Brady would fall off a cliff and become a bum in short order.³⁴ Since that time, Brady appeared in four Super Bowls, winning three (including one with a new team), was Super Bowl Most Valuable Player twice, and was the League Most Valuable Player once.³⁵ Kellerman failed to appreciate how Brady's lifestyle choices, from his TB12 workout methods to his diet, have allowed him to continue to play at a high level.³⁶ Although senior military leaders may not be playing professional football, they can still realize benefits from healthy lifestyle choices throughout adulthood. For example, men over the age of sixty-six who trained at 80% of their one-repetition maximum achieved gains in strength similar to improvements seen in much younger men. Moreover, adults over the age of ninety also improved their strength, resulting in higher levels of mobility.³⁷ Studies such as these suggest that lifelong exercise allows men and women to maintain their strength and endurance longer across their lifespans.

31. Stefanacci, "Physical Changes with Aging."

32. Khari Arnold, "Nine Takeaways from 2018-2019 NBA Roster Survey," News, National Basketball Association, October 24, 2018, <https://www.nba.com/news/takeaways-2018-19-nba-roster-survey>; ESPN Stats & Info, "Average Age in Esports Vs. Major Sports," Esports, ESPN, September 17, 2017, https://www.espn.com/esports/story/_/id/20733853/the-average-age-esports-versus-nfl-nba-mlb-nhl.

33. Siparsky, Kirkendall, and Garrett, "Muscle Changes in Aging," 38.

34. *First Take*, "The Best of Max Kellerman's Tom Brady 'Cliff Theory,'" aired on January 19, 2020, on ESPN, YouTube video file, 07:59, <https://www.youtube.com/watch?v=RvyAVctVB5I&t=556s>.

35. Nick Goss, "ESPN's Max Kellerman Roasts Himself With Awesome Tom Brady 'Cliff' Tweet," Sports, News, NBC Boston, January 24, 2021, updated January 24, 2021, <https://www.nbcboston.com/news/sports/nbcports/espn-max-kellerman-roasts-himself-with-awesome-tom-brady-cliff-tweet/2286003>.

36. Scott Davis, "Tom Brady Is Still Dominating in His 40s Thanks to a Strict Fitness and Nutrition Lifestyle He Calls 'The TB12 Method,'" Sports, *Insider Online*, updated March 23, 2020, <https://www.businessinsider.com/the-tb12-method-how-tom-brady-trains-to-stay-at-the-top-of-his-game-2017-12>.

37. Siparsky, Kirkendall, and Garrett, "Muscle Changes in Aging," 38.

Like muscle development, we can influence bone development across the lifespan. Skeletal bones provide the body's structure, support body weight, protect vital organs, store minerals, produce blood cells, and work with muscles to enable movement. The skeletal system consists of 206 bones, cartilage, joints, ligaments, and tendons.³⁸ Bone composition, approximately 65% inorganic (mainly calcium phosphate) and 35% organic (primarily collagen), affects bone growth and health.

Across the lifespan, bones undergo a process of generation, regeneration, and decline. Bones grow in length until a point late in adolescence when the growth plates close.³⁹ From this point, the bones continue a process known as remodeling, the resorption of old bone and deposition of new bone, bringing bone density to a peak before age thirty, and ultimately replacing the skeleton approximately every ten years.⁴⁰ The remodeling process involves the interaction of two cell types, osteoclasts and osteoblasts, that interact with hormones, minerals, growth factors, and environmental factors.⁴¹

Hormones, particularly testosterone and estrogen, play a significant role in controlling remodeling. The decrease in estrogen, for example, causes a greater rate of resorption over deposition, making low bone density particularly concerning for post-menopausal women.⁴² For example, osteoporosis is a disease commonly seen in women that develops as bone mineral density and mass decline, increasing fracture risk. Osteoporosis often becomes evident only after a fracture, as symptoms may not be present.⁴³ Osteoporosis occurs when the bone mineral density levels fall at least 2.5 standard deviations below the levels seen in young adults. Osteopenia exists when bone mineral density levels drop between 1 - 2.5 standard

38. "Skeletal System," Health Library, Cleveland Clinic, last reviewed November 19, 2019, accessed February 6, 2021, <https://my.clevelandclinic.org/health/articles/21048-skeletal-system>.

39. Frank Pessler, "Overview of Bone Disorders in Children" in *Bone Disorders in Children*, Merck Manual Consumer Version (Rahway, NJ: Merck & Co., December 2019), last modified November 2022, <https://www.merckmanuals.com/home/children-s-health-issues/bone-disorders-in-children/overview-of-bone-disorders-in-children#v38720668>.

40. Alexandra Villa-Forte, "Bones," in *Bones, Joint, and Muscle Disorders*, Merck Manuals Consumer Version (Rahway, NJ: Merck & Co., December 2019), last modified September 2022, <https://www.merckmanuals.com/home/bone,-joint,-and-muscle-disorders/biology-of-the-musculoskeletal-system/bones>.

41. George K. Chan and Gustavo Duque, "Age-Related Bone Loss: Old Bone, New Facts," *Gerontology* 48, no. 2 (March/April 2002), 62-63, <https://doi.org/10.1159/000048929>.

42. Chan and Duque, "Age-Related Bone Loss," 64.

43. NIH Osteoporosis and Related Bone Diseases National Resource Center, "Osteoporosis Overview," National Institute of Arthritis and Musculoskeletal and Skin Diseases, National Institutes of Health, last reviewed October 2019, <https://www.bones.nih.gov/health-info/bone/osteoporosis/overview>.

deviations below normal levels and is considered a precursor to osteoporosis.⁴⁴ Hormone replacement therapy may help post-menopausal women retain bone mineral density, but it carries significant risks that will be discussed later.⁴⁵

Although most osteoporosis studies have focused on older adult populations, low bone density is becoming a concern for adults in midlife.⁴⁶ In a recent study, more than a quarter of the men and women between thirty-five and fifty years old had osteopenia, leading to osteoporosis in later life.⁴⁷ Moreover, the number of fat-storing cells (adipose tissue) deposited within the bone marrow also increased with age.⁴⁸ Higher levels of bone marrow fat and lower bone density correlate with a higher incidence of fractures, but the exact causal relations are still under investigation.⁴⁹ These findings are concerning, but the lifestyle choices described below can help maintain skeletal health.

The lifestyle choice that most directly impacts skeletal health is the decision to engage in weight-bearing exercises such as weightlifting, hiking, walking, and climbing stairs.⁵⁰ Sustaining high levels of weight-bearing training also increases bone mineral density, strength, balance, and coordination, all of which lower fall risk and instances of bone fracture later in life.⁵¹

Besides performing weight-bearing exercises, senior leaders should meet the recommended daily intake of calcium and vitamin D to support healthy bone mass. Calcium is readily available in dairy products, fatty

44. World Health Organization Scientific Group, *The Assessment of Osteoporosis at Primary Health Care Level*, Summary Report PDF (Geneva: WHO Collaborating Centre for Metabolic Bone Diseases, 2007), 2, https://frax.shef.ac.uk/FRAX/pdfs/WHO_Technical_Report.pdf.

45. Martha Lally and Suzanne Valentine-French, "8.5: Climacteric" in *Lifespan Development: A Psychological Perspective* (The California State University, CA: Libre Texts, 2019), accessed on December 10, 2020, [https://socialsci.libretexts.org/Bookshelves/Human_Development/Book%3A_Lifespan_Development_-_A_Psychological_Perspective_\(Lally_and_Valentine-French\)/08%3A_Middle_Adulthood/8.05%3A_Climacteric](https://socialsci.libretexts.org/Bookshelves/Human_Development/Book%3A_Lifespan_Development_-_A_Psychological_Perspective_(Lally_and_Valentine-French)/08%3A_Middle_Adulthood/8.05%3A_Climacteric).

46. Martha A. Bass et al., "Bone Mineral Density Among Men and Women Aged 35 to 50 Years," *Journal of American Osteopathic Association* 119, no. 6 (June 2019), 358, <https://jaoa.org/article.aspx?articleid=2735169>.

47. Bass et al., "Bone Mineral Density," 357.

48. Taffet, "Normal Aging."

49. Xiaojuan Li and Ann Schwartz, "MRI Assessment of Bone Marrow Composition in Osteoporosis," *Current Osteoporosis Reports* 18, no. 1 (February 2020): 57-66, <https://doi.org/10.1007/s11914-020-00562-x>.

50. Villa-Forte, "Introduction to the Biology."

51. Karl Michaelsson et al., "Leisure Physical Activity and the Risk of Fracture in Men," *PLOS Medicine* 4, no. 6 (June 19, 2007), <https://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.0040199>.

fish, almonds, sesame seeds, and many green leafy vegetables.⁵² The body also produces vitamin D, which aids in calcium absorption when cholesterol in the skin is converted into vitamin D after exposure to ultraviolet radiation.⁵³ Although several factors (i.e., geographic location and skin tone) affect how quickly the body begins converting vitamin D, as little as 15 minutes a day may be sufficient. Levels can also be augmented by eating vitamin D-rich foods such as milk and cereal, fatty fish (i.e., salmon and tuna), mushrooms, and egg yolks.⁵⁴ Doctors may also recommend a supplement if your vitamin D levels are low.

The Neurocognitive System

The neurocognitive system includes the structures and processes in the central nervous system that regulate cognitive function.⁵⁵ The brain receives inputs from the various senses, processes them, and controls the body's response. The brain is composed of grey matter (primarily neurons) and white matter (primarily axons that connect nerve cells). Axons are covered in a fatty substance called myelin that gives them their white appearance.⁵⁶ Both grey and white matter play a role in neurocognitive health.

Cognitive abilities continue to increase into the fifties but begin to decline as the volume of white matter begins to fall.⁵⁷ For example, longitudinal studies using a battery of cognitive tests revealed cognitive function improves well into midlife.⁵⁸ These findings also illustrate the difference between fluid and crystallized intelligence. Fluid intelligence is the capacity to learn new ways of solving problems and performing activities quickly and abstractly. Crystallized intelligence is the accumulated knowledge of the world acquired through formal learning and experience. Both crystallized and fluid intelligence tend to increase through early adulthood but then begin to diverge as fluid intelligence begins to decline.⁵⁹ Although

52. Marcy B. Bolster, "Osteoporosis" in *Bones, Joint, and Muscle Disorders*, Merck Manuals Consumer Version (Rahway, NJ: Merck & Co., December 2019), last modified September 2022, <https://www.merckmanuals.com/home/bone,-joint,-and-muscle-disorders/osteoporosis/osteoporosis#v28546768>.

53. Ansley Hill, "7 Effective Ways to Increase Your Vitamin D Levels," Healthline, March 17, 2019, last reviewed May 5, 2022, <https://www.healthline.com/nutrition/how-to-increase-vitamin-d>.

54. Hill, "7 Effective Ways."

55. "Neurocognitive," Medical, Merriam-Webster, accessed February 7, 2021, <https://www.merriam-webster.com/medical/neurocognitive>.

56. Esther Heerema, "White Matter in the Brain," Verywell Health, last updated April 15, 2022, <https://www.verywellhealth.com/what-is-white-matter-in-the-brain-98119>.

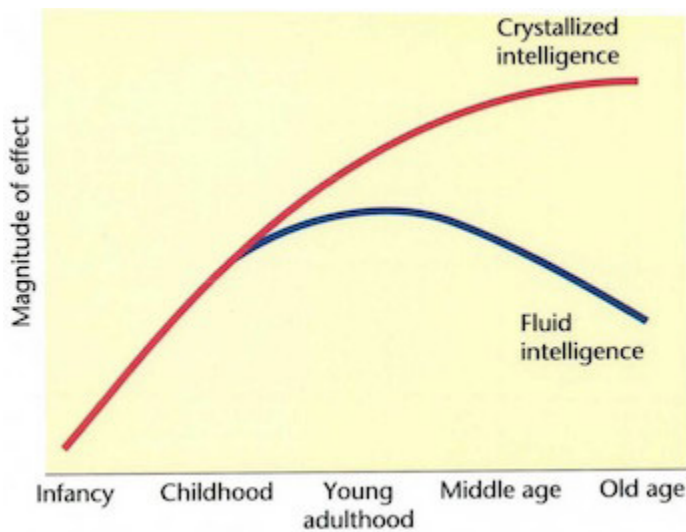
57. Melissa Lee Phillips, "The Mind at Midlife," *Monitor on Psychology* 42, no. 4 (April 2011), <https://www.apa.org/monitor/2011/04/mind-midlife>.

58. Phillips, "The Mind at Midlife."

59. Martha Lally and Suzanne Valentine-French, "8.6: Brain Functioning" in *Lifespan Development: A Psychological Perspective* (The University of California, CA: Libre Texts, 2019), accessed on December 10, 2020, <https://opentextbooks.concordia.ca/lifespandevelopment/chapter/8-6-brain-functioning/>.

an older adult may not think as quickly as a younger adult, they have a broader base to draw from, allowing them to achieve better outcomes.⁶⁰ For example, a younger chess player may decide on moves faster, but older players tend to win by drawing on years of experience. Even when presented with a seemingly novel situation, the midlife adult is likely to have faced a similar problem and have a potential solution.⁶¹ Moreover, adults in midlife tend to be calmer and better able to navigate social situations than younger adults.⁶² Retaining cognitive function is one of the more positive aspects of aging in midlife, but several lifestyle choices can help sustain cognitive health across the lifespan.⁶³

Figure 2. Crystallized and Fluid Intelligence.⁶⁴



Countless software developers claim that their smartphone applications can help improve cognition. However, researchers at Cedars-Sinai suggest that developing neuroplasticity, or the brain's ability to rewire itself, is

60. Phillips, "The Mind at Midlife."

61. Martha Lally and Suzanne Valentine-French, "8.8: Gaining Expertise - The Novice and the Expert" in *Lifespan Development: A Psychological Perspective* (The University of California, CA: Libre Texts, 2019), accessed on December 10, 2020, [https://socialsci.libretexts.org/Bookshelves/Human_Development/Book%3A_Lifespan_Development_-_A_Psychological_Perspective_\(Lally_and_Valentine-French\)/08%3A_Middle_Adulthood/8.08%3A_Gaining_Expertise_-_The_Novice_and_the_Expert](https://socialsci.libretexts.org/Bookshelves/Human_Development/Book%3A_Lifespan_Development_-_A_Psychological_Perspective_(Lally_and_Valentine-French)/08%3A_Middle_Adulthood/8.08%3A_Gaining_Expertise_-_The_Novice_and_the_Expert).

62. Phillips, "The Mind at Midlife."

63. Lisa Ronan et al., "Obesity Associated with Increased Brain Age from Midlife," *Neurobiology of Aging* 47 (2016): 63-70, <https://doi.org/10.1016/j.neurobiolaging.2016.07.010>.

64. Sarah Bryant, "Working Memory Training," Study.com, September 11, 2017, <https://study.com/academy/lesson/working-memory-training.html>.

more complicated than simply repeating the same tasks.⁶⁵ Optimally, the brain needs to be challenged continuously with new trials while being supported by an overall healthy lifestyle. In other words, eating a healthy diet consisting of whole foods, getting adequate sleep, not smoking, limiting alcohol consumption, and getting regular exercise benefits both the heart and the brain.⁶⁶

Maintaining a healthy lifestyle may also support the brain in another surprising way. A recent study measured white matter volume in individuals categorized by body mass index. As expected, white matter increased through middle age and decreased after that. For overweight and obese subjects, however, white matter volume decreased more rapidly than in lean subjects. Overweight or obese participants exhibited accelerated brain age by a decade compared to the lean subjects in midlife, suggesting that cardiovascular fitness can protect and restore white matter and short-term memory.⁶⁷

The Cardiopulmonary System

The cardiopulmonary system is composed of two distinct but interrelated systems. The cardiovascular system includes the heart, blood vessels, and blood that work together to transport oxygen, nutrients, hormones, and waste, fight infection, clot bleeding in wounds, and support thermoregulation.⁶⁸ The collection of airways, lungs, muscles, and blood vessels that allow us to breathe make up the respiratory system. While its primary function is to exchange oxygen and carbon dioxide, the respiratory system also allows us to talk and smell. The musculoskeletal system provides the structure and muscular function that facilitates breathing, while the respiratory system provides the oxygen that fuels the muscles.⁶⁹

Senior leaders must focus on their cardiopulmonary health in midlife. According to the Centers for Disease Control and Prevention, heart disease and cancer are the leading causes of death in midlife. Improvements in detecting and treating cancer have led to a steady decline in cancer deaths from 1999 to 2017. Although total deaths from heart disease also decreased,

65. Kyle Beswick, "Do Brain Games Help Brain Health?" Cedars-Sinai, Cedars-Sinai (blog), September 23, 2019, <https://www.cedars-sinai.org/blog/brain-games.html>.

66. "The Thinking on Brain Games," Harvard Health Publishing, Harvard Medical School, October 1, 2019, <https://www.health.harvard.edu/mind-and-mood/the-thinking-on-brain-games>.

67. Ronan et al., "Obesity," 63-70.

68. Healthline Editorial Team, "Circulatory," Human Body Maps, Healthline, last updated December 31, 2021, <https://www.healthline.com/human-body-maps/circulatory-system#1>.

69. "Respiratory System," Health Library, Cleveland Clinic, last reviewed January 24, 2020, <https://my.clevelandclinic.org/health/articles/21205-respiratory-system>

researchers noticed a troubling increase in deaths in subjects between 44 and 64 years old during the last three years of the study.⁷⁰ These years coincide with periods of increased stress associated with senior leadership.

In a recent study, the Defense Health Agency found that 18.1% of active-duty service members had at least one of the risk factors associated with cardiovascular disease - obesity, high cholesterol, high blood pressure, or elevated blood glucose levels. The incidence rates increased progressively with advancing age, mirroring the findings seen in the USAWC student population (see page 2).⁷¹ In addition, senior leaders are more likely to have experienced deployments, further increasing their risk for heart disease.⁷²

Maximum oxygen utilization ($VO_{2\max}^2$), or the cardiopulmonary system's maximum workload, also decreases throughout midlife and beyond. The traditional formula for estimating maximum heart rate ($220 - \text{age}$) highlights aging's impact on the heart's ability to work.⁷³ Other procedures used to calculate the maximum aerobic heart rate, where the exertion level is nearly all aerobic, also use age in the computation.⁷⁴ Whether using a formula to estimate maximum heart rate or maximum aerobic heart rate, work capacity diminishes with age. Although physical exercise can improve aerobic capacity in sedentary individuals, physical training does not modify the age-related decline in maximum heart rate.⁷⁵ Studies have indicated that the rate of decrease in aerobic capacity coming into and through midlife begins at 3-6% per decade but accelerates to 20% per decade beyond age seventy.⁷⁶ The rapid degradation in the ability to use oxygen across the lifespan underscores the need to sustain aerobic fitness in midlife as a critical component of well-being later in life.

70. Sally C. Curtin, "Trends in Cancer and Heart Disease Death Rates Among Adults Aged 45-64: United States, 1999-2017," *National Vital Statistics Reports* 68, no. 5 (May 22, 2019): 1-9, https://www.cdc.gov/nchs/data/nvsr/nvsr68/nvsr68_05-508.pdf.

71. Francis O'Donnell, Shauna Stahlman, and Alexis A. Oetting, "Incidence Rates of Diagnoses of Cardiovascular Diseases and Associated Risk Factors, Active Component, U.S. Armed Forces, 2007-2016," *Medical Surveillance Monthly Report* 25, no. 3 (March 2018): 12-18, <https://www.health.mil/Reference-Center/Reports/2018/01/01/Medical-Surveillance-Monthly-Report-Volume-25-Number-3>.

72. "Nancy F. Crum-Cianflone et al., "Impact of Combat Deployment and Posttraumatic Stress Disorder on Newly Reported Coronary Heart Disease Among US Active Duty and Reserve Forces," *Circulation* 129, no. 18 (May 6, 2014): 1813-820, <https://doi.org/10.1161/CIRCULATIONAHA.113.005407>.

73. Taffet, "Normal Aging."

74. Phillip Maffetone, "The MAF 180 Formula: Heart-rate Monitoring for Real Aerobic Training," MAF, last updated July 2020, <https://philmaffetone.com/180-formula/>.

75. Taffet, "Normal Aging."

76. Jerome L. Fleg et al., "Accelerated Longitudinal Decline of Aerobic Capacity in Health Older Adults," *Circulation* 112, no. 5 (July 25, 2005): 674, <https://doi.org/10.1161/CIRCULATIONAHA.105.545459>.

The lungs are also a part of the cardiopulmonary system and play a significant role in aerobic fitness. Lung volume, however, can decrease with age due to changes in the musculature and bone structure surrounding and supporting the lungs. Chest wall flexibility reduces by approximately one-third between the age of thirty to 70 years old.⁷⁷ Muscles in the chest wall and the diaphragm also change, resulting in decreased efficiency.⁷⁸ The cumulative effects of these changes are minimal during midlife, especially for those that maintain a healthy, physically active lifestyle.⁷⁹

Many of the risk factors for the cardiopulmonary system's diseases are positively influenced by lifestyle choices, such as engaging in physical activity, eating a healthy diet, limiting alcohol consumption, and eliminating tobacco use.⁸⁰ Cardiopulmonary fitness is most known for playing a central role in reducing heart disease and improving the quality of life by reducing aging effects on multiple systems. Fortunately, cardiopulmonary fitness is not limited by age and can be enhanced throughout adulthood. For example, adults between sixty and eighty years old improved their aerobic fitness by 20-30% with training.⁸¹ For senior leaders, sustaining a high level of cardiopulmonary fitness addresses the leading cause of death in midlife and improves the quality of life throughout adulthood.

The Metabolic System

Metabolism is the process the body uses to convert dietary intake into the energy needed for the body to function and maintain physical activity.⁸² Moreover, metabolism involves the interaction of the digestive, endocrine, and cardiopulmonary systems in particular. The endocrine system drives the digestive system primarily through the thyroid gland, the adrenal glands, and the pancreas to control metabolism. The pancreas plays a significant role in health and makes the hormone insulin, which controls blood sugar levels.⁸³ Several changes to these systems occur during midlife that can significantly impact well-being.

77. M. Estenne, J.C. Yernault and A. De Troyer, "Rib Cage and Diaphragm-Abdomen Compliance in Humans: Effects of Age and Posture," *Journal of Applied Physiology* 59, no. 6 (1985): 1842, <https://doi.org/10.1152/jappl.1985.59.6.1842>.

78. Taffet, "Normal Aging."

79. Lally and Valentine-French, "8.1: Physical Development."

80. "Know Your Risk for Heart Disease," Heart Disease, Centers for Disease Control and Prevention, last reviewed December 9, 2019, https://www.cdc.gov/heartdisease/ricks_factors.htm.

81. Guoyuan Huang et al., "Controlled Endurance Exercise Training and VO_{2max} Changes in Older Adults: A Meta-Analysis," *Preventive Cardiology* 8, no. 4 (Fall 2005): 217-25, <https://doi.org/10.1111/j.0197-3118.2005.04324.x>.

82. Mayo Clinic Staff, "Metabolism and Weight Loss: How You Burn Calories," Weight Loss, Healthy Lifestyle, Mayo Clinic, October 8, 2022, <https://www.mayoclinic.org/healthy-lifestyle/weight-loss/in-depth/metabolism/art-20046508>.

83. "Endocrine System," Diseases and Conditions, Cleveland Clinic, last reviewed May 12, 2020, <https://my.clevelandclinic.org/health/articles/21201-endocrine-system>.

People often blame a slowing metabolism for weight gain during midlife, but the reason for weight gain is rarely that simple.⁸⁴ The term basal metabolic rate (BMR), or the number of calories your body requires at rest, is used interchangeably with resting metabolic rate.⁸⁵ Although BMR is dependent on gender, height, weight, and body composition, BMR also decreases with age. The *Dietary Guidelines for Americans* recommends simple diet modifications to reduce daily caloric intake by 200 to 400 calories per day between the ages of thirty and sixty, regardless of activity levels.⁸⁶ This caloric reduction is roughly equivalent to skipping a small, white chocolate mocha or a king-sized candy bar, suggesting that even small lifestyle choices can make important differences in midlife.

As caloric requirements decrease, body fat levels increase throughout midlife as body fat accumulates in the abdominal region.⁸⁷ Body fat levels increase beneath the skin, in muscle tissue, and within bones. Men tend to store fat in the upper abdomen and back, whereas women keep it in their waist and upper arms. Increased body fat, high blood pressure, harmful cholesterol levels, and elevated blood glucose levels are symptoms of a growing health crisis known as metabolic syndrome.⁸⁸

Metabolic syndrome is a cluster of risk factors that includes high blood pressure, high blood sugar, excess abdominal fat, and elevated cholesterol and triglyceride levels. Individuals with three of the five risk factors meet the criteria for metabolic syndrome.⁸⁹ It is becoming increasingly common in the United States and affects nearly one-third of the adult population.⁹⁰ It is closely related to insulin resistance, a condition where the muscle, liver, and fat tissue cells cannot use insulin correctly.⁹¹ Insulin resistance shares risk factors with metabolic syndrome and increases heart disease

84. Mayo Clinic Staff, "Metabolism and Weight Loss."

85. Scott Frothingham, "What Is Basal Metabolic Rate?" Healthline, November 12, 2018, <https://www.healthline.com/health/what-is-basal-metabolic-rate#takeaway>.

86. U.S. Department of Agriculture and U.S. Department of Health and Human Services, "Dietary Guidelines for Americans, 2020-2025," 9th Edition, December 2020, 139-141, https://www.dietaryguidelines.gov/sites/default/files/2020-12/Dietary_Guidelines_for_Americans_2020-2025.pdf.

87. Lally and Valentine-French, "8.1: Physical Development."

88. Laura A. Crist et al., "Influence of Change in Aerobic Fitness and Weight on Prevalence of Metabolic Syndrome," *Preventing Chronic Disease* 9 (June 5, 2012), https://www.cdc.gov/pcd/issues/2012/11_0171.htm.

89. "Metabolic Syndrome," Health Topics, National Heart, Lung, and Blood Institute, National Institutes of Health, accessed on March 28, 2021, <https://www.nhlbi.nih.gov/health-topics/metabolic-syndrome>.

90. Mayo Clinic Staff, "Metabolic Syndrome," Diseases and Conditions, Mayo Clinic, last updated on March 14, 2019, <https://www.mayoclinic.org/diseases-conditions/metabolic-syndrome/symptoms-causes/syc-20351916>.

91. U.S. Department of Health and Human Services, Centers for Disease Control, *National Diabetes Statistics Report, 2014* (Atlanta 2014), 9, https://stacks.cdc.gov/view/cdc/23442/cdc_23442_DS1.pdf.

and stroke risks, especially in those that smoke.⁹² Additionally, insulin resistance and metabolic syndrome are associated with an increased risk of breast, colon, prostate, and uterus cancer.⁹³

Metabolic syndrome can also lead to type 2 diabetes.⁹⁴ Type 2 diabetes occurs when the pancreas does not produce enough insulin and cells do not utilize sugar appropriately. It develops slowly and is considered a part of aging that often goes unnoticed until complications arise.⁹⁵ As of 2018, 17.5% of adults in midlife had diabetes, with those in midlife experiencing a four-fold increase in diagnoses compared to younger adults.⁹⁶ The prevalence of diabetes continues to grow, despite campaigns to increase awareness. The American Diabetes Association (ADA) now recommends testing all patients over 45 years of age for diabetes, regardless of other risk factors. Moreover, the connection between diabetes and metabolic syndrome is highlighted by the finding that almost all cases of type 2 diabetes occur in overweight or obese individuals, a risk factor closely linked to insulin resistance and metabolic syndrome.⁹⁷

Metabolic syndrome is also associated with gastroesophageal reflux disease (GERD). Also known as heartburn, GERD is caused by acid from the stomach leaking into the esophagus through the lower esophageal sphincter.⁹⁸ Aside from the characteristic burning sensation in the chest, GERD produces an acid taste in the mouth and may include chronic sore throat, laryngitis, hoarseness, cough, chest pain, and difficulty swallowing.⁹⁹ The problem or discomfort experienced when swallowing is a condition called dysphagia. The acid associated with GERD causes irritation, scarring, or

92. "Metabolic Syndrome," Health Topics.

93. Sari Harrar, "What to Know About Insulin Resistance," Type 2 Diabetes, Endocrine Web, last updated March 29, 2019, <https://www.endocrineweb.com/conditions/type-2-diabetes/insulin-resistance-causes-symptoms>.

94. Mayo Clinic Staff, "Metabolic Syndrome."

95. Corinne O'Keefe Osborn, "Type 1 and Type 2 Diabetes: What's the Difference?" Healthline, last updated July 17, 2022, <https://www.healthline.com/health/difference-between-type-1-and-type-2-diabetes>.

96. U.S. Department of Health and Human Services, *National Diabetes Statistics Report 2020: Estimates of Diabetes and Its Burden in the United States*, Centers for Disease Control (Atlanta, 2020), 1-3, <https://www.cdc.gov/diabetes/pdfs/data/statistics/national-diabetes-statistics-report.pdf>.

97. American Diabetes Association, "Diabetes Care: Standards of Medical Care in Diabetes - 2016: Summary of Revisions," *The Journal of Clinical and Applied Research and Education* 39, no. 1 (January 2016): S16, https://care.diabetesjournals.org/content/39/Supplement_1/S4; "Metabolic Syndrome," Health Topics.

98. Lamia Kallel et al., "Metabolic Syndrome is Associated with Gastroesophageal Reflux Disease Based on a 24-Hour Ambulatory PH Monitoring," *Diseases of the Esophagus* 24, no. 3 (April 2011): 153-59, <https://doi.org/10.1111/j.1442-2050.2010.01118.x>.

99. "Gastroesophageal Reflux Disease (GERD)," American Academy of Allergy, Asthma & Immunology, accessed on March 30, 2021, <https://www.aaaai.org/conditions-and-treatments/related-conditions/gastroesophageal-reflux-disease>.

constriction that prevents the muscles of the esophagus from swallowing correctly.¹⁰⁰ Left untreated, GERD can lead to ulcers in the esophagus, pain in the chest, difficulty swallowing foods, bleeding, and cancer.¹⁰¹ GERD may also lead to a condition known as Barrett’s Esophagus, where the cells lining the esophagus become more like intestinal cells. This cellular change places one at greater risk of forming adenocarcinoma, a type of cancer seen in the lower portion of the esophagus.¹⁰² While these conditions require consultation with medical professionals, lifestyle changes can positively impact and will likely be prescribed as part of the treatment.

Lifestyle choices that include improved diet, increased physical activity, and weight loss reduce the likelihood of adult-onset diabetes and can also be used to address metabolic syndrome.¹⁰³ For example, maintaining physical activity across the lifespan has a long-lasting, positive impact on insulin resistance.¹⁰⁴ Building fitness at an advanced age can still impact insulin sensitivity, even into the late 70s.¹⁰⁵ Different exercise modalities to include high-intensity interval training can improve insulin sensitivity in older adults.¹⁰⁶ Physical activity alone, however, is not enough and must be combined with a healthy diet. In one study, following the ADA’s recommendations to include physical activity and caloric restriction resulted in a 44% decrease in the incidents of the disease.¹⁰⁷ See Chapter 3 for more information about physical activity and Chapter 4 for more information on diet.

Specific lifestyle changes can help those experiencing GERD. Eating smaller meals, not eating late at night, avoiding fatty or fried foods that aggravate the condition, and limiting alcohol and caffeine intake can reduce GERD’s

100. Erica Roth, “Difficulty Swallowing (Dysphagia) Due to Acid Reflux,” Healthline, last updated September 28, 2018, <https://www.healthline.com/health/gerd/dysphagia#causes>.

101. “GERD (Chronic Acid Reflux),” Diseases and Conditions, Cleveland Clinic, last reviewed December 6, 2019, <https://my.clevelandclinic.org/health/diseases/17019-gerd-or-acid-reflux-or-heartburn-overview>.

102. “Barrett’s Esophagus,” Diseases and Conditions, Cleveland Clinic, last updated June 23, 2020, <https://my.clevelandclinic.org/health/diseases/14432-barretts-esophagus>.

103. American Diabetes Association, “Diabetes Care”; Mayo Clinic Staff, “Metabolic Syndrome.”

104. Tipwadee Bunprajun et al., “Lifelong Physical Activity Prevents Aging-Associated Insulin Resistance in Human Skeletal Muscle Myotubes via Increased Glucose Transporter Expression,” *PLOS One* 8, no. 6 (June 21, 2013), <https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0066628>.

105. Ellen M. Evens et al., “Aerobic Power and Insulin Action Improve in Response to Endurance Exercise Training in Healthy 77-87 Yr Olds,” *Journal of Applied Physiology* 98, no. 1 (January 2005), <https://doi.org/10.1152/jappphysiol.00928.2004>.

106. Ditte Sogaard et al., “High-Intensity Interval Training Improves Insulin Sensitivity in Older Individuals,” *Acta Physiologica* 222, no. 4 (April 2018), <https://doi.org/10.1111/apha.13009>.

107. Richard F. Hamman, et al., “Effect of weight loss with lifestyle intervention on risk of diabetes,” *Diabetes Care* 2006; 29:2102-2107, <https://doi.org/10.2337/dc06-0560>.

effects.¹⁰⁸ Healthcare professionals also recommend smoking cessation to help control metabolic syndrome, diabetes, and GERD. Although smoking has historically been considered the leading risk factor for heart disease, the National Institutes of Health may identify metabolic syndrome as the leading risk factor.¹⁰⁹

The Reproductive System

The reproductive system consists of the organs involved in sexual reproduction.¹¹⁰ For senior leaders in midlife, there are two areas of concern related to the reproductive system. The first area of concern is related to the system's primary ability to reproduce. The second area concerns the hormones produced by the reproductive organs that impact hormone levels in other systems. Each gender has unique challenges in these areas and will be addressed separately.

During midlife, most women will enter a period called perimenopause. This period is generally characterized by decreased estrogen and progesterone production in the ovaries and occurs eight to ten years before menopause.¹¹¹ On average, menopause occurs at fifty-one years old and is defined by twelve months without a menstrual cycle.¹¹² Menopause can result naturally with age or when the ovaries do not produce enough estrogen and progesterone due to external factors. Moreover, it can be induced by surgically removing the ovaries or cancer treatments involving chemotherapy and radiation.¹¹³

Menopause is characterized by a host of symptoms that can be highly disruptive and can also lead to an increased risk of heart disease, weight gain, and osteoporosis.¹¹⁴ For example, decreasing hormone levels can raise cholesterol levels and arteriosclerosis, thereby elevating the risk for heart

108. Mayo Clinic Staff, "Gastroesophageal Reflux Disease (GERD)," Diseases & Conditions, Patient Care & Health Information, Mayo Clinic, last updated May 22, 2020, <https://www.mayoclinic.org/diseases-conditions/gerd/symptoms-causes/syc-20361940>.

109. National Heart, Lung, and Blood Institute, "Metabolic Syndrome."

110. Melissa Conrad Stoppler, "Medical Definition of Reproductive System," MedicineNet, last reviewed March 29, 2021, https://www.medicinenet.com/reproductive_system/definition.htm.

111. "Postmenopause," Diseases and Conditions, Cleveland Clinic, last reviewed October 5, 2021, <https://my.clevelandclinic.org/health/diseases/15224-menopause-perimenopause-and-postmenopause>.

112. Lally and Valentine-French, "8.5: Climacteric."

113. Mayo Clinic Staff, "Menopause: Symptoms and Causes," Diseases and Conditions, Mayo Clinic, last updated October 14, 2020, <https://www.mayoclinic.org/diseases-conditions/menopause/symptoms-causes/syc-20353397>.

114. Mayo Clinic Staff, "Menopause: Symptoms and Causes."

disease.¹¹⁵ Lower basal metabolic rates, combined with reduced physical activity levels, can result in weight gain. In addition, the complex interaction of hormones on bone mineral density can increase the risk of osteoporosis.¹¹⁶ While many symptoms of menopause require medical intervention to address, these three symptoms can be influenced by healthy lifestyle choices.

Regular aerobic exercise and strength training can play a critical role in mitigating the effects of menopause and may alleviate some of the symptoms.¹¹⁷ Exercise must be combined with a healthy diet to counteract the results of a slowing metabolism. Eliminating tobacco use, limiting caffeine consumption, and drinking alcohol only in moderation can also ease some symptoms.¹¹⁸ Although healthy lifestyle choices and some prescription medicines may help mitigate the symptoms and effects of menopause, some women may need to visit their primary healthcare provider for more definitive care.¹¹⁹ For example, a doctor may prescribe hormone replacement therapy in certain situations, particularly for moderate to severe hot flashes, and prevent bone density loss. Hormone replacement therapy is not without risks and has been associated with an increased risk of heart disease, stroke, blood clots, and breast cancer.¹²⁰ The indications for hormone replacement depend on several individualized factors, including age, family history, previous medical conditions, and severity of symptoms. If, after consultation with a doctor, hormone replacement therapy is appropriate, the importance of managing risk factors through lifestyle remains.¹²¹

Men also experience a decline in fertility as they age that has already begun by midlife.¹²² Although the number and viability of sperm cells men

115. Kristeen Cherney, "Premenopause, Perimenopause, and Menopause." Healthline, last updated August 28, 2020, <https://www.healthline.com/health/menopause/difference-perimenopause>.

116. "Menopause, Perimenopause and Postmenopause," Diseases and Conditions, Cleveland Clinic, last reviewed December 24, 2019, <https://my.clevelandclinic.org/health/diseases/15224-menopause-perimenopause-and-postmenopause>.

117. "Menopause, Perimenopause and Postmenopause," Cleveland Clinic.

118. Kristeen Cherney, "Premenopause, Perimenopause, and Menopause," Healthline, last updated August 28, 2020, <https://www.healthline.com/health/menopause/difference-perimenopause>.

119. Mayo Clinic Staff, "Menopause: Diagnosis and Treatment," Diseases and Conditions, Mayo Clinic, last updated October 14, 2020, <https://www.mayoclinic.org/diseases-conditions/menopause/diagnosis-treatment/drc-20353401>.

120. North American Menopause Society, "The 2017 Hormone Therapy Position Statement of The North American Menopause Society," *Menopause: The Journal of the North American Menopause Society* 24, no. 7 (2017): 728-53, <http://www.menopause.org/docs/default-source/2017/nams-2017-hormone-therapy-position-statement.pdf>.

121. Janice Rymer, Ruth Wilson, and Karen Ballard, "Making Decisions about Hormone Replacement Therapy," *British Medical Journal* 326, no. 7384 (February 8, 2003): 322-26, INSERT MISSING URL HERE.

122. Taffet, "Normal Aging."

produce diminish with age, research suggests that men remain sexually active well into their sixties and seventies.¹²³ However, in some cases, men do not generate enough testosterone, resulting in low sex drive, erectile dysfunction, fatigue, and muscular strength loss.¹²⁴ Although television commercials would suggest otherwise, the American Urological Association reports that only about 2.1% of men have low testosterone, with the preponderance occurring at an older age.¹²⁵ Many factors can affect testosterone production, including accidental damage to the testes, infection, chemotherapy or radiation, obesity, metabolic syndrome, drug use, aging, or removal due to cancer.¹²⁶ Additionally, low testosterone is more common in overweight, obese, or diabetic men. Consequently, doctors may recommend lifestyle changes to address these conditions in addition to conducting blood tests to determine testosterone levels.¹²⁷

Doctor prescribed treatment for low testosterone involves testosterone replacement therapy administered via skin patches, gels, pellets implanted under the skin, or injections.¹²⁸ Like hormone replacement therapy for women, testosterone replacement therapy has potential health risks for men. For example, testosterone replacement therapy increases cardiovascular disease risk, prostate cancer and may interrupt sperm production.¹²⁹ Ironically, testosterone therapy is not always effective in reducing symptoms of low testosterone. A review of 156 randomized controlled trials found that testosterone therapy did not benefit cardiovascular health, sexual function, muscle strength, mood, or cognitive function. In contrast, progressive resistance training improves sex hormone levels in older men.¹³⁰ Moreover, overweight and obese men had significantly lower testosterone levels than men with a healthy weight. Vigorous aerobic exercise can also increase testosterone levels.¹³¹

123. John DeLamater, "Sexual Expression in Later Life: A Review and Synthesis," *Journal of Sex Research* 49, no. 2/3 (March-June 2012): 125-41, <https://www.jstor.org/stable/23249140>.

124. "Low Testosterone (Male Hypogonadism)," Diseases and Conditions, Cleveland Clinic, last reviewed on September 2, 2022, <https://my.clevelandclinic.org/health/diseases/15603-low-testosterone-male-hypogonadism>.

125. "What is Low Testosterone?" Urology A-Z, Low Testosterone, Urology Care Foundation, accessed on March 27, 2021, <https://www.urologyhealth.org/urology-a-z/1/low-testosterone>.

126. "Low Testosterone (Male Hypogonadism)," Cleveland Clinic.

127. Matthew Solan, "Treating Low Testosterone Levels," Harvard Health Publishing, Harvard Medical School, last updated August 9, 2019, <https://www.health.harvard.edu/mens-health/treating-low-testosterone-levels>.

128. "Low Testosterone (Male Hypogonadism)," Cleveland Clinic.

129. Urology Care Foundation, "What is Low Testosterone?"

130. Koji Sato et al., "Resistance Training Restores Muscle Sex Steroid Hormone Steroidogenesis in Older Men," *The Federation of American Societies for Experimental Biology* 28, no. 4 (April 2014): 1891-897, <https://doi.org/10.1096/fj.13-245480>.

131. Hiroshi Kumagai et al., "Vigorous Physical Activity Is Associated with Regular Aerobic Exercise-Induced Increased Serum Testosterone Levels in Overweight/Obese Men," *Hormone and Metabolic Research* 50, no. 1 (2018): 73-79, <https://www.thieme-connect.com/products/ejournals/abstract/10.1055/s-0043-117497>.

Conclusion

Senior leader health and wellness is an issue of strategic importance. Not only do senior leaders have significant influence over their institutions, but they also serve as role models and mentors for the people they lead. Senior leaders experience many physiological changes during midlife. Some of these changes are related to biological functions over which they have little control. However, many changes attributed to age are influenced by lifestyle choices that senior leaders can control. Maintaining a healthy lifestyle will contribute to their productivity and quality of life now and well into the future. Vigorous physical activity, a healthy diet, adequate rest, stress management, and weight management combine to reduce the adverse effects of aging on the musculoskeletal, neurocognitive, cardiopulmonary, metabolic, and reproductive systems, and the risk factors identified for heart disease, metabolic syndrome, and diabetes. Understanding how the body will change and what lifestyle choices can produce positive outcomes is part of a holistic approach to health and wellness.

Key Takeaways

- Many changes attributed to age are influenced by controllable lifestyle choices.
- By making healthy lifestyle choices, senior leaders can remain physically fit and avoid many unpleasant age-related changes while mitigating the biological changes that lead to frailty later in life.
- Exercise allows senior leaders to maintain their strength and endurance longer across their lifespans. Similarly, sustaining a high level of cardiopulmonary fitness addresses the leading cause of death in midlife and improves the quality of life throughout adulthood.
- Lifestyle choices that include improved diet, increased physical activity, and weight loss reduce the likelihood of adult-onset diabetes and can also be used to address metabolic syndrome.

Chapter 3

PHYSICAL FITNESS GUIDANCE TO ACHIEVE OPTIMAL HEALTH AND PERFORMANCE

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The chief task in life is simply this: to identify and separate matters so that I can say clearly to myself which are externals not under my control and which have to do with the choices I actually control.

Epictetus¹

The ancient philosopher Epictetus encouraged people to identify the aspects of life that they can control. Today, he might advise senior leaders to prioritize activities that impact the quality of their lives positively. Choosing to remain physically active is an important behavioral choice that senior leaders can make now to improve health and optimize performance later in life.² Competing priorities, however, often force them to compromise in ways that detract from their long-term health and fitness goals. Understanding basic fitness principles will help senior leaders optimize physical adaptation and performance, allowing them to effectively and efficiently design an ideal physical fitness program that incorporates moderate to high-intensity cardiovascular exercise, functional fitness training, and flexibility training in a way that optimizes their health and performance.

1. Ryan Holiday and Stephen Hanselman, *The Daily Stoic: 366 Meditations on Wisdom, Perseverance, and the Art of Living* (New York: Portfolio, 2016), 136.

2. U.S. Department of Health and Human Services, *Physical Activity Guidelines for Americans*, 2nd edition, (Washington, DC, 2018), 118, <https://health.gov/healthypeople/tools-action/browse-evidence-based-resources/physical-activity-guidelines-americans-2nd-edition>.

Exercise is the foundation for achieving optimal health and performance.³ Its benefits are immediate and affect the body's ability to prevent chronic disease, reduce stress, and improve sleep. This chapter examines current societal and military health trends, the systemic benefits of engaging in a routine physical fitness program, and provides guidance for prescriptive training to assist senior leaders with achieving their health and fitness goals within the constraints of competing professional priorities and time demands.

Trends - America, the Army, and the Army War College

America is in a health crisis. Although Americans are living longer, they are not necessarily living better.⁴ Today, nearly 133 million American adults have one or more preventable chronic diseases.⁵ Obesity, heart disease, diabetes, and some types of cancer are the primary causes of preventable premature death and reduced healthspan.⁶ Although 70% of the most common chronic diseases can be prevented or managed to some degree through healthy lifestyle choices such as engaging in regular physical activity, only 25.3% of Americans reported being physically active in 2020.⁷ Furthermore, the percentage of overweight and obese adults increased from 63.2% in 2011 to 66.7% in 2020, with approximately 75% of middle-aged Americans being overweight or obese.⁸

American service members are not immune to the significant public health concerns that plague Americans.⁹ In a study from 2017 conducted in

3. Rob Newsom, "The Connection Between Diet, Exercise, and Sleep," Sleep Foundation, updated April 12, 2022, <https://www.sleepfoundation.org/physical-health/diet-exercise-sleep>.

4. Mark Mather and Paola Scommegna, "Up to Half of U.S. Premature Deaths Are Preventable; Behavioral Factors Key," Population Reference Bureau, September 2015, <https://www.prb.org/us-premature-deaths/>.

5. Wullianallur Raghupathi and Viju Raghupathi, "An Empirical Study of Chronic Diseases in the United States: A Visual Analytics Approach to Public Health," *International Journal of Environmental Research and Public Health* 15, no. 3 (2018): 2, <https://doi.org/10.3390/ijerph15030431>.

6. Healthspan refers to the period of life that is free from major chronic clinical diseases and disability. See Douglas R. Seals, Jamie N. Justice, and Thomas J. LaRocca, "Physiological Geroscience: Targeting Function to Increase Healthspan and Achieve Optimal Longevity," *The Journal of Physiology* 594, no. 8 (2016): 2001-24, <https://doi.org/10.1113/jphysiol.2014.282665>.

7. Barbara A. Bushman, "Exercise for Prevention of Chronic Diseases," *ACSM's Health & Fitness Journal* 24, no. 1 (2020): 8, <https://doi.org/10.1249/FIT.0000000000000533>; Center for Disease Control and Prevention, "Adult Physical Inactivity Prevalence Maps by Race/Ethnicity," accessed December 8, 2022, <https://www.cdc.gov/physicalactivity/data/inactivity-prevalence-maps/index.html>.

8. Center for Disease Control and Prevention, "Nutrition, Physical Activity, and Obesity: Data, Trends and Maps," accessed December 8, 2022, <https://www.cdc.gov/nccdphp/dnpao/data-trends-maps/index.html>.

9. Army Public Health Command, "2021 Health of the Force," 67, accessed December 8, 2022, <https://www.health.mil/Reference-Center/Technical-Documents/2022/12/14/DOD-Health-of-the-Force-2021>.

service members, 51% of the participants were classified as overweight, with an additional 13% classified as obese.¹⁰ The researchers also found that 42% of the men and 6% of the women classified as overweight perceived themselves as being the right weight, despite their elevated body mass index (BMI).¹¹ Although the prevalence of obesity in active duty soldiers (18%) is lower than age- and sex-matched U.S. adults (27%), the prevalence of obesity among soldiers increases with age until the mid-forties, mirroring the pattern seen in the civilian population.¹² While the demanding physical requirements of the Army may, in part, limit significant BMI increases, they do not effectively offset opposing influences, such as poor nutrition, chronic stress, and lack of sleep.¹³

Despite historically having greater cardiorespiratory endurance and being at lower risk for heart disease than their civilian counterparts, U.S. Army War College (USAWC) students may still be at risk for preventable health concerns.¹⁴ For example, nearly 70% of the military students attending the USAWC in residence during academic year 2021 were classified as overweight or obese. Additionally, 70% were classified as hypertensive, 46% had high total cholesterol levels (over 200mg/dl), and nearly 30% had low-density lipoprotein (LDL) levels above 130mg/dl (the normal range is below 100mg/dl). All of these health indicators can be influenced or managed through healthy lifestyle choices.¹⁵

America's progressively unhealthy lifestyle may be due in part to the persistent professional demands that have erased line between personal and private life.¹⁶ Steadman, Britt, and Hammer recently surveyed

10. Heidi L. Clark et al., "Misperceptions of Weight Status in Military Men and Women," *Military Medicine* 182, no. 5 (2017): e1792, <https://doi.org/10.7202/MILMED-D-16-00202>.

11. Although there are some reliability concerns with the Body Mass Index (BMI), it is useful to identify individuals with BMIs at the extreme ends – very underweight or obese. BMI can be used to increase awareness, promote lifestyle changes, and change individual behavior. The CDC BMI calculator can be found here: https://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/english_bmi_calculator/bmi_calculator.html. For more information, see Take Care Staff, "The Pros and Cons of Measuring Obesity with BMI," accessed February 12, 2023, <https://www.wrvo.org/post/pros-and-cons-measuring-obesity-bmi>.

12. Army Public Health Command, "2021 Health of the Force," 51.

13. Tracey J. Smith et al., "Overweight and Obesity in Military Personnel: Sociodemographic Predictors," *Obesity* 20, no. 7 (2012): 1534, <https://doi.org/10.1038/oby.2012.25>.

14. John Duncan, Mark A. Vaitkus, and William F. Barko, "The U.S. Army War College and the Road to Executive Health and Fitness," in *The U.S. Army War College Guide to Executive Health and Fitness*, ed. William F. Barko and Mark A. Vaitkus (Carlisle, PA: Army Physical Fitness Research Institute, 2000), 1-21. <https://www.cdc.gov/nccdphp/dnpa/usphs/pdfs/army.pdf>

15. David A. Wright et al., "Physical Fitness and Cardiovascular Disease Risk Factors in Senior Military Officers," *Military Medicine* 159, no. 1 (1994): 60.

16. Dan Pontefract, "You Are Way Too Busy; It's Hampering Your Ability To Think And Be Productive," *Forbes* July 9, 2018, <https://www.forbes.com/sites/danpontefract/2018/07/09/you-are-way-too-busy-its-hampering-your-ability-to-think-and-be-productive/?sh=1e4098dda4cc>.

resident students at the USAWC and found that over 80% reported that work requirements negatively impacted their personal life (see Chapter 8). As one might expect, these officers reported increased stress levels and a lack of time and energy to conduct physical activity, eat properly, and get recommended amounts of sleep. The physical impacts of longer work hours may not be overt, but competing work-life demands can lead to choices that result in unhealthy physical and mental stress levels.¹⁷

Health Benefits from Exercise

Clear and compelling data demonstrate that routine physical activity improves psychological well-being, the quality and quantity of sleep, and reduces the risk of many chronic diseases and other adverse health outcomes. According to Alex Azar, the former Secretary of Health and Human Services, “regular physical activity is one of the most important things people can do to improve their health. Moving more and sitting less has tremendous benefits for everyone, regardless of age, sex, race, ethnicity, or current fitness level.”¹⁸ Nevertheless, many Americans struggle to translate physical activity guidelines into action.¹⁹

The 2018 *Physical Activity Guidelines for Americans* defines physical activity as basic human movement that includes walking, jogging, swimming, and some forms of yoga.²⁰ “Exercise is physical activity that is planned, structured, and repeated ... to improve health, maintain fitness and is important as a means of physical rehabilitation.”²¹ It entails a level of planning and programming that enables progressive improvements in aerobic conditioning, muscular strength, and endurance. Finally, physical fitness is defined as “the ability to carry out daily tasks without undue fatigue and with ample energy.”²² This chapter addresses the eleven components of fitness in subsequent sections and aligns each within the construct of building an effective training program to achieve optimal performance in senior leaders.

As USAWC students often hear during their tenure in Carlisle, PA, “*What got you here, won’t get you there.*”²³ The maxim is typically quoted in the

17. Matthew A. Stults-Kolehmainen and Rajita Sinha, “The Effects of Stress on Physical Activity and Exercise,” *Sports Medicine (Auckland, N.Z.)* 44, no. 1 (2014): 13, <https://doi.org/10.1007/s40279-013-0090-5>.

18. U.S. Department of Health and Human Services, “Physical Activity Guidelines for Americans, 1.

19. Bushman, “Exercise for Prevention of Chronic Diseases,” 5–10.

20. U.S. Department of Health and Human Services, 70.

21. “Exercise,” The Free Dictionary, <https://medical-dictionary.thefreedictionary.com/exercise>.

22. Carl J. Caspersen, Kenneth E. Powell, and Gregory M. Christenson, “Physical Activity, Exercise, and Physical Fitness: Definitions and Distinctions for Health-Related Research,” *Public Health Reports* 100, no. 2 (1985): 126–31, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1424733/>.

23. Marshall Goldsmith, *What Got You Here Won’t Get You There : How Successful People Become Even More Successful* / (Westport, CT: Hyperion, 2007), 1.

context of strategic leadership, but it also applies to maintaining health and optimizing performance. Young adults seem to be able to get away with staying up late, eating less nutritious foods, and missing physical training sessions without lasting consequences. Senior leaders, however, are not as fortunate. Despite knowing the significant role regular exercise plays in maintaining a healthy lifestyle, senior leaders often forgo physical activity altogether to complete higher priority tasks at work or home.²⁴ Even the modest levels of physical activity recommended by the U.S. Department of Health and Human Services to achieve substantial health benefits may seem unobtainable to many (Figure 1).

Figure 1. Physical Activity Guidelines for Americans²⁵

Aerobic Activity	Muscular Strength and Endurance	Flexibility
At least 150 minutes of moderate-intensity exercise or at least 75 minutes of vigorous-intensity (high intensity) exercise per week.	At least two days per week of moderate or greater intensity exercise that involves all major muscle groups.	Dynamic (before exercise) and static (during and after exercise) stretching conducted independently or as part of the training session.
<p>Moderate intensity: run, bike, elliptical, swim, rower, recreational sports at 55-75% effort (6/7 RPE¹)</p> <p>Vigorous intensity: Sprints, intervals, competitive sports at 80-95% effort (8/9 RPE)</p>	<p>Moderate intensity: full body weight-training 5-12 reps with 50-75% of 1-rep max and 45-90 second rest between sets. Increase intensity by reducing rest, increasing weight, or combining exercise into a circuit</p>	<p>Dynamic stretching: PRT² – preparatory drills</p> <p>Static stretching: PRT recovery drills, PNF³, Yoga</p>

1. RPE: Rate of Perceived Exertion; 2. PRT: Physical Readiness Training; 3. PNF: Proprioceptive Neuromuscular Facilitation

Nevertheless, increasing the amount of physical activity through higher intensity, greater frequency, and/or longer duration benefits health outcomes in various ways.²⁶ For example, changes in physical activity that increase physical fitness levels can have immediate health benefits. Increased physical fitness can also help reduce the risk for or prevent many chronic diseases and other adverse health outcomes.²⁷ Figure 2 shows the relationship between physical activity levels and the risk of death from chronic disease. It highlights the immediate health benefits experienced from simply being physically active. It also depicts the steep health benefits

24. Duncan, Vaitkus, and Barko, 1.

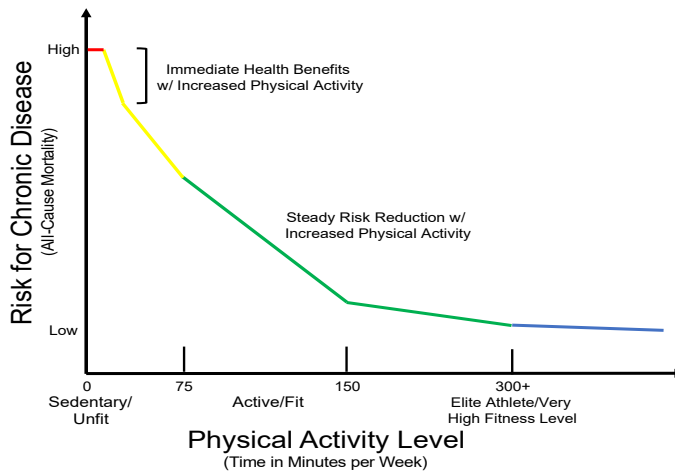
25. U.S. Department of Health and Human Services, 11.

26. U.S. Department of Health and Human Services, 28.

27. Gunnar Erikssen, "Physical Fitness and Changes in Mortality: The Survival of the Fittest," *Sports Medicine (Auckland, N.Z.)* 31, no. 8 (2001): 571, <https://doi.org/10.2165/00007256-200131080-00001>.

gained by increasing time spent conducting moderate to vigorous physical activity per week. Moreover, conducting moderate to high intensity physical activity can help delay most preventable health-related causes of death and “compress overall morbidity across the healthspan.”²⁸ In other words, dedicating time to exercise can extend the period of life free from major chronic diseases.²⁹

Figure 2. Relationship of Risk for Chronic Disease to Physical Activity Level³⁰



Prioritizing regular exercise is an effective way to reduce stress and its negative physiological effects.³¹ In addition to engaging in physical activity, developing effective coping mechanisms such as employing relaxation techniques, yoga, and mindfulness meditation can also help reduce the physiological effects of stress.³² Furthermore, physical activity sharpens cognitive ability, improves quality of life, increases time in deep sleep, and reduces daytime sleepiness.³³ As noted in Chapter 2, routine exercise also delays the onset of age-related physical changes and slows the body’s natural degeneration of muscle mass and bone density. Similarly, commitment to physical activity sustains coordination and balance while preserving flexibility and reducing the potential for injury.³⁴

28. Seals, Justice, and LaRocca, 2001.

29. Seals, Justice, and LaRocca, 2009.

30. This chart is based on the Department of Health and Human Services “Physical Activity Guidelines for Americans” and Dr. Barbra Bushman’s research on “Exercise for Prevention of Chronic Diseases.” See footnotes 2 and 7.

31. Stults-Kolehmainen and Sinha, 3-4.

32. Ginger Martire, “The Physical Effects of Stress: How Your Fast-Paced Life Can Kill You,” *Dr. Ginger Martire* (blog), March 10, 2016, <http://www.gingermartirephd.com/physical-effects-stress-fast-paced-life-can-kill/>.

33. U.S. Department of Health and Human Services, 19.

34. Kent Adams, Patrick O’Shea, and Katie L O’Shea, “Aging: Its Effects on Strength, Power, Flexibility, and Bone Density,” *Strength and Conditioning Journal* 21, no, 2 (1999): 65-77, https://journals.lww.com/nsca-scj/Citation/1999/04000/Aging_Its_Effects_on_Strength_Power.21.aspx.

Putting a comprehensive and well-informed plan into action is vital to establishing a feasible training program that yields the desired health and performance goals. The next section focuses on designing the optimal fitness program for senior leaders informed by physiological considerations and limited available time. It provides the framework to apply the principles of fitness appropriately and improve individual physical fitness and overall health.

Basic Fitness Principles

The human body is remarkably resilient and efficient at adapting to physical stressors.³⁵ In the context of physical activity, the two primary systems that enable human movement are the cardiovascular and musculoskeletal systems. When the body experiences challenging exercise, it adapts to the physical demands placed on these two systems in preparation for the next challenge. Although many senior leaders understand the role that both systems play in overall health and performance, their challenge remains making the time to devote to working out.

Cardiovascular endurance is one of the five health-related components of fitness and involves increasing heart, lung, and blood vessel efficiency. Conducting routine cardiovascular exercise can improve aerobic fitness and reduce the risk for cardiovascular diseases, some types of cancer, and obesity.³⁶ Despite its health benefits, however, cardiovascular exercise often requires extended periods of time. High intensity interval training (HIIT) sessions may be an ideal option for senior leaders to address aerobic fitness under time constraints.

Our physical capacity changes over the lifespan.³⁷ As the body ages, it naturally loses muscle mass and strength, especially after 60.³⁸ This process of age-related decrease in lean mass and strength is called sarcopenia (see Chapter 2). Many factors contribute to sarcopenia, but regular exercise helps maintain greater strength and endurance over time. Traditional muscular strength and endurance programs can offset age-related

35. Martin J. MacInnis and Martin J. Gibala, "Physiological Adaptations to Interval Training and the Role of Exercise Intensity," *The Journal of Physiology* 595, no. 9 (2017): 2915–2930, <https://doi.org/10.1113/JP273196>.

36. U.S. Department of Health and Human Services, "Top 10 Things to Know About the Second Edition of the Physical Activity Guidelines for Americans," Health.gov, Office of Disease Prevention and Health Promotion, last updated August 25, 2021, <https://health.gov/our-work/physical-activity/current-guidelines/top-10-things-know>.

37. Maria Westerståhl et al., "Longitudinal Changes in Physical Capacity from Adolescence to Middle Age in Men and Women," *Scientific Reports* 8, no. 1 (2018), 1, <https://doi.org/10.1038/s41598-018-33141-3>.

38. Keijo Häkkinen et al., "Changes in Muscle Morphology, Electromyographic Activity, and Force Production Characteristics During Progressive Strength Training in Young and Older Men," *The Journals of Gerontology Series A: Biological Sciences and Medical Sciences* 53A, no. 6 (1998): B421, <https://doi.org/10.1093/gerona/53A.6.B415>.

musculoskeletal losses.³⁹ Even in older people, strength development resulting from strength training may include muscle growth if the overall training intensity and duration are sufficient.⁴⁰ For example, high-intensity free-weight training that includes squats and deadlifts can increase bone mineral density and help maintain flexibility and balance.⁴¹ Incorporating a high-intensity training (HIT) program two to three times per week may delay the physiological effects of aging and maintain fitness and optimal performance across the lifespan.⁴² Consequently, to achieve the desired physical improvements in performance and fitness, one must understand and properly apply the basic principles of training (see Figure 3) to the health components of fitness (see Figure 4).

Figure 3. Principles of Training⁴³

Training Principle	Definition	Example
Overload	Exposing the body to physical demands greater than accustomed-to training stress to stimulate training adaptation.	Increasing speed or distance or increasing weight lifted or the number of repetitions in a single training session - requiring the body to work harder and adapt to added demand.
Progression	The gradual increase in training stress to sustain tissue overload and elicit continued training adaptation.	Incrementally adding weight or increasing the speed or distance throughout a training period.
Periodization	The deliberate systematic variation of a training program over time.	Changing a training program from strength-focused to endurance or vice versa.
Individualization	The modification to training that accounts for an athlete's unique capacity for exercise.	Training is adjusted according to age, gender, rate of progress, and previous experience.
Reversibility	The reduction of muscular tissue resulting in loss of beneficial fitness/performance adaptations.	Use it or lose it. It can be reversed when training is resumed.
Specificity	Fitness/performance improves through training specific movement patterns and intensities.	Strength – 1 - 6 Reps Power – 1 - 5 Reps Hypertrophy – 6 - 12 Reps Endurance – 12+ Reps

39. Adams, O'Shea, and O'Shea, 72.

40. Adams, O'Shea, and O'Shea, 72.

41. Adams, O'Shea, and O'Shea, 72.

42. Adams, O'Shea, and O'Shea, 70.

43. Korey Kasper, "Sports Training Principles," *Current Sports Medicine Reports* 18, no. 4 (2019): 95-96, <https://doi.org/10.1249/JSR.0000000000000576>.

Figure 4. Health Components of Fitness⁴⁴

Component	Definition	Example
Cardiovascular Endurance	Ability to efficiently deliver oxygen to the body.	Running, cycling, rowing, swimming, HIIT, ¹ and HIFT ²
Muscular Strength	Amount of force a particular muscle group can produce.	Squats, Deadlifts, Bench Press, Pull-ups for 1-6 repetitions
Muscular Endurance	Applying repeated force from a particular muscle group against a given resistance over a period of time	Push-ups, Sit-ups, for 12+ repetitions
Flexibility	The range of motion around any given joint.	Static Stretching, Dynamic Stretching, Yoga, Pilates
Body Composition	The body's ratio of fat mass to lean mass (muscle).	Senior Leader Sustainment Program provides BIA ³

¹High intensity interval training; ²High intensity functional training; ³Bioelectric impedance analysis (BIA) measures body composition through rate of electrical current traveling through body.

Overload and progression, two of the principles of training listed in Figure 3, are critical components in designing a training program. Overload is accomplished by increasing demands placed on the body during a single training session to stimulate a desired physiological adaptation. For example, adding an extra set, completing more repetitions, or increasing the training weight can all be used to increase the demand on the body. Progression builds upon the overload principle and refers to gradually increasing physical stressors on the muscular or cardiovascular system over a period of time to promote physiological adaptation, enabling the body to become stronger, faster, or more flexible over time.⁴⁵ Developing a fitness training program should include deliberate, incremental increases in workload (overload) applied over a period of time (progression) to achieve individual long-term goals.

Overload and progression are included in a training program by applying the F.I.T.T. principle (Frequency; Intensity; Time; Type - see Figure 5) to assist individuals design a training program tailored to available time, fitness level, and overall training goal. Frequency refers to how often an

44. Laura Williams, "5 Health-related Components of Fitness," Verywell Fit, last updated November 4, 2022, <https://www.verywellfit.com/the-components-of-fitness-4154074>.

45. Michael I. Lambert et al., "General Principles of Training," in *The Olympic Textbook of Medicine in Sport*, ed. Martin P. Schwellnus, (Hoboken, NJ: Wiley-Blackwell, 2009), 14, <https://doi.org/10.1002/9781444300635.ch1>.

individual performs muscular strength, endurance, or cardiovascular training. Intensity can be measured by the percentage of maximum heart rate or the rate of perceived exertion (RPE) and refers to the level of physical difficulty experienced during the “work” phase of the training session.⁴⁶ Time or the duration of physical activity can vary depending upon exercise intensity. For example, high intensity exercise requires less time to achieve the desired training effect compared to the same exercise conducted at a lower intensity. Finally, type refers to the type of muscular strength and endurance, cardiovascular work capacity, and/or flexibility training completed. Incorporating these training principles into an exercise program sets the conditions to achieve desired fitness improvements while reducing potential overuse and acute injury.

Figure 5. F.I.T.T. Example Using Health and Human Services Physical Activity Guidelines

	Frequency	Intensity	Time	Type
Aerobic Exercise	5 days/week	Moderate (150 min/wk)	30 minutes	Tabata Bike 30:60s
	3 days/week	Vigorous (75 min/wk)	25 minutes	Hill Repeats 500-meter Row
Muscular Strength and Endurance	2+ days/week	Moderate to High	20-30 minutes	Full Body HIIT ¹ or HIFT ² Session
Flexibility	2-7 days/week	Moderate	10 - 15 minutes	Dynamic, Static, PNF, Yoga

¹High intensity interval training, ²High intensity functional training.

Exercise Duration and Intensity

The Department of Health and Human Services *Physical Activity Guidelines for Americans* recommends moderate and vigorous intensity exercise that includes both cardiovascular and muscular strength training sessions. However, moderate intensity, steady state physical activity may not be the most ideal for achieving optimal performance. The subsequent sections examine moderate intensity continuous training compared to high intensity interval training (HIIT) and high intensity functional training (HIFT). While moderate and vigorous intensity exercises provide health benefits, HIIT and HIFT provide time and performance benefits not attained by moderate intensity continuous training (MICT).

46. *FM 7-22 Holistic Health and Fitness* has additional information for calculating maximum heart rate and RPE (see Chapter 6).

For several decades, MICT has been the principal method of physical training and emphasizes extended periods of continuous exercise at a moderate intensity to achieve desired physical conditioning goals.⁴⁷ A typical MICT training session might include walking on a treadmill at a comfortable pace, running three miles at a sustained speed, or doing three sets of ten repetitions on the bench press using moderately heavyweight (60-75% maximum effort). Historically, MICT has served as the foundation of the United States Army's physical training program because it is simple, inexpensive, and can be performed by large groups with little or no formal training in almost any environmental condition.⁴⁸

Although MICT can improve health outcomes, there are a few drawbacks that make it a challenge for senior leaders. First, MICT exercise sessions typically take 45 minutes or longer to complete, depending upon the cardiovascular or muscular strength and endurance training session. As noted throughout this book, senior leaders have competing demands that make it difficult to consistently dedicate 45 minutes or more to physical training sessions. Second, the most common overuse injuries are typically attributed to improper training characterized by repetitive physical activity that the body is not prepared to perform.⁴⁹ These injuries are primarily linked to running and include the typical overuse injuries such as, runner's knee, stress fractures, tendonitis, and plantar fasciitis. Moreover, 66% of soldiers 45 years old and older account for most overuse injuries.⁵⁰

In contrast, high intensity interval training (HIIT) and high intensity functional training (HIIFT) emphasize low volume training characterized by periods of high-intensity exercise that elevate the heart rate to 80-95% of the target maximum heart rate followed by brief periods, if any, of lower intensity exercise or rest periods.⁵¹ Recent research has demonstrated the value of HIIT on health indicators, finding that HIIT resulted in equivalent health improvements as MICT despite large variances in total exercise time requirements.⁵²

47. Martin J. Gibala, Patrick J. Gagnon, and Bradley C. Nindl, "Military Applicability of Interval Training for Health and Performance," *Journal of Strength and Conditioning Research* 29 (2015): S40-45, <https://doi.org/10.1519/JSC.0000000000001119>.

48. Gibala, Gagnon, and Nindl, S40.

49. Mayo Clinic, "Overuse Injury: How to Prevent Training Injuries," *Healthy Lifestyle Fitness*, March 10, 2021, <https://www.mayoclinic.org/healthy-lifestyle/fitness/in-depth/overuse-injury/art-20045875>.

50. Southeast Orthopedic Specialists, "Common Overuse Injuries," *Southeast Orthopedic Blog*, accessed February 12, 2023, <https://se-ortho.com/common-overuse-injuries/>.

51. MacInnis and Gibala, 2916.

52. Shigenori Ito, "High-Intensity Interval Training for Health Benefits and Care of Cardiac Diseases - The Key to an Efficient Exercise Protocol," *World Journal of Cardiology* 11, no. 7 (2019): 171-88, <https://doi.org/10.4330/wjc.v11.i7.171>.

Figure 6. Comparison Between Exercise Duration and Intensity

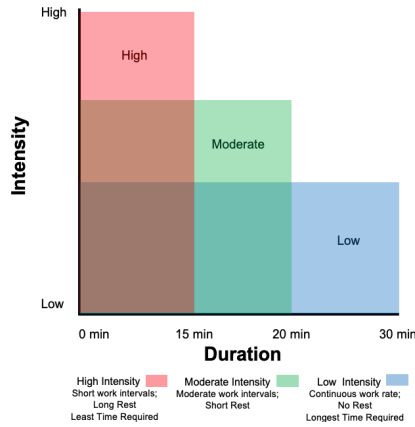


Figure 6 depicts the relationship between exercise time and intensity during a single training session. An advantage of HIIT sessions is that exercise intensity, recovery period, and the number of iterations can be tailored to individual fitness levels. The F.I.T.T. principles should be applied when developing any exercise program and should align with overload and progression training principles. See Figure 7 for examples of HIIT training options that can be used to establish an effective aerobic fitness training program.

Figure 7. HIIT Workout Examples⁵³

Event	Work/Rest	Iterations	Time Required	Benefits
Tabata ¹	20/10 sec.	8	4 Minutes	Increase cardiovascular work capacity; increased calorie burn short timeframe
30:60s/ 60:120s	30/60 sec. 60/120 sec.	8-15/ 6-10	12-23 Minutes/ 18-30 Minutes	Improve cardiovascular work capacity; Anaerobic Endurance
Hill Repeats	20-30 sec/ 120 sec rest	5-10	12-25 Minutes	Explosive leg strength; Anaerobic Endurance; speed
Sprints	30/30 sec	8-10	8-10 minutes	Increase work capacity; power, speed, Anaerobic Endurance
Intervals	200m/90 sec	8-10	24-30 Minutes	Speed, Anaerobic Endurance
Intervals	400m/3 min	6-8	26-34 Minutes	

¹Tabata - Type of High Intensity Interval Training protocol comprised of 6-8 “exhaustive” intervals of 20 seconds maximum effort followed by 10 seconds rest.⁵⁴ (Alternate Exercises: Bike: 90-110 rpm for time; Rower: 250m or 500m; Elliptical: 400m; Swim: 50-100m) Adapted in part from FM 7-22 (Chapter 6).

As an alternative to HIIT, moderate intensity interval training (MIIT) may help prepare physically inactive or untrained populations and individuals recovering from injury for more intense physical activity. Although MIIT resembles HIIT, the target heart rate is reduced to 55-75% of maximum heart rate and the number of intervals is increased to achieve the same physiological adaptation. Naturally, the reduced relative intensity requires the total exercise volume and training time to increase to achieve the same training effect as HIIT.⁵⁵ Of relevance to military physical training, HIIT and MIIT are practical for large groups of any fitness level, age, and sex.⁵⁶

Many studies have evaluated the effectiveness of HIIT programs on metabolic and cardiorespiratory fitness. Training programs that include

53. Headquarters, Department of the Army, *FM 7-22 Holistic Health and Fitness*, (Washington, DC: Department of the Army, October 8,2020), 6-5, https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN30964-FM_7-22-001-WEB-4.pdf.

54. Izumi Tabata, “Tabata Training: One of the Most Energetically Effective High-Intensity Intermittent Training Methods,” *The Journal of Physiological Sciences* 69, no. 4 (2019): 566, <https://doi.org/10.1007/s12576-019-00676-7>.

55. Gibala, Gagnon, and Nindl, S40.

56. Gibala, Gagnon, and Nindl, S43.

HIFT result in similar improvements in cardiorespiratory fitness. However, gains in muscular strength and lean body mass were significantly greater with HIFT compared to HIIT and MICT training.⁵⁷ Consequently, HIFT is an attractive way to meet fitness goals while reducing overuse injuries and time commitment.⁵⁸ Specifically, HIFT incorporates HIIT in low volume and emphasizes “functional, multi-joint movements that include aerobic and muscular strengthening exercises.”⁵⁹ It can be tailored to any fitness level and stimulates greater muscle recruitment than traditional steady state cardiovascular endurance and muscular strength and endurance exercises. The objective of HIFT is to elicit physiological adaptation across multiple predetermined health (muscular strength and endurance, aerobic fitness, flexibility, and mobility) and skill (agility, coordination, speed, and power) related components of fitness.⁶⁰ Figure 8 provides definitions and examples for the skill components of fitness.

Figure 8. Skill Components of Fitness⁶¹

Component	Definition	Example
Agility	Ability to change direction quickly and/or adjust body position vertically or laterally.	Shuttle run; cone drills; agility ladders
Coordination	Efficiency of integrating and synchronizing the body's movement in space; includes visual alignment such as hand-eye coordination.	Squats, jump rope; sports, yoga, agility ladder drills
Power	The ability to generate maximal force.	Box jumps, standing power throw; medicine ball slams; clean; snatch
Speed	The rate at which a person or covers distance. Involves 95 -100% to effort. Develops both aerobic and anaerobic systems.	50m Sprint (The <u>sprint</u> segment of the Sprint Drag Carry); intervals; hill repeats
Reaction Time	Cognitive time to process an external stimulus occurring and the physical response.	Directional drills using cones with voice commands, “forward,” “back,” “left,” “right.”
Balance	Your ability to adjust your body position to remain upright.	Standing yoga poses, BOSU ball workouts, using balance discs to perform exercises.

57. Yuri Feito et al., “High-Intensity Functional Training (HIFT): Definition and Research Implications for Improved Fitness,” *Sports* 6, no. 3 (2018): 76, <https://doi.org/10.3390/sports6030076>.

58. Wayne W. Campbell, et al., “High-Intensity Interval Training for Cardiometabolic Disease Prevention,” *Medicine & Science in Sports & Exercise*, 51, no. 6, (2019): 1220-26, <https://doi.org/10.1249/MSS.0000000000001934>.

59. Feito et al., 2.

60. Feito et al., 13.

61. Laura Williams, “What Are the 6 Skill-Related Fitness Components?,” Verywell Fit, last updated September 16, 2022, <https://www.verywellfit.com/skill-related-fitness-components-4155209>

Most HIFT programs seek to improve cardiovascular work capacity through the integration of a variety of “bodyweight exercises (push-ups, sit-ups, pull-ups, air squats, etc.), weighted lifts (deadlifts, squats, goblet squats, kettlebell swings, push press, etc.), and aerobic fitness exercises (see Figure 9 for examples of HIFT sessions).”⁶² HIFT workouts are designed to be completed in the fastest time possible or by completing a series of exercises within a given time frame for *As Many Repetitions/Rotations As Possible* (AMRAP).⁶³ Rest time, although not always necessary, can be programmed to follow each series of exercises or can be taken “as needed” throughout the training session.⁶⁴ A properly designed HIFT program should incorporate the principles of overload and progression, the F.I.T.T. principles, along with injury prevention measures, and adequate recovery time between training sessions.⁶⁵

Military personnel can benefit from HIFT in numerous ways. First, HIFT workouts can be completed “in a fraction of the time required” for traditional Army physical training sessions without sacrificing health and fitness.⁶⁶ Second, HIFT sessions can be conducted in austere environments using bodyweight or everyday items used during military operations (i.e., tires, sandbags, water jugs, duffle bags, etc.). Third, HIFT workouts offer a variety of options that prevent boredom and increase overall enjoyment. Finally, HIFT sessions can be scaled to individual fitness levels and can be modified to accommodate injuries.⁶⁷ By simply adjusting the exercise mode—bike, elliptical, rower, or stair climber—individuals can continue to work towards their fitness goals.

62. Christopher K. Haddock et al., “The Benefits of High-Intensity Functional Training Fitness Programs for Military Personnel,” *Military Medicine* 181, no. 11 (2016): e1510. <https://doi.org/10.7205/MILMED-D-15-00503>; Feito et al., 8.

63. Feito et al., 3.

64. Feito et al., 5.

65. Haddock et al., 5.

66. Haddock et al., 2.

67. Haddock et al., 5.

Figure 9. Example HIFT Training Sessions

Workout		Time/ Rotations	Exercise	Time	Notes
1	Tabata	4 Minutes (AMRAP) 20 seconds work; 10 seconds rest;	Kettlebell Swings (KBs) Push-Ups Sit-Ups Air Squats Sprints – Bike/Run/ Elliptical	25 min	Rest - 1 minute between tabata iterations
2	Power	4-5 Rotations	5 Box/Tire Jumps 3-5 Clapping Pushups 5 Medicine Ball Slams 10 KB Swings 30 Sec Bike Sprint ¹ (90-second rest)	25 Min	¹ Can substitute elliptical or rower (250 meters) in place of bike
3	Legs	4-5 Rotations	60 Sec Spin Bike ² 30 Air Squats 10 Power Jumps 10 KB Swings (60-second rest)	20-25 Min	² Moderate to heavy tension on spin bike (90-110 RPM)
4	Full Body	24 Minutes (As Many Rotations as Possible)	20 Air Squats 3-5 Pull Ups ³ 10 Hand Release Push-ups 8-10 V-Ups	24 Min	³ Use bands to assist with pull-ups if unable to do unassisted repetitions.
5	Full Body 2	3-5 Rotations	Push Ups ⁴ 20-30 Air Squat 20-35 Sit Ups 10-20 KB Swings High Intensity Cardio ⁵ Rest 2 Minutes	24-40 Min	⁴ Use 1/2 ACFT Hand Release Push Up score. ⁵ Run/Elliptical 400m; Row 500m; or Bike 30 Seconds at Moderate to Heavy Tension
6	Hypertrophy	Circuit (10, 8, 6, 6, 6 Repetitions)	Plate Loaded Push Ups Leg Tucks ⁶ Goblet Squats Pull-ups ⁷ Rest 60 Seconds	24 Min	⁷ Add weight if able to exceed programmed repetitions; Use bands to assist with pull-ups if unable to do unassisted repetitions.
7	100s	Do 100 Reps in as few sets as possible	Push-Ups Air Squats Crunches KB Swings Dumbbell Curls Triceps Press downs	15-20 Min	⁸ First set AMRAP- Target repetitions can be scaled down or up to individual's fitness level (50;75;125)
8	Strength	4-5 Sets ⁹ 3-6 Repetitions 90 -120 seconds Rest	Squats Bench Press/Push Press Deadlifts	30-40 Minutes	⁹ Strict form should be followed over increased weight. If proper form is not achieved reduce weight to allow for proper form.

Flexibility

Flexibility is another of the five health-related components of fitness and refers to the level of elasticity in a single muscle or group of muscles.⁶⁸ As people age, the range of motion in their lower extremities progressively declines.⁶⁹ Unfortunately, many people ignore the importance of flexibility in preventing injury and maintaining functional fitness across the lifespan. Flexibility exercises should be conducted at least two times per week for at least ten minutes and can be incorporated into the daily training session to save time.⁷⁰ Additionally, participating in physical fitness activities requiring major joints to move through their full range of motion can preserve flexibility.⁷¹

Static and dynamic stretching are two common stretching modalities. Dynamic stretches should be completed before exercise and include controlled movements that prepare muscles, ligaments, and other soft tissue for more explosive activities. On the other hand, static stretches involve holding a single position for a specified period and can be conducted independently, during, or after a training session.⁷²

Proprioceptive neuromuscular facilitation (PNF) and yoga are two examples of static stretching. PNF training is a form of partner-assisted static stretching that provides the most significant increases in flexibility and range of motion.⁷³ Three different techniques focus on applying a combination of passive stretching techniques with isometric contractions to elicit deeper stretches than otherwise achieved with regular static stretching. Go to *PNF Stretching: A How-To Guide*, by Kristen Barta, to find more information on how to properly conduct PNF.⁷⁴ Yoga combines the benefits of focused breathing techniques, meditation, and flowing through sequential poses that stretch and flex various muscle groups.⁷⁵ Yoga has gained popularity in the past several years and provides a challenging yet enjoyable way to improve flexibility, strength, and reduce stress. Lastly, *FM 7-22 Holistic Health and Fitness* offers effective preparatory (dynamic) and recovery drills (static) that can be incorporated into any physical fitness program to improve flexibility and reduce the potential for injury.⁷⁶

68. Wojtek J. Chodzko-Zajko et al., "American College of Sports Medicine Position Stand: Exercise and Physical Activity for Older Adults," *Medicine & Science in Sports & Exercise* 41, no. 7 (2009): 1511, <https://doi.org/10.1249/MSS.0b013e3181a0c95c>.

69. Adams, O'Shea, and O'Shea, 70.

70. U.S. Department of Health and Human Services, "Physical Activity Guidelines for Americans," 61.

71. Adams, O'Shea, and O'Shea, 70.

72. Leigh-Ann Bramble, "Static vs. Dynamic Stretching: What Are They and Which Should You Do?," April 19, 2021, https://www.hss.edu/conditions_dynamic-static-stretching.asp.

73. Barta Kristen, "PNF Stretching: A How-To Guide," Healthline, last updated July 9, 2017, <https://www.healthline.com/health/fitness-exercise/pnf-stretching>.

74. Barta.

75. American Osteopathic Association, "Benefits of Yoga," accessed February 12, 2023, <https://osteopathic.org/what-is-osteopathic-medicine/benefits-of-yoga/>.

76. Headquarters, Department of the Army, *FM 7-22 Holistic Health and Fitness*, 6-5.

Tying It All Together

Exercise is the foundation for achieving optimal health and performance.⁷⁷ The benefits are undeniable, immediate, and affect the body's ability to reduce the effects of stress, improve sleep, and reduce the risk of many chronic diseases and other adverse health outcomes. However, the challenge for senior leaders is that they face competing priorities that often detract from their long-term health and fitness goals. They work long hours, get limited sleep, and experience extended periods of unhealthy stress, all of which have detrimental impacts on the quality and quantity of life across the lifespan.

Soren Brage, an epidemiologist from Cambridge University, aptly stated in a recently published study that, "irrespective of our current life circumstances, it is never too late to build physical activity into your daily routine to enjoy a longer, healthier life."⁷⁸ Understanding that time is a limited commodity, prioritizing exercise is an important behavioral decision that senior leaders must make to realize the health benefits and reduce the risk for preventable chronic disease. Therefore, an exercise program that incorporates moderate to high-intensity cardiovascular exercise, functional resistance training, and flexibility training is a time-efficient training mode for all ages and fitness levels (see Figure 10 for a sample training plan). This makes high intensity training an ideal exercise solution for senior leaders to achieve optimal health and performance.

77. Newsom, 1.

78. Lisa Rapaport, "Maintaining or Starting Exercise in Middle Age Tied to Longer Life," Reuters, July 17, 2019, <https://www.reuters.com/article/us-health-fitness-middle-agedmaintaining-or-starting-exercise-in-middle-age-tied-to-longer-life-idUSKCN1UC2E9>.

Figure 10. Sample Training Program

Monday	Tuesday	Wednesday	Thursday	Friday	Weekend
<p>30:60s 5-minute dynamic warm up <i>10 Iterations</i> 70%¹ - 1st Iteration 80% - 2nd Iteration 90% - Remaining Iterations</p>	<p>5 Rotations (10, 8, 6, 6, 6) Plate Loaded P/U Leg Tucks Goblet Sqts Pull Ups Rest 60 Sec (Static Stretch)</p>	<p>Tabata (Bike/Rower) 3 Cycles of 4 minutes; 85% effort; rest 2 minutes between cycles (Static Stretch)</p>	<p>Active Recovery Four for Core Yoga Flexibility</p>	<p>Intervals 5-minute dynamic warm up 2 x 400m 2 x 300m 2 x 200m 2 x 100m Rest = Run time x 2 (Static Stretch)</p>	<p>Strength 4 Sets of 6 85% 1 Rep Max (1RM) Squats/Leg Press Bench Press Deadlifts</p>
<p>AMRAP In 24 Minutes 20 Air Sqts 3 Pull Ups 10 Hand Release P/U 8 V-Ups</p>	<p>30:60s 5-minute dynamic warm up <i>11² Iterations</i> 70% - 1st Iteration 80% - 2nd Iteration 90% - Remaining Iterations</p>	<p>Active Recovery Four for Core Yoga Flexibility</p>	<p>Hill Repeats 5-minute dynamic warm up 7 Iterations 70% - 1st Iteration 80% - 2nd Iteration 90% - Remaining Iterations</p>	<p>Reverse Tabata 10 Sec Work/ 20 Sec Rest Sprints – Bike (Moderate Tension) Push Ups Air Squats Sit Ups Kettlebell Swings 60 secs Rest</p>	<p>Recovery (Run, Bike, Row, Elliptical) 30-40 mins Aerobic Activity 60-70% Effort</p>
<p>30:60s 5-minute dynamic warm up <i>12 Iterations</i> 70% - 1st Iteration 80% - 2nd Iteration 90% - Remaining Iterations</p>	<p>5 Rotations < Increase Weight by 5-10lbs for set 3-5 > (10, 8, 6, 6, 6) Plate Loaded P/U Leg Tucks Goblet Sqts Pull Ups Rest 60 Sec (Static Stretch)</p>	<p>Tabata (Bike/Rower) 3 Cycles of 4 minutes; 90% effort; rest 2 minutes between cycles (Static Stretch)</p>	<p>Active Recovery Four for Core Yoga Flexibility</p>	<p>Intervals 5-minute dynamic warm up 2 x 400m 2 x 300m 2 x 200m 3 x 100m Rest = Run time x 2 (Static Stretch)</p>	<p>Strength 4 Sets of 6 85% 1 Rep Max (1RM) Squats/Leg Press Bench Press Deadlifts</p>
<p>Reverse Tabata 10 Sec Work/ 20 Sec Rest Sprints – Bike (Heavy Tension) Push Ups Air Squats Sit Ups Kettlebell Swings 60 Secs Rest</p>	<p>30:60s 5-minute dynamic warm up <i>10 Iterations</i> 70% - 1st Iteration 85% - 2nd Iteration 95%³ - Remaining Iterations</p>	<p>Active Recovery Four for Core Yoga Flexibility</p>	<p>Hill Repeats 5-minute dynamic warm up 8 Iterations 70% - 1st Iteration 80% - 2nd Iteration 90% - Remaining Iterations</p>	<p>AMRAP In 24 Minutes 20 Air Sqts 3 Pull Ups 10 Hand Release P/U 8 V-Ups *Goal add 1 “rotation”</p>	<p>Recovery (Run, Bike, Row, Elliptical) 30-40 mins Aerobic Activity 60-70% Effort</p>

Note 1. Rate of Perceived Exertion (RPE) – Numbered rating scale from 1-10 associated with exertion level. Applied to both cardiovascular and strength/ endurance activities.

(Moderate = 6; Vigorous = 7-8; High Intensity = 9; Maximum Effort = 10)

Note 2. A way to apply the Overload Principle - Add 1 iteration to second 30:60 training session.

Note 3. Reduce number of iterations back to 10 and increase effort to near maximum.

Key Takeaways

- Routine exercise has been shown to delay the onset of age-related physical changes and the body's natural loss of muscle mass and bone density.
- Senior leaders should balance work demands with healthy life choices that include regular physical activity of sufficient duration, intensity, and frequency.
- Participating in physical fitness activities that require major joints to move through their full range of motion can preserve flexibility and mobility.
- A benefit of participating in high intensity interval training (HIIT) and high intensity functional training (HIFT) sessions is that exercise intensity, rest duration, and the number of cycles can be tailored to individual fitness levels.
- HIIT and HIFT offer senior leaders an attractive way to achieve optimal health and improve physical fitness while consuming less overall time per week.

Chapter 4

DIET AND NUTRITION FOR ENERGY AND VIGOR

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“Nutritional readiness is the attainment of an individual nutritional strategy that supports optimal physical and cognitive function as well as lifelong disease and injury prevention.”

- U.S. Army¹

The health and wellness of senior military leaders is a strategic readiness issue. Poor senior leader health diminishes individual performance and, due to the influence of senior leaders, overall organizational performance.² Poor health increases health care costs for the nation for those currently serving and for the VA.³ It may also perpetuate the “broken vet” stereotype, negatively impacting recruiting and retention efforts and the military’s overall reputation.⁴ Statistics from the Senior Leader Sustainment Program at Carlisle Barracks for the 2021 Army War College class paint a concerning picture. 70% of students had high blood pressure, 46% had high cholesterol, and 15% had a body fat percentage greater than 30%.⁵ What is causing senior military leaders’ poor wellness, and how can wellness be improved? An essential and often neglected component of overall wellness is nutrition.

1. Headquarters Department of the Army, *FM 7-22, Holistic Health and Fitness* (Washington, DC: Department of the Army, October 26, 2020): 8-1.

2. “Poor Nutrition,” Centers for Disease Control, accessed March 26, 2021, <https://www.cdc.gov/chronicdisease/resources/publications/factsheets/nutrition.htm>.

3. “Chronic Disease and Military Readiness,” Centers for Disease Control, accessed March 26, 2021, <https://www.cdc.gov/chronicdisease/pdf/factsheets/military-readiness-h.pdf>.

4. Leonard Wong and Stephen J. Gerras, *Veteran Disability Compensation and the Army Profession: Good Intentions Gone Awry* (US Army War College Press, 2021).

5. US Army War College 2021 Senior Leader Sustainment Program results data.

Nutritional requirements for senior military leaders in midlife are different from those at the beginning of a senior leader's career.

Indeed, healthy nutrition may even be more important for overall wellbeing as individuals age. Chapter 1, defined midlife and explained why midlife is a pivotal period for wellbeing.⁶ Senior leaders often require deliberate adjustment to patterns from young adulthood to account for the lifestyle changes they face in midlife. These lifestyle changes often require a nutritional pivot. This chapter will help senior leaders understand what thoughtful nutrition can accomplish and provide practical recommendations to assess and manage food intake. It focuses on several critical aspects of nutrition for senior military leaders in midlife, emphasizing nutrition to sustain energy to meet work and life demands. The chapter also explains macronutrients and micronutrients, provides recommendations on what to eat in midlife, includes brief recommendations on the use of supplements, and provides nutrition recommendations for enhanced vigor and stress management.

Army and Department of Defense (DoD) Publications and Initiatives

Several Army and DoD publications provide baseline nutritional guidance applicable to senior military leaders in midlife. Army Regulation (AR) 40-25, *Nutrition and Menu Standards for Human Performance Optimization*, establishes nutritional standards utilized by military food service programs to support human performance optimization (HPO).⁷ Army Regulation 30-22, *The Army Food Program*, operationalizes the guidance in AR 40-25 to feed soldiers across the enterprise.⁸ Army Field Manual (FM) 7-22, *Holistic Health and Fitness*, also provides foundational nutritional readiness guidance and general guidelines for operational and therapeutic nutrition.⁹ The *Warfighter Nutrition Guide* published by Uniformed Services University (USU) Consortium for Health and Military Performance (CHAMP) provides strategies for performance nutrition intended to give leaders and soldiers "...nutritional strategies to optimize performance during operations and to preserve health."¹⁰ Specifically, chapter 16 of the *Warfighter Nutrition Guide* entitled "Sustaining Health for the Long-term Warfighter" provides practical nutrition recommendations for soldiers later in their careers. This chapter will expand on some of these

6. See Chapter 1, "Midlife and the Military" for a detailed discussion on midlife.

7. Headquarters Department of the Army, *AR 40-25: Nutrition and Menu Standards for Human Performance Optimization* (Washington, DC: Department of the Army, January 3, 2017).

8. Headquarters Department of the Army, *AR 30-22, The Army Food Program* (Washington, DC: Department of the Army, July 17, 2019).

9. Headquarters Department of the Army, *FM 7-22, Holistic Health and Fitness* (Washington, DC: Department of the Army, October 26, 2020).

10. Uniformed Services University, Consortium for Health and Military Performance (CHAMP), *Warfighter Nutrition Guide* (Bethesda, MD, February 2020).

recommendations and highlight nutrition science of particular importance for midlife senior military leaders.¹¹

Despite recognizing the importance of nutrition to servicemember wellness, performance, and readiness, Department of Defense (DoD) efforts to improve nutrition policy, education, food choices, and the quality of feeding have stalled. Instead, a culture of inattention to nutrition is pervasive, exacerbated by stove-piped service nutrition programs that lack proper oversight from medical experts.¹² DoD Instruction (DoDI) 1010.10 *Health Promotion and Disease Prevention* addresses the need for healthy environments that support optimal wellness, including access to healthy foods.¹³

Numerous initiatives have been implemented across the DoD to meet the requirements of DoDI 1010.10, including Operation Live Well, Healthy Base Initiative (HBI), and Go for Green nutrition labeling. However, none of these programs have been translated into policy or are funded.¹⁴ The culture of inattention to nutrition in the service is an obstacle to soldier wellness that negatively impacts readiness and has consequences for senior leaders who have poor habits due to growing up professionally in an environment that did not correctly emphasize proper nutrition. If a top priority of the DoD is wellness as outlined in DoDI 1010.10, then senior military leaders must begin by carefully managing their own nutrition to set the proper example and should work to institutionalize healthful nutrition across the Department based on the many published recommendations from experts in nutrition, human performance, and wellness.¹⁵

Nutrition to Sustain Energy to Meet Work and Life Demands

How do senior leaders know how much energy they need? What are the best sources for required energy? As senior military leaders age and their lifestyles become less active, the energy required to fuel the body also changes. It is essential to know individual daily energy requirements so that senior leaders can avoid over-fueling, resulting in obesity, or under-fueling and limiting their bodies' performance. A senior military leader's understanding of specific nutritional needs is an important and often overlooked aspect of self-awareness. Regular consumption of more

11. The foundational principles in AR 40-25 and FM 7-22 apply to senior military leaders in midlife; however, there are additional unique considerations covered throughout this chapter.

12. Pamela Elfenbaum et al., "Priorities for Implementing Nutritional Science into Practice to Optimize Military Performance," *Nutrition Reviews* 75 (2017): 89.

13. Department of Defense, *DoD Instruction 1010.10 Health Promotion and Disease Prevention* (April 28, 2014).

14. Melissa R. Troncoso et al., "Targeting Nutritional fitness by Creating a Culture of Health in the Military," *Military Medicine* 186, (2021): 83.

15. Pamela Elfenbaum et al., "Priorities for Implementing Nutritional Science into Practice to Optimize Military Performance."

energy than is needed can result in excess energy storage as body fat.¹⁶ Unfortunately, physiological and lifestyle changes in midlife increase the risk of obesity and associated diseases.¹⁷ Excessive body fat, known as obesity, is a risk indicator for several metabolic and other diseases. While several studies surmise that restricted energy intake has positive impacts on aging,¹⁸ regular consumption of less energy than is required diminishes physical and cognitive performance and reduces the ability of the body to heal and repair from stress, injury, and illness.¹⁹

Energy needs typically decrease with age for several reasons. Sarcopenia is a crucial physiological change explained in more detail in chapter 2, and is one important reason. Sarcopenia is “a progressive and generalized loss of skeletal muscle mass and strength.”²⁰ Sarcopenia causes a decrease in lean muscle mass relative to body fat, resulting in reduced basal metabolic rates as individuals age.²¹ Basal metabolic rate is the energy required to perform essential functions to sustain life. A reduction in basal metabolic rate means that the body needs less fuel for energy, commonly measured in kilocalories (kcal). When less fuel is required, overall caloric intake must be reduced to maintain the balance between fat and lean tissue, and exercise must be increased to increase lean muscle and energy consumption. Without deliberate action to rebalance energy consumption, individuals risk storing excess energy as body fat. In other words, most people require less food for sustenance as they age.

Chapter 2, explains how sarcopenia tends to increase with age and decreased physical activity and is higher for women.²² Emerging research also indicates that basal metabolic rates are likely already lower on average for African Americans than whites by approximately 100Kcal/day.²³ Therefore, women and African Americans should be especially cognizant of midlife physiological changes and implement mitigation strategies such as adhering to the guidelines in this chapter and in Chapter 3, Lifestyle

16. Jeffrey M. Friedman, “Obesity: Causes and Control of Excess Body Fat,” *Nature* 459, no. 7245 (2009): 340.

17. For a more thorough explanation, see Chapter 2, “Physiological Changes in Midlife.”

18. Alison Abbott, “Reduced-calorie Diet Shows Signs of Slowing Ageing,” *Nature* 555, no. 7698 (2018): 570.

19. Linda Partridge, “Diet and Healthy Aging,” *New England Journal of Medicine* 367, no. 26 (2012): 2550.

20. Alfonso J. Cruz-Jentoft and John E. Morley, “Definitions of Sarcopenia,” in *Sarcopenia* (Hoboken, NJ: John Wiley & Sons, Incorporated, October 1, 2012).

21. Institute of Medicine, *Dietary Reference Intakes: The Essential Guide to Nutrient Requirements*, (Washington, DC: National Academies Press, 2005).

22. For a more thorough explanation, see Chapter 2, “Physiological Changes in Midlife.”

23. Alfredo Jones et al., “Body-Composition Differences Between African American and White Women: Relation to Resting Energy Requirements,” *American Journal of Clinical Nutrition* 79, no.5 (2004): 780.

changes due to aging that result in reduced physical activity also reduce energy requirements. Transition to a more sedentary job or lifestyle as a senior leader or into retirement can reduce energy expenditure. Reduced physical activity due to limitations from age-related diseases or injury also contributes to lower energy expenditure. Failure to adapt nutrition to decreased energy needs is a contributor to weight gain in midlife.

Fortunately, research indicates that senior leaders can improve energy expenditure components with dietary and lifestyle choices to gain or maintain appropriate body composition and fitness. The quality of foods we eat, not just how much, is vital for maintaining a healthy ratio of body fat and lean muscle tissue; it is also important to mental well-being, quality of life, and the ability to stay active into older age. For example, adequate protein intake mitigates sarcopenia.²⁴ Basal metabolic rate may improve through eating protein-rich foods that are high in iron, zinc, and selenium, including meat, seafood, legumes, nuts, and seeds. Basal metabolic rate may also be increased by consuming moderate amounts of caffeine, eating hot peppers, seaweed, certain spices, or even drinking ice water regularly.²⁵ In addition, of course, increasing physical activity increases energy expenditure.²⁶

Senior leaders concerned with nutrition should start with a general knowledge of their daily energy requirements and demands. Calculating energy expenditure and energy needs is a relatively straightforward process aided by years of nutrition and physiological research translated into tools such as energy expenditure equations and calculators. Energy expenditure includes four components. The first component is basal metabolic rate (BMR), defined as the energy required to perform “basic functions to sustain life, such as breathing, circulation, nutrient processing, and cell production.”²⁷ The second component is the thermic effect of food (TEF), which “refers to the number of kcal needed by the body to digest, absorb, and process nutrients from foods.”²⁸ The third component of energy expenditure is thermoregulation, which is “the process that allows your body to maintain your core temperature.”²⁹ The fourth component of energy expenditure is physical activity.³⁰ There are several equations to

24. Alfonso J. Cruz-Jentoft and John E. Morley, “Nutritional Approaches to Treating Sarcopenia,” in *Sarcopenia* (Hoboken, NJ: John Wiley & Sons, Incorporated, October 1, 2012).

25. “The 12 Best Foods to Boost your Metabolism,” Healthline, accessed February 1, 2021, <https://www.healthline.com/nutrition/metabolism-boosting-foods>.

26. Chapter 3 provides practical guidance on physical fitness and explain physical fitness benefits in greater detail in midlife and beyond.

27. “What is Basal Metabolic Rate?” Healthline, accessed November 18, 2020, <https://www.healthline.com/health/what-is-basal-metabolic-rate>.

28. “The 12 Best Foods to Boost your Metabolism,” Healthline.

29. “What is Thermoregulation?” Healthline, accessed November 18, 2020, <https://www.healthline.com/health/thermoregulation>.

30. Institute of Medicine, *Dietary Reference Intakes: The Essential Guide to Nutrient Requirements*, (Washington, DC: National Academies Press, 2006) 86-87.

calculate energy expenditure by combining these four components. The United States (U.S.) Government currently uses the equation developed in 2005 by the National Academy of Sciences to calculate Estimated Energy Requirement (EER) based on age, gender, height, body weight, and physical activity (computed as a coefficient based on four levels, sedentary, low active, active, and very active).

Energy Expenditure Requirement (EER) calculations are a starting point for determining appropriate intake. Mathematically, EER is the midpoint of a normally distributed population, therefore, 50 percent of the time, it overestimates energy needs, and 50 percent of the time, it underestimates energy needs for an individual.³¹ However, EER helps establish a starting point for monitoring personal energy intake. Choosing the appropriate physical activity (PA) level is a critical step in computing EER correctly. The PA level should reflect an honest assessment of a senior leader's activity level. A review of the definitions in Table 1 indicates that few senior leaders likely fall in the "very active" category. After retirement, many are likely in the low or sedentary categories.

Table 1: Physical Activity (PA) Categories³²

PA category	PA Value	Military Context Example
Sedentary	Men: 1.00	A person who spends the entire day sitting
	Women: 1.00	
Low	Men: 1.11	A staff officer who sits most of the day, other than the walking necessary to perform tasks of daily living
	Women: 1.12	
Active	Men: 1.25	A military leader who exercises approximately one hour a day, or walks 6–8 miles in a day in the fulfillment of duties
	Women: 1.27	
Very Active	Men: 1.48	A military leader who is engaging in several hours of vigorous exercise daily; equivalent to a professional athlete
	Women: 1.45	

PA, in addition to age, body weight, height, and sex can then be used in the following equations optimized for adults to identify a baseline for daily energy needs:

$$\text{Men: EER} = 662 - (9.53 \times \text{age [y]}) + \text{PA} \times [(15.91 \times \text{weight [kg]}) + (539.6 \times \text{height [m]})]$$

$$\text{Women: EER} = 354 - (6.91 \times \text{age [y]}) + \text{PA} \times [(9.36 \times \text{weight [kg]}) + (726 \times \text{height [m]})]^{33}$$

y = years; kg = kilograms; m = meters

31. Institute of Medicine, *Dietary Reference Intakes: The Essential Guide to Nutrient Requirements* (2006), 36.

32. Institute of Medicine, *Dietary Reference Intakes: The Essential Guide to Nutrient Requirements*, (2006), 36. Adapted and reproduced with permission from the National Academy of Sciences, Courtesy of the National Academies Press, Washington, D.C.

33. Institute of Medicine, *Dietary Reference Intakes: The Essential Guide to Nutrient Requirements*, (2006), 82.; This equation differs from older equations in its enhanced accuracy and in its elimination of basal metabolic rate as a factor in the equation.; Steven B. Heymsfield et al. "How Much May I Eat? Calorie Estimates Based Upon Energy Expenditure Prediction Equations," *Obesity Reviews* 7, no. 4 (2006): 361.

Table 2: Example EER Calculation (Woman)

<p>45-year-old, female, senior leader who weighs 155 pounds, is 67 inches tall, and is active:</p> <p style="text-align: center;">Example EER Calculation</p> <p>EER for Women: $354 - (6.91 \times \text{age in years [y]}) + \text{Physical activity value [PA]} \times (9.36 \times \text{weight in kilograms [kg]} + 726 \times \text{height in meters [m]})$</p> <p>Step 1: Convert pounds (weight) to kilograms and inches(height) to meters. $155 \text{ pounds} \div 2.2 = 70.45 \text{ kg}$ $67 \text{ inches} \times 0.0254 = 1.70 \text{ m}$</p> <p style="padding-left: 40px;">Step 2: Multiply age in years times 6.91. $6.91 \times 45 = 311$</p> <p style="padding-left: 40px;">Step 3: Subtract result in Step 2 from 354. $354 - 311 = 43$</p> <p style="padding-left: 40px;">Step 4: Multiply weight in kg times 9.36. $70.45 \text{ kg} \times 9.36 = 659$</p> <p style="padding-left: 40px;">Step 5: Multiply height in m times 726. $1.70 \text{ m} \times 726 = 1234$</p> <p style="padding-left: 40px;">Step 6: Add results from Steps 4 and 5, multiply result by PA $1.12 (659 + 1234) = 2120$</p> <p style="padding-left: 40px;">Step 7: Add results from Steps 3 and 6. $43 + 2120 = 2163 \text{ kilocalories (kcal) needed per day}$</p>
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Table 3. Example EER Calculation (Man)

<p>45-year-old, male, senior leader who weighs 205 pounds, is 72 inches tall, and is active:</p> <p style="text-align: center;">Example EER Calculation</p> <p>EER for Men: $662 - (9.53 \times \text{age in years [y]}) + \text{Physical activity value [PA]} \times (15.91 \times \text{weight in kilograms [kg]} + 539.6 \times \text{height in meters [m]})$</p> <p>Step 1: Convert pounds (weight) to kilograms and inches(height) to meters.</p> <p style="text-align: center;">$205 \text{ pounds} \div 2.2 = 93 \text{ kg}$ $72 \text{ inches} \times 0.0254 = 1.83 \text{ m}$</p> <p>Step 2: Multiply age in years times 9.53.</p> <p style="text-align: center;">$9.53 \times 45 = 429$</p> <p>Step 3: Subtract result in Step 2 from 662.</p> <p style="text-align: center;">$662 - 429 = 233$</p> <p>Step 4: Multiply weight in kg times 15.91.</p> <p style="text-align: center;">$93 \text{ kg} \times 15.91 = 1480$</p> <p>Step 5: Multiply height in m times 539.6.</p> <p style="text-align: center;">$1.83 \text{ m} \times 539.6 = 987.47$</p> <p>Step 6: Add results from Steps 4 and 5, multiply result by PA</p> <p style="text-align: center;">$1.25 (1480 + 987.47) = 3084$</p> <p>Step 7: Add results from Steps 3 and 6.</p> <p style="text-align: center;">$233 + 3084 = 3317 \text{ kilocalories (kcal) needed per day}$</p>
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The EER calculation generates a baseline or starting point for balancing energy intake with expenditure and is an important first step to managing nutrition.³⁴ Next, individuals should track food intake in detail to manage actual energy intake. Many helpful food journaling tools are available through applications such as MyFitnessPal™.³⁵ However, a simple handwritten notebook utilized to track all food intake is adequate. Comparing actual energy intake to the calculated recommended energy intake is often eye-opening. Energy intake that regularly exceeds the calculated recommended EER for an individual may indicate that an individual should reduce energy (kcal) intake for optimum health. This

34. For ease of computation, a calculator is available on the USDA website at <https://www.nal.usda.gov/fnic/dri-calculator/results.php>.

35. "About," MyFitnessPal, accessed February 1, 2021, <https://www.myfitnesspal.com>. The U.S. government and the Department of defense do not officially endorse MyFitnessPal or any other specific fitness or nutrition monitoring product.

reduction can mitigate the risk of the accumulation of body fat as excess energy is stored. Energy intake that is regularly less than the EER baseline may result in fatigue and other undesirable metabolic or performance-related effects. Sustained energy deficits pose significant health concerns, particularly in non-obese individuals, as energy stores deplete. The body begins to use muscle tissue for energy in the absence of other energy sources, which has several adverse effects on performance.³⁶

Determining the correct energy intake for any individual requires some experimentation. Adding or removing 100 kcal per day for a week and evaluating objective factors such as changes in body weight, and subjective factors such as energy and vigor is an ongoing process that is well worth the effort. As mentioned previously, recent research indicates that a slight reduction in kcal can slow signs of aging. The Comprehensive Assessment of Long-term Effects of Reducing Intake of Energy (CALERIE) study sponsored by the U.S. National Institutes of Health tested the effects of energy restriction on 200 healthy, non-obese adults. The findings indicated improved metabolism and improved health across several age-related clinical markers.³⁷ Some leaders may find that EER calculated energy intake is too high to maintain healthy body composition, and others may find it too low to sustain energy needs. Because every leader has different energy requirements that cannot be clearly identified without some experimentation, individuals should expect to alter kcal intake for optimal energy after completing their EER calculation and food intake assessment.

Macronutrients

Determining the correct amount of energy intake for an individual is a foundational process of healthful nutrition. However, it does not tell the entire story. In addition to consuming the right amount of food, individuals need to eat the right kinds of food. Recent Army publications, including the “The Warfighter Nutrition Guide,” provide excellent general information about what to eat in the military context that applies to senior military leaders in midlife. The three main sources of energy are carbohydrates, fats, and proteins. More commonly referred to as macronutrients, these fuels provide energy and are therefore required in large amounts for normal growth, development, and overall health.³⁸

36. Stefan M. Pasiakos, “Nutritional Requirements for Sustaining Health and Performance During Exposure to Extreme Environments,” *Annual Review of Nutrition* 40, no. 1 (2020): 221.

37. Alison Abbott, “Reduced-calorie Diet Shows Signs of Slowing Ageing,” *Nature* 555, no. 7698 (2018): 570.

38. Adrienne Youdim, “Overview of Nutrition,” Merck, accessed April 2, 2021, <https://www.merckmanuals.com/professional/nutritional-disorders/nutrition-general-considerations/overview-of-nutrition>.

The body prefers carbohydrates for energy, which it converts to glucose to fuel the brain and muscles. Failure to eat adequate carbohydrates will likely result in a feeling of fatigue with an accompanying decrease in physical and mental performance.³⁹ Many leaders avoid carbohydrates due to a misconception that carbohydrate consumption is unhealthy and can lead to obesity. In fact, carbohydrates are required for optimal nutrition. Senior military leaders in midlife should eat between 5 and 8 grams (g) of carbohydrates per kilogram (kg) of body weight each day, depending on activity level. If we utilize the leaders from the EER examples, the calculation is as follows:

Female leader:

$$155 \text{ lbs.} / 2.2 = 70 \text{ kg}$$

$$70 \text{ kg} \times 6 \text{ grams} = 420 \text{ grams of carbohydrates}$$

Male leader:

$$205 \text{ lbs.} / 2.2 = 93 \text{ kg}$$

$$93 \text{ kg} \times 6 \text{ grams} = 558 \text{ grams of carbohydrates}$$

Overconsumption of energy, including energy from carbohydrates, is a contributing factor to obesity, diabetes mellitus, and other metabolic conditions or diseases. However, energy comes from fat and protein in addition to carbohydrates, so avoiding needed carbohydrates in an attempt to restrict energy intake without comprehensively evaluating all macronutrient needs may actually reduce performance and health.⁴⁰

Fats are also critical components of a balanced diet. Fat is foundational to producing certain hormones, protecting organs, insulating the body, transporting nutrients in the body, and serving a structural role in cells. Consume fats in moderation because they contain twice as many kcal per gram as carbohydrates.⁴¹ Senior military leaders should primarily eat monounsaturated fats that are beneficial to health, such as the fats found in nuts and seeds, fish, olives, olive oil, and avocado.⁴²

39. Louise M. Burke, "New Guidelines for Carbohydrate Intake in Sport from the International Olympic Committee," *Pulse* 31, no.3 (2012): 7.

40. Louise M. Burke, "New Guidelines for Carbohydrate Intake in Sport from the International Olympic Committee."

41. "How Many Calories and in One Gram of Fat, Carbohydrate, or Protein?" USDA, accessed February 15, 2021, <https://www.nal.usda.gov/fnic/how-many-calories-are-one-gram-fat-carbohydrate-or-protein>.

42. "Facts About Monounsaturated Fats," MedlinePlus, accessed November 21, 2020, <https://medlineplus.gov/ency/patientinstructions/000785.htm>.

Protein intake should focus on the nine essential amino acids (EAA) that the human body cannot produce and must be consumed from protein sources in the diet. The EAA enable several critical functions, including muscle contraction, the formation of muscle, hair, nails, skin, and other tissues, production of energy (secondary source), repair of injuries, protection from infections, transport of fats, vitamins, and minerals throughout the body and structure for every part of the body.⁴³ Dietary protein should amount to between 0.8 and 1.6 g/kg of body weight/day, depending on activity level. When energy needs are high due to intense training or intense mission conditions, an individual should consume more protein. However, overconsumption of protein should be avoided because it stresses the kidneys and may result in disorders such as gout or kidney stones.

Micronutrients

Careful monitoring of macronutrient consumption is important but does not ensure optimal nutrition in isolation. Senior leaders should also ensure adequate consumption of micronutrients due to the essential support of myriad important physiological functions provided by these important substances. Micronutrients are vitamins and minerals required by the body in small amounts that help make energy and red blood cells, optimize immune function, maintain muscles and joints' health, and aid in recovery from exercise.⁴⁴ Numerous governmental and scientific organizations have developed recommended daily intakes of vitamins and minerals. The Army has developed military service-specific recommendations with the Air Force and the Navy, referred to as Military Dietary Reference Intakes (MDRI), which address service members' unique lifestyle requirements (see Table 4).⁴⁵ The MDRI is just a guide. Specific individual needs will vary, yet under or overconsumption of particular nutrients should drive dietary assessment and possibly adjustment. When combined with information explaining the nutritional content of various foods, MDRI are a guide to evaluation individual dietary intake. The following questions might arise: In a typical week, are there significant shortfalls for any particular micronutrient? Does one's diet unnecessarily (or even toxically) contain too much of a particular nutrient? What are vitamins and minerals, and why are they essential to overall health?

43. CHAMP, *Warfighter Nutrition Guide*, 18.

44. CHAMP, *Warfighter Nutrition Guide*, 23.

45. Headquarters, Department of the Army, AR 40-25: *Nutrition and Menu Standards for Human Performance Optimization*, 13.

Table 4. Military Dietary Reference Intakes Per Day⁴⁶

Nutrient	Unit	Men	Women	Notes
Energy (General/routine)	kcal/d	3400	2300	Estimate that varies by individual for moderate levels of activity and are appropriate for most personnel in garrison. Values are rounded up to the nearest 50 kilocal (kcal).
Light activity	kcal/d	3000	2100	
Moderate activity	kcal/d	3400	2300	
Heavy activity	kcal/d	3700	2700	
Exceptionally-heavy activity	kcal/d	4700	3000	
Protein	g/d	102 (68-136)	83 (55-110)	The MDRI is based on a recommended daily intake of 0.8 to 1.6 g/kg body weight
Carbohydrate	g/d	510 (340-680)	414 (276-552)	
Fiber	g/d	34	28	
Fat	g/d	<113 (100-157)	<77 (70-100)	Total energy from fat should not exceed 30 percent of total kcal.
Linoleic acid	g/d	17	12	
α -linolenic acid	g/d	1.6	1.1	
Vitamin A	μ g RAE/d (IU/d)	900 (3000)	700 (2333)	The unit of measure is microgram of retinol activity equivalent (μ g RAE)
Vitamin D	μ g/d	15	15	The unit of measure is milligram (μ g)
Vitamin E	mg/d	15	15	
Vitamin K	μ g/d	120	90	
Vitamin C	mg/d	90	75	
Thiamin (B ₁)	mg/d	1.2	1.1	
Riboflavin (B ₂)	mg/d	1.3	1.1	
Niacin	mg NE/d	16	14	The unit of measure is niacin equivalent (NE)
Vitamin B ₆	mg/d	1.3	1.3	
Folate	μ g DFE/d	400	400	The unit of measure is micrograms of dietary folate equivalent (μ g DFE)
Vitamin B ₁₂	μ g/d	2.4	2.4	
Calcium	mg/d	1000	1000	
Phosphorous	mg/d	700	700	
Magnesium	mg/d	420	320	
Iron	mg/d	8	18	
Zinc	mg/d	11	8	
Sodium	mg/d	<2300	<2300	
Iodine	μ g/d	150	150	
Selenium	μ g/d	55	55	
Fluoride	mg/d	3	3	The MDRI is based on a recommended daily intake of 0.05 mg/kg body weight
Potassium	mg/d	4700	4700	The MDRI is based on a recommended daily intake of 40 mg/kg body weight

46. Headquarters, Department of the Army, *AR 40-25: Nutrition and Menu Standards for Human Performance Optimization*, 13.

MDRI Legend
kcal/d = Kilocalories per day
g/d = grams per day
µg RAE/d (IU/d) = microgram of retinol equivalent per day (retinol equivalents include retinol, beta-carotene, alpha carotene and beta-cryptoxanthin)
Mg NE/d = milligram of Niacin equivalent per day (niacin equivalents include niacinamide, inositol hexanicotinate, niacin and tryptophan)
µg DFE/d = microgram of folate equivalent per day (folate equivalents include folate and folic acid)
µg/d = microgram per day
mg/d = milligram per day

Vitamins are substances needed for normal cell function, growth, and development.⁴⁷ Vitamins are broadly categorized as water or fat-soluble. The body cannot store water-soluble vitamins such as Vitamin C and B. Any excess consumed is eliminated through urination once the body has used what it needs. Therefore, there is no need to consume more than 100% of the MDRI for any water-soluble vitamin. Furthermore, water-soluble vitamins must be consumed daily to maintain adequate stores. The fat-soluble vitamins, vitamins A, D, E, and K, are stored in body fat and the liver, so they do not necessarily need to be consumed every day. However, fat-soluble vitamins are eliminated from the body much more slowly than water-soluble vitamins, so there is a great risk of toxicity if too much is consumed. Of the four fat-soluble vitamins, the most toxic if over-consumed is vitamin A. Many dietary supplements include well over the recommended intake of vitamins, so buyers should beware of the dangers of consuming these products and avoid products with very high amounts of vitamins.⁴⁸

Minerals, naturally occurring inorganic solids, are also “essential for health and optimal performance,” and are classified as major or trace minerals. Major minerals include calcium, phosphorous, magnesium, sodium, potassium, chloride, and sulfur.⁴⁹ They are classified as “major minerals” because relatively large amounts should be consumed daily (>200 mg/day). The body requires a lower amount of trace minerals, including iron, manganese, copper, iodine, zinc, fluoride, and selenium. Minerals aid in brain and neural function, bone structure maintenance, muscle function and growth, energy production, reproductive functions, and immune function.⁵⁰

47. “Vitamins,” MedlinePlus, accessed November 22, 2020, <https://medlineplus.gov/ency/article/002399.htm>.

48. Gerald F. Combs, “Vitamin Safety,” in *The Vitamins, Fundamental Aspects in Nutrition and Health* (Burlington, MA: Elsevier Academic Press, 2008), 503-505.

49. CHAMP, *Warfighter Nutrition Guide*, 24.

50. CHAMP, *Warfighter Nutrition Guide*, 25.

What should I eat?

Food intake should vary to ensure proper consumption of carbohydrates, fat, protein, vitamins, and minerals. No single food is a complete source of all vitamins and minerals or necessary macronutrients, therefore nutrition needs, including protein, vitamins, and minerals, require consuming a wide variety of whole food for optimal wellness. Consuming a wide variety of foods is particularly important in midlife as physiological decline begins to become more apparent. Fortunately, several tools are available to inform the consumption of the right foods. The U.S. Department of Agriculture’s (USDA) recently revised MyPlate™ eating guide is one such tool that recommends food intake utilizing food groups to help ensure adequate food variety for optimal health. Food categories are whole fruits, assorted vegetables, whole grains, lean protein, and dairy.⁵¹ The USDA “Dietary Guidelines for Americans, 2020-2025,” revised in 2020, is another important reference which provides more detailed food and beverage guidelines informed by the latest nutrition science that expand on MyPlate™ recommendations.⁵² Consuming a variety of foods is especially important in the demanding forward deployed or field environment. The US Army has designed rations to provide the breadth of macronutrients and micronutrients required to sustain wellness even in austere environments. Field rations are carefully prepared to include the required nutrients, so they should be consumed in their entirety to ensure adequate nutrition when in a field environment.⁵³

The busy lifestyle of a senior leader, travel demands, and the requirement to eat at restaurants or in a time-constrained environment can make the consumption of a good variety of foods daily difficult, if not wholly unrealistic. Fortunately, spreading healthy eating with good variety across several days is a viable solution. If vegetable intake or protein intake is low on a particular day, it should be balanced with an increased intake of these foods the following days, generally following the guidelines described in this chapter. Table 5 outlines the USDA recommendations for average daily intake by food groups to achieve an adequate intake of vitamins and minerals, and macronutrients. This information should guide senior military leaders in meal planning.

51. “What is My Plate?” MyPlate, accessed November 22, 2020, <https://www.choosemyplate.gov>.

52. U.S. Department of Agriculture and U.S. Department of Health and Human Services. *Dietary Guidelines for Americans, 2020-2025. 9th Edition*, December 2020, www.dietaryguidelines.gov.

53. Headquarters, Department of the Army, *AR 30-22, The Army Food Program* (Washington, DC: Department of the Army, July 17, 2019).

Table 5. Healthy Eating Pattern in the United States at the 2,000-Calorie Level⁵⁴

Food Group	Amount^(a) in the 2,000 Calorie Diet
Vegetables	2.5 c-eq/day
Dark Green	1.5 c-eq/wk
Red & Orange	5.5 c-eq/wk
Legumes (Beans and Peas)	1.5 c-eq/wk
Starchy	5 c-eq/wk
Other	4 c-eq/wk
Fruits	2c-eq/day
Grains	6 oz-eq/day
Whole Grains	≤ 3 oz-eq/day
Refined Grains	≤ 3 oz-eq/day
Dairy	3 c-eq/day
Protein Foods	5.5 oz-eq/day
Seafood	8 oz-eq/wk
Meats, Poultry, Eggs	26 oz-eq/wk
Nuts, Seeds, Soy Products	5 oz-eq/wk
Oil	27 g/day
Limit on Calories for Other Uses (% of Calories)^(b)	270 Kcal/day (14%)
(a) Food group amounts shown in cup-(c) or ounce-(oz) equivalents (eq). Oils are shown in grams (g).	
(b) Calories from added sugars, added refined starches, solid fats, and alcohol are included in this category. Most diets do not have enough calories available after meeting food group needs to consume added sugars or saturated fats and stay within daily energy level requirements.	

Supplements

Achieving adequate nutritional variety through supplementation is a temptation for many senior military leaders due to the perceived ease of maintaining sufficient nutrition with minimal effort. However, the multi-day approach to eating a good variety of whole foods is more effective than supplementation to achieve the needed variety of foods for optimal health. With few exceptions, there is little scientific consensus indicating that

54. U.S. Department of Health and Human Services and U.S. Department of Agriculture, *2015–2020 Dietary Guidelines for Americans. 8th Edition*, December 2015, <http://health.gov/dietaryguidelines/2015/guidelines>.

supplementation, including protein, multivitamins, or minerals, improves overall health for otherwise healthy individuals. In some circumstances, under the direction of a healthcare provider, senior military leaders may benefit from therapeutic supplementation of calcium, vitamin D, iron, and some antioxidants or other nutrients not otherwise available in adequate quantities through whole foods. Single micronutrient supplements are generally only appropriate for the correction of clinically defined medical conditions.⁵⁵

The American College of Sports Medicine (ACSM) position statement on Nutrition and Athletic Performance further warns that "...supplements represent an ever-growing industry, but a lack of regulation of manufacture and marketing means that [individuals] can fall victim to false advertising and unsubstantiated claims." In addition, the U.S. Food and Drug Administration (FDA) regulation of supplements is minimal. It does not guarantee the efficacy or safety of a supplement and instead relies on manufacturers to assure the safety and contents of their own products despite the profit incentives that might motivate a less scrupulous manufacturer to hide or obscure risks.⁵⁶ A cautious approach toward supplementation is prudent and drastically reduces the risk of accidental consumption of a dangerous compound or one prohibited by the DoD, at worst or simply wasting money on a substance that has not been shown to provide the benefits its manufacturer claims. Operation Supplement Safety (OPSS), the "Department of Defense dietary supplement resource for the military community, leaders, healthcare providers, and DoD civilians," is a uniquely helpful resource for senior military leaders.⁵⁷ The program website includes detailed information on supplementation, a portal to consult an expert on supplements, and a regularly updated extensive list of dietary supplement ingredients prohibited by the DoD.

Nutrition for Enhanced Vigor

The demands placed upon senior military leaders can diminish the vigor of even the most seemingly energetic individuals. Fortunately, many recent studies indicate consumption of specific foods can enhance vigor. Research focuses on specific foods to enhance cognition and generally improve

55. Academy of Nutrition and Dietetics, Dietitians of Canada, & American College of Sports Medicine, "Nutrition and Athletic Performance. Medicine & Science" in *Sports & Exercise* 48, no. 3, (2016): 543.

56. "Questions and Answers on Dietary Supplements," U.S. Food & Drug Administration (FDA), accessed November 28, 2020, <https://www.fda.gov/food/dietarysupplements/usingdietarysupplements/ucm480069.htm>.

57. "Operation Supplement Safety," Uniformed Services University (USU), Center for Health and Military Performance (CHAMP), accessed March 3, 2021, <https://www.opss.org>.

health through the pivotal midlife years and beyond. While the research to date has not resulted in recommendations for specific therapeutic dosages of particular foods to cure or prevent any condition, it has identified widespread positive effects from several nutrients experts agree should be in a balanced diet. Studies of caffeine's and omega-3 fatty acids' effects on brain health have resulted in essential considerations for senior military leaders. Additionally, research on dietary fiber consumption, whole grains, iron, and calcium, and the impacts of alcohol consumption have promising results or warnings senior military leaders should heed. Key findings for each of these dietary components are summarized below.

Omega-3 fatty acids are essential for cell and tissue development. Experts agree that long-chain omega-3 (LC-n3-FA) consumption derived from sea-fish such as mackerel or salmon, is likely beneficial, but specific dosages require additional research. Most researchers agree that LC-n3-FA is critical to the developing brain *in utero* and after birth. While the mechanisms are not yet clear, most researchers agree omega-3 fatty acids remain important throughout life and, when in adequate supply in the brain, may increase cognitive performance while providing a lowered risk of dementia.⁵⁸ Senior military leaders ideally should include oily ocean fish in their diet regularly. "The American Heart Association recommends eating two, 3 – 5 ounce servings of fatty fish per week."⁵⁹ However, in situations preventing adequate consumption, senior leaders should discuss a fish oil supplement with a health care provider to capitalize on any potential benefits and discuss and weigh risks from fish-oil supplement interactions with some medications and conditions.⁶⁰

In general, researchers also agree caffeine consumption can benefit health, particularly liver health, and provide a beneficial boost to energy and cognition when taken in appropriate doses.⁶¹ FM 7-22 recommends 200 milligrams of caffeine (equivalent to two cups of coffee) before a critical meeting or engagement to enhance alertness.⁶² This standard dose can be used to restore alertness temporarily, but is not a substitute for sleep and, if overused, can result in dehydration, disrupted sleep patterns, or other adverse health effects.

58. Sebastian Huhn et. Al, "Components of a Mediterranean Diet and their Impact on Cognitive Functions in Aging," *Frontiers in Aging Neuroscience* 7, no. 132 (2015): 1.

59. "Fish and Omega-3 Fatty Acids," American Heart Association, accessed November 29, 2020, <https://healthyforgood.heart.org/Eat-smart/Articles/Fish-and-Omega-3-Fatty-Acids>.

60. "Fish Oil," National Medicines Comprehensive Database, accessed November 28, 2020, <http://naturaldatabase.therapeuticresearch.com>

61. Robin Poole et al., "Coffee Consumption and Health: Umbrella Review of Meta-Analyses of Multiple Health Outcomes," *BMJ (Clinical Research Ed.)* (2017): 359, <https://doi.org/10.1136/bmj.j5024>.

62. Headquarters, Department of the Army, *FM 7-22, Holistic Health and Fitness* (Washington, DC: Department of the Army, October 8, 2020).

Table 6, adapted from FM 7-22, outlines recommended caffeine intakes for optimal alertness.

Table 6. Caffeine Dose for Optimal Alertness⁶³

Type of sleep challenge	Dose
Sustained Operations	<ul style="list-style-type: none"> • 200 mg at midnight • 200 mg again at 0400 and 0800 if needed • Use during daytime (1200 mg and 1600 mg) only if needed
Night Operations with daytime sleep	<ul style="list-style-type: none"> • 200 mg at start of night shift • 200 mg again 4 hours later • Late dose: at least 6 hours prior to start of daytime sleep
Restricted Sleep (<6 hours)	<ul style="list-style-type: none"> • 200 mg upon wakening • 200 mg again 4 hours later • Late dose: at least 6 hours prior to sleep period
mg = milligrams	

Dietary fiber is not explicitly related to cognition and brain health, but it is related to general wellness in midlife. Dietary fiber is the structural component of plants that humans cannot digest. Dietary fiber is either soluble or insoluble. Soluble fiber absorbs water, which slows digestion, while insoluble fiber adds bulk that aids in regularity. Fiber is an essential component of a healthy diet that plays a role in risk reduction for several diseases, including high blood pressure, diabetes mellitus, heart disease, and several cancers. Adequate consumption of fruits, vegetables, and whole grains will likely result in sufficient consumption of fiber. The U.S. Department of Health and Human Services Dietary Guidelines for Americans recommends women 31-49 years of age, consume at least 25 grams of fiber daily, while women over 50 years of age, should consume at least 22 grams of fiber daily. Men, between 31 and 49 years of age, should consume 31 grams of fiber daily, and men over 50 years of age, should consume at least 24 grams.⁶⁴ Table 7 lists several foods high in fiber to aid in meal planning for adequate fiber consumption.

63. Headquarters, Department of the Army, *FM 7-22, Holistic Health and Fitness*, 11-11.

64. U.S. Department of Health and Human Services & U.S. Department of Agriculture, "Shifts Needed to Align with Healthy Eating Patterns," *2015-2020 Dietary Guidelines for Americans 8th ed.*, (Washington, DC: Health and Human Services Dept. and Agriculture Dept, 2015) 37-62.

Table 7. High Fiber Foods⁶⁵

Food	Serving Size	Fiber (grams)
Cereals		
Fiber One	½ cup	14
All-Bran	½ cup	10
Shredded Wheat	1 cup	6
Vegetables		
Spinach (Cooked)	1 cup	4
Broccoli	½ cup	3
Carrots	1 medium	2
Baked Goods		
Whole-wheat bread	1 slice	3
Bran muffin	1	2
Legumes (cooked)		
Lentils		8
Kidney beans	½ cup	6
Lima beans	½ cup	6
Grains		
Barley	1 cup	9
Wheat Bran	¼ cup	6
Fruit		
Pear (with skin)	1 medium	6
Strawberries (fresh)	1 cup	4
Prunes (dried plums)	6	12

Encouraging research also indicates the importance of consuming whole grains for individuals in midlife. However, specific intake recommendations are not available beyond the MRDI. Because of the broad consensus about whole grains' healthfulness, senior leaders should consume whole grains, instead of less nutritious processed grain foods that include white flour or white rice where important nutritional components of grains have been removed. Examples of whole grain substitutes for white flour or white rice include quinoa, brown rice, farro, oatmeal or other whole grain cereals, whole wheat breads, and whole wheat pastas.

Finally, moderation of alcohol consumption is vital for vigor in midlife. Alcohol has no nutritional value and can be high in kcal. Alcohol

65. "High Fiber Foods," MedlinePlus, accessed January 31, 2021, <https://medlineplus.gov/ency/patientinstructions/000193.htm>

consumption disrupts sleep, as outlined more thoroughly in chapter 5. It also can damage the liver and pancreas, increase blood pressure and the risk for stroke and cardiovascular disease, and when consumed in excess, can suppress the immune system. Interestingly, recent research indicates that for many adults, one to two glasses of red wine consumed daily can increase good cholesterol in the blood (high-density lipoprotein cholesterol or HDL-C) and provide some protection against heart disease. However, senior military leaders should be cautious because the harmful effects caused by overconsumption can be severe.⁶⁶

Nutrition to Manage Stress

Senior military leaders are well acquainted with stress, particularly as they enter midlife and face the complex stresses of senior leadership, aging, and family during this pivotal time (see Chapter 7, for additional discussion). The strains from chronic stress can cause wide-ranging adverse outcomes and place senior military leaders “at greater risk for illness, injury, and mental health issues.”⁶⁷ Research indicates a strong relationship between stress and nutrition. Researchers are working to identify nutritional interventions for stress reduction and clarify the connections between nutrition and various stress types. Fortunately, some researchers have indicated consuming certain foods may have a mitigating effect on several stress-related conditions.⁶⁸ This section briefly highlights some of the most promising findings in the area of stress and nutrition, provides brief nutritional recommendations for managing the impact of stress, and explains oxidative stress and what research indicates can be done to combat it.

Chronic stress, a common experience of military professionals, combined with high-fat, high-sugar diets, is a significant factor in the development of obesity.⁶⁹ Therefore, limiting the intake of high-fat and high-sugar foods reduces the risk of developing obesity for senior military leaders subjected to chronic stress. Mental health, which impacts the ability to manage stress, is also likely affected by nutrition. Recent research indicates that a diet including vegetables, fruit, and whole grains promotes mental health, particularly in women.⁷⁰ These benefits are in addition to the benefits discussed elsewhere in this chapter. Adequate micronutrient consumption

66. “Alcohol’s effects on the body,” National Institute on Alcohol Abuse and Alcoholism accessed November 30, 2020, <http://www.niaaa.nih.gov/alcohol-health/alphabets-effects-body>.

67. CHAMP, *Warfighter Nutrition Guide*, 113.

68. Tarique Hussain et al., “Oxidative Stress and Inflammation: What Polyphenols Can Do for Us?” *Oxidative Medicine and Cellular Longevity* (2016).

69. CHAMP, *Warfighter Nutrition Guide*, 118.

70. Felice N. Jacka et al., “Nutrient Intakes and the Common Mental Disorders in Women,” *Journal of Affective Disorders* 141, no. 1 (2012): 79–85.

also aids in managing stress. Zinc, magnesium, vitamins B, C, and E help mitigate the effects of stress, while magnesium and B vitamins are essential to serotonin production, a hormone regulating mood and stress response.⁷¹

Chapter 5 explains the connection between sleep and stress. Fortunately, many foods appear to aid with restfulness. Tart cherries and tart cherry juice are a natural source of dietary melatonin, a hormone thought to enhance restfulness and sleep. Almonds and spinach, and other foods rich in magnesium can also improve sleep and relaxation.⁷² Some foods can aggravate stress-related conditions. Substances frequently consumed by military leaders that are likely to worsen stress include caffeine, alcohol, tobacco, and fried or highly processed foods. Senior military leaders should be careful when including these items in their diet. These items should be consumed in moderation, or not at all, according to the guidelines in this chapter.⁷³

Oxidative stress is the excessive production of reactive oxygen species (ROS), otherwise known as free radicals, in the cells and tissues within the body. Oxidative stress that the body's antioxidant system cannot overcome may increase inflammation in the body and contribute to several chronic diseases, especially age-related diseases.⁷⁴ This oxidation or production of free radicals results from metabolism and exposure to the environment. However, the accumulation of these free radicals can result in structural and functional damage to tissues. Antioxidants, including polyphenols, which are natural antioxidant compounds present in plants, and other phytonutrients, can interact with ROS and limit cell damage.⁷⁵

The mechanism of action for phytonutrients, including polyphenols, is still not completely understood. However, nutrition experts still recommend consuming a wide variety of diversely colored fruits and vegetables to ensure adequate consumption of antioxidants. There is no recommended daily allowance for phytonutrients but eating a wide variety of foods ensures sufficient intake. Green leafy vegetables such as spinach are exceptionally nutrient-dense and, therefore, should be consumed regularly in addition to red, yellow, and orange vegetables in the greatest variety possible.⁷⁶ Additional possible benefits from the consumption of antioxidants include

71. David O. Kennedy, et al., "Effects of High-dose B Vitamin Complex with Vitamin C and Minerals on Subjective Mood and Performance in Healthy Males," *Psychopharmacology* 211 no. 1 (2010): 55-68.

72. Glyn Howatson et al., "Effect of Tart Cherry Juice (*Prunus Cerasus*) on Melatonin Levels and Enhanced Sleep Quality," *European Journal of Nutrition* 51 no. 8 (2012): 909-916.

73. CHAMP, *Warfighter Nutrition Guide*, 119.

74. Zdenka Durackova, "Some Current Insights into Oxidative Stress," *Physiological Research* 59, no.4 (2010): 459-469.

75. Shashank Kumar and Abhay K. Pandey, "Chemistry and Biological Activities of Flavonoids: An Overview," *The Scientific World Journal* (2013).

76. Claudine Manach et al., "Polyphenols: Food Sources and Bioavailability," *The American Journal of Clinical Nutrition* 79, no.5 (2004): 727-747.

optimized muscle performance, injury prevention, enhanced immune function, reduced pain and inflammation, prevention of heart disease and diabetes mellitus, and mitigation of high blood pressure. Interestingly, but consistent with other research related to supplementation, antioxidant supplement consumption has not consistently shown these protective benefits. However, consumption of whole foods has been consistently shown to provide these nutrients and lead to the aforementioned health benefits.⁷⁷ For reference, Tables 8 and 9 list common antioxidants and phytonutrients and what foods contain them.

Table 8. Common Antioxidants⁷⁸

Name	Classification	Food Sources
Beta-Carotene	A pigment found in plants that gives them their yellow and orange colors	Carrots, squash, sweet potatoes, tomatoes, cantaloupe, peaches, and apricots
Cysteine	Nonessential amino acid	High-protein foods, including ricotta and cottage cheese, yogurt, pork, chicken, turkey, wheat germ and granola
Flavonoids	Natural compounds found in plants	Kale, beets, cranberries, red and black grapes, oranges, lemons, grapefruits, and green tea
Selenium	Mineral	Fish, shellfish, red meat, grains, eggs, chicken, and garlic
Vitamin A	Fat-soluble vitamin	Salmon, eggs, milk, spinach, carrots, sweet red peppers, mangos, black-eyed peas, and broccoli
Vitamin C	Water-soluble vitamin, also called ascorbic acid	Citrus fruits, green pepper, broccoli, leafy greens, strawberries, raw cabbage, and potatoes
Vitamin E	Fat-soluble vitamin	Wheat germ, nuts, seeds, whole grains, leafy greens, and vegetable oil

Table 9. Common Phytonutrients⁷⁹

Type	Food Sources
Anthocyanins	Red and blue fruits such as acai, blueberries, blackberries, raspberries, cherries, plums, and vegetables such as eggplant, red onions, red potatoes, and radishes
Beta-Carotene	Leafy green, orange and yellow vegetables such as broccoli, spinach, collard greens, kale, sweet potatoes, carrots, and cantaloupe
Flavanones	Citrus fruits
Flavonols	Apples, apricots, beans, broccoli, cherry tomatoes, kale, pear, onions, cherries, tea, dark chocolate
Isoflavones	Celery, parsley, thyme, and oregano
Lutein	Soybeans and soybean products such as tofu, soy milk, and edamame
Lycopene	Tomatoes, watermelon, pink grapefruit, and red peppers
Zeaxanthin	Green vegetables, citrus fruits, and eggs

77. "Antioxidants: In Depth," National Center for Complementary and Integrative Health, accessed November 31, 2020, <https://nccih.nih.gov/health/antioxidants/introduction.htm>.

78. CHAMP, *Warfighter Nutrition Guide*, 26.

79. CHAMP, *Warfighter Nutrition Guide*, 125.

Conclusion

Senior military leaders have an obligation to the military to model healthful nutrition as stewards of the profession and to support initiatives that support a culture of wellness across the force. They must also maintain their health to enable continued service and pivot to a high quality of life through retirement and beyond. The foundational nutrition requirements for midlife senior military leaders are similar to younger soldiers' requirements. However, they vary in some critical ways including the need for specific nutrients to combat the effects of aging and stress. Fortunately, numerous resources are available to reasonably manage nutrition for optimal wellness using the latest nutrition science. Many of these resources are highlighted in this chapter, in other Army publications, or are available through other reliable resources.

Set in the midlife military professional context, recommendations to manage nutrition can be summarized by five guidelines. 1) Senior military leaders must carefully monitor energy intake to prevent excess body fat storage and ensure adequate sustained energy for performance. Time invested to determine daily energy requirements is well spent for long term health and foundational to any comprehensive nutrition plan and is an often-overlooked component of knowing oneself. Complete an EER calculation to establish a baseline. Additional resources to determine energy needs are available through Army Wellness Centers, Registered Dietitians (RDs), and even some fitness facilities who can test basal metabolic rates and other physiological factors. This testing can provide a much more precise measure of actual energy needs. 2) Senior leaders should be aware of macronutrient and micronutrient requirements for age and gender and consume the recommended amounts of whole foods that will ensure adequate intake. The human body is remarkably resilient, but optimal function requires the correct balance and variety of nutrients. 3) Leaders should take special care to ensure the most food variety possible daily or at least weekly. Varied whole foods help provide the correct mix of carbohydrates, protein, healthy fats, vitamins, and minerals. Furthermore, consuming various and colorful fruits and vegetables ensures a broad range of antioxidants, critical to mitigating oxidative stress and chronic disease. 4) Senior military leaders should ensure adequate intake of omega-3 fatty acids, antioxidants, iron, calcium, and whole grains. A growing body of research indicates that these nutrients help manage the negative physiological changes associated with aging. 5) Senior military leaders should regularly discuss their dietary intake with their healthcare provider and a Registered Dietitian in the context of overall wellness, energy, and vigor and only use therapeutic supplements under their healthcare provider's direction to treat specific medical needs.

Key Takeaways

- Obesity is a chronic and widespread problem in the United States and the military. Lifestyle changes in midlife require a nutritional pivot.
- Familiarity with caloric needs will inform effective nutritional strategies to sustain energy to meet work and life demands.
- What you eat is equally important as how much you eat. A balanced diet will have appropriate macronutrient (carbohydrate, protein, fat) and micronutrient (vitamins, minerals) content. Seek variability in your diet.
- Due to a lack of regulatory oversight, approach dietary supplements with skepticism and caution.

Chapter 5

SLEEP AS A CRITICAL RESOURCE FOR PERFORMANCE HEALTH AND WELLBEING

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In peace and war, the lack of sleep works like termites in a house: below the surface, gnawing quietly and unseen to produce gradual weakening which can lead to sudden and unexpected collapse.

– Major General Aubrey Newman¹

Fatigue is associated with adverse events in the military. In 2018, the United States Army Aeromedical Research Lab (USAARL) conducted a retrospective review of 133 Class A and B aircraft mishaps between 2011 and 2015.² Twenty eight percent of the mishaps, 37 cases, were fatigue related.³ USAARL identified partial sleep deprivation (less than 6 hours), time of mishap (between the hours of 2200 and 0600), and duration of duty day (greater than 10 hours) as the contributing factors to fatigue.⁴ The 37 cases resulted in 15 fatalities, 16 total disabilities, and \$309 million in damages or \$7.7 million per mishap.⁵

According to the USAARL study, partial sleep deprivation contributed to the 37 mishaps because it was associated with “reduced cognitive performance, loss of attention, decreased reaction time, and memory impairment.”⁶ As noted in the USAARL findings, sleep and fatigue mitigation are critical to mission success, individual performance, and personal safety. Beyond impacts to operations and training, sleep is a critical resource for the health

1. Aubrey S. Newman, *Follow Me: The Human Element in Leadership* (Novato, CA: Presidio Press, 1981), 279.

2. United States Army Aeromedical Research Laboratory (USAARL), “Review of U.S. Army Aviation Accident Reports: Prevalence of Environmental Stressors and Medical Conditions,” Report No. 2018-02, (2018), 6.

3. USAARL, 6.

4. USAARL, 6.

5. USAARL, 7.

6. USAARL, 7.

and wellbeing of every service member and leaders play a critical role in managing fatigue across their formations.⁷

In March 2021, the Department of Defense (DoD) released a study focused on the effects of sleep deprivation on military readiness in response to section 749 of the National Defense Authorization Act for Fiscal Year 2020.⁸ The report defined sleep deprivation as “inadequate sleep that negatively impacts a Service Member’s military effectiveness, evidenced by a reduced ability to execute complex cognitive tasks, communicate effectively, quickly make appropriate decisions, maintain vigilance, and sustain a level of alertness required to carry out assigned duties.”⁹ Furthermore, sleep deprivation was identified as a “contributing factor to mental health disorders and physical diseases, conditions, and syndromes” that undermines readiness.¹⁰

In multi-domain operations, the Joint Chiefs of Staff recently recognized the need for “intellectual overmatch,” which requires leaders to develop and sustain peak mental and physical performance.¹¹ By extension, the most essential weapon system in the multi-domain environment is the human brain, as expressed in cognitive dominance. Addressing sleep deprivation in the military begins with Army leaders understanding the critical importance of sufficient sleep on their own readiness and their ability to meet the cognitive and physical demands required to maintain intellectual overmatch.¹²

Moreover, leaders’ behaviors and attitudes toward sleep can influence their subordinates’ health, wellbeing, and performance. Many of us have had leaders whose actions reflected unhealthy sleep schedules and discouraged their subordinates from getting adequate sleep to keep up with the boss. Not only does prioritizing sleep improve organizational

7. Deydre S. Teyhen, et al., “How Sleep Can Help Maximize Human Potential: The Role of Leaders,” *Journal of Science and Medicine in Sport* 24, no. 10 (2021), 988-994.

8. National Defense Authorization Act 2020, Public Law 116-92, 116th Congress (December 20, 2019), 133 STAT.1358, SEC. 749, “Study on Effects of Sleep Deprivation on Readiness of Members of the Armed Forces,” <https://www.congress.gov/116/plaws/publ92/PLAW-116publ92.pdf>.

9. U.S. Department of Defense, *Report to Congressional Armed Services Committees: Study on Effects of Sleep Deprivation on Readiness of Members of the Armed Services*, (Washington, DC: DoD, March 2021), i, <https://www.health.mil/Reference-Center/Reports/2021/02/26/Study-on-Effects-of-Sleep-Deprivation-on-Readiness-of-Members-of-the-Armed-Forces-Final-Report>.

10. U.S. Department of Defense, i.

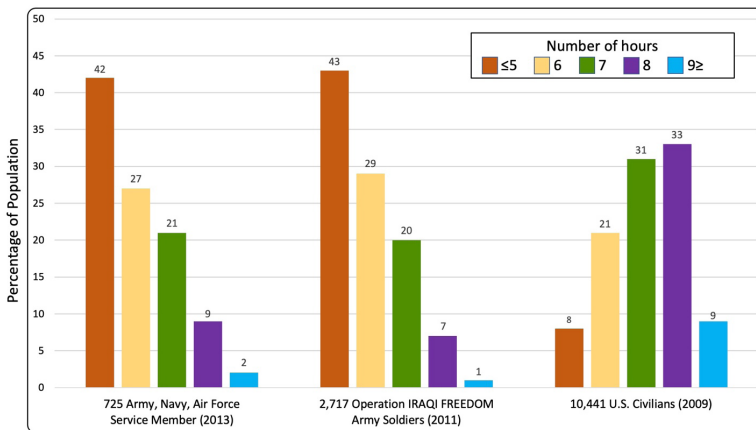
11. Joint Chiefs of Staff, *Developing Today’s Joint Officers for Tomorrow’s Ways of War: The Joint Chiefs of Staff Vision and Guidance for Professional Military Education & Talent Management*, (Washington, DC: Joint Chiefs of Staff, 2020), 2, https://www.jcs.mil/Portals/36/Documents/Doctrine/education/jcs_pme_tm_vision.pdf?ver=2020-05-15-102429-817; Headquarters, Department of the Army, FM 7-22 Holistic Health and Fitness, (Washington, DC: Department of the Army, October 8, 2020), xiv, https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN30964-FM_7-22-001-WEB-4.pdf.

12. Headquarters, Department of the Army, xiii.

readiness, it also better prepares senior leaders to address the challenges and stresses of work and life while mitigating the physiological changes associated with aging.

According to the National Sleep Foundation adults require seven hours of sleep per night to achieve peak cognitive and physical performance.¹³ However, most Americans achieve a “less-than-optimal (but subjectively tolerable and sustainable) level of chronic, mild sleep restriction” by sleeping less than seven hours per night.¹⁴ A recent RAND study attempted to quantify the impact of military culture on sleep by comparing sleep duration in civilian and military populations.¹⁵ Service members reported fewer hours of sleep per night than their civilian counterparts. Over 40% of military personnel slept less than five hours a night, compared to 8% of the civilian population (see Figure 1).¹⁶ Moreover, approximately 70% of service members reported sleeping less than seven hours per night compared to 29% of their civilian counterparts.¹⁷

Figure 1. Sleep Duration: U.S. Civilian Population Compared to U.S. Military Personnel¹⁸



13. Alexa Fry, “What is Healthy Sleep?,” Sleep Foundation, last updated April 29, 2022, <https://www.sleepfoundation.org/sleep-hygiene/what-is-healthy-sleep/>.

14. Nancy J. Wessensten and Thomas J. Balkin, “The Challenge of Sleep Management in Military Operations,” *U.S. Army Medical Department Journal* October – December 2013: 112, <https://ufdc.ufl.edu/AA00062689/00032>.

15. FM 7-22, *Holistic Health and Fitness* defines sleep duration as the number of hours slept. See Headquarters, Department of the Army, Chapter 11, page 11-1.

16. Wendy M. Troxel et al., *Sleep in the Military: Promoting Healthy Sleep Among US Servicemembers*, (Santa Monica, CA: RAND Corporation), 16, https://www.rand.org/content/dam/rand/pubs/research_reports/RR700/RR739/RAND_RR739.pdf

17. U.S. Department of Defense, 4.

18. Adapted from Troxel et al., 16.

You may be asking the question, “I have gotten this far in my professional career without focusing on sleep, why should I make changes now?” In the following sections, we review the impact of sleep enhancement on individual health outcomes and the professional impact of how leadership emphasis on sleep may impact operational outcomes and risk mitigation. We then review practical strategies for implementing measurable change in your personal sleep habits and within the organizations you lead.

Personal discipline is paramount to success as a military leader. Discipline takes commitment, effort and may, at times, conflict across domains. For example, people may sacrifice sleep to spend more time in the gym to increase power, strength, and endurance. However, the cost of sleep loss on cognitive performance is more difficult to measure. The prevailing military mindset regarding sleep is unhealthy and competes directly with science and common sense. Instead of wearing lack of sleep as a badge of courage and “embracing the suck,” leaders need to change sleep culture as the first step in gaining intellectual overmatch. In the following paragraphs we will provide the latest evidence supporting sleep as a critical resource for health maintenance and mental acuity.

Sleep and the Military Leader

Science underscores sleep’s role in cognitive performance, critical and creative thinking, awareness, and effective communication.¹⁹ Improved sleep is associated with improved attention, response times, and greater mental flexibility.²⁰ It enhances judgment, awareness, mood, resilience, and the ability to navigate and respond to unfamiliar information.²¹ Sufficient sleep also enhances concentration, improves emotional outlook, and increases social awareness.²² Sleep also boosts the immune system allowing the body to fight off infections, reduces blood pressure, lowers the resting heart rate, and releases hormones that stimulate the process of breaking down fats.²³

19. Torbjörn Åkerstedt and Peter M. Nilsson, “Sleep as Restitution: An Introduction,” *Journal of Internal Medicine* 254, no. 1 (2003): 10, <https://doi.org/10.1046/j.1365-2796.2003.01195.x>.

20. Bradley M. Ritland et al., “Effects of Sleep Extension on Cognitive/Motor Performance and Motivation in Military Tactical Athletes,” *Sleep Medicine* 58 (2019): 54, <https://doi.org/10.1016/j.sleep.2019.03.013>.

21. Eric R. Pedersen et al., “Increasing Resilience Through Promotion of Healthy Sleep Among Service Members,” *Military Medicine* 180, no. 1 (2015): 4, <https://doi.org/10.7205/MILMED-D-14-00264>; William DS Killgore et al., “Sleep Deprivation Reduces Perceived Emotional Intelligence and Constructive Thinking Skills,” *Sleep Medicine* 9, no. 5 (2008): 524, <https://doi.org/10.1016/j.sleep.2007.07.003>.

22. Geraldine S. Perry, Susheel P. Patil, and Letitia R. Presley-Cantrell, “Raising Awareness of Sleep as a Healthy Behavior,” *Preventing Chronic Disease* 10 (2013): 1, <https://dx.doi.org/10.5888%2Fpcd10.130081>; Marie Vandekerckhove and Raymond Cluydts, “The Emotional Brain and Sleep: An Intimate Relationship,” *Sleep Medicine Reviews* 14, no. 4 (2010): 219, <https://doi.org/10.1016/j.smrv.2010.01.002>.

23. Martha Lally and Suzanne Valentine-French, “8.3: Sleep,” in *Lifespan Development – A Psychological Perspective* (College of Lake County, last modified September 25, 2019), [https://socialsci.libretexts.org/Bookshelves/Human_Development/Book%3A_Lifespan_Development_-_A_Psychological_Perspective_\(Lally_and_Valentine-French\)/08%3A_Middle_Adulthood/8.03%3A_Sleep](https://socialsci.libretexts.org/Bookshelves/Human_Development/Book%3A_Lifespan_Development_-_A_Psychological_Perspective_(Lally_and_Valentine-French)/08%3A_Middle_Adulthood/8.03%3A_Sleep).

Similarly, sleep allows the body to repair tissue and recover following exercise. It elevates mood and increases motivation to follow rigorous fitness programs.²⁴ Extending sleep duration by 90 minutes can also have immediate and significant positive impacts on athletic performance.²⁵ Furthermore, testosterone, which is instrumental in performance and recovery, is restored to peak levels at the end of a seven to nine-hour sleep cycle. Going one night without sleep can reduce testosterone levels by 90 percent.²⁶ Physical exercise, on the other hand, aids sleep onset, promotes restorative non-rapid eye movement (NREM) and rapid eye movement (REM) sleep, allowing the body to recover more rapidly from physical stress and injuries.²⁷

In contrast, short sleep duration is associated with increased risk of cancer, cardiovascular disease, type 2 diabetes, and obesity.²⁸ For example, shortened sleep increases appetite and hunger, leading to excessive food intake. Decreased sleep duration increases the risk of weight gain, obesity, and type 2 diabetes by altering food cravings, the type of food consumed, and meal timing.²⁹ Similarly, degraded sleep duration and quality can cause an individual to lose interest in exercise or reduce their workout intensity.³⁰

Similarly, sleep affects mental fitness. Chronic sleep restriction correlates with an increased risk of post-traumatic stress disorder (PTSD), traumatic brain injuries (TBI), depression, and suicide.³¹ For example, approximately

24. Shona L Halson, "Nutrition, Sleep and Recovery," *European Journal of Sport Science* 8, no. 2 (2008): 119, <https://doi.org/10.1080/17461390801954794>; Wesensten and Balkin, 112.

25. Ritland et al., 54.

26. Janna Mantua et al., "Sleep Loss During Military Training Reduces Testosterone in U.S. Army Rangers: A Two-Study Series," *International Journal of Sports and Exercise Medicine* 6, no. 4 (2020), 1-2. <https://doi.org/10.23937/2469-5718/1510169>.

27. Halson, 119.

28. National Institute of Neurological Disorders and Stroke, "Brain Basics: Understanding Sleep," U.S. Department of Health and Human Services, last reviewed February 10, 2023, <https://www.ninds.nih.gov/health-information/public-education/brain-basics/brain-basics-understanding-sleep#:~:text=Sleep%20is%20important%20to%20a,up%20while%20you%20are%20awake>; Mark R. Zielinski, James T. McKenna, and Robert W. McCarley, "Functions and Mechanisms of Sleep," *AIMS Neuroscience* 3, no. 1 (2016): 77, <https://dx.doi.org/10.3934%2FNeuroscience.2016.1.67>.

29. Andrea M. Spaeth, David F. Dinges, and Namni Goel, "Effects of Experimental Sleep Restriction on Weight Gain, Caloric Intake, and Meal Timing in Healthy Adults," *Sleep*, 36, no. 7 (2013): 981, <https://doi.org/10.5665/sleep.2792>; Kristen L. Knutson and Eve Van Cauter, "Associations Between Sleep Loss and Increased Risk of Obesity and Diabetes," *Annals of the New York Academy of Sciences* 1129 (2008): 299-300, <https://doi.org/10.1196/annals.1417.033>.

30. Knutson and Cauter, 299.

31. Adam D. Bramoweth and Anne Germain, "Deployment-Related Insomnia in Military Personnel and Veterans," *Current Psychiatry Reports* 15, no. 10 (2013): 1, <https://dx.doi.org/10.1007%2Fs11920-013-0401-4>; David D. Luxton et al., "Prevalence and Impact of Short Sleep Duration in Redeployed OIF Soldiers," *Sleep* 34, no. 9 (2011): 1192, <https://doi.org/10.5665/SLEEP.1236>.

88% of combat veterans with PTSD have chronic sleep disruption.³² Moreover, individuals who suffer from sleep disturbances before deployments are at a higher risk of developing post-traumatic stress from stressful experiences, including combat.³³ Individuals with at least one TBI are also at higher risk for decreased sleep continuity, which can prolong the recovery period.³⁴ Suffering from inadequate sleep also increases the risk of depression. Individuals who regularly get 8 hours of sleep are at the lowest risk for suicidal ideation, planning, attempts, and death compared to individuals reporting fewer hours of sleep. There is a 34 percent increase in the risk of suicide associated with poor sleep quality.³⁵ All of these statistics are important to consider as the Army battles the harmful behaviors that continue to plague the force.

Sleep in Midlife: “I need less sleep the older I get.”

Senior leaders are adept at developing strategies based on their experiences and wisdom to address life challenges and to navigate stress. However, their experience and wisdom are impacted by physiological changes associated with aging. The changes in sleep patterns common in midlife can have profound effects on the mind and body. For example, as adults age, they have more difficulty coping with insufficient sleep. Sleep deprivation amplifies the age-related declines in cognition, memory, and information processing speed and may compromise a leader’s ability to capitalize on midlife experience and wisdom.³⁶ Getting adequate amounts of uninterrupted sleep becomes more challenging with age. Moreover, the ability to fall back to sleep after waking during the sleep cycle becomes

32. John H. Krystal et al., “Sleep Disturbance in Chronic Military-Related PTSD: Clinical Impact and Response to Adjunctive Risperidone in the Veterans Affairs Cooperative Study # 504,” *The Journal of Clinical Psychiatry* 77, no. 4 (2016): 488, <http://dx.doi.org/10.4088/JCP.14m09585>.

33. Philip Gehrman et al., “Predeployment Sleep Duration and Insomnia Symptoms as Risk Factors for New-Onset Mental Health Disorders Following Military Deployment,” *Sleep* 36, no. 7 (2013): 1009, <http://dx.doi.org/10.5665/sleep.2798>.

34. Craig J. Bryan, “Repetitive Traumatic Brain Injury (or Concussion) Increases Severity of Sleep Disturbance Among Deployed Military Personnel,” *Sleep* 36, no. 6 (2013): 944, <https://doi.org/10.5665/sleep.2730>; Military Health System, “DoD Clinical Recommendation: Management of Sleep Disturbances Following Concussion/mTBI: Guidance for Primary Care Management in Deployed and Non-Deployed Settings,” *Health.mil*, accessed March 21, 2021, <https://www.health.mil/Reference-Center/Publications/2020/07/31/Management-of-Sleep-Disturbances-Following-ConcussionmTBI-Clinical-Recommendation>; FM 7-22, *Holistic Health and Fitness* defines sleep continuity as the ease of falling asleep and maintaining uninterrupted sleep (see Headquarters, Department of the Army, 11-2).

35. Rebecca A. Bernert and Thomas E. Joiner, “Sleep Disturbances and Suicide Risk: A Review of the Literature,” *Neuropsychiatric Disease and Treatment* 3, no. 6 (2007): 736, <https://dx.doi.org/10.2147%2Fndt.s1248>.

36. Wilse B. Webb and C. Michael Levy, “Age, Sleep Deprivation, and Performance,” *Psychophysiology* 19, no. 3 (1982): 275, <https://doi.org/10.1111/j.1469-8986.1982.tb02561.x>; Margie E. Lachman, “Development in Midlife,” *Annual Review of Psychology* 55 (2004): 319, <https://doi.org/10.1146/annurev.psych.55.090902.141521>.

increasingly more difficult in midlife.³⁷ As a result, individuals spend less time in NREM and REM sleep, giving the brain and body less time to recover.³⁸

Sleep deprivation and associated lack of sufficient cognitive and physical recovery contribute to or exacerbate a range of health issues commonly found in midlife.³⁹ For example, declines in sleep duration and sleep quality can alter hormone release, contribute to insulin resistance, and disrupt glucose metabolism, all of which can intensify the physiological changes associated with midlife.⁴⁰ As a result, sleep-restricted adults face an increased risk of higher blood pressure, type 2 diabetes, cardiovascular disease, and weight gain.⁴¹ Chronic sleep restriction may contribute to the cognitive decline associated with aging, possibly accelerating the aging process by three to eight years.⁴² Sleep deprivation is associated with decreased glymphatic clearance, increasing the risk of neurodegenerative diseases such as Alzheimer's disease.⁴³ Consistent inadequate sleep duration and sleep quality in midlife can also influence cognitive performance up to 20 years later.⁴⁴

Common comorbidities observed in midlife (i.e., sleep apnea, restless leg syndrome, depression, and insomnia) further complicate the physiologically driven changes in sleep quality associated with aging.⁴⁵ Sleep deprivation caused by our own actions (also known as behaviorally induced insufficient sleep syndrome (BISS)) in midlife also contributes to sleep deprivation by "stealing" time typically associated with sleep.⁴⁶ Senior leaders deal with family and life stressors and other "sleep stealing

37. Dominique Gosselin, Joseph De Koninck, and Kenneth Campbell, "Novel Measures to Assess the Effects of Partial Sleep Deprivation on Sensory, Working, and Permanent Memory," *Frontiers In Psychology* 8 (2017): 14, <https://doi.org/10.3389/fpsyg.2017.01607>.

38. Kristine Yaffe, Cherie M. Falvey, and Tina Hoang, "Connections between Sleep and Cognition in Older Adults," *The Lancet Neurology* 13, no. 10 (2014): 1017, [https://doi.org/10.1016/s1474-4422\(14\)70172-3](https://doi.org/10.1016/s1474-4422(14)70172-3).

39. Kermit Pattison, "Sleep Deficit," *Experience Life*, May 05, 2015, <https://experiencelife.lifetime.life/article/sleep-deficit/>.

40. Lally and Valentine-French, "8.3 Sleep."

41. Kristen L. Knutson et al., "Association Between Sleep and Blood Pressure in Midlife: the CARDIA Sleep Study," *Archives of Internal Medicine* 169, no. 11 (2009): 1061, <https://doi.org/10.1001/archinternmed.2009.119>; Åkerstedt and Nilsson, 11.

42. Jane E. Ferrie et al., "Change in Sleep Duration and Cognitive Function: Findings from the Whitehall II Study," *Sleep* 34, no. 5 (2011): 571, <https://doi.org/10.1093/sleep/34.5.565>.

43. Maiken Nedergaard and Steven A. Goldman, "Glymphatic Failure as a Final Common Pathway to Dementia," *Science* 370, no. 6512 (2020): 50-56, <https://doi.org/10.1126/science.abb8739>.

44. June C. Lo et al., "Sleep Duration and Age-Related Changes in Brain Structure and Cognitive Performance," *Sleep* 37, no. 7 (2014): 1171, <https://doi.org/10.5665/sleep.3832>.

45. Gosselin et al., 14.

46. Michael J. Sateia, "International Classification of Sleep Disorders- Third Edition," *Chest* 146, no. 5 (2014): 1391, <https://doi.org/10.1378/chest.14-0970>.

activities” such as watching television, playing video games, and surfing the internet.⁴⁷ As described in Chapter 8 senior leaders are not immune to BISS and often are forced to choose between sleep, work requirements, physical fitness, and family time. The choices between sleep, work, fitness, and family often confound senior leaders. Chapter 8 offers several techniques to design schedules and boundaries that preserve sleep, reduce interference from work activities, and increase engagement in personal wellbeing and family life.⁴⁸

Sleep in the Multi-Domain Context

Service members need to perform at peak cognitive levels to integrate the complex systems associated with sophisticated multi-domain operations.⁴⁹ Sleep deprivation impairs innovative thinking and flexible decision-making required to generate creative and appropriate solutions to unfamiliar challenges. Reducing sleep duration and degrading sleep continuity leads to inflexible thinking and greater difficulty understanding, interpreting, and responding to changing situations.⁵⁰ Furthermore, sleep deprivation degrades performance by causing individuals to focus excessively on peripheral issues or distractions, to be less willing to modify previous plans and strategies, and to show less empathy for teammates.⁵¹ In contrast, sufficient sleep optimizes brain function, allowing leaders to make good decisions, use sound judgment, and maintain effective situational awareness.⁵² Vignette 6-1 demonstrates the impact of sleep deprivation on cognitive function during simulated sustained combat.

Vignette 6-1: Thirteen five-person teams were evaluated for their ability to conduct **simulated continuous combat operations lasting 36 hours**. Each team’s task was to plot target locations; derive range, bearing, and angle of gun elevation; and charge immediately on receipt of the target and update situation maps. Across 36 hours of sleep deprivation, each team’s ability to derive range, bearing, and elevation accurately and to charge was unimpaired. **After approximately 24 hours without sleep ... team members stopped updating their situation maps and stopped computing preplanned targets immediately on receipt of new**

47. Wesensten and Balkin, 114.

48. See Chapter 8 of this volume: “Reframing Work-Life Balance for Senior Military Leaders.”

49. Nancy J. Wesensten et al., “Jet Lag and Sleep Deprivation,” in *Military Preventive Medicine: Mobilization and Deployment* (Fort Sam Houston, TX: Borden Institute, 2003): 298, <https://doi.org/10.3109/9780203998007-16>.

50. Yvonne Harrison and James A. Horne, “One Night of Sleep Loss Impairs Innovative Thinking and Flexible Decision Making,” *Organizational Behavior and Human Decision Processes* 78, no. 2 (1999): 141-142, <https://doi.org/10.1006/obhd.1999.2827>.

51. Yvonne Harrison and James A. Horne, “The Impact of Sleep Deprivation on Decision Making: A Review,” *Journal of Experimental Psychology: Applied* 6, no. 3 (2000): 246, <https://doi.org/10.1037//1076-898x.6.3.236>.

52. Killgore et al., 524.

information... [T]he teams disrupted their smooth, accurate flow of work, fired on prohibited targets, and generally lost control of the operation.⁵³

Leaders must balance sleep duration, timing, and continuity against mission requirements and constraints.⁵⁴ By finding opportunities for and creating conditions that maximize sleep, leaders foster mission success by increasing the resilience needed to overcome combat's emotional and physical challenges. In contrast, sleep deprivation over a prolonged period increases risks to mission in several ways. For example, sleep-deprived soldiers have slower reaction times, lack high emotional regulation, and make poor decisions, especially when forced to respond to ethical dilemmas quickly.⁵⁵ When operating in groups, sleep-deprived individuals have the propensity to loaf, often deferring work and actions to others resulting in reduced productivity and animosity.⁵⁶ Sleep deprivation is associated with an elevated risk of depression, post-traumatic stress disorder, and suicide.⁵⁷ Furthermore, senior leaders are not immune to the effects of sleep deprivation on behavioral health.⁵⁸ Leaders should consider the impact of their sleep habits on their own readiness and mission success.

Army senior leaders are becoming increasingly aware and attuned to the importance of sufficient sleep. For example, FM 7-22 uses the acronym **SLEEP** to encourage leaders to **set** conditions, **lead** by example, **educate**, and **encourage**, and **prioritize and plan** for sleep.⁵⁹ Army leaders are setting the example by discussing and educating subordinates on the importance of sleep, by resourcing better sleeping conditions for their Soldiers, and by prioritizing sleep as a combat multiplier balanced against mission requirements. Retired Lieutenant General David Barno's description of the Army's culture and sleep exemplifies the shift in priorities. "The Army has always had an internal dynamic that real men don't need sleep and can just push on, and it's incredibly stupid. Combat is a thinking man's business, and your brain doesn't function without sleep."⁶⁰ The DoD and the Army recognize the impact of sleep loss on ethical judgment, decision-making,

53. Wesensten et al., 291. Emphasis added.

54. FM 7-22 *Holistic Health and Fitness* defines sleep timing as the ability to initiate and maintain sleep, influenced by the circadian rhythm (see Headquarters, Department of the Army, 11-2).

55. William DS Killgore et al., "The Effects of 53 Hours of Sleep Deprivation on Moral Judgment," *Sleep* 30, no. 3 (2007): 351, <https://doi.org/10.1093/sleep/30.3.345>.

56. Claudia Y. D. Hoeksema-van Orden, Anthony W. K. Gaillard, and Bram P. Buunk, "Social Loafing Under Fatigue," *Journal of Personality and Social Psychology* 75, no. 5 (1998): 1179, <https://doi.org/10.1037/0022-3514.75.5.1179>.

57. Brian C. Gunia et al., "Sleep Leadership in High-Risk Occupations: An Investigation of Soldiers on Peacekeeping and Combat Missions," *Military Psychology* 27, no. 4 (2015): 1990, <https://doi.org/10.1037/mil0000078>.

58. Meghann Myers, "Army Report: Self-doubt and Sleep Deprivation Led to 2-Star's Suicide," *Army Times*, January 11, 2017, <https://www.armytimes.com/news/your-army/2017/01/11/army-report-self-doubt-and-sleep-deprivation-led-to-2-star-s-suicide/>.

59. Headquarters, Department of the Army, 11-5.

60. Dave Phillips, "The Army Rolls Out a New Weapon: Strategic Napping," *New York Times*, October 1, 2020, <https://www.nytimes.com/2020/10/01/us/army-naps.html>.

and risk-taking behavior.⁶¹ Indeed, sleep deprivation is strongly correlated with unethical conduct, associated with limited self-regulation, increased cognitive fatigue, and reduced inhibitions.⁶²

Senior leaders must address sleep deficits observed in garrison, training, and combat environments. For example, a study conducted in 2015 found that only a quarter of soldiers surveyed reported that their leaders encouraged them to get sufficient sleep or provide conducive sleep conditions. Only 35% of Soldiers surveyed considered sleep as a critical planning factor.⁶³ Historically, military culture has undervalued or dismissed the role that sleep plays in individual and unit readiness. A RAND study cited “culture, operational [tempo], knowledge-related, and medical system barriers” as impediments to promoting sleep and treating service members with sleep disorders.⁶⁴

Senior military leaders must understand the critical role sleep plays in sustaining individual health, wellbeing, and performance. Moreover, leaders’ behaviors and attitudes may impact their subordinates’ health, wellbeing, and performance. Prioritizing sleep improves organizational readiness and prepares senior leaders to navigate career and midlife stressors.

Recommendations to Improve Sleep (Individual)

The following section offers recommendations on sleep-related strategies to improve performance in the cognitive and physical domains that may help postpone age-related decrements associated with midlife. Often, individuals can make minor behavioral adjustments to enhance sleep duration, timing, and continuity.

Sleep Hygiene

Sleep hygiene includes habits and factors (i.e., daily routines, exercise, use and timing of stimulants, environmental conditions, and cognitive wellbeing) that impact the duration, timing, and continuity of sleep.⁶⁵ Improving sleep hygiene can be accomplished by implementing behavior changes over several weeks and months that encourage sleep while avoiding behaviors that inhibit sleep.⁶⁶ The Sleep Hygiene Index (see Table

61. U.S. Department of Defense, 3; Department of the Army, *A Leader’s Guide to Soldier Health and Fitness*, ATP 6-22.5 (Washington, DC: Department of the Army, 2016), 2-5.

62. Christopher M. Barnes et al., “Lack of Sleep and Unethical Conduct,” *Organizational Behavior and Human Decision Processes* 115, no. 2 (2011): 177, <https://doi.org/10.1016/j.obhdp.2011.01.009>.

63. Gunia et al., 203-205.

64. Troxel et al., xx.

65. David F. Mastin, Jeff Bryson, and Robert Corwyn, “Assessment of Sleep Hygiene Using the Sleep Hygiene Index,” *Journal of Behavioral Medicine* 29, no. 3 (2006): 223, <http://dx.doi.org/10.1007/s10865-006-9047-6>.

66. Brant W. Riedel, “Sleep Hygiene,” in *Treatment of Late-life Insomnia*, eds. Kenneth L. Lichstein and Charles M. Morin (Thousand Oaks, CA: Sage, 2000), 125-146, <https://dx.doi.org/10.4135/9781452225555>.

1) can be used to assess inadequate sleep hygiene and offers a framework to organize behaviors to improve hygiene.⁶⁷ Please take a minute to take the test and assess the results.

Table 1. Sleep Hygiene Index⁶⁸

Sleep Hygiene Index						
Below you will find a list of statements. Please rate how true each statement is for you by circling a number next to it. Use the scale below to make your choice.						
	0	1	2	3	4	Score:
	Never	Rarely	Sometimes	Frequently	Always	
1. I take daytime naps lasting two or more hours.	0	1	2	3	4	
2. I go to bed at different times from day to day.	0	1	2	3	4	
3. I get out of bed at different times from day to day.	0	1	2	3	4	
4. I exercise to the point of sweating within 1 hr of going to bed.	0	1	2	3	4	
5. I stay in bed longer than I should two or three times a week.	0	1	2	3	4	
6. I use alcohol, tobacco, or caffeine within 4 h of going to bed or after going to bed.	0	1	2	3	4	
7. I do something that may wake me up before bedtime (for example: play video games, use the internet, or clean).	0	1	2	3	4	
8. I go to bed feeling stressed, angry, upset, or nervous.	0	1	2	3	4	
9. I use my bed for things other than sleeping or sex (for example: watch television, read, eat, or study).	0	1	2	3	4	
10. I sleep on an uncomfortable bed (for example: poor mattress or pillow, too much or not enough blankets).	0	1	2	3	4	
11. I sleep in an uncomfortable bedroom (for example: too bright, too stuffy, too hot, too cold, or too noisy).	0	1	2	3	4	
12. I do important work before bedtime (for example: pay bills, schedule, or study).	0	1	2	3	4	
13. I think, plan, or worry when I am in bed.	0	1	2	3	4	
Total Score:						

If your score is greater than 39.5, your sleep hygiene is poor, and you should write down one strength and one goal to focus on for the next 7 days. If your score falls between 26 and 39.5, your sleep hygiene is fair, and you should write down two strengths and one goal to focus on for the next 7 days. If your score falls between 12.5 and 26, your sleep hygiene is moderate, and you should write down three strengths and one goal to focus on for the next 7 days. If your score is less than 12.5, your sleep hygiene is excellent, and you should write down four strengths and identify what may cause you to compromise your sleep habits. The scoring rubric is from <https://zestysleep.com/sleep-hygiene-index/>.

There are many things one can do to improve sleep hygiene. For example, routinely napping for two or more hours during the day or sleeping in on weekends reflects sleep debt and potentially poor sleep habits. Instead, avoid napping after 3 pm to sustain the sleep pressure required to fall asleep at bedtime.⁶⁹ Although many individuals know that caffeine and nicotine are stimulants, they often forget that they are “antithetical to sleep” and signal the body to be alert and awake.⁷⁰ Consequently, limiting caffeine and

67. Mastin et al., 223.

68. Adapted from Mastin et al., 226-227.

69. U.S. Department of Health and Human Services, “In Brief: Healthy Sleep,” National Heart, Lung, and Blood Institute, last modified September 2011, <https://www.nhlbi.nih.gov/files/docs/public/sleep/healthysleepfs.pdf>.

70. Headquarters, Department of the Army, *FM 7-22*, 11-4.

nicotine consumption six hours before bedtime may also improve sleep.

Many additional behavioral and environmental changes can also be implemented to improve sleep hygiene and facilitate sleep onset. Establish a consistent wake time and bedtime seven days per week to allow the body to improve the circadian rhythm.⁷¹ Develop a healthy pre-bedtime routine.⁷² Consider setting an evening alarm as a reminder to begin winding down and preparing for sleep. A nightly sleep routine might include reducing fluid intake three hours before bedtime to prevent sleep disruption, avoiding alcohol consumption within two hours of bedtime, avoiding vigorous exercise or elevating core body temperature within an hour of bedtime, and limiting exposure to electronic devices at least 30 minutes before bedtime.⁷³

Unfortunately, common evening behaviors hinder the onset of sleep. For example, a common misbelief is that alcohol helps one sleep better. While alcohol may help one fall asleep, its effects are short-lived. As the body metabolizes alcohol, it disrupts sleep cycles and negatively impacts the latter stages of sleep.⁷⁴ Furthermore, many people enjoy watching television and using other electronic devices that emit blue light before or while in bed. Unfortunately, blue light negatively affects sleep by impacting melatonin release and may trick the mind into thinking it is daytime. Fortunately, its impacts are reduced by wearing blue light blocking lenses.⁷⁵ Moreover, television, radio, and other activities can distract the mind and prevent the brain from achieving the deepest sleep stages, disrupting sleep continuity.⁷⁶

Creating a healthy sleep environment can help improve sleep quality. Start by mitigating ambient light in the bedroom. Use window covers or a sleep mask, red nightlights for safety, and turn clocks away from the bed to minimize anxiety about sleep.⁷⁷ Further limit distractions by using earplugs or white noise machines to reduce ambient and background noise. Setting a bedroom temperature between 63 degrees °F (with heavy bedding) and

71. Headquarters, Department of the Army, *FM 7-22*, 11-2; Edward J. Stepanski and James K. Wyatt, "Use of Sleep Hygiene in the Treatment of Insomnia," *Sleep Medicine Reviews* 7, no. 3 (2003): 219, <https://doi.org/10.1053/smr.2001.0246>.

72. "Healthy Sleep Habits," American Academy of Sleep Medicine, last modified August 2020, <http://sleepeducation.org/essentials-in-sleep/healthy-sleep-habits>.

73. Wesensten and Balkin, 116; National Heart, Lung, and Blood Institute, "Healthy Sleep Habits," American Academy of Sleep Medicine.

74. Mahesh M. Thakkar, Rishi Sharma, and Pradeep Sahota, "Alcohol Disrupts Sleep Homeostasis," *Alcohol* 49, no. 4 (2015): 299, <https://doi.org/10.1016/j.alcohol.2014.07.019>.

75. Kimberly Burkhart and James R Phelps, "Amber Lenses to Block Blue Light and Improve Sleep: A Randomized Trial," *Chronobiology International* 26, no. 8 (2009): 1602, <https://doi.org/10.3109/07420520903523719>; Ari Shechter et al., "Blocking Nocturnal Blue Light for Insomnia: A Randomized Controlled Trial," *Journal of Psychiatric Research* 96 (2018): 196, <https://doi.org/10.1016/j.jpsychires.2017.10.015>.

76. Alain Muzet, "Environmental Noise, Sleep and Health," *Sleep Medicine Reviews* 11, no. 2 (2007): 141, <https://doi.org/10.1016/j.smr.2006.09.001>.

77. Zachary A. Caddick et al., "A Review of the Environmental Parameters Necessary for an Optimal Sleep Environment," *Building and Environment* 132 (2018): 18, <https://doi.org/10.1016/j.buildenv.2018.01.020>.

82 degrees °F (without bedding) with humidity between 40-60% will also help produce environmental conditions conducive to sleep.⁷⁸

Finally, engage in stress-relieving activities before bedtime. Many individuals may be preoccupied with work, worries, thoughts, or other stressors that can inhibit sleep. Mindfulness practice, breathing exercises, light stretching, meditative yoga, or a casual walk can help calm the mind and release tension.⁷⁹ Likewise, if unable to sleep after 20 minutes in bed, do not continue to lie in bed and try to force sleep, as it will only delay onset. Instead, get out of bed and practice relaxing activities that reduce stress and calm the mind, such as mindful deep breathing, soothing stretching, or reading.⁸⁰ Limiting light and sound while doing so will further aid in easing the mind to sleep.

Senior leaders who struggle with persistent daytime sleepiness, disrupted sleep, insomnia, or excessive snoring should consult their medical provider to address its impact on their physical and mental wellbeing. Medical providers may recommend minor lifestyle changes, adjust medication and supplement use, or recommend additional tests to understand issues that may be disrupting sleep patterns. The following section provides an abbreviated list of medical and non-medical sleep aids and their potential side-effects. The list is provided to aid discussions with a medical provider when seeking treatment for sleep disturbances or disruptions. The list should not substitute for a medical consultation.

Medical and Non-medical Sleep Aids

Medical options to discuss with a medical provider include taking melatonin, sleep hypnotic drugs, and a combination of drugs for extreme circumstances requiring immediate sleep followed by immediate alertness. Melatonin generally does not promote sleep onset, but studies have demonstrated its efficacy in resetting the circadian rhythm (i.e., jetlag). Melatonin is not regulated by the FDA and thus may have varied amounts in each formulation.⁸¹

Prescribed sleep hypnotics, such as Zolpidem/Ambien and Temazepam/Restoril, facilitate the onset and continuity of sleep.⁸² These medications may be addictive and generally should not be used for longer than a month. Studies have also linked high doses and prolonged use of hypnotics

78. Caddick et al., 14.

79. U.S. Department of Health and Human Services, "In Brief: Healthy Sleep;" U.S. Department of Defense, 11-4.

80. Wesensten and Balkin, 116; U.S. Department of Health and Human Services, "In Brief: Healthy Sleep;" Eric Suni, "Sleep Hygiene," Sleep Foundation, last updated September 29, 2022, <https://www.sleepfoundation.org/sleep-hygiene>.

81. Rebecca B. Costello et al., "The Effectiveness of Melatonin for Promoting Healthy Sleep: A Rapid Evidence Assessment of the Literature," *Nutrition Journal* 13, no. 106 (2014), 2. <https://doi.org/10.1186/1475-2891-13-106>.

82. Use of trademarked names does not imply endorsement by the author, the U.S. Army War College, the Department of Defense, or the U.S. Government and is intended only to assist in identification of specific medications.

with an increased risk of mortality and certain cancers.⁸³ For situations where sleep-deprived individuals require immediate sleep followed by immediate alertness, doctors may prescribe a combination of drugs that includes a sleep-inducing hypnotic and a rapid awakening agent (i.e., dextroamphetamine or modafinil). However, the longer-term health impact of using a two-drug combination for prolonged periods remains an area of research and study.⁸⁴

Medical providers may also recommend non-pharmacological options such as keeping a sleep diary to track and understand daily routines that affect sleep or conducting a sleep study to rule out sleep disorders such as sleep apnea.⁸⁵ For example, smart phone applications can be used to help track sleep.⁸⁶ Mobile applications such as *CBT-I Coach* have been used to augment therapy from a medical provider, whereas other applications such as *Sleep Cycle* can be used to capture individual sleep data.⁸⁷ Tools like the psychomotor vigilance test can measure reaction times and alertness, both of which are impacted by a sleep deficit.

Other non-pharmacological options include behavioral therapies that improve sleep. For example, behavioral therapies such as cognitive behavioral therapy for insomnia (CBT-i) and brief behavioral treatment for insomnia (BBTi) have more durable and longer lasting benefits than pharmacological solutions.⁸⁸ Senior leaders have options to discuss with their medical provider if they are having difficulty falling or staying asleep.

83. Daniel F. Kripke, Robert D. Langer, and Lawrence E. Kline. "Hypnotics' Association with Mortality or Cancer: A Matched Cohort Study," *BMJ Open* 2, no. 1 (2012), 1, <http://dx.doi.org/10.1136/bmjopen-2012-000850>.

84. Wesensten et al., 293.

85. Colleen E. Carney et al., "The Consensus Sleep Diary: Standardizing Prospective Sleep Self-Monitoring," *Sleep* 35, no. 2 (2012): 287, <https://doi.org/10.5665/sleep.1642>; Deepak Shrivastava et al., "How to Interpret the Results of a Sleep Study," *Journal of Community Hospital Internal Medicine Perspectives* 4, no. 5 (2014): 1, <https://doi.org/10.3402/jchimp.v4.24983>.

86. Jong Cheol Shin, Julia Kim, and Diana Grigsby-Toussaint, "Mobile Phone Interventions for Sleep Disorders and Sleep Quality: Systematic Review," *JMIR mHealth and uHealth* 5, no. 9 (2017): e131, <https://doi.org/10.2196/mhealth.7244>.

87. Erin Koffel et al., "A Randomized Controlled Pilot Study of CBT-I Coach: Feasibility, Acceptability, and Potential Impact of a Mobile Phone Application for Patients in Cognitive Behavioral Therapy for Insomnia," *Health Informatics Journal* 24, no. 1 (2018): 4, <https://doi.org/10.1177/1460458216656472>; Adrian A. Ong and M. Boyd Gillespie, "Overview of Smartphone Applications for Sleep Analysis," *World Journal of Otorhinolaryngology-Head and Neck Surgery* 2, no. 1 (2016): 47, <https://doi.org/10.1016/j.wjorl.2016.02.001>; Use of trademarked names does not imply endorsement by the author, the U.S. Army War College, the Department of Defense, or the U.S. Government.

88. Vincent F. Capaldi et al., "Insomnia in the Military: Application and Effectiveness of Cognitive and Pharmacologic Therapies," *Current Psychiatry Reports* 17, no. 10 (2015): 4, <https://doi.org/10.1007/s11920-015-0622-9>; Troxel et al., 92; Matthew D. Mitchell et al., "Comparative Effectiveness of Cognitive Behavioral Therapy for Insomnia: A Systematic Review," *FOCUS* 12, no. 1 (2014): 86, <https://doi.org/10.1176/appi.focus.12.1.80>.

Recommendations to Improve Sleep (Organizational)

The following section offers recommendations on sleep leadership at the organizational level; strategies to improve the cognitive and physical performance of units in garrison, training, and combat.

Sleep Banking

Sleep banking provides the “physical resilience” to prepare for sleep loss.⁸⁹ Building a reserve of sleep by increasing daily sleep duration reduces the effects of subsequent sleep deprivation. Sleep banking extends performance and sustains alertness while also shortening the duration of recovery following decremented sleep.⁹⁰ Leaders should plan for and integrate sleep banking into operations to allow individuals and units to increase performance during periods of anticipated sleep loss (see Table 2). Sleep banking also improves morale and unit climate, even during periods of training or combat with reduced sleep.⁹¹

Table 2. Sleep Banking Strategy⁹²

Operations or Training	Strategy
Before	<ul style="list-style-type: none"> Integrate sleep banking into training plans two weeks prior to execution Set conditions for 8 or more hours of sleep per 24-hour period Implement reverse cycle physical training, ~1600-1700hrs Stop caffeine and alcohol at least 6 hours before sleep
During	<ul style="list-style-type: none"> Integrate naps to accumulate 7 to 8 hours of sleep Use caffeine to reduce grogginess and improve alertness Separate day and night sleeping areas
After	<ul style="list-style-type: none"> Allow additional time to refill the sleep bank Sleep at least 8 hours to return to optimal cognitive and physical performance

Napping can buy back sleep debt. Short duration naps have minimal impact on the circadian rhythm and sleep cycle when limited to 20-30 minutes. Short-duration naps are most effective at restoring the body and mind while limiting sleep inertia upon waking.⁹³ The best time to nap is the early afternoon, which coincides with the circadian rhythm’s natural dip.⁹⁴

Caffeine use

Caffeine suppresses sleep pressure building in the brain, but it cannot replace sleep, improve judgment or decision-making.⁹⁵ The recommended

89. U.S. Department of Defense, 15.

90. Wesensten and Balkin, 111.

91. Amy Thompson, Brad Jones, and Jordan Thornburg, “Sleep Banking,” *Military Review* (January – February 2017): 92-95, https://www.armyupress.army.mil/Portals/7/military-review/Archives/English/MilitaryReview_2017228_art016.pdf.

92. Adapted from Headquarters, Department of the Army, *FM 7-22*, 11-9.

93. Amber Brooks and Leon Lack, “A Brief Afternoon Nap Following Nocturnal Sleep Restriction: Which Nap Duration is Most Recuperative?” *Sleep* 29, no. 6 (2006): 831, <https://doi.org/10.1093/sleep/29.6.831>.

94. Qingwei Chen et al., “Effects of Afternoon Nap Deprivation on Adult Habitual Nappers’ Inhibition Functions,” *Biomed Research International* (2018): 2, <https://doi.org/10.1155/2018/5702646>.

95. Headquarters, Department of the Army, *FM 7-22*, 11-11.

dose to enhance alertness and mental acuity is 200mg of caffeine or two cups of coffee, not to exceed 400mg in 24 hours.⁹⁶ For periods of total sleep deprivation, caffeine consumption should not exceed 1000mg.⁹⁷ See Table 3 for a caffeine dosing strategy during sustained operations with total and partial sleep deprivation and night operations.

Table 3. Caffeine Dosing Strategy⁹⁸

Mission Requirements	Caffeine Dose
Sustained Operations – Total Sleep Deprivation	<ul style="list-style-type: none"> • 200mg at midnight • 200mg at 0400 and 0800 as needed • 200mg at 1200 and 1600 as needed
Sustained Operations – Partial Sleep Deprivation (6 hours or less)	<ul style="list-style-type: none"> • 200mg upon awakening • 200mg four hours later • Last Dose: at least 6 hours before bed
Night Operations with Daytime Sleep	<ul style="list-style-type: none"> • 200mg at start of night shift • 200mg four hours later • Last Dose: at least 6 hours before bed

Jet Lag

Jet lag stresses the body's internal clock and throws it out of synchronization. It takes several days for the body to restore the circadian rhythm as it resynchronizes to the new time zone. Jet lag affects younger travelers less severely than individuals in midlife who require additional recovery time after a flight.⁹⁹

Traveling across three or fewer time zones produces minimal jet lag. Several guiding principles can be implemented to reduce jet lag (see Table 4). For example, the body needs one day of recovery per hour of time zone change.¹⁰⁰ For short trips (less than 72 hours) that cross four or more time zones, one should attempt to remain in the original time zone.¹⁰¹ Although eastbound flights crossing six time zones can feel more

96. A cup of coffee is generally 100 milligrams of caffeine; D.A. Hansen et al., "Randomized, Double-Blind, Placebo-Controlled, Crossover Study of the Effects of Repeated-Dose Caffeine on Neurobehavioral Performance During 48 h of Total Sleep Deprivation," *Psychopharmacology* 236 (2019), 7. <https://doi.org/10.1007/s00213-018-5140-0>; Daniele Wikoff et al., "Systematic Review of the Potential Adverse Effects of Caffeine Consumption in Healthy Adults, Pregnant Women, Adolescents, and Children," *Food and Chemical Toxicology* 109 (2017): 586, <https://doi.org/10.1016/j.fct.2017.04.002>.

97. Olivier Coste, Patrick Remont, and Didier Lagarde, *Wake-Sleep Cycle Management during SUSOPS and CONOPS in French Military Forces: Policy and Ethics* (Institut de Medicine Navale du Service de Sante des Armees, Toulon, France, 2009), 29-9, <https://apps.dtic.mil/sti/citations/ADA567875>.

98. Adapted from Headquarters, Department of the Army, *FM 7-22*, 11-11.

99. Wesensten et al., 290.

100. Wesensten et al., 289-290, 294.

101. Jim Waterhouse et al., "Jet Lag: Trends and Coping Strategies," *The Lancet* 369, no. 9567 (2007): 1125-1126, [https://doi.org/10.1016/S0140-6736\(07\)60529-7](https://doi.org/10.1016/S0140-6736(07)60529-7).

stressful than westbound flights, each direction can affect sleep differently. For example, eastbound travelers have difficulty falling asleep, whereas westbound travelers have less difficulty falling asleep but have difficulty remaining asleep. For north or southbound flights, jet lag results from flight duration and sleep deprivation. In other words, the longer the flight and associated sleep deprivation from the flight, the more exhaustion and malaise experienced by the traveler.¹⁰²

Table 4. Jet Lag Strategy¹⁰³

Travel	Strategy
Before	<ul style="list-style-type: none"> • Integrate sleep banking into training plans two weeks prior to travel • Set conditions for 8 or more hours of sleep per 24-hour period • Implement reverse cycle physical training, ~1600-1700hrs • Refrain from attempting to pre-adapt to a new time zone • Issue foam ear plugs, eye mask, and blankets • Drink water and hydrate prior to travel
During	<ul style="list-style-type: none"> • Coordinate for meals prior to or immediately after takeoff • Drink lots of water and eat roughage (fruit and vegetables) • Sleep, use the assistance of foam ear plugs, eye mask, and a blanket
After	<ul style="list-style-type: none"> • Schedule meetings during normal waking hours from originating time zone • Regular exercise and mealtimes shorten the recovery period • Avoid naps for 3 to 4 days as the body adjusts to a new time zone • Melatonin can aid with recovering from jetlag as it assists with resetting the circadian rhythm*

* Melatonin dosing can be administered depending on the direction of travel. For recovery from eastbound flights, take melatonin in the late afternoon. For recovery from westbound flights, take melatonin halfway through a sleep cycle to prevent waking up too early.

Public Health Related Resources

There are many resources available from military and civilian sources to help service members improve sleep duration, timing, and continuity. This section provides a partial listing and does not imply endorsement of commercial products by the authors, the U.S. Army War College, the Department of Defense, or the U.S. Government.

The DoD sleep-related websites include information, resources, and tools generated by the Uniformed Services University Consortium of Health and Military Performance (CHAMP), the Army Public Health Center, the Army FIT – Ready and Resilient, the Walter Reed Army Institute of Research, and the Biotechnology High Performance Computing Software Applications Institute (BHSAI).¹⁰⁴ For example, the Human Performance

102. Wesensten et al., 289-290.

103. Adapted from Headquarters, Department of the Army, *FM 7-22*, 11-7 through 11-8.

104. “Sleep & Stress,” Uniformed Services University Consortium of Health and Military Performance (CHAMP), accessed March 30, 2021, <https://www.hprc-online.org/mental-fitness/sleep-stress>; “Sleep,” Army Public Health Center, updated January 5, 2021, <https://phc.amedd.army.mil/topics/healthyliving/sleep>; “Army FIT – Ready and Resilient,” Army Resiliency Directorate, accessed March 30, 2021, <https://armyfit.army.mil/>, CAC or DS Logon required; “Sleep Resources,” Walter Reed Army Institute of Research (WRAIR), accessed February 12, 2023, <https://wrair.health.mil/Sleep-Resources/>; “2B-Alert Web,” Biotechnology High Performance Computing Software Applications Institute (BHSAI), accessed March 30, 2021, <http://sleep.bhsai.org/>.

Resources found on the CHAMP website provide evidence-based resources to maximize holistic performance that include tips and information on sleep that leaders can use to educate themselves and their teams.¹⁰⁵ The CHAMP website also offers an “Ask the Expert” service where one can submit questions and receive tailored responses from CHAMP providers, scientists, and researchers.¹⁰⁶

The Army Public Health Center publishes tips and articles for healthy living, including effective sleep habits, sleeping tactics during sustained operations, and a sleep checklist for leaders and supervisors. The Army Public Health Center also includes links to news articles that discuss sleep’s role in consolidating memory, maintaining health, and the interaction between diet and sleep patterns.¹⁰⁷

The Army FIT – Ready and Resilient website offers information focused on physical, emotional, social, spiritual, and family fitness. The website allows service members to take the *Azimuth Check For Soldiers* and to view their results and personalized recommendations based on the results. It also offers specific resources on sleep loss and performance, developing better sleep habits, impacts of screen time before bed, and links between post-traumatic stress disorder and sleep disruptions.¹⁰⁸

The Walter Reed Army Institute of Research (WRAIR) Center for Military Psychiatry and Neuroscience also offers a wide range of tips, checklists, and fact sheets for individuals and units.¹⁰⁹ The resources on WRAIR’s website are based on decades of military-specific studies on warfighter performance and resilience. In addition, WRAIR houses the DoD’s largest research sleep laboratory and focuses on implementing science in operational units and continues to study the impacts of sleep on alertness, decision-making, and performance to produce material and non-material solutions for warfighters.¹¹⁰

The Biotechnology High Performance Computing Software Applications Institute (BHSAL) is part of the Army’s Telemedicine and Advanced Technology Research Center (TATRC). Found on the BHSAL website, the “2B-Alert” tool and mobile application can be used to predict how an individual’s sleep/wake schedule will be impacted by caffeine consumption and time of day.¹¹¹ The website and app can also design an individual plan optimizing sleep/wake and caffeine to increase alertness during 48 hours of total sleep deprivation.¹¹²

105. CHAMP, “Sleep & Stress.”

106. “Ask the Expert,” Uniformed Services University Consortium of Health and Military Performance (CHAMP), accessed March 30, 2021, <https://www.hprc-online.org/ask-the-expert>.

107. Army Public Health Center, “Sleep.”

108. Army Resiliency Directorate, “Army FIT – Ready and Resilient.”

109. WRAIR, “Sleep Resources.”

110. “Behavioral Biology,” WRAIR, accessed February 12, 2023, <https://wrair.health.mil/Biomedical-Research/Center-for-Military-Psychiatry-and-Neuroscience/Behavioral-Biology/>.

111. BHSAL, “2B-Alert Web.”

112. Jaques Reifman et al., “2B-Alert App: A Mobile Application for Real-Time Individualized Prediction of Alertness,” *Journal of Sleep Research* 28, no. 2 (2019): 1, <https://doi.org/10.1111/jsr.12725>.

Civilian sleep resources include the National Sleep Foundation and the American Association of Sleep Medicine websites, which provide extensive articles on sleep science and sleep and wellness reviews. For example, www.sleepfoundation.org includes information on sleep hygiene, the circadian rhythm, women's health and sleep, infant and youth sleep, and travel fatigue. The National Sleep Foundation offers a sleep calculator to determine the optimal sleep schedule and in-depth analysis of sleep disorders like insomnia, sleep apnea, and restless leg syndrome (RLS). The www.sleepfoundation.org website provides detailed reviews of sleep-related products, including mattresses, sheets, pillows, CPAP machines, anti-snoring devices, and weighted blankets. Finally, the American Association of Sleep Medicine provides online resources to measure sleep at www.sleepeducation.org.

Conclusion

Sleep is fundamental to senior leader health and wellbeing and plays a critical role in sustaining performance throughout midlife. The physiological processes that occur during sleep have profound impacts on all systems of the body, especially brain health. Sufficient sleep enhances cognitive function and mental agility required to gain the intellectual overmatch needed to win in complex multi-domain operations. Prioritizing sleep improves individual and organizational readiness and serves as a tool for senior leaders to mitigate physiological changes associated with aging. By ensuring adequate sleep duration, continuity, and timing, senior leaders nourish their mind and body maximizing their cognitive and physical performance and forestalling the biological declines of aging.

Key Takeaways

- Senior military leaders must understand the critical role sleep plays in sustaining their individual health, wellbeing, performance, and readiness.
- Prioritizing sleep better prepares leaders to address the challenges of work and life while mitigating the physiological changes associated with aging.
- Sleep deprivation reduces one's ability to execute complex cognitive tasks, communicate effectively, make appropriate decisions, and maintain vigilance.
- Sleep, physical fitness, and diet are interdependent and are often among the first things sacrificed in times of stress.
- Sleep deprivation can exacerbate a range of health issues commonly found in midlife.
- This chapter provides both individual and organizational recommendations to improve sleep.

Chapter 6

MINDFULNESS TRAINING FOR OPTIMIZATION AND WELLNESS

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“We are devoting 90 minutes every day to our physical well-being and physical excellence. We value it and protect it. What are we doing that’s equivalent for the mind?”

—Lieutenant General Walter Piatt¹

Contemporary senior military leaders are bombarded with information and must rapidly employ the sense-making and sense-giving skills required for strategic leadership.² Senior military leaders also confront a complex mental landscape that interlaces increasing professional responsibility, mounting information processing requirements, and a growing demand for technical, conceptual, and interpersonal competencies.³ These demands suggest a need for the Army to train senior leaders to optimize their cognitive and physical capacities. As “the American way of war must evolve and adapt” to dominate the competitive environment, so too must our training.⁴ To match the increased pace and information processing requirements of the modern landscape, the U.S. Army must transform how we hone our senior

1. Lieutenant General Walter Piatt, as quoted in Dr. Amishi P. Jha, “Driven to Distraction: What Senior Leaders Can Do to Improve Focus,” November 14, 2018, in *War Room*, produced by the US Army War College, podcast, <https://warroom.armywarcollege.edu/podcasts/driven-to-distraction>.

2. Michael Hosie, “Senior Leader Development,” in *Strategic Leadership*, ed. Tom Galvin and Dale Watson (Carlisle: U.S. Army War College, 2019), 84.

3. Douglas Waters, “Strategic Leader Competencies,” in *Strategic Leadership*, ed. Tom Galvin and Dale Watson (Carlisle: U.S. Army War College, 2019), 70.

4. U.S. Army, “The U.S. Army in Multi-Domain Operations 2028,” *TRADOC Pamphlet 525-3-1* (Washington, D.C.: Headquarters, Department of the Army, 2018), i.

military leaders' mental skills.⁵ Mindfulness training presents an underutilized tool with demonstrated potential to optimize cognitive performance, reduce emotional reactivity, and increase wellness.⁶

Defined as paying “attention to present-moment experience without judgment, elaboration, or emotional reactivity,” mindfulness is an essential skill that midlife senior military leaders can master with practice.⁷ Mindfulness training, which aims to increase mindfulness via engagement in guided mindfulness drills, bolsters cognitive performance and presents an evidenced-based training tool that senior military leaders can incorporate into personal and organizational activities to improve attention and working memory.⁸ In addition to presenting a competitive advantage, mindfulness training benefits senior military leaders by enhancing their *pre-silience* or the maximization of healthful states useful for negotiating stressors (see also Chapter 7).⁹ Pre-silience reflects purposeful preparation for life's challenges, both personal and professional. Mindfulness practice can be conceptualized as cognitive training and may be employed by midlife senior military leaders and their soldiers to optimize performance and enhance wellness.¹⁰

This chapter asserts that mindfulness training presents an untapped competitive advantage for senior military leaders operating in complex environments. It describes how senior military leaders can use mindfulness training to optimize cognitive performance, reduce emotional reactivity, and enhance wellness as a protective buffer against midlife challenges. It

5. U.S. Army Chief of Staff, “Army Multi-Domain Transformation: Ready to Win in Competition and Conflict,” *Chief of Staff Paper #1* (Washington, D.C.: Department of the Army, 2021): 27.

6. Yi-Yuan Tang and Michael I. Posner, “Mindfulness and Training Attention,” in *Handbook of Mindfulness and Self-Regulation*, edited by Brian D. Ostafin, Michael D. Robinson, and Brian P. Meier, (New York: Springer, 2015), 24; Garland, Hanley, Goldin, and Gross, “Testing the Mindfulness-to-Meaning Theory,” 1-19.

7. Amishi Jha, Elizabeth Stanley, Anastasia Kiyonaga, Ling Wong, and Lois Gelfand, “Examining the Protective Effects of Mindfulness Training on Working Memory and Affective Experience,” *Emotion* 10, no 1 (2010): 54-64.

8. Marieke K. Van Vugt and Amishi P. Jha, “Investigating the Impact of Mindfulness Meditation Training on Working Memory: A Mathematical Modeling Approach,” *Journal of Cognitive, Affective, and Behavioral Neuroscience* 11 (2011): 344-353; Dianna Quach, Kristen E. Jastrowski Mano, and Kristi Alexander, “A Randomized Controlled Trial Examining the Effect of Mindfulness Meditation on Working Memory Capacity in Adolescents,” *Journal of Adolescent Health* 58, no. 5 (2016): 489-496.

9. Amishi Jha, *Peak Mind: Find Your Focus, Own Your Attention, Invest 12 Minutes a Day* (New York: HarperOne, 2021), 17.

10. Douglas Johnson, Nathaniel Thom, Elizabeth Stanley, Lori Haase, Alan Simmons, Pei-An Shih, Wesley Thompson, Eric Potterat, Thomas Minor, and Martin Paulus, “Modifying Resilience Mechanisms in At-Risk Individuals: A Controlled Study of Mindfulness Training in Marines Preparing for Deployment,” *American Journal of Psychiatry* 171, no. 8 (August 2014): 844-53.

also recommends opportunities for senior military leaders to adopt personal and institutional mindfulness training programs. Finally, the paper addresses potential barriers to implementing this evidenced-based cognitive training tool and suggestions for overcoming them.

The Concept of Mindfulness

Mindfulness is neither dogmatic, nor is it the exclusive domain of a spiritual tradition.¹¹ Human beings have practiced mindfulness for at least 2,600 years in multiple contexts, and it has origins in the world's great wisdom traditions.¹² For example, the Roman emperor, military leader, and philosopher Marcus Aurelius was an early mindfulness practitioner who asserted the importance of self-observation, present moment-focused thinking, and distancing from one's own mental narrative.¹³ Today, mindfulness continues to emphasize the intentional self-regulation of attention without judgment and should be approached as a trainable skill.¹⁴

Mindfulness is understood as a natural human capacity that can be improved with practice.¹⁵ Viewing mindfulness as a trainable skill is particularly relevant for senior military leaders seeking a competitive edge and confronting midlife stressors. For example, Brigadier General Richard R. Coffman's quest to thrive, reduce stress, and increase wellness during the onset of the COVID-19 pandemic included initiating a personal mindfulness practice. Coffman observed that mindfulness training has been more difficult than he anticipated.¹⁶ However, he understands focused and nonjudgmental awareness of the present moment can be mastered and has been motivated to stick with his practice to improve his professional performance and personal well-being.¹⁷

11. Rebecca Greenslade, "Beyond Mindfulness, Towards Antiquity," *Self & Society* 43, no.1 (2015): 35-40.

12. Shauna L. Shapiro, Hooria Jazaieri, and Philippe R. Goldin, "Mindfulness-based Stress Reduction Effects on Moral Reasoning and Decision Making," *The Journal of Positive Psychology*, (2012): 1-12.

13. Greenslade, "Beyond Mindfulness," 35-40.

14. Simon B. Goldberg, Kevin M. Riordan, Shufang Sun, and Richard J. Davidson, "The Empirical Status of Mindfulness-Based Interventions: A Systematic Review of 44 Meta-Analyses of Randomized Controlled Trials," *Perspectives on Psychological Science* (February 2021): 1.

15. Eric L. Garland, Adam W. Hanley, Phillippe R. Goldin, and James J. Gross, "Testing the Mindfulness-to-Meaning Theory: Evidence for Mindful Positive Emotion Regulation from a Reanalysis of Longitudinal Data," *PLoS ONE* 12 (2017): 2.

16. Brigadier General Richard R. Coffman, Personal Communication with Ann Meredith, January 19, 2021.

17. Coffman, Personal Communication with Ann Meredith, January 19, 2021.

Mindfulness Training as a Competitive Advantage

Relevance for the Military. Intellectual overmatch is paramount in Multi-Domain Operations and necessitates peak mental performance.¹⁸ Indeed, swift and accurate decision-making is essential for effective strategic competition and conflict, yet it is threatened by information overload in the volatile environment. As the U.S. Army Chief of Staff writes, “Future conflicts will require cognitive speed to create opportunities and achieve decision dominance.”¹⁹ To meet the increased pace and information processing requirements of contemporary competition, the U.S. Army should reconceptualize training to not only include physical fitness, but also cognitive fitness.²⁰ Institutionalized mindfulness training should be a part of this campaign for decision dominance and cognitive optimization. Mindfulness can improve the heightened awareness, rapid information processing, and environmental sensing senior military leaders need to “make decisions at the speed of relevance.”²¹ Yet, it remains an untapped military competitive advantage.

The U.S. Army recognizes the benefits and potential of mindfulness training for soldiers and codified it in doctrine—Field Manual 7-22, *Holistic Health and Fitness*. This manual links soldier health and fitness to readiness, and mindfulness is presented as an impactful individual skill. *FM 7-22* notes mindfulness practice can modify brain processes that can potentially lead to other physiological changes, such as “relaxation, improved focus, reduced inflammation, lower stress hormones, and enhanced immune system function.”²² In addition, *FM 7-22* recommends soldiers pursue mindfulness training for stress and pain management, improved sleep, decreased blood pressure, and controlling addictive behavior.²³ *FM 7-22* recognizes other beneficial qualities of mindfulness practice relevant to military audiences, including “improved quality of life, higher emotional intelligence, creativity and concentration, and increased empathy, spirituality, and self-compassion.”²⁴ Despite these recognized benefits, the institutionalization of mindfulness training remains elusive.

18. United States Joint Chiefs of Staff, “Developing Today’s Joint Officers for Tomorrow’s Ways of War: The Joint Chiefs of Staff Vision and Guidance for Professional Military Education & Talent Management,” (Washington, D.C.: Headquarters, Department of Defense, May 2020), 2.

19. U.S. Army Chief of Staff, “Army Multi-Domain Transformation,” 1.

20. U.S. Army Chief of Staff, “Army Multi-Domain Transformation,” 27.

21. Joseph F. Dunford, “The Character of War and Strategic Landscape Have Changed,” *Joint Force Quarterly* 89, 2nd Qtr (2018): 3.

22. U.S. Army, *Field Manual 7-22: Holistic Health and Fitness* (Washington, D.C.: Headquarters, Department of the Army, 2020), 13-3.

23. U.S. Army, *FM 7-22*, 11-4.

24. U.S. Army, *FM 7-22*, 13-3.

In many ways, mindfulness aligns with the culture of military discipline, and, therefore, has great relevance to the Army and other services. Mindfulness centers on paying focused attention to the present moment, which is particularly useful for soldiers. Attention training begins on the first day of Basic Combat Training.²⁵ However, a soldier's body may be standing at attention, but his or her mind may be wandering.²⁶ The opposite of a "mind at attention," mind-wandering may continue throughout a soldier's career and is associated with decreased job performance.²⁷ Mindfulness presents a cognitive training tool to hone soldiers' attention and working memory.²⁸ Mindfulness may also enhance cognitive resilience, which is the "ability to maintain or regain cognitive capacity at risk of decline over periods of high demand."²⁹ These skills are essential for all soldiers but perhaps particularly for midlife senior military leaders to compete in their demanding and competitive environment.

Relevance for Midlife. In addition to the competitive advantage it presents for the military in general, mindfulness may also be particularly beneficial in midlife. A pivotal period, midlife is characterized by peaking personal and professional demands (see Chapter 1).³⁰ While midlife can bring significant personal and professional gratification, senior military leaders may also confront chronic stress, mental health challenges, and the beginning of cognitive and physical degeneration.³¹ Midlife naturally brings decreasing fluid intelligence, or information processing speed.³² In addition, chronic stress in midlife can be pervasive, permeating the personal,

25. Shapiro, Jazaieri, and Goldin, "Mindfulness-based Stress Reduction Effects on Moral Reasoning and Decision Making," 1-12.

26. Sean Bruyey, "Mindfulness and Minefields: Walking the Challenging Path of Awareness for Soldiers and Veterans," in *Practitioner's Guide to Ethics and Mindfulness-Based Interventions*, ed. Lynette M. Monteiro, Jane F. Compson, and Frank Musten (New York: Springer, 2017), 390.

27. Amishi Jha, Alexandra Morrison, Justin Dainer-Best, Suzanne Parker, Nina Rostrup, and Elizabeth Stanley, "Minds 'at Attention': Mindfulness Training Curbs Attentional Lapses in Military Cohorts," *PLoS ONE* 10, no. 2 (2015): 1-19.

28. Jha, Stanley, Kiyonaga, Wong, and Gelfand, "Examining the Protective Effects of Mindfulness Training," 54-64; Anthony P. Zanesco, Ekaterina Denkova, Scott L. Rogers, William K. McNulty, and Amishi P. Jha, "Mindfulness Training as Cognitive Training in High-demand Cohorts: An Initial Study in Elite Military Servicemembers," *Progress in Brain Research* 244 (2019): 323-354.

29. Amishi P. Jha., Anthony P. Zanesco, Ekaterina Denkova, Alexandra B. Morrison, Nicolas Ramos, Keith Chichester, John W. Gaddy, and Scott L. Rogers, "Bolstering Cognitive Resilience Via Train-the-Trainer Deliver of Mindfulness Training in Applied High-Demand Settings," *Mindfulness* 11 (2020): 684.

30. Margie E. Lachman, "Development in Midlife," *Annual Review of Psychology* 55, (2004): 305-331; Hosie, "Senior Leader Development," 84.

31. David M. Almeida, Jennifer R. Piazza, Robert S. Stawski, and Laura C. Klein, "The Speedometer of Life: Stress, Health and Aging," in *Handbook of the Psychology of Aging*, ed. K. Warner Schaie and Sherry L. Willis (San Diego: Elsevier, 2011), 198.

32. Margie E. Lachman, "Development in Midlife," 319.

professional, psychological, and physical aspects of a senior military leader's life. Mindfulness practice provides a resource for senior military leaders to confront midlife challenges, which include persistent transitions and growing responsibility, along with age-related declines in memory, information processing speed, and cognition.³³ Mindfulness practice presents senior military leaders with an accessible tool to improve job performance, manage stress, and optimize cognitive functioning.³⁴ Given this context, mindfulness training offers an essential tool that senior military leaders can use for optimization and wellness.

Relevance for Leadership. The Army defines leadership as “the activity of influencing people by providing purpose, direction, and motivation to accomplish the mission and improve the organization.”³⁵ It further suggests that leaders who possess and enact the right knowledge, skills, and behaviors (KSBs) will be more successful. Mindfulness practice directly strengthens many of those KSBs and is also likely indirectly related to leadership through its effect on various leadership competencies, including intellect, judgment, empathy, presence, resilience and transformational leadership behaviors. For example, a study found that leader mindfulness was positively related to employee job satisfaction and positive affect through transformational leadership.³⁶ Another study found that leader mindfulness enabled leaders to attenuate displayed abusive leadership to subordinates to whom they felt hostility.³⁷ In effect, mindfulness training bolsters the building blocks on which effective leadership is built, and, as such, remain highly relevant to the Army.

Benefits of Mindfulness Training

Optimized Cognitive Performance. With its demonstrated capability to improve practitioners' attention, working memory, and other sense-making cognitive skills, mindfulness practice offers senior military leaders essential training to hone the mental competencies needed to compete and win in a complex environment.³⁸ One example of these mental competencies is

33. Margie E. Lachman, “Development in Midlife,” 319.

34. Amishi Jha, Scott Rogers, Eric Schoomaker and Edward Cardon, “Deploying Mindfulness to Gain Cognitive Advantage: Considerations for Military Effectiveness and Well-being,” *NATO Science and Technology Conference Proceedings* (2019), 3-4.

35. U.S. Army, *ADP 6-22, Army Leadership and the Profession* (Washington, D.C.: Headquarters, Department of the Army, 2019), 1-13.

36. Anna S. Pinck and Sabine Sonnentag, “Leader Mindfulness and Employee Well-Being: The Mediating Role of Transformational Leadership. *Mindfulness* 9, No. 3 (2018): 884-896.

37. Lindie H. Liang, Douglas J. Brown, D. Lance Ferris, Samuel Hanig, Huiwen Lian, and Lisa M. Keeping, “The Dimensions and Mechanisms of Mindfulness in Regulating Aggressive Behaviors,” *Journal of Applied Psychology* 103, No. 3 (2018): 281-299.

38. Jha, Rogers, Schoomaker and Cardon, “Deploying Mindfulness to Gain Cognitive Advantage,” 3-4.

understanding, which the U.S. Army Chief of Staff recently characterized as an essential building block of great power competition.³⁹ Understanding can be achieved through situational awareness and environmental sensing. One way mindfulness training improves environmental sensing is through regular open monitoring practice, which will be described in a forthcoming section of this chapter.⁴⁰ Enhanced information processing is another mental competency optimized by mindfulness training. Enhanced information processing is particularly important for senior military leaders because it supports adaptive leadership, which is the ability to observe and interpret events and respond to crises.⁴¹ In addition, mindfulness training may bolster senior military leaders' decision-making ability.⁴² This benefit makes mindfulness training a critically important cognitive tool, as optimized and accelerated decision-making assists senior military leaders in achieving the intellectual overmatch needed to gain and retain the competitive advantage.⁴³

Studies show mindfulness strengthens working memory capacity, which is important for senior military leaders as they rapidly process information in complex and volatile environments.⁴⁴ Defined as the temporary maintenance and manipulation of information, working memory is the capacity to not only recall information ranging from verbal and visual to conceptual and spatial, but use it during active problem solving.⁴⁵ Distraction and emotionally charged thoughts impede working memory and hinder cognitive performance.⁴⁶ Significantly, learning and comprehension are tied to working memory and may be correspondingly impacted by distraction, emotional reactivity, and stress.⁴⁷

39. U.S. Army Chief of Staff, "The Army in Military Competition," *Chief of Staff Paper #2* (Washington, D.C.: Department of the Army, 2021): 1.

40. Jha, Rogers, Schoomaker and Cardon, "Deploying Mindfulness to Gain Cognitive Advantage," 1-14.

41. Jha, Rogers, Schoomaker, and Cardon, 4.

42. Shapiro, Jazaieri, and Goldin, "Mindfulness-based stress reduction effects on moral reasoning and decision making," 1-12.

43. U.S. Army Chief of Staff, "Army Multi-Domain Transformation," 1.

44. Amishi P. Jha, Anthony P. Zanesco, Ekaterina Denkova, William K. MacNulty, and Scott L. Rogers, "The Effects of Mindfulness Training on Working Memory Performance in High-Demand Cohorts: A Multi-Study Investigation," *Journal of Cognitive Enhancement* (2021).

45. Anastasia Kiyonaga and Tobias Egner, "Working Memory as Internal Attention: Toward and Integrative Account of Internal and External Selection Processes," *Psychonomic Bulletin & Review* 20, No. 2 (2013): 228-242.

46. Patricia A. Deuster and Eric Schoomaker, "Mindfulness: A Fundamental Skill for Performance Sustainment and Enhancement," *Journal of Special Operations Medicine* 15, no. 1 (2015): 93-99.

47. Michael D. Mrazek, Michael S. Franklin, Dawa T. Phillips, Benjamin Baird, Jonathan W. Schooler, "Mindfulness Training Improves WMC & GRE performance While Reducing Mind-Wandering," *Psychological Science*, 24, no. 5, (2013): 776-781; Amishi P. Jha, Ekaterina Denkova, Anthony P. Zanesco, Joanna E. Witkin, Joshua Rooks, and Scott

Traditional texts from centuries ago refer to mindfulness as non-forgetting and non-distraction. Today, models propose that mindfulness practice may optimize performance by bolstering attention, improving working memory, increasing self-regulation, and minimizing off-task thoughts.⁴⁸ Research also indicates mindfulness training can improve executive function, which is an important benefit for senior military leaders.⁴⁹ Studies show mindfulness works to improve attention through intentional and repetitive practice with focusing, noticing distraction, and re-focusing as needed to maintain attention on a selected object.⁵⁰ Notably, the benefits of mindfulness training increase with practice.⁵¹ Research found that the more participants engaged in mindfulness training, the greater the resulting protective benefits on their attention during stressful periods.⁵²

Mindfulness training counters mind-wandering and its associated performance costs by building capacity to intentionally redirect attention. Defined as off-task thought, mind-wandering redirects attentional resources from the task at hand to internally generated thoughts.⁵³ Off-task thinking occurs during 30-50% of waking hours and may occur more often due to the potential for under-reporting due to lack of self-awareness.⁵⁴ Mind-wandering could be especially significant for professions requiring situational awareness and response, including military service.⁵⁵ The mandate to minimize mind-wandering and maximize focused attention is especially relevant for senior military leaders operating in a volatile, uncertain, complex, and ambiguous strategic environment.

In addition to strengthening core cognitive control processes that support learning, comprehension, and memory, mindfulness training is associated

L. Rogers, "Does Mindfulness Training Help Working Memory 'Work' Better?" *Current Opinion in Psychology* 28 (2019): 273-278.

48. Amishi P. Jha, Ekaterina Denkova, Anthony P. Zanesco, Joanna E. Witkin, Joshua Rooks, and Scott L. Rogers, 273-276.

49. Tang and Posner, "Mindfulness and Training Attention," 24.

50. Brian D. Ostafin, "Taming the Wild Elephant: Mindfulness and Its Role in Overcoming Automatic Mental Processes," in *Handbook of Mindfulness and Self-Regulation*, edited by Brian D. Ostafin, Michael D. Robinson, and Brian P. Meier (New York: Springer, 2015), 55.

51. Joshua Rooks, Alexandra B. Morrison, Merissa Goolsarran, Scott L. Rogers, and Amishi P. Jha, "'We Are Talking About Practice': The Influence of Mindfulness vs. Relaxation Training on Athletes' Attention and Well-being Over High-Demand Intervals," *Journal of Cognitive Enhancement* 1, no. 2 (2017): 151.

52. Amishi P. Jha, Alexandra B. Morrison, Suzanne C. Parker, and Elizabeth A. Stanley, "Practice is Protective: Mindfulness Training Promotes Cognitive Resilience in High-Stress Cohorts," *Mindfulness* 8 (2017): 46-58.

53. Jha, Morrison, Dainer-Best, Parker, Rostrup, and Stanley, "Minds 'at attention,'" 2.

54. Jha, Morrison, Dainer-Best, Parker, Rostrup, and Stanley, 2.

55. Jha, Morrison, Dainer-Best, Parker, Rostrup, and Stanley, 2.

with increases in several other strategic thinking competencies.⁵⁶ These include critical thinking, convergent and divergent thinking, perspective taking, and cognitive flexibility.⁵⁷ Mindfulness practice has also been shown to increase creativity, an area that may improve senior leaders' approach to attacking intractable problems and managing complex adaptive systems.⁵⁸ Researchers propose that mindfulness training may do this by helping practitioners overcome habitual thought patterns and thus opening them to more novel and divergent thinking.⁵⁹ Separately, studies indicate mindfulness helps practitioners restructure problems, which allows for insightful resolution.⁶⁰ In addition, research shows mindfulness training may assist with conducting moral reasoning and making ethical decisions.⁶¹ These benefits may result from mindfulness's effect on the attention-control system and are particularly useful for senior military leaders who are increasingly called upon to make fast-paced moral and ethical decision as the human-in-the-loop supporting artificial intelligence and machine learning systems.

Reduced Emotional Reactivity. Defined as the intensity of emotional response to stimuli, emotional reactivity can impede learning, comprehension, working memory, and cognitive performance.⁶² Mindfulness training may assist midlife senior military leaders in reducing their emotional reactivity by minimizing attentional orienting toward "emotionally threatening cues."⁶³ Deliberate attention focusing, or de-centering, may enable

56. Dr. Amishi P. Jha, Conversation with the Author, March 24, 2021; Kirk W. Brown, Robert J. Goodman, Richard M. Ryan, and Bhikkhu Analayo, "Mindfulness Enhances Episodic Memory Performance: Evidence from a Multimethod Investigation," *PLoS ONE*, 11, no.7 (2016).

57. Chris Noone, Brendan Bunting, and Michael J. Hogan, "Does Mindfulness Enhance Critical Thinking? Evidence for the Mediating Effects of Executive Functioning in the Relationship between Mindfulness and Critical Thinking," *Frontiers in Psychology*, no. 6 (2016): 20-43; Lorenza S. Colzato, Ayca Ozturk, and Bernhard Hommel, "Meditate to Create: The Impact of Focused Attention and Open-monitoring Training on Convergent and Divergent Thinking," *Frontiers in Psychology*, 3 (2012):116; Niels J.V. Doesum, Reinout E. de Vries, Arjan A.J. Blokland, Jessica M. Hill, David M. Kuhlman, Adam W. Stivers, Joshua M. Tybur, Paul A.M. Van Lange, "Social Mindfulness: Prosocial the Active Way," *The Journal of Positive Psychology*, 15 no. 2, (2020): 183-193; Jonathan Greenberg, Keren Reiner, and Nachshon Meiran, "Mind the Trap": Mindfulness Practice Reduces Cognitive Rigidity," *PLoS ONE* 7, no. 5 (2012): e36206.

58. Ostafin, "Taming the Wild Elephant," 55-56; Matthijs Baas, Barbara Nevicka, and Femke S.T. Velden, "Specific Mindfulness Skills Differentially Predict Creative Performance," *Personality and Social Psychology Bulletin* 40, no.9 (2014): 1092-1106.

59. Ostafin, "Taming the Wild Elephant," 55-56.

60. Ostafin, "Taming the Wild Elephant," 55-56.

61. Shapiro, Jazaieri, and Goldin, "Mindfulness-based Stress Reduction Effects on Moral Reasoning," 1-12.

62. Richard Davidson, "Affective Style and Affective Disorders: Perspectives from Affective Neuroscience," *Cognition and Emotion* 12 (1998): 307-330.

63. Garland, Hanley, Goldin, and Gross, "Testing the Mindfulness-to-Meaning Theory," 1-19.

senior military leaders to distance themselves from emotionally charged thoughts and to “initiate cognitive coping strategies,” thereby intentionally minimizing distraction and redirecting mental capability.⁶⁴ Research indicates mindfulness training can impact positively how the brain processes emotions in healthy, depressed, and anxious individuals, rendering the emotion regulation aspect of mindfulness training broadly beneficial.⁶⁵ Relatedly, research shows working memory may be related to the regulation of emotions.⁶⁶ People with poor working memory may be more likely to “have emotionally intrusive thoughts” and act prejudicially toward others.⁶⁷ Not only do these findings have strategic thinking implications, but they also have moral, ethical, and leadership consequences. Importantly, mindfulness training-related improvements in working memory may also reduce emotional reactivity.⁶⁸ Both outcomes benefit strategic military leaders’ emotional equanimity and ethical leadership. These positive outcomes of mindfulness training offer the U.S. Army an irreplaceable competitive advantage. By training and reinforcing ethical leadership and decision-making as a competitive advantage, they help preserve the reputation of the United States in the narrative, or perception-based, dynamic of competition, which shapes how partners, allies, and adversaries interpret U.S. actions.⁶⁹

Increased wellness. Developing mindfulness as a skill to optimize healthful states is especially beneficial for midlife senior military leaders seeking a buffer against stress and age-related decline. Mindfulness practice is associated with resilience (see Chapter 7) and has been demonstrated to improve well-being, which is “feeling good and/or experiencing fulfillment and purpose.”⁷⁰ Psychological stress can be understood as “a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering

64. Antoine Lutz, Amishi P. Jha, John D. Dunne, and Clifford D. Saron, “Investigating the Phenomenological Matrix of Mindfulness-related Practices from a Neurocognitive Perspective,” *American Psychologist* 70, no. 7 (2015): 632-658; Garland, Hanley, Goldin, and Gross, “Testing the Mindfulness-to-Meaning Theory,” 1-19.

65. Patricia A. Deuster and Eric Schoomaker, “Mindfulness: A Fundamental Skill for Performance Sustainment and Enhancement,” *Joint Special Operations Medicine* 15, no.1 (2015): 93-99.

66. Amishi P. Jha, Elizabeth A. Stanley, Anastasia Kiyonaga, Ling Wong, and Lois Gelfand, “Examining the Proactive Effects of Mindfulness Training on Working Memory Capacity and Affective Experience,” *Emotion* 10, no. 1 (2010): 54-64.

67. Jha, Stanley, and Baime, “What Does Mindfulness Training Strengthen?” 207-221.

68. Jha, Stanley, Kiyonaga, Wong, and Gelfand, “Examining the Proactive Effects of Mindfulness Training on Working Memory Capacity and Affective Experience,” 54-64.

69. U.S. Army Chief of Staff, “The Army in Military Competition,” v.

70. Susan Sonnentag, “Dynamics of Well-being,” *Annual Review of Organizational Psychology and Organizational Behavior* 2, (2015): 261.

his or her well-being.”⁷¹ Research ranging across a wide variety of populations shows mindfulness training can help mitigate stress.⁷² A study examining US Marines preparing to deploy found that mindfulness training was protective against increased negative mood during stressful periods and that the training has protective effects on working memory.⁷³

Research findings further indicate mindfulness training assists with sleep quality and duration.⁷⁴ Sleep impacts senior military leaders’ physiological and psychological performance, well-being, and health (see Chapter 5).⁷⁵ Through improved sleep, mindfulness training likely improves leader performance.⁷⁶ Sleep plays a restorative role in cognition and can improve communication and focus.⁷⁷ Associated with mood and information processing, sleep can bolster concentration, resilience, and mental agility.⁷⁸ Research with service members shows adequate sleep reduces stress, improves feelings of well-being, and bolsters unit effectiveness, which promotes mission accomplishment.⁷⁹ The benefits associated with sleep are similar to those connected with mindfulness training. To maximize these benefits, senior military leaders may consider implementing mindfulness training to promote improved sleep.

While not the focus of this chapter, mindfulness is widely used as a therapeutic tool to address mental and physical health challenges, including pain, post-traumatic stress disorder, and anxiety, among others.⁸⁰ The

71. Richard S. Lazarus and Susan Folkman, *Stress, Appraisal, and Coping* (New York: Springer Publishing Company, 1984), 19.

72. Ruth A. Baer, “Mindfulness Training as a Clinical Intervention: A Conceptual and Empirical Review,” *Clinical Psychology* 10, no. 2 (2003): 125-143.

73. Jha, Stanley, Kiyonaga, Wong, and Gelfand, “Examining the Proactive Effects of Mindfulness Training on Working Memory Capacity and Affective Experience,” 54-64.

74. Ute R. Hülshager, Alina Feinholdt, and Annika Nubold, “A Low-Dose Mindfulness Intervention and Recovery from Work,” *Journal of Occupational and Organizational Psychology* 88, no. 3 (2015): 464-489.

75. Torbjörn Åkerstedt and Peter M. Nilsson, “Sleep as Restitution: An Introduction,” *Journal of Internal Medicine* 254, no. 1 (2003): 10.

76. Deuster and Schoemaker, “Mindfulness: A Fundamental Skill for Performance Sustainment and Enhancement,” 93-99.

77. Åkerstedt and Nilsson, “Sleep as Restitution,” 10.

78. Bradley M. Ritland et al., “Effects of Sleep Extension on Cognitive/Motor Performance and Motivation in Military Tactical Athletes,” *Sleep Medicine* 58 (2019): 54; William D. S. Killgore, Ellen T. Kahn-Greene, Erica L. Lipizzi, Rachel A. Newman, Gary H. Kamimori, Thomas J. Balkin, “Sleep Deprivation Reduces Perceived Emotional Intelligence and Constructive Thinking Skills,” *Sleep Medicine* 9, no. 5 (2008): 517; Geraldine S. Perry, Susheel P. Patil, and Letitia R. Presley-Cantrell, “Raising Awareness of Sleep as a Healthy Behavior,” *Preventing Chronic Disease* 10 (2013): 1.

79. Brian C. Gunia, Maurice L. Sipos, Matthew LoPresti, and Amy B. Adler, “Sleep Leadership in High-Risk Occupations: An Investigation of Soldiers on Peacekeeping and Combat Missions,” *Military Psychology* 27, no. 4 (2015): 199-200.

80. Bruyee, “Mindfulness and Minefields,” 377; Michael Ussher, Amy Spatz, Claire Copland, Andrew Nicolaou, Abbey Cargill, Nina Amini-Tabrizi, and Lance McCracken,

long-standing and broad-ranging utility of mindfulness training for wellness and optimization demonstrates its applicability across culture, context, and cohort. After reviewing mindfulness research, former U.S. Army Surgeon General, Lieutenant General Eric Schoomaker, assessed, “The evidence behind the benefits of mindfulness is extensive and instructive. Importantly, evidence suggests that mindfulness can be helpful for many operational, leadership, and personal activities and is likely beneficial for enhancing resilience and overall health.”⁸¹

Implementation: Senior Military Leaders’ Personal Adoption of Mindfulness

Mindfulness and marksmanship have much in common. Both are trainable skills, require concentration, and can include breathing as a focus. Just as a marksman selects a target, mindfulness practice begins with attentional orienting, which is as simple as selecting a focal object, maintaining focus, noticing focus drifting, selecting again, and repeating the process.⁸² In this way, repetitions are completed and the mind muscle is strengthened.⁸³ Like physical exercise, mindfulness practice should be considered training and has predictable outcomes resulting from repetition.⁸⁴ Lieutenant General Piatt has called mindfulness exercises “push-ups for the mind.”⁸⁵

These cognitive “push-ups” reinforce self-regulation strategies that develop “attention control, emotion regulation, and enhanced self-awareness.”⁸⁶ Instead of building muscle mass, mindfulness training strengthens self-regulation in three ways:

- 1) attentional orienting, which is the ability to select and sustain attention on a subset of information while remaining undistracted,

“Immediate Effects of a Brief Mindfulness-based Body Scan on Patients with Chronic Pain,” *Journal of Behavioral Medicine* 37 (2014): 127–134.

81. Deuster and Schoomaker, “Mindfulness: A Fundamental Skill for Performance Sustainment and Enhancement,” 93-99.

82. Garland, Hanley, Goldin, and Gross, “Testing the Mindfulness-to-Meaning Theory,” 1-19.

83. Jha, Rogers, Schoomaker, and Cardon, “Deploying Mindfulness to Gain Cognitive Advantage,” 4.

84. Rooks, Morrison, Goolsarran, Rogers, and Jha, “We Are Talking About Practice,” 152.

85. Jha, Rogers, Schoomaker, and Cardon, “Deploying Mindfulness to Gain Cognitive Advantage,” 4.

86. Tang, Hölzel, and Posner, “Neuroscience of Mindfulness Meditation,” 213–225; Britta K. Hölzel, Sara W. Lazar, Tim Gard, Zev Schuman-Olivier, David R. Vago, Ulrich Ott, “How Does Mindfulness Meditation Work? Proposing Mechanisms of Action from a Conceptual and Neural Perspective,” *Perspectives on Psychological Science* 6, no. 6 (2011): 551.

2) meta-awareness, which is the ability to monitor one's ongoing experience with an awareness of doing so; and

3) decentering, which is the ability to view one's experience at a psychological distance so that biases, mind-sets, and conceptual interpretations are viewed as mental processes rather than accurate depictions of reality.⁸⁷

Two major categories of mindfulness exercises drive improvements in self-regulation: focused attention and open awareness. Selecting and redirecting attention are central to each of the exercises. During focused attention training, the practitioner orients their attention on a selected object and returns their attention to the object when their mind wanders.⁸⁸ The suggested mindful breathing practice below from the Walter Reed Army Institute of Research provides a sample focused attention exercise:

Take 3 deep and slow breaths and now let your breathing return to its normal pace.

Focus your attention on where you feel the breath most – that is the target of your attention. For example, it could be your nostrils, it could be your chest, or your shoulders.

Select what is most salient for you and focus on it.

Notice when your mind wanders away from this target and when it does, return it gently back to the sensation.

Practice this exercise for 2-3 minutes.⁸⁹

During open awareness exercises, the practitioner focuses awareness beyond the physical body and brings attention to the surrounding environment.⁹⁰ The suggested open monitoring practice below from the Walter Reed Army Institute of Research provides a sample open awareness exercise:

Settle in by taking a few deep and slow breaths.

87. Jha, Rogers, Schoomaker, and Cardon, "Deploying Mindfulness to Gain Cognitive Advantage," 4.

88. Jha, Rogers, Schoomaker, and Cardon, "Deploying Mindfulness to Gain Cognitive Advantage," 4.

89. Walter Reed Army Institute of Research, "COVID-19 Mindfulness: Boosting Your Capacity Under Stress," February 5, 2021 COVID-19_Mindfulness_Quick_Guide_WRAIR.pdf (army.mil)

90. Walter Reed Army Institute of Research, "COVID-19 Mindfulness: Boosting Your Capacity Under Stress," February 5, 2021 COVID-19_Mindfulness_Quick_Guide_WRAIR.pdf (army.mil)

On each exhale, relax more deeply, letting go of tension in the neck and shoulders.

Allow your breathing to continue at its own natural pace.

Expand awareness beyond your physical self to your surroundings.

Be aware of sounds, smells, the touch of air on your skin, light through the eyelids.

Notice when your mind wanders, then gently bring your attention back to awareness.

Feel yourself to be unchanging and timeless—even as things come and go around you.

Practice this exercise for 5-10 minutes.⁹¹

Through habitual training with exercises like these, mindfulness increases the practitioner's ability to focus on internal and external stimuli and experience.⁹²

Mindfulness training involving exercises that emphasize attention to the breath, the body, and one's surroundings is a path to cultivating more moments of mindfulness, but it is not the only approach.⁹³ Since mindfulness practice involves directing attention onto a focus object, anything can be the object of mindfulness practice. This includes eating, walking, washing dishes, and doing paperwork. Performing daily activities in an intentional way has been shown to increase mindfulness and reap its associated benefits.⁹⁴ To maximize the benefits of mindfulness training, the Walter Reed Army Institute of Research suggests soldiers conduct twelve minutes of personal mindfulness practice a few days a week.⁹⁵ However, senior military leaders should not view mindfulness practice as an additional training requirement that needs to be scheduled. Instead, senior military leaders should integrate mindfulness into their daily activities.

91. Walter Reed Army Institute of Research, "COVID-19 Mindfulness: Boosting Your Capacity Under Stress," February 5, 2021 COVID-19_Mindfulness_Quick_Guide_WRAIR.pdf (army.mil)

92. Brian D. Ostafin, Michael D. Robinson, and Brian P. Meier, "Introduction: The Science of Mindfulness and Self-Regulation," in *Handbook of Mindfulness and Self-Regulation*, edited by Brian D. Ostafin, Michael D. Robinson, and Brian P. Meier (New York: Springer, 2015), 6.

93. Paul Verhaeghen, *Presence* (New York: Oxford, 2017), 5.

94. Garland, Hanley, Goldin, and Gross, "Testing the Mindfulness-to-Meaning Theory," 2.

95. Walter Reed Army Institute of Research, "COVID-19 Mindfulness: Boosting Your Capacity Under Stress," February 5, 2021 COVID-19_Mindfulness_Quick_Guide_WRAIR.pdf (army.mil)

Walter Reed Army Institute of Research makes these recommendations for incorporating mindfulness into everyday experience:

Take a couple of mindful breaths throughout the day to recharge mentally and physically.

Take a moment to monitor your inner and outer experience while walking from one place to another.

Accept what cannot be controlled.

In response to difficult situations, pause and act with intention rather than react in the moment.⁹⁶

Understanding mindfulness as an intentional approach to engagement that can be conducted during normal life shows how accessible implementing personal mindfulness training can be for time-constrained senior military leaders.

Integration: Army Institutional Adoption of Mindfulness Practices

Numerous American occupational fields have adopted mindfulness training programs, including education, medicine, and professional sports.⁹⁷ Dr. Jon Kabat-Zinn's work forms the foundation for much institutional integration of mindfulness training.⁹⁸ Kabat-Zinn pioneered mindfulness as an intervention for potential stressors, to include those caused by physical and emotional pain, work, sleep, and food.⁹⁹ He developed Mindfulness Based Stress Reduction (MBSR) training to help practitioners focus on their functionality and capability in the presence of stress-inducing situations.¹⁰⁰ Significantly, MBSR serves as the basis for most Mindfulness Based Interventions (MBIs).¹⁰¹ Whether general purpose or directed toward a specific community such as veterans or Service Members, MBIs employ tools

96. Walter Reed Army Institute of Research, "COVID-19 Mindfulness: Boosting Your Capacity Under Stress," February 5, 2021 COVID-19_Mindfulness_Quick_Guide_WRAIR.pdf (army.mil)

97. Ana M. Gómez-Olmedo, Carmen Valor, and Isabel Carrero, "Mindfulness in Education for Sustainable Development to Nurture Socioemotional Competencies: A Systematic Review and Metaanalysis," *Environmental Education Research* (2020): 1-29; Ruben Vonderlin, Miriam Biermann, Martin Bohus, and Lisa Lyssenko, "Mindfulness-based Programs in the Workplace: A Meta-analysis of Randomized Controlled Trials," *Mindfulness* 11, no. 7 (2020): 1579-1598; Rooks, Morrison, Goolsarran, Rogers, and Jha, "We Are Talking About Practice," 151.

98. Jon Kabat-Zinn, "An Outpatient Program in Behavioral Medicine for Chronic Pain Patients Based on the Practice of Mindfulness Meditation: Theoretical Considerations and Preliminary Results," *General Hospital Psychiatry* 4 (1982): 33-47.

99. Jon Kabat-Zinn, *Full Catastrophe Living* (New York: Bantam, 2013), 356.

100. Kabat-Zinn, 356.

101. Bruyey, "Mindfulness and Minefields," 377.

such as body scans, mindful movement, and meditation to intentionally observe thoughts and the internal and external environment in the present moment.¹⁰²

Veterans Administration (VA) mindfulness programming may offer insight into institutional integration for the Active Duty Army. VA programs seek to teach and embed mindfulness practice into individual wellness efforts and predominately focus on the MBSR course.¹⁰³ An example is the Wilmington, Delaware VA's *Vanguard of Mindfulness* program, which used MBSR as a framework and offered year-long group coursework, examination of foundational mindfulness texts, and creation of a post-course mindfulness community. The Wilmington VA also developed *Buddy up*, a program intended to foster connection and support continued mindfulness practice. In addition, the Wilmington VA created the *Yummy* program to emphasize mindful eating.¹⁰⁴ Separately, the VA implemented a "Mindful VA" conference call to share best practices among its mindfulness instructors.¹⁰⁵ VA programs required teachers with robust training and a personal mindfulness practice, which could sometimes limit program availability.¹⁰⁶

The U.S. Army has not yet integrated an institutionally available mindfulness program, despite the VA's example and the established benefits of mindfulness training for military Service Members.¹⁰⁷ Encouragingly, *FM 7-22* serves as a mandate to include mindfulness in readiness-focused training and provides a starting point for mindfulness training integration into institutional frameworks.¹⁰⁸ *FM 7-22* describes mindfulness practice as "essential" for health and fitness and classifies it as a component of readiness training.¹⁰⁹ Professional Military Education and annual resiliency training may present opportunities to integrate mindfulness into institutional Army training.

102. Lynette M. Monteiro, Frank Musten, and Jane Compson, "Traditional and Contemporary Mindfulness: Finding the Middle Path in the Tangle of Concerns," *Mindfulness* 6, no.1 (2015): 1-13.

103. Dr. Jennifer Tedesco, Personal Communication with the Author, November 8, 2020.

104. Dr. Jennifer Tedesco, Personal Communication with the Author, November 8, 2020.

105. Dr. Jennifer Tedesco, Personal Communication with the Author, November 8, 2020.

106. Dr. Jennifer Tedesco, Personal Communication with the Author, November 8, 2020.

107. Johnson, Thom, Stanley, Haase, Simmons, Shih, Thompson, Potterat, Minor, and Paulus, "Modifying Resilience Mechanisms in At-Risk Individuals," 844-53; Meland, Ishimatsu, Pensgaard, Fonne, Garde, and Harris, "Impact of Mindfulness Training on Physiological Measures of Stress," 191-208; Bijlsma, Muis, van Tilborg, "Mindfulness in the Dutch Military," 1-26.

108. U.S. Army, *FM 7-22*, 5-5.

109. U.S. Army, *FM 7-22*, 13-3.

Professional Military Education. In support of the effort to “incorporate [mindfulness] curriculum into the Army resilience structure in a codified way,” the U.S. Army initiated a mindfulness pilot program during October 2020 Basic Combat Training at Fort Jackson, South Carolina, to determine if mindfulness training could be integrated into initial entry training and begin producing effects lasting throughout a Soldier’s career.¹¹⁰ Early evidence from this largest military mindfulness trial indicates basic trainees experienced stress reduction and improved focus.¹¹¹ As military culture and norms are embedded in Basic Combat Training, this pilot program could present fertile ground for U.S. Army institutional adoption of mindfulness training.¹¹² Mindfulness training is also featured in General Officer/Senior Leader curriculum.¹¹³ Introducing mindfulness across generations and in multiple venues will help anchor and embed mindfulness training in the Army culture and ingrain it as part of the US Army competitive advantage.¹¹⁴

Soldiers are required to conduct annual resilience training, which could present another opportunity for institutional integration of mindfulness training. Currently, mindfulness is not included in resilience training, but the Army Resilience Directorate (ARD) recommends soldiers conduct personal mindfulness practices, such as the body scan, thought journaling, and grounding for resilience and performance optimization.¹¹⁵

Mindfulness-Based Attention Training (MBAT). To date, U.S. Army mindfulness programming has been largely research-driven.¹¹⁶ MBAT is one such grant-based program in which soldiers receive mindfulness training that is based on Kabat-Zinn’s MBSR but tailored to a military context.¹¹⁷ Whereas MBSR generally focuses on stress and symptom reduction, MBAT emphasizes wellness and performance optimization.¹¹⁸ Consisting of weekly two-hour-long facilitated sessions conducted over four weeks,

110. COL Kevin Bigelman, Personal Communication with the Author, October 28, 2020.

111. Chad Garland, “Army Tests Fitness Benefits of Yoga and Meditation in Basic Training,” *Stars and Stripes*, February 23, 2021, <https://www.stripes.com/news/us/army-tests-fitness-benefits-of-yoga-and-meditation-in-basic-training>.

112. Bruyey, “Mindfulness and Minefields,” 388-9; John P. Kotter, *Leading Change* (Boston: Harvard Business School Press, 1996), 21.

113. Dr. Amishi Jha, Personal Communication with the Author, October 9, 2020.

114. Kotter, *Leading Change*, 21.

115. Army Resilience Directorate, “I Want to Optimize My Performance,” ARD: I Want to Optimize My Performance (army.mil).

116. Dr. Amishi Jha, Personal Communication with the Author, October 9, 2020.

117. Jha, Zanesco, Denkova, Morrison, Ramos, Chichester, Gaddy, and Rogers, “Bolstering Cognitive Resilience Via Train-the-Trainer Deliver of Mindfulness Training,” 684.

118. Jha, Zanesco, Denkova, Morrison, Ramos, Chichester, Gaddy, and Rogers, “Bolstering Cognitive Resilience Via Train-the-Trainer Deliver of Mindfulness Training,” 683-697.

combined with daily 15-minute exercises, MBAT is organized around four mindfulness themes that are approached in a military-accessible context and language:

The concentration theme introduces participants to mindfulness “basics,” including discussion of mind-wandering and the science of mindfulness.

The body awareness theme involves cultivation of greater self-awareness, the development of equanimity, and learning to distinguish “(over)-reactions” from “responses.”

The open monitoring theme leads to the further development of self-regulation skills through awareness of unpleasant experiences and moments of uncertainty.

The theme of connection addresses adaptive and effective leadership and explores group cohesion and the cultivation of kindness/connection practices.¹¹⁹

MBAT’s approach has consistently demonstrated beneficial effects. One large-scale Department of Defense-funded study showed soldiers made gains in attention and working memory after four weeks of mindfulness training in the MBAT program.¹²⁰ Additional research with elite military cohorts showed these groups also made attentional gains with MBAT training.¹²¹ These results indicate mindfulness may have utility as a military cognitive training tool.¹²² Additional research points to train-the-trainer as an effective method of MBAT delivery.¹²³ After receiving train-the-trainer MBAT training, instructors with knowledge of the military but no prior mindfulness training led MBAT training, which resulted in measurable improvement in soldiers’ sustained attention and working memory. The potential for train-the-trainer instruction makes MBAT increasingly accessible to the force. With its limited time requirement, demonstrated cognitive returns, and train-the-trainer instruction format, MBAT may provide a vehicle for the Army to implement mindfulness training at scale. In addition, MBAT delivered by trained trainers has recently been found to

119. Jha, Zanesco, Denkova, Morrison, Ramos, Chichester, Gaddy, and Rogers, “Bolstering Cognitive Resilience Via Train-the-Trainer Deliver of Mindfulness Training,” 683-697.

120. Zanesco, Denkova, Rogers, McNulty, and Jha, “Mindfulness Training as Cognitive Training,” 323.

121. Zanesco, Denkova, Rogers, McNulty, and Jha, “Mindfulness Training as Cognitive Training,” 354.

122. Zanesco, Denkova, Rogers, McNulty, and Jha, “Mindfulness Training as Cognitive Training,” 323.

123. Jha, Zanesco, Denkova, Morrison, Ramos, Chichester, Gaddy, and Rogers, “Bolstering Cognitive Resilience Via Train-the-Trainer Deliver of Mindfulness Training,” 683.

improve marksmanship under stress when soldiers practiced 3 or more days a week.¹²⁴

Attaching to Organizational Activities. Other opportunities for institutional Army integration of mindfulness training include integrating mindfulness into existing organizational practices. Examples could include opening meetings with five mindfulness minutes.¹²⁵ These brief sessions could also include a group guided meditation or short mindful walk. Lieutenant General Piatt offered possibilities including beginning or ending Army physical training with a mindfulness practice.¹²⁶

Overcoming Barriers to Implementation

Barriers to U.S. Army implementation of mindfulness training may be cultural or operational. First, lack of understanding presents a potential impediment to U.S. Army adoption of mindfulness training. Soldiers may be hesitant or reluctant to adopt mindfulness practices due to misunderstandings about mindfulness and preconceived stereotypes about mindfulness practitioners. Anecdotal evidence indicates some soldiers may misconstrue mindfulness as being prohibitively associated with a particular spiritual practice.¹²⁷ Introducing soldiers to the benefits of mindfulness training and acquainting them with its ancient roots, including in Roman Stoicism, may make them more receptive to mindfulness training.¹²⁸

Some soldiers may believe mindfulness practices are contrary to military culture.¹²⁹ Demonstrating to soldiers that mindfulness training helps focus their attention, improve their working memory, decrease their experience of stress, and bolster their creativity may help them understand how mindfulness training can enhance performance.¹³⁰ Mindfulness bolsters mission accomplishment for mundane tasks such as searching for debris on flight lines and looking for potential fire sources on ships as well as for high order requirements necessitating peak executive functioning such as battle command and targeting.¹³¹ The opposite of dulling soldiers' intensity, research

124. Thomas H. Nassif, Amanda L. Adrian, Ian A. Gutierrez, Alexis C. Dixon, Scott L. Rogers, Amishi P. Jha, and Amy B. Adler, "Optimizing Performance and Mental Skills with Mindfulness-Based Attention Training: Two Field Studies with Operational Units," *Mil Med*, (2021), Online ahead of print, DOI: 10.1093/milmed/usab477.

125. Dr. Amishi Jha, Personal Communication with the Author, October 9, 2020.

126. Amishi Jha, Major General Walter Piatt, Anderson Cooper, "Mindfulness in the Military," May 29, 2019, <https://youtu.be/pN64uJIRasI>.

127. Lieutenant Colonel Peter Olsen, Conversation with the Author, February 23, 2021.

128. Jha, Rogers, Schoomaker and Cardon, "Deploying Mindfulness to Gain Cognitive Advantage," 1-14.

129. Bruyey, "Mindfulness and Minefields," 408.

130. Jha, Rogers, Schoomaker and Cardon, "Deploying Mindfulness to Gain Cognitive Advantage," 1-14.

131. Bruyey, "Mindfulness and Minefields," 392.

shows mindfulness training improves the critical battlefield ability to be both calm and alert.¹³² This is because, like a rifle, the brain performs better with focusing. To this end, Lieutenant General Piatt views mindfulness training as akin to “zeroing the mind.”¹³³

The cognitive optimization resulting from mindfulness training does not require a technology-driven solution, which may seem simplistic and antithetical to military modernization. Given the contemporary bias toward technology, it may be difficult to conceptualize how integrating an ancient practice at scale could lead to a U.S. competitive advantage in Multi-Domain Operations. TRADOC PAM 525-3 “The Army in Multi-Domain Operations” calls for “biotechnical sensors monitoring the status and changes in human performance [to] augment commanders’ understanding of their units.”¹³⁴ TRADOC PAM 525-3 also suggests, “Man-machine interfaces, enabled by artificial intelligence and high-speed data processing, [will] improve human decision making in both speed and accuracy.”¹³⁵ This implies that reliance on artificial intelligence and machine learning will result in “cognitive offloading” or the decreased need for human decision making.¹³⁶ Rather, the increasingly complex and data-rich information environment requires more human intervention at greater decision-making speed.¹³⁷ Cognitive overmatch necessitates the converging of technology with peak human cognition. Mindfulness training affords senior military leaders the opportunity to sharpen their cognitive skills, not permission to surrender their decision-making responsibility to technology.

An operational barrier may be *FM 7-22*’s restriction of mindfulness training to the Combat/Peak 2 phase, which may limit broader implementation of mindfulness training. Combat/Peak 2 calls for the “highest intensity training...to achieve peak levels of readiness.”¹³⁸ While research shows mindfulness training can help prepare service members for deployment, it is problematic to limit mindfulness to one training phase.¹³⁹ Instead, mindfulness should be viewed as beneficial across all training periods, as mindfulness is related to numerous cognitive tasks required across the training

132. Anders Meland, Kazuma Ishimatsu, Anne Marta Pensgaard, Vivianne Fonne, Anne Helene Garde, and Anette Harris, “Impact of Mindfulness Training on Physiological Measures of Stress and Objective Measures of Attention Control in a Military Helicopter Unit,” *International Journal of Aviation Psychology* 25, no. 3-4 (2015): 191-208.

133. Amishi Jha, Major General Walter Piatt, Anderson Cooper, “Mindfulness in the Military,” May 29, 2019, <https://youtu.be/pN64uJlRasI>

134. U.S. Army, “The U.S. Army in Multi-Domain Operations 2028,” 20.

135. U.S. Army, “The U.S. Army in Multi-Domain Operations 2028,” 20.

136. Jha, Rogers, Schoomaker and Cardon, “Deploying Mindfulness to Gain Cognitive Advantage,” 1-14.

137. Jha, Rogers, Schoomaker and Cardon, “Deploying Mindfulness to Gain Cognitive Advantage,” 1-14.

138. U.S. Army, *FM 7-22*, 5-5.

139. Morrison and Jha, “Mindfulness, Attention, and Working Memory,” 39.

cycle. An additional barrier to implementation is *FM 7-22's* linkage of mindful awareness with focus on “what is important.”¹⁴⁰ This seemingly misconstrues the concept of mindfulness. Instead, mindfulness practice involves focusing on *what is with an attitude of acceptance and nonjudgement*. Adjusting this understanding of—and approach to—mindfulness could assist the Army in implementing mindfulness training.

Conclusion

Mindfulness training presents an untapped competitive advantage that can help senior military leaders achieve the intellectual overmatch needed to win in today’s complex environment. Mindfulness training has been shown to optimize performance, reduce emotional reactivity, and increase wellness.¹⁴¹ In addition, mindfulness training is linked to increases in the strategic thinking competencies essential to senior military leadership, such as critical and creative thinking, convergent and divergent thinking, perspective taking, and moral and ethical decision making.¹⁴² Mindfulness training also promotes the cognitive resilience necessary to sustain operations under stressful conditions.¹⁴³ Optimizing senior military leader performance and wellness, mindfulness training is especially relevant for the pivotal midlife years and can help develop pre-silience against personal and professional stressors.¹⁴⁴

To reap these benefits, senior military leaders may integrate mindfulness training into their daily activities. Institutional implementation opportunities include incorporating mindfulness training into Professional Military Education and Army Resilience structures, implementing Mindfulness-Based Attention Training at scale, and pinning mindfulness training to existing organizational activities. While adopting mindfulness training may require cultural shifts in the U.S. Army, these changes dovetail with the U.S. Army’s emphasis on people as top priority.

Above all, implementing mindfulness practice could help the U.S. Army train for competition and prepare for conflict, as enhancing soldiers’ ability

140. U.S. Army, *FM 7-22*, 13-3.

141. Tang, Hölzel, and Posner, “The Neuroscience of Mindfulness Meditation,” 213–225; Garland, Hanley, Goldin, and Gross, “Testing the Mindfulness-to-Meaning Theory,” 1-19.

142. Noone, Bunting, and Hogan, “Does Mindfulness Enhance Critical Thinking?” 20-43; Doesum, de Vries, Blokland, Hill, Kuhlman, Stivers, Tybur, and Van Lange, “Social Mindfulness,” 183-193; Greenberg, Reiner, and Meiran, “Mind the Trap,” e36206; Colzato, Ozturk, and Hommel, “Meditate to Create,” 116.

143. Jha, Zanenco, Denkova, Morrison, Ramos, Chichester, Gaddy, and Rogers, “Bolstering Cognitive Resilience Via Train-the-Trainer Deliver of Mindfulness Training,” 684.

144. Jha, Stanley, Kiyonaga, Wong, and Gelfand, “Examining the Protective Effects of Mindfulness Training,” 54-64.

to maintain situational awareness and process information supports cognitive dominance and are essential skills for fighting and winning in Multi-Domain Operations. Adopting mindfulness training can help senior military leaders answer Lieutenant General Piatt's question, "What are we doing to train the mind?"

Key Takeaways

- Mindfulness is understood as a natural human capacity that can be improved with practice.
- Mindfulness supports the sense-making and sense-giving skills required of senior leaders to effectively perform in today's complex and dynamic world.
- Mindfulness can strengthen core cognitive control processes that support learning, comprehension, and memory. Studies suggest cognitive optimization through improved attention and working memory.
- Institutionalized mindfulness practice in the Army could strengthen our cognitive advantage.

Chapter 7

SENIOR LEADER RESILIENCE

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“Operational readiness is based on strength and resilience. Senior leaders who recognize the importance of resilience in their own lives and the lives of their people will lead better in the most stressful environments on and off the battlefield.”

-Major General D. A. Sims, II

Senior leaders are, by definition, resilient. By the time they are promoted to a position of strategic responsibility, they have undoubtedly weathered a series of difficult real-world challenges, supervising soldiers, managing resources, and experiencing the ups and downs of military life. These same senior leaders know that they have “the ability to face and cope with adversity, adapt to change, recover, learn, and grow from setbacks.”¹ While they may have moments of self-doubt, and glimpses into the imposter phenomenon, they would not have made it this far if they did not have a resilient core.

And because senior leaders in the Army are trained to learn and grow, they are also likely to wonder how they can reinforce their resilience. By being cognizant of their own resilience and the forces that strain that resilience, they can not only position themselves to be optimally effective leaders, healthy individuals, and loving family members, but also position themselves to support resilience in their subordinate leaders, and thus, by extension, the resilience of their troops.

Here is what this chapter is not about. It is not a summary or integrated review of Army programs or of doctrine. It is also not about creating a

1. U.S. Army, “Holistic Health and Fitness,” *FM 7-22* (Washington DC: Department of the Army, 2020), 3-4, https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN30714-FM_7-22-000-WEB-1.pdf

one-size-fits-all solution. Instead, this chapter is designed to support senior leaders by explicitly describing stressors they may face, identifying key strategies that can be used for coping, and demystifying the limits of resilience. By applying established scientific findings to the occupational context in which military senior leaders operate, this chapter delineates what leaders can do to boost their own resilience and the resilience of their teams.

Understanding the context

Stressors: Traumatic Events and Hassles

Most senior leaders are familiar with concepts related to traumatic stress. They know traumatic combat experiences are associated with greater risk of posttraumatic stress disorder symptoms, and other mental health problems such as depression, anxiety, and alcohol misuse.² Leaders, particularly those who have deployed to combat, know that combat-related traumatic events include watching fellow soldiers get wounded or die, witnessing moral transgressions, and risking severe injury or death. Such traumatic events can impact an individual at the moment of exposure (in an acute stress reaction), shortly thereafter (in a combat stress reaction), or months later.³

Much has been written on the resilience of soldiers in the aftermath of combat. Indeed, several studies have documented that most soldiers are resilient in the face of these experiences, with approximately 75-80% not reporting mental health symptoms, 8-10% reporting the decline of symptoms following exposure to combat-related trauma, and 7-10% reporting the emergence of symptoms in the months following return home. Still others (approximately 2-3%) report mental health problems both prior to deployment and afterwards. The trajectories are similar whether the outcome is post-traumatic stress symptoms, aggression, or depression and anxiety.⁴ Of course, these kinds of results are based on self-

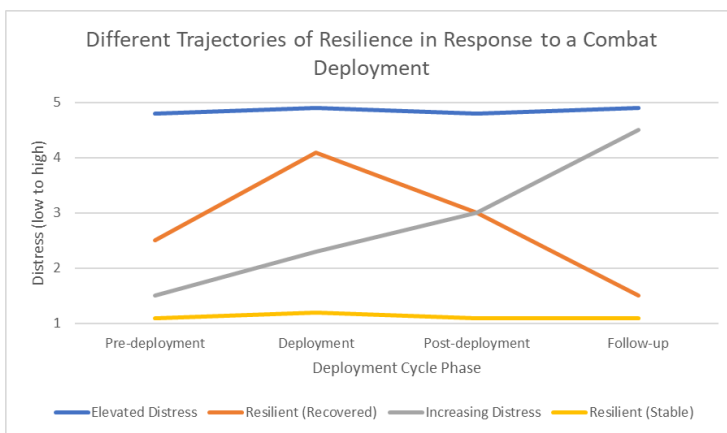
2. Marija Spanovic Kelber, Derek J. Smolenski, Don E. Workman, Maria A. Morgan, Abigail L. Garvey Wilson, Marjorie S. Campbell, Daniel P. Evatt, and Bradley E. Belsher, "Typologies of Combat Exposure and Their Effects on Posttraumatic Stress Disorder and Depression Symptoms," *Journal of Traumatic Stress* 32, no. 6 (2019): 946-956. doi:10.1002/jts.22459.; Jeffrey L. Thomas, Joshua E. Wilk, Lyndon A. Riviere, Dennis McGurk, Carl A. Castro, and Charles W. Hoge. 2010, "Prevalence of Mental Health Problems and Functional Impairment among Active Component and National Guard Soldiers 3 and 12 Months Following Combat in Iraq," *Archives of General Psychiatry* 67, no. 6 (2010): 614-623. doi:10.1001/archgenpsychiatry.2010.54.w

3. K. E. Porter, H. M. Cochran, S. K. H. Richards, and M. B. Sexton, "Combat Stress." In *Stress: Concepts, Cognition, Emotion, and Behavior*, ed. George Fink, (San Diego, CA: Elsevier Academic Press, 2016), 365-371. <https://search-ebscohost-com.libproxy.clemson.edu/login.aspx?direct=true&db=psych&AN=2016-26280-045>

4. G. A. Bonanno, A.D. Mancini, J. L. Horton, T. M. Powell, C. A., LeardMann, E. J. Boyko, T. S. Wells, T. I. Hooper, G. D. Gackstette, & T.C. Smith, "Trajectories of trauma symptoms and resilience in deployed US military service members: Prospective cohort study" *The British Journal of Psychiatry*, 200, no. 4 (2012): 317-323. <https://doi-org.libproxy.clemson.edu/10.1192/bjp.bp.111.096552>; Oscar A. Cabrera, Amy B. Adler, and Paul D. Bliese, "Growth Mixture Modeling of Post-Combat Aggression: Application to Soldiers Deployed to Iraq," *Psychiatry Research* 246 (2016): 539-544.; Oscar A. Cabrera and Amy B.

reported symptoms and trajectories of positive outcomes such as morale or flourishing may be somewhat different. To help conceptualize these different trajectories, Resilient – Stable, Resilient – Recovered, Increasing Distress, and Elevated Distress trajectories are depicted schematically in Figure 1.

Figure 1



Note: This figure does not represent specific data. It is a conceptual summary of patterns reported in published studies cited in this chapter.

Trajectory studies highlight the impact that traumatic experiences can have on individuals and the various factors that can moderate the impact of these experiences. Soldiers are also pretty good at estimating their own resilience. For example, one study surveyed a brigade, and asked soldiers who were about to deploy to Afghanistan to rate themselves on a resilience measure, answering questions such as “It does not take me long to recover from a stressful event,” and “I usually come through difficult times with little trouble.” They were then asked to rate their mental health symptoms after combat. Soldiers who said that they were resilient were right: even when they were exposed to high levels of combat, they reported fewer mental health symptoms compared to those who rated themselves lower on resilience.⁵ Interestingly, those individuals whose self-ratings predicted their actual resilience were more likely to report social connection after the deployment, suggesting that it is not just some internal fortitude but the ability to forge close relationships that help individuals sustain their mental health following combat.

Adler, “Psychological Distress across the Deployment Cycle: Exploratory Growth Mixture Model,” *BJPsych Open* 7 (2021). doi:10.1192/bjo.2021.50.

5. Thomas W. Britt, Amy B. Adler, and Jamie Fynes, “Perceived Resilience and Social Connection as Predictors of Adjustment Following Occupational Adversity,” *Journal of Occupational Health Psychology* 26, no. 4 (2021): 339–349. doi:10.1037/ocp0000286.

Although soldiers may be attuned to the impact of traumatic stressors and there is a fair amount of media attention on soldiers exposed to combat, soldiers are typically less attuned to the role of everyday hassles in resilience. Small hassles matter more than we think they do, with research on resilience highlighting the importance of everyday hassles in predicting individual wellbeing. Dan Gilbert, a renowned social psychologist from Harvard University, has extensively studied what makes people happy. He discovered a curious conundrum. People are not particularly good at predicting what will make them happy, what he terms “impact bias.”⁶ People tend to over-estimate the impact that bad things will have on them and under-estimate the impact that minor annoyances will have. In other words, people are not particularly good at predicting what is going to cause them stress.

In the military, this impact bias would mean that leaders might be prepared for an NTC rotation to spike their stress levels but not realize that getting a flat tire, having their hot water heater break, or getting into a minor disagreement with their child can chip away at their wellbeing and wear down their resilience. Even in a deployed context, minor hassles are more predictive of mental health symptoms than are combat-related events. For example, in a study of 168 US convoy operators in Iraq, Heron and colleagues found that daily hassles such as living conditions, long work hours, and availability of hygiene products predicted depression and PTSD symptoms more than combat exposure did.⁷ By underestimating the impact of these hassles, senior leaders might miss an opportunity to intervene and reduce the number of hassles that they and their units experience. They also have an opportunity to bolster their resilience – so that they are ready to handle the emotions that come with stressors.

Employee Resources for Responding to Stress and Adversity

Understanding resilience also means appreciating that there are individual differences in the resources that individuals bring to bear on how they respond to both traumatic events and everyday hassles.⁸ Military personnel have numerous resources for addressing stressful events, including individual (e.g., positive coping and physical fitness), unit (e.g., positive command climate, unit cohesion), family (e.g., emotional ties, nurturing), and community (e.g., belongingness, connectedness) resources. The possession or absence of these critical resources can affect whether individuals perceive a stressor as a threat or challenge.⁹ Viewing

6. Timothy D. Wilson, and Daniel T. Gilbert, “The Impact Bias Is Alive and Well.” *Journal of Personality and Social Psychology* 105, no. 5 (2013): 740–748. doi:10.1037/a0032662.

7. Elizabeth A. Heron, Craig J. Bryan, Craig A. Dougherty, and William G. Chapman, “Military Mental Health: The Role of Daily Hassles While Deployed,” *Journal of Nervous and Mental Disease* 201, no. 12 (2013): 1035–1039. doi:10.1097/NMD.000000000000058.

8. L. S. Meredith, C. D. Sherbourne, S. L. Gaillot, L. Hansell, H. V. Ritschard, A. M. Parker, & G. Wrenn, “Promoting Psychological Resilience in the U.S. Military,” *Rand Health Quarterly*, 1, no. 2 (2011): 2.

9. Richard S. Lazarus, and Susan Folkman, “Cognitive Theories of Stress and the Issue of Circularity,” In *Dynamics of Stress: Physiological, Psychological, and Social*

a stressor as a challenge can make it more palatable than viewing it as a threat. Individuals who generally see stressors as challenges tend to have a growth mindset when responding to adversity; they perceive stressors as providing opportunities for developing and building efficacy.¹⁰

One popular theory describes resources as both relatively concrete, such as a car, house, and money, and more abstract, such as self-esteem, emotional attachments, and optimism. In this theory, called the Conservation of Resources Theory, resource components can be linked together and form a kind of “resource caravan.”¹¹ For example, senior leaders who possess the resource of emotional intelligence will have healthier relationships, and these relationships will result in the availability of interpersonal support. Both emotional intelligence and interpersonal support are part of the resource caravan that can help leaders respond effectively to different types of stressors.

Not only do individuals have these different resources, but these resources can be depleted or replenished over time. The idea that individuals have a reservoir of resources to draw from is the theory’s cornerstone. The Conservation of Resources theory posits that if individuals use too much of their personal resources without replenishment, they will not be as effective. Indeed, a prolonged loss of resources is predictive of burnout, and depleted resources also place individuals at greater risk for struggling to address subsequent challenges. This continuous depletion of resources is known as a “loss spiral.”¹²

A “loss spiral” is akin to the concept of allostatic load which describes how over the course of a lifespan, an accumulation of stress can significantly hinder different physiological systems from functioning.¹³ This concept helps explain why individuals with adverse childhood experiences (like witnessing physical abuse, having a family member die by suicide, or growing up in a household with substance use problems) may have heightened physiological reactivity that increases wear-and-tear on the body. This load places them at risk for a range of negative physiological

Perspectives, eds. Mortimer H. Appley and Richard Trumbull, (New York, NY: Plenum Press, 1986) 63–80. <https://search-ebshost-com.libproxy.clemson.edu/login.aspx?direct=true&db=psych&AN=1987-97126-004>.

10. Alia J. Crum, Modupe Akinola, Ashley Martin, and Sean Fath, “The Role of Stress Mindset in Shaping Cognitive, Emotional, and Physiological Responses to Challenging and Threatening Stress,” *Anxiety, Stress & Coping: An International Journal* 30, no. 4 (2017): 379–395. doi:10.1080/10615806.2016.1275585.

11. Stevan E. Hobfoll, Jonathon Halbesleben, Jean-Pierre Neveu, and Mina Westman, “Conservation of Resources in the Organizational Context: The Reality of Resources and Their Consequences,” *Annual Review of Organizational Psychology and Organizational Behavior* 5 (2018): 103–128. doi:10.1146/annurev-orgpsych-032117-104640.

12. Hobfoll, 103–128.

13. Bruce McEwen, and Elizabeth Norton Lasley, “Allostatic Load: When Protection Gives Way to Damage,” In *The Praeger Handbook on Stress and Coping*, Vol. 1., eds. Alan Monat, Richard S. Lazarus, and Gretchen Reevy, (Westport, CT: Praeger Publishers/Greenwood Publishing Group, 2007) 99–109. <https://search-ebshost-com.libproxy.clemson.edu/login.aspx?direct=true&db=psych&AN=2007-05755-005>.

and psychosocial outcomes in adulthood such as autoimmune disease, heart disease, cancer, and depression.¹⁴ Leaders may see this dynamic with their soldiers, given that soldiers who enter the military are more likely to have adverse childhood experiences than civilians.¹⁵ In both the case of allostatic load and the loss spiral, excessive demands (in the absence of resources and recovery) can lead to greater vulnerability.

Clearly, many individuals with adverse childhood experiences adjust well and emerge successfully from difficult environments, particularly if they have one stable and supportive adult in their life.¹⁶ Moreover, individuals who can maintain or grow their resources can experience a “gain spiral.”¹⁷ A gain spiral is a marker of greater accumulation of resources and a corresponding improvement in one’s ability to navigate demands. That is why stress management programs will typically spend time talking about the need for self-care, and the need to replenish one’s resources through rest, relaxation, and engaging in diverting activities. Without replenishment, individuals are less able to navigate stressors that they might otherwise be able to handle.

The Army’s investment in replenishment is exemplified by the expectation that senior leaders successfully manage their own leave. And yet leave only occurs occasionally while individuals need to replenish daily and weekly as well. Thus, it is important for individuals to produce methods for replenishing themselves on a routine basis and not only during leave.

Sabine Sonnentag from the University of Mannheim has researched the importance of recovering from work when the workday is over. Individuals who fail to detach from work and who do not engage in appropriate recovery activities have fewer resources the next day for addressing challenges that they encounter.¹⁸ Ironically, recovery from work appears to be most important for those employees who are most engaged in their work.¹⁹ Senior leaders certainly fit in this category.

14. Cristina Barboza Solís, Michelle Kelly-Irving, Romain Fantin, Muriel Darnaudéry, Jérôme Torrisani, Thierry Lang, and Cyrille Delpierre, “Adverse Childhood Experiences and Physiological Wear-and-Tear in Midlife: Findings from the 1958 British Birth Cohort,” *Proceedings of the National Academy of Sciences of the United States of America* 112, no. 7 (2015): E738–46. doi:10.1073/pnas.1417325112.

15. John R. Blosnich, Melissa E. Dichter, Catherine Cerulli, Sonja V. Batten, and Robert M. Bossarte, “Disparities in Adverse Childhood Experiences among Individuals with a History of Military Service,” *JAMA Psychiatry* 71, no. 9 (2014): 1041–1048. doi:10.1001/jamapsychiatry.2014.724.

16. Ann S. Masten, Karin M. Best, and Norman Garmezy, “Resilience and Development: Contributions from the Study of Children Who Overcome Adversity.” *Development and Psychopathology* 2, no. 4 (1990): 425–444. doi:10.1017/S0954579400005812.

17. Hobfoll, et al. 2018.

18. Sabine Sonnentag, Laura Venz, and Anne Casper, “Advances in Recovery Research: What Have We Learned? What Should Be Done Next?” *Journal of Occupational Health Psychology* 22, no. 3 (2017): 365–380. doi:10.1037/ocp0000079.

19. Sabine Sonnentag, Eva J. Mojza, Carmen Binnewies, and Annika Scholl, “Being Engaged at Work and Detached at Home: A Week-Level Study on Work Engagement, Psychological Detachment, and Affect,” *Work & Stress* 22, no. 3 (2008): 257–276. doi:10.1080/02678370802379440.

Recovery activities can be passive (such as watching Netflix) or active (such as running). What matters more, however, is how well these activities enable someone to experience recovery. There are several different facets of recovery, to include engaging in an engrossing non-work activity that provides markers of progress and achievement (like woodworking, cooking, brewing beer, DIY projects, bird watching, etc.), making choices around the details of how to spend your time, and having fun and enjoying yourself. One of the most important facets of recovery, however, is psychological detachment, or mentally disconnecting from work during non-work time. This facet is the strongest predictor of recovery, operationalized as low levels of fatigue, according to an analysis of more than 50 psychological studies of individual workers.²⁰ Mindfulness may also provide a meaningful method of building one's capacity for attention and psychological detachment (see Chapter 6).

In the military context, experiencing psychological detachment from work can be a bit of a challenge. First, technology means that the individual is likely to be connected to work even during off-hours. Second, if someone is living on post or deployed, it may be more of a challenge to feel detached from work. So senior leaders need to think about how to create a sense of detachment in their own lives – perhaps through establishing work-free zones in their homes or taking day trips off post. How leaders chose to demand work from their own subordinates will also determine the degree to which their team members can recover adequately as well. Are leaders allowing subordinates time and space for recovery as a matter of routine? Are they encouraging effective recovery techniques? Steadman and colleagues further discuss the importance of recovery for the interface between work and home in Chapter 8 of the present volume.

Importantly, people can be trained to better recover from work to maintain the resources necessary for dealing with small and large demands. Hahn and colleagues trained employees on better recovery techniques.²¹ This training addressed effectively detaching from work, relaxing, and exploring non-work areas of mastery and control (like woodworking, cooking etc.). Employees reported greater confidence in recovering from work after the training and better recovery experiences and higher sleep quality. The point senior leaders can take away is that being more aware of the need for recovery can improve recovery and the ability to deal with demands. In addition, more recent research has revealed the importance of recovery not only when the workday is over, but also at different points during the workday. Studies show that employees who engage in brief *respite*s during the workday (such as taking a short break to walk or listen to music)

20. Andrew A. Bennett, Arnold B. Bakker, and James G. Field, "Recovery from Work-related Effort: A Meta-analysis," *Journal of Organizational Behavior* 39, no. 3 (2018): 262-275. doi:10.1002/job.2217.

21. Verena C. Hahn, Carmen Binnewies, Sabine Sonnentag, and Eva J. Mojza, "Learning How to Recover from Job Stress: Effects of a Recovery Training Program on Recovery, Recovery-Related Self-Efficacy, and Well-Being," *Journal of Occupational Health Psychology* 16, no. 2 (2011): 202-216. doi:10.1037/a0022169.

have more energy and perform better than employees who fail to engage in respites or instead do *chores* (e.g., checking email, constructing to-do lists) when taking a break from work.²² Although taking breaks during the workday may be especially difficult for leaders to schedule, even briefly disengaging from work through strategies such as mindfulness may be beneficial for sustaining motivation and performance.

Coping Depends on the Context

Recovery is one way to sustain resilience; coping strategies are another - although there is no one way to cope that works all the time. Originally, coping research focused on comparing two main approaches: problem-focused and emotion-focused coping. But the study results were not consistent. Sometimes studies found that problem-focused coping was useful (e.g., overspending could be handled by a problem-focused approach like establishing a budget), and sometimes studies found that emotion-focused coping was beneficial (e.g., stress from the death of a loved one could be managed by an emotion-focused coping approach of being with family members). So, which type of coping was better than the other? The answer was that the context determined what response was most effective.²³ For stressors that could be changed – like financial strain – problem-focused coping was a better, healthier strategy; however, for stressors that could not be changed – like loss – emotion-focused coping was better.

In the military, studies have borne out this distinction. For example, during basic combat training, Soldiers who use acceptance, a form of emotion-focused coping, actually do better in adjusting to military life.²⁴ While problem-focused coping is also associated with better adjustment, the association between acceptance and adjusting to military life is even stronger. Why is that? Because much of the military context is not within the control of the soldiers. Similarly, we have found an equivalent pattern in studies with soldiers in combat, with acceptance being a significant predictor of mental health particularly under conditions of high combat levels.²⁵

In fact, training that teaches individuals to distinguish between controllable and uncontrollable stressors and when to use which coping strategy has

22. Charlotte Fritz, Chak Fu Lam, and Gretchen M. Spreitzer, "It's the Little Things That Matter: An Examination of Knowledge Workers' Energy Management," *The Academy of Management Perspectives* 25, no.3 (2011): 28–39. doi:10.5465/AMP.2011.63886528.

23. Cecilia Cheng, Hi-Po Bobo Lau, and Man-Pui Sally Chan, "Coping Flexibility and Psychological Adjustment to Stressful Life Changes: A Meta-Analytic Review," *Psychological Bulletin* 140, no. 6 (2014): 1582–1607. doi:10.1037/a0037913.

24. Thomas W. Britt, Monique Crane, Stephanie E. Hodson, and Amy B. Adler, "Effective and Ineffective Coping Strategies in a Low-Autonomy Work Environment," *Journal of Occupational Health Psychology* 21, no. 2 (2016): 154–168. doi:10.1037/a0039898.

25. Thomas W. Britt, Amy B. Adler, Gargi Sawhney, and Paul D. Bliese, "Coping Strategies as Moderators of the Association between Combat Exposure and Posttraumatic Stress Disorder Symptoms," *Journal of Traumatic Stress* 30, no. 5 (2017): 491–501. doi:10.1002/jts.22221.

increased adaptation to stress.²⁶ Individuals who participated in this kind of coping flexibility training were better able to apply the appropriate coping strategy to their work demands and were less depressed four months later.

Most senior leaders are probably well versed in problem-focused coping. It plays into their strengths. Senior leaders typically like to make decisions, take action, and move forward. What may be less intuitive, however, is the utility of emotion-focused coping and acceptance for stressors that cannot be controlled. Understanding how to distinguish the two approaches can benefit senior leaders and their ability to prepare subordinates to manage these two types of stressors as well.

Self-awareness

Selecting and implementing the appropriate coping style for the context requires self-awareness, or the understanding of one's emotional or mental experience.²⁷ Ideally, self-awareness can be a foundational tool that prompts an individual to pause and select an optimal response. Self-awareness requires individuals to be able to identify emotions. Studies have shown that the brain is affected by the sheer act of labelling emotions.²⁸ Labelling emotions activates the part of the prefrontal cortex of the brain responsible for regulating emotion and reduces activation in the amygdala (the part of the brain responsible for emotion).

You may have heard the ability to make emotional distinctions referred to as emotional intelligence. For example, instead of identifying a negative emotion as simply feeling "bad," someone who is emotionally intelligent will be able to distinguish and label that emotion as feeling "guilty," "irritated," "disappointed," or some other specific nuanced experience. One way to train individuals in emotional intelligence is to highlight the differences between emotions, as exemplified by the emotion wheel in Figure 2.²⁹ By using the emotion wheel to put specific feelings into precise language, individuals can get smarter on their emotional experience.

26. Cecilia Cheng, Aleksandr Kogan, and Jasmine Hin-man Chio, "The Effectiveness of a New, Coping Flexibility Intervention as Compared with a Cognitive-Behavioural Intervention in Managing Work Stress," *Work & Stress* 26, no. 3 (2012): 272-288. doi:10.1080/02678373.2012.710369.

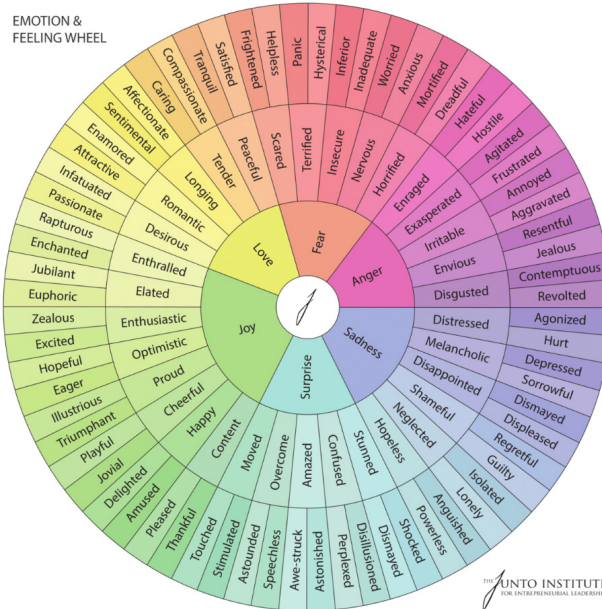
27. In social psychology, high levels of self-awareness can potentially interfere with functioning because it can magnify the experience of negative emotions. People can end up focusing on their own shortcomings at the cost of having a more objective perspective regarding a particular situation (Mark R. Leary, *The Curse of the Self: Self-Awareness, Egotism, and the Quality of Human Life*, (New York, NY: Oxford University Press, 2004). doi:10.1093/acprof:oso/9780195172423.001.0001.). In this chapter, we are considering self-awareness from the emotion regulation literature, which emphasizes emotional literacy as a cornerstone of adaptive responding.

28. Ahmad R. Hariri, Susan Y. Bookheimer, and John C. Mazziotta, "Modulating Emotional Responses: Effects of a Neocortical Network on the Limbic System," *NeuroReport: For Rapid Communication of Neuroscience Research* 11, no. 1 (2000): 43-48. doi:10.1097/00001756-200001170-00009.

29. Jared B. Torre, and Matthew D. Lieberman, "Putting feelings into words: Affect labeling as implicit emotion regulation." *Emotion Review* 10, no. 2 (2018): 116-124.

Indeed, research has shown that when individuals are trained to be more emotionally intelligent, they are better able to perceive the emotions that they and others experience, and they make better decisions in laboratory tasks.³⁰ Thus, it is important to be fluent in the language of emotions and not simply reduce emotions to the very basics (like “sad,” “mad,” and “glad”).

Figure 2



Note: Reprinted with permission. <https://feelingswheel.com/>

Leaders can help subordinate leaders and team members become more fluent in the language of emotions through leading by example and asking questions. When leaders identify their own emotions and use words that go beyond the basic primary emotions, they may be able to get those around them to tune into the distinctions that such words convey. And by asking questions or listening carefully and labelling the emotions they hear someone describe, they can help boost the emotional literacy of the team.

Emotion Regulation

After identifying one's emotional state, the next critical step is choosing how to respond. This ability to be deliberate in how to respond emotionally

30. Anna Alkozei, Ryan Smith, Lauren A. Demers, Mareen Weber, Sarah M. Berryhill, and William DS Killgore. "Increases in emotional intelligence after an online training program are associated with better decision-making on the Iowa gambling task." *Psychological reports* 122, no. 3 (2019): 853-879.

is critical not just for the individual but also the group around them – their subordinates and their families. How leaders react will filter down and establish the norms for emotional expression within their organization. Is this an organization that gets excited and “fired up” about upcoming events or is this an organization characterized by scolding and disappointment?

Learning how to respond deliberately to inner emotional experience is not easy. There are techniques such as mindfulness that can train the brain to strengthen non-reactivity to emotional experience (see Chapter 6). Other techniques that support emotion regulation typically involve cognitive restructuring. In cognitive restructuring, individuals are encouraged to consider a situation from a different cognitive vantage point. Albert Ellis, the developer of Rational Emotive Behavior Therapy, illustrated the power of this process when he developed the ABC model, where A stands for Activating Events, B stands for Beliefs, and C stands for Consequences.³¹ The ABC model highlights that events do not cause emotions (consequences) directly. Instead, beliefs (or thoughts) influence how an event is interpreted, which leads to a subsequent emotion (or Consequence). The key in this ABC sequence is that beliefs can be irrational and by addressing the dysfunctional nature of certain beliefs, individuals can experience healthier consequences. In a small study introducing the concept of the ABC model to high school students, Saelid and Nordhal (2017) found that 90% of participants reported not being previously aware of the link between thoughts and feelings. In addition, training in the ABC model reduced dysfunctional thinking and increased feelings of hope relative to a comparison condition 6 months later.³²

The Master Resilience Training program in the US Army relies on the core tenets of the ABC model; the Army calls the model “ATC,” where the T stands for thinking.³³ The aim of training soldiers in the ATC model is to prompt them to reflect on what thoughts they are experiencing in response to a particular event and how those thoughts can be reframed to yield a different emotional outcome. Such reframing can happen through awareness of thinking traps, which are ingrained, automatic ways of interpreting events typified by all-or-none thinking.

Others have built on these foundational studies of cognitive restructuring and identified conscious and unconscious strategies to emotion regulation. One of the leading scholars in the area of emotion regulation, James Gross

31. <https://laptrinhx.com/albert-ellis-abc-model-in-the-cognitive-behavioral-therapy-spotlight-2558456028/>

32. Anette Gry Saelid, and Hans M. Nordahl, “Rational Emotive Behaviour Therapy in High Schools to Educate in Mental Health and Empower Youth Health A Randomized Controlled Study of a Brief Intervention,” *Cognitive Behaviour Therapy* 46, no. 3 (2017): 196–210. <https://search-ebscohost-com.libproxy.clemson.edu/login.aspx?direct=true&db=psych&AN=2017-09819-002>.

33. Karen J. Reivich, Martin E. P. Seligman, and Sharon McBride, “Master Resilience Training in the US Army.” *American Psychologist*, *Comprehensive Soldier Fitness*, 66, no. 1 (2011): 25–34. doi:10.1037/a0021897.

at Stanford University, has developed a process model that explains how individuals both upregulate their emotions (e.g., increasing a sense of energy by jumping up and down before the ACFT) and downregulate their emotions (e.g., slowing down one's breath before giving a high-level brief).³⁴ He describes a series of processes ranging from what situations we select for ourselves (e.g., avoiding an irritating colleague may help us downregulate our feelings of frustration), how we modify that situation (e.g., bringing a family member to support us during a meaningful ceremony), how we shift our attention (e.g., looking away when watching someone perform a difficult task under stress), and how we alter our response to the situation (e.g., reappraising the situation, avoiding thinking traps). These strategies are more effective when used before an emotion has been experienced. For example, cognitive reappraisal is likely to be more effective than suppressing a felt emotion.

Other researchers have focused on the emotion regulation process following the emergence of a particular emotion. Acceptance and Commitment Therapy (ACT) exemplifies how individuals can be trained in acceptance, using techniques such as metaphors that enable individuals to accept their emotion without necessarily responding to it.³⁵ These metaphors, such as placing an emotion on a leaf and watching it flow downstream, or imagining oneself as a mountain, strong and enduring, enable individuals to observe the emotion without automatically reacting to it.³⁶ In this way, emotions are observed and accepted. Emotions also need to be understood as normal responses to circumstances. For senior leaders, getting a “reality check” that their emotional experience is normal can be difficult if they are trying to maintain appropriate boundaries with those around them. They may need to search out colleagues and mentors to confirm that their emotions are understandable and normal.

Another technique that supports emotional regulation is personal distancing. Personal distancing allows individuals to place a space between their emotional experience and their sense of self. Personal distancing can be practiced by using a third-person pronoun to describe one's experience (“Tom is upset”) as opposed to a first-person pronoun (“I am upset”). Research shows that using this third person pronoun can boost adaptation and reduce rumination.³⁷ It may sound strange, but studies show that this

34. James J. Gross, “Emotion Regulation: Current Status and Future Prospects,” *Psychological Inquiry* 26, no. 1 (2015): 1–26. doi:10.1080/1047840X.2014.940781.

35. Steven C. Hayes, Jason B. Luoma, Frank W. Bond, Akihiko Masuda, and Jason Lillis, “Acceptance and Commitment Therapy: Model, Processes and Outcomes,” *Behaviour Research and Therapy* 44, no. 1 (2006): 1–25. doi:10.1016/j.brat.2005.06.006.

36. Jillian C. Shipherd, Kristalyn Salters-Pedneault, and Joanne Fordiani, “Evaluating Postdeployment Training for Coping with Intrusive Cognition: A Comparison of Training Approaches,” *Journal of Consulting and Clinical Psychology* 84, no. 11 (2016): 960–971. doi:10.1037/ccp0000136.

37. E. Kross, E., and O. Ayduk, “Self-Distancing: Theory, Research, and Current Directions.” In *Advances in Experimental Social Psychology*, Vol. 55, ed. James M. Olson, (San Diego, CA: Elsevier Academic Press, 2017), 81–136. <https://search.ebscohost-com.libproxy.clemson.edu/login.aspx?direct=true&db=psyh&AN=2017-28923-002>.

shift can positively impact reasoning in both younger and older adults.³⁸

Temporal distancing operates along a similar path and allows individuals to place their experience into perspective, again, inviting them to have some distance between themselves and their immediate emotional response.³⁹ One clever technique that can be used quickly is to ask “how will I feel about this situation five weeks from now? Five months from now? And five years from now?”). Just these questions alone can help individuals place their experience into temporal perspective, reminding them that this too shall pass – or at least not be as intensely painful as it is in the present moment. Temporal distancing also encourages individuals to avoid rumination. Mindfulness may also enable self-distancing and temporal distancing (see Chapter 6).

It is worth mentioning that emotion regulation does not mean clamping down on emotions or never expressing negative emotions. It is about being deliberate and authentic in how an individual chooses to respond. For example, leaders may decide to inject disapproval in their communication with a subordinate or express frustration on behalf of their team in response to a last-minute tasker. The key here is that the individual is aware of their emotional experience and able to regulate their emotional expression, so they are sharing their emotions at the right time, the right place, and in the right way. Of course, no one is going to regulate their emotions all the time – if someone is outraged, grumpy, fed up, and their resources are low and they are tired, or emotionally depleted, they may find themselves responding in an unregulated manner that they later may regret. The key is not to expect perfection or be an emotional robot but to identify and express the emotion appropriately.⁴⁰

38. Igor Grossmann, and Ethan Kross, “Exploring Solomon’s Paradox: Self-Distancing Eliminates the Self-Other Asymmetry in Wise Reasoning about Close Relationships in Younger and Older Adults.” *Psychological Science* 25, no. 8 (2014): 1571–1580. doi:10.1177/0956797614535400.

39. Emma Bruehlman-Senecal, Özlem Ayduk, and Oliver P. John, “Taking the Long View: Implications of Individual Differences in Temporal Distancing for Affect, Stress Reactivity, and Well-Being,” *Journal of Personality and Social Psychology* 111, no. 4 (2016): 610–635. doi:10.1037/pspp0000103.supp (Supplemental).

40. Deanna Geddes, Rhonda R. Callister, & Donald E. Gibson, “A message in the madness: functions of workplace anger in organizational life,” *Academy of Management Perspectives*, 34, no. 1 (2020), 28-47.

Leadership

Leaders can influence subordinates in a variety of ways, and the Army's Leadership Requirements Model offers a useful description.⁴¹ In addition, specific leadership behaviors can boost team leadership.⁴² Army studies show that when leaders engage in these specific behaviors, their units gain an edge. So that over and above being a good leader – as defined by Army doctrine – adding in these targeted behaviors into a leader's repertoire can help bolster a team's health and functioning. For example, when sleep is a target for leaders, they have units that report better quality sleep.⁴³ Even a hour of training in sleep leadership, in which platoon leadership teams learn about the conditions for healthy sleep, leading by example, educating unit members about sleep, encouraging healthy sleep, and considering sleep in operational planning, results in units that are twice as likely to report adequate sleep compared to units with leaders who do not get this training (see also Chapter 5).⁴⁴ Similarly, when health promotion is a key target, and leaders frequently engage in behaviors that support health promotion, soldiers benefit. For example, in one survey during the start of the COVID-19 pandemic, soldiers were approximately 30% more likely to adhere to preventive health guidelines if their leaders engaged in health-promoting behaviors, even after accounting for ratings of general leadership.⁴⁵

Finally, when leaders support resilience and *People First* initiatives, soldiers are more likely to feel that these initiatives are relevant and helpful.⁴⁶ For example, in rolling out Wellness Checks, a pilot program involving a mandatory annual session with a Military and Family Life Counselor, soldiers who reported that their leaders actively supported the Wellness program were 30% more likely to report that the Wellness Check helped them in their professional life.

41. U.S. Army, "Developing Leaders", *FM 6-22* (Washington DC: Department of the Army, 2020). https://armypubs.army.mil/epubs/DR_pubs/DR_a/ARN36735-FM_6-22-000-WEB-1.pdf

42. Amy B. Adler, Kristin N Saboe, James Anderson, Maurice L Sipos, and Jeffrey L Thomas, "Behavioral Health Leadership: New Directions in Occupational Mental Health," *Current Psychiatry Reports* 16 no. 10 (2014): 484. doi:10.1007/s11920-014-0484-6.

43. Brian C. Gunia, Maurice L. Sipos, Matthew LoPresti, and Amy B. Adler, "Sleep Leadership in High-Risk Occupations: An Investigation of Soldiers on Peacekeeping and Combat Missions," *Military Psychology* 27, no. 4 (2015): 197–211. doi:10.1037/mil0000078.; Brian C. Gunia, Amy B. Adler, Paul D. Bliese, and Kathleen M. Sutcliffe, "How are you Sleeping? Leadership Support, Sleep Health, and Work-Relevant Outcomes," *Occupational Health Science* (2021): 1-18.

44. Amy B. Adler, Paul D. Bliese, Matthew L. LoPresti, Jennifer L. McDonald, and Julie C. Merrill, "Sleep leadership in the army: A group randomized trial," *Sleep Health* 7, no. 1 (2021): 24-30.

45. https://www.wrair.army.mil/sites/default/files/2021-02/BHAT_Technical_Report_Phase_I_Public_Release.pdf

46. Douglas A. Sims II, and Amy B. Adler, "Enhancing Resilience in an Operational Unit," *The US Army War College Quarterly: Parameters* 47, no. 1 (2017): 9.

These specific leader behaviors—whether focused on sleep, health promotion, or *People First*—have some elements in common: First, leaders set the conditions for success. Second, leaders lead by example. Third, leaders educate and encourage their subordinates in the relevant topics. Fourth, leaders acknowledge the reality that their subordinates are encountering. Fifth, leaders plan and prioritize to optimize their subordinates in managing the specific topic. Engaging in domain-specific leadership can empower leaders to have an impact on their unit's resilience but any discussion of resilience in the military needs to also consider the limits of resilience as a solution to a particular challenge.

The Limits of a Resilience Lens

Resilience has its limits; acknowledging these limits is essential for senior leaders to avoid unnecessary pitfalls.⁴⁷ If senior leaders demand that resilience needs to be evident regardless of circumstances, they may have unrealistic expectations of their troops, of their own families, and of themselves, leaving them vulnerable and ill-prepared. The following points should be considered to understand the limits that a resilience lens offers.

(1) Everyone falters. While resilient thinking is a useful habit to cultivate, it is important to remember that everyone falters at some point. Bending under the strain of difficult demands does not mean someone is not resilient but that they have reached a point at which they need to take a break, respect their stress levels, and reach out for support from friends, family, or behavioral health professionals. Expecting perfection is not a resilient way of thinking, it is a set up for disappointment.

(2) Address the problem, not just the need for individual resilience. Focusing on resilience as an individual responsibility can prompt leaders to miss an opportunity to identify and tackle problems. Even just acknowledging a stressful reality facing a unit can be helpful. Members of the organization can feel understood, enabling them to align themselves with the senior leader rather than feel like they are on opposing sides.

(3) Expectations of resilience can impede reaching out for support. If everyone is expected to be resilient no matter what, individuals who are struggling may be reluctant to reach out for help before they need it or while they are experiencing distress. Senior leader messages must be carefully calibrated to set expectations of success while defining help-seeking as a sign of healthy coping. Counseling can be a useful tool, much like executive coaching or organizational consultation. It involves a safe place to be honest with oneself, to feel heard, and to share the burden, without fear of being judged or negative career implications. Senior leaders should also consider leveraging counseling opportunities to help them maintain their balance.

47. Amy B. Adler, "Resilience in a Military Occupational Health Context: Directions for Future Research," In *Building Psychological Resilience in Military Personnel: Theory and Practice.*, eds. Robert R. Sinclair and Thomas W. Britt, (Washington, DC: American Psychological Association, 2013), 223–235. doi:10.1037/14190-010.

Building a Culture that Promotes Resilience

With these three caveats in mind, senior leaders may want to consider what it would mean to create a culture that promotes resilience. Organizational culture, defined by MIT professor Edgar Schein at the Sloan School of Management, is reflected in an organization's artifacts, values, and assumptions.⁴⁸ Artifacts are the most visible markers of culture like building architecture, inside jokes and dress code. Espoused values are the organization's official norms, rules, and regulations, such as a unit's motto or policy. Underlying assumptions reflect deeply embedded attitudes that may not be visible to the outside observer, such as the organization's unwritten code of respect, attitude toward planning, and acceptance of certain emotions. Together, these elements of organizational culture can provide cues to incoming teammates about what is normal, what is expected, and what is genuinely valued⁴⁹.

Trying to shift an organizational culture is notoriously difficult and, in the military, it is particularly challenging because of the constant flow of individuals and leaders in and out of the organization.⁵⁰ For senior leaders interested in changing a culture, this turnover may mean having to reiterate what matters to them. While much has been written about changing organizational culture, the main pillars acknowledge that culture change begins with defining and communicating the goal and aligning strategy and processes to meet that goal.⁵¹

Communication is key and needs to occur at all levels, using a variety of methods, branding the new vision, and clarifying what aspects of the change that are non-negotiable. Change is also optimized by a sense of urgency, ensuring accountability, building coalitions, and creating short-term wins to help maintain momentum. In promoting cultural change, it is important to consider whether change needs to wait for all the component parts to be in place or whether change should be prompted regardless so that the perfect is not the enemy of the good. One way to help discern whether cultural change can be successfully advanced is to conduct a pilot. It is important to also measure efforts for course correction, reinforcing success, and helping the change stick. It is also important to be patient and not underestimate how difficult organizational change is.

48. Edgar H. Schein, "Culture: The Missing Concept in Organization Studies," *Administrative Science Quarterly* 41, no. 2 (1996): 229-240. doi:10.2307/2393715.

49. Steve M. Jex, & Thomas W. Britt, *Organizational Psychology: A Scientist-Practitioner Approach*, 3rd ed. (John Wiley & Sons Inc., Hoboken, NJ, 2014).

50. See Adler & Sowden, 2018, for a detailed description of how these elements apply to the military context. Amy B. Adler, and Walter J. Sowden. "Resilience in the military: The double-edged sword of military culture." In *Military and veteran mental health*, (Springer, New York, NY, 2018), 43-54.

51. John P. Kotter, "Leading Change: Why Transformation Efforts Fail. (Cover Story)," *Harvard Business Review* 73, no. 2 (1995): 59-67. <https://search.ebscohost.com.libproxy.clemson.edu/login.aspx?direct=true&db=bth&AN=9503281992>.

In creating an organizational culture that promotes resilience, leaders may need to find creative ways to help their organization focus on the determinants of resilience (e.g., adaptability, cohesion, positive command climate), encourage healthy strategies (e.g., emotional awareness, restructuring, acceptance, distancing), and promote specific leader behaviors in their subordinate leaders (reminding them that showing up, emphasizing the topic, asking about the topic and talking about the topic in their own lives will make a difference).⁵²

One way that leaders can start is by assessing their organization in terms of soldier perceptions. That way, leaders know what to focus on in terms of gaps and what to build on in terms of strengths. While objective outcomes can be useful, they will not necessarily provide an understanding of the soldier's experience. Units can look great on paper in terms of training statistics and vehicle maintenance, but those metrics can be deceiving if they are indicative of a culture focused on check-the-block leadership rather than personal connection. Using alternative anonymous self-report surveys, focus groups, and battlefield circulation can provide a multi-dimensional understanding of readiness.

Even Winston Churchill "would disappear and pop up somewhere in London with ordinary people, to find out what they were thinking."⁵³ While the dramatization of this sort of moment in the movie *The Darkest Hour* may not have reflected a specific event, historians note that Churchill did engage in these kinds of spontaneous pulse checks with his constituents. The Army's equivalent of Churchill's conversations with ordinary Londoners is battlefield circulation, where leaders proactively seek unfiltered communication. This direct line of communication, coupled with surveys and the use of trusted junior leaders, can help senior leaders get a sense of their own organization's culture.

Conclusion

Coping with adversity, adapting to change, and recovering from setbacks are all key parts of being resilient. Being resilient is a process, not an end point. Recognizing the impact of traumatic stressors and daily hassles is a key start. It is also important to consider the need to adapt coping strategies, enhance personal resources, and guard recovery on a routine basis. Furthermore, the power of self-awareness and the diversity of emotion regulation strategies are all foundational to sustaining resilience. Paying attention to this foundation can help leaders not only be effective as individuals but can help them encourage resilience in their own organizations. Sharing these strategies with others can also help build a more resilient and ready force.

52. Meredith, et al. 2011, 2.; Douglas A. Sims II, and Amy B. Adler, "Enhancing resilience in an operational unit," *The US Army War College Quarterly: Parameters* 47, no. 1 (2017): 9.

53. <https://www.thewrap.com/darkest-hour-winston-churchill-sneak-off-london-underground-subway/>

Key Takeaways

- Senior leaders face numerous work and non-work demands that may decrease their resilience
- Differentiate what can and cannot be controlled for effective coping
- Try personal distancing (“I am angry” vs. “Tom is angry”) and temporal distancing (“how will I feel 5 weeks, 5 months, and 5 years from now?”) to help in emotion regulation
- Recognize that people misjudge what is going to be stressful for them – this is called impact bias
- Use nuanced labelling of emotions to impact the brain and improve emotion regulation
- Promote a culture focused on resilience by being patient, communicating at all levels, and following the Churchill method (aka battlefield circulation)

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Chapter 8

REFRAMING WORK-LIFE BALANCE FOR SENIOR MILITARY LEADERS

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“We had an opportunity to get that captain back [from Cobra Gold] to be there for the birth of his child. And that brigade commander would not let him go back. And I just thought that was a travesty.”

-General James McConville¹

The idea of work-life balance is as popular as it is elusive. As mobile technology and globalized information have blurred the lines between home and workspaces, many organizations have emphasized the need to attain balance, or work-life integration, because “balance” is rarely achieved. A familiar refrain heard among many professionals is to “Find your balance. Avoid bringing work home. Spend more time doing the things you love, with the ones you love.” These sentiments hint at a point of harmony where individuals can place work into equilibrium with “all else,” resulting in a long-awaited and fulfilling quality of life. Work-life balance, however, is neither a balancing act nor a function of delicately equalizing time throughout a day, month, year, or lifetime.

The goal of this chapter is to reframe the notion of work-life balance and provide recommendations that senior military leaders can use to improve the work-life interface for themselves and those they lead. This chapter reviews the challenging work environment that senior military leaders face and examines work-life balance through a lens of occupational health psychology. This viewpoint shows that work-life balance (referred to in this

1. Haley Britzky, 15 October 2020. “The Army Chief of Staff Wants You to Have Work-Life Balance. Seriously,” <https://taskandpurpose.com/news/army-chief-mcconville-people-priority/>.

chapter as the quality of the *work-life interface*) is a function of apportioning personal energy resources, not managing time. When individuals invest energy resources at work, they retain fewer of those resources to invest in other areas of life. This deficiency can lead to conflict.² This chapter presents findings from a survey of resident senior military leaders at the United States Army War College (USAWC). Recommendations are offered for senior military leaders to not only improve their own work-life integration, but also facilitate the work-life interface of their followers, positively affecting their families and loved ones.

The Nature of the Military Work Environment

According to anecdotal and quantitative research, most senior military leaders find that work creates rather than reduces tension and conflict at home.³ It is rare to hear a senior military leader who is content with the way work combines with home life. This narrative is so consistent that it has become a cultural norm and an institutional expectation of military service. Spouses also grow frustrated at the often-unpredictable work schedules that cause senior military leaders to miss family events like dinner, date night, and children's activities. Dissatisfaction only compounds when those service members routinely arrive home cognitively and emotionally drained, unable to fully engage at home.

Why is this so often the case? There are clear benefits to military service, but why do the sacrifices routinely overshadow those benefits? What about the institution of military service makes it challenging to develop a healthy work-life interface? The following are six factors about military service that can impede a healthy work-life interface:

- 1) The lethal potential of military work elevates its importance and often gives it primacy over other areas of life.
- 2) The military is committed to caring for its people. As a result, leaders quickly adopt a mindset of 24-hour responsiveness.
- 3) The amount of work facing senior military leaders. Senior leaders have enormous responsibilities and obligations for those they lead.
- 4) Military senior leaders drive their organizations towards poorly defined readiness objectives. Performance standards for specific tasks are usually

2. Stevan E. Hobfoll, Jonathon Halbesleben, Jean-Pierre Neveu, and Mina Westman, "Dynamic Self-Regulation and Multiple-Goal Pursuit Dynamic System: A System in Which the Elements Change over Time," *Annual Review of Organizational Psychology and Organizational Behavior*, 5 (2018): 103-28, <https://doi.org/10.1146/annurev-orgpsych->

3. Andrew C. Steadman, "Reframing Work-Life Balance" (strategic research project, U.S. Army War College, PA, 2021).

clear, but unit readiness ratings often rest on the subjective assessments of commanders. This dynamic creates a culture where leaders push the pace of training and operations.

5) The “up or out” promotion system that weights a leader’s success on predetermined performance periods. A leader’s promotion potential rests on succeeding in command positions and key staff jobs.

6) The military has evolved a culture that espouses hard work and busyness as ends unto themselves, even regarding them as ritual badges of honor in the process of leader development.

Research Foundation for Work-life Interface

An important goal of this chapter is to clarify the often-conflicted concept of work-life interface and offer recommendations to improve it. This section examines the work-life interface through the lens of occupational health psychology, asking: *What does science say about work-life integration? How can research provide greater understanding and perspective for senior military leaders who feel out of balance?* Answering these questions can improve the way senior military leaders work and lead, but the first step is to let go of the idea that finding balance is a worthy aim to pursue at all.⁴

The Myth of Balance

The common notion of balance in work and life appears increasingly outdated and irrelevant. One early trace of balancing the day’s activities emanated from 19th Century Welsh manufacturer, philanthropist, and social reformer Robert Owen. Owen was a champion of labor rights and coined the term, “Eight hours’ labour, Eight hours’ recreation, Eight hours’ rest.”⁵ Owen’s concept later fueled the labor rights movement in the United States and the phrase carried forward the implication that work, rest, and relaxation should be in equilibrium. By this time, the Industrial Revolution was changing the nature of work and non-work roles by separating the workplace from the home and introducing the concept of regulating work

4. Wendy J. Casper, Hoda Vaziri, Julie Holliday Wayne, Sara DeHauw, and Jeffrey Greenhaus, “The Jingle-Jangle of Work–nonwork Balance: A Comprehensive and Meta-Analytic Review of Its Meaning and Measurement.” *Journal of Applied Psychology* 103, no. 2 (2018): 182–214. doi:10.1037/apl0000259.supp (Supplemental).; Julie Holliday Wayne, Marcus M. Butts, Wendy J. Casper, and Tammy D. Allen. 2017. “In Search of Balance: A Conceptual and Empirical Integration of Multiple Meanings of Work–family Balance.” *Personnel Psychology* 70 (1): 167–210. doi:10.1111/peps.12132.

5. Robert Owen, 1817, New Lanark, Scotland, retrieved from National Museum of Australia, online at <https://www.nma.gov.au/defining-moments/resources/eight-hour-day>, accessed April 5, 2021. Comment attributed to Robert Owen.

time.⁶ This transition created the cultural notion of public and private life, along with temporal and physical boundaries that disrupted the interactions between parents and family members.⁷

During WWI and WWII, women were thrust into the workplace when men left for battle, and children went into some of the first day care centers. When men returned home, some women left the workplace while some stayed. In the latter half of the 20th Century, tension between work and non-work roles increased as women made up more of the workforce (29.6% to 45.2% from 1950 to 1990) and dual earner households became more prevalent.⁸ Continued globalization and unbridled technological access to information all but erased the line between work and non-work activity, driving the “on demand” economy and the 24/7 “on call” culture that many workers face today.⁹

Seeing the connection between work environments and adverse health indicators, occupational health psychologists have focused their research efforts towards understanding the relationship between work and home (i.e., all non-work activities) since the 1980’s.¹⁰ Studies examined the relationships among the various domains of life (e.g., work, self, family, community, etc.) and how those interactions impact health, well-being, and productivity.¹¹ The intersection of roles related to the work and family domains is known as the work-family interface (WFI), but given the variety of identities leaders adopt, the term work-*life* interface (WLI) is more inclusive and appropriate to describe the relationship between work and everything else.¹² Further, the present chapter proposes that “work-life

6. Nancy P. Rothbard and Ariane Ollier-Malaterre, “Boundary Management,” in *The Oxford Handbook of Work and Family* (New York, NY: Oxford University Press, 2016), 109-122.

7. Rothbard and Ollier-Malaterre, 109-122.

8. United States Department of Labor, “Table 2. Families by Presence and Relationship of Employed Members and Family Type, 2018-2019 Annual Averages,” Economic News Release, (April 21, 2020), <http://www.bls.gov/news.release/famee.t02.htm>, accessed April 5, 2021.

9. Tammy D. Allen and Angela Martin, “The Work-Family Interface: A Retrospective Look at 20 Years of Research in JOHP,” *Journal of Occupational Health Psychology* 22, no. 3 (2017): 259-272, <https://doi.org/10.1037/ocp0000065>.

10. Allen and Martin, 259-272.; Greenhaus, Jeffrey H., and Nicholas J. Beutell. 1985. “Sources and Conflict between Work and Family Roles.” *The Academy of Management Review* 10 (1): 76–88. doi:10.2307/258214.

11. Leslie B. Hammer and Jacquelyn M. Brady “Worker Well-being and Work-life issues,” in *Historical perspectives in industrial and organizational psychology* (2nd ed.) (New York, NY: Routledge/Taylor and Francis Group, 2021), 270-291.

12. This terminology is supported by terms used by Jenny Sok, Rob Blomme, and Debbie Tromp in “Positive and Negative Spillover from Work to Home: The Role of Organizational Culture and Supportive Arrangements,” *British Journal of Management* 25, no. 3 (2014): 456-472, <https://doi.org/10.1111/1467-8551.12058>.

well-being” is a perception of a positive work-life interface that contributes to the wellbeing of the individual.

The phrase work-life balance does appear as a distinct construct in the science literature, but most often in generic terms lacking measurable qualities.¹³ One 2001 study defined work-life balance as “the degree to which an individual is able to simultaneously balance the temporal, emotional, and behavioral demands of both paid work and family responsibilities.”¹⁴ This study found that employees reported lower stress when they had more flexibility over location and timing in their jobs.¹⁵ Other studies have mirrored this approach, reasoning that a person lacks work-life balance if work or other responsibilities cause them to experience stress. This conclusion, however, creates an unrealistic condition for achieving work-life balance and hints at an equilibrium to be pursued, all while providing no common scale for measuring one’s progress toward that equilibrium. Herein lies the myth of balance.

Work-life Interface: Interference and Facilitation

Instead of viewing the relationship between work and home as a balance, researchers have instead found it more useful to understand how the various domains of life interact to affect one’s ability to fulfill obligations, build healthy relationships, and sustain wellbeing. This section of the chapter addresses both the negative and positive ways work and home influence each other. Recent research suggests that demands (e.g., tension, stress, pain) in one area of life can easily spill over into other areas.¹⁶ Work commitments may cause physical, mental, and emotional exhaustion that takes a toll on one’s ability or desire to engage at home. Picture the service member who is too exhausted to play with their children after work or who is so obsessed with work that they are not mentally present during their child’s dance recital or sporting event. This concept, known as work interference with family (WIF), affects individual wellbeing and popularized the pursuit of work-life balance.¹⁷

Conversely, stress in other areas of life can impact performance at work and is called family interference with work (FIW) or negative spillover.¹⁸ Picture

13. Allen and Martin, 259-272.

14. Jeffrey E. Hill et al., “Finding an Extra Day a Week: The Positive Influence of Perceived Job Flexibility on Work and Family Life Balance,” in *Family Relations* 50, no. 1 (2001): 49, <http://www.jstor.org/stable/585774>.

15. Hill et al, 49-58.

16. Sok, Blomme, and Tromp, 456-472.

17. Eko Yi Liao et al., “A Resource-Based Perspective on Work-Family Conflict: Meta-Analytical Findings,” *Career Development International* 24, no. 1 (2019): 37-73, <https://doi.org/10.1108/CDI-12-2017-0236>.

18. Liao et al., 37-73.

a service member distracted by thoughts of a sick family member during a meeting or when their poor sleep habits impacted work productivity. In many workplace cultures it is inappropriate to let personal matters interfere with work.¹⁹ Consequently, workers may be less inclined to ask for help even if they are distracted or less productive.²⁰ The stigma persists despite the findings that employees are more engaged and experience lower stress when their supervisors provide flexibility and support in the face of FIW.²¹ Family-supportive supervisor behaviors are essential in creating positive work climates leading to increased job satisfaction, lower turnover intentions, and improved work-life interface.²²

Positive outcomes can also occur when life's domains intersect and enhance each other in a concept known as facilitation or positive spillover.²³ Family to work facilitation (FWF) might occur when a service member is inspired by their spouse to be more engaged at work or when a leader returns from leave reenergized and able to think more strategically. Conversely, work to family facilitation (WFF) occurs when life at work enables richer relationships at home. Picture a service member passing important lessons learned at work to their loved ones. Finally, facilitation and interference are interactive, concurrent, and multidirectional across life roles.²⁴ For example, personal life can facilitate performance at work despite work demands interfering with life at home.

Conservation of Resources Theory

Conservation of Resources (COR) theory, introduced in Chapter 7, provides a context for understanding work-life interference and facilitation. Although COR theory was initially developed as a framework for understanding the effects of traumatic stress, it also applies to work-related stress. In this context, an individual's resilience depends partly on the availability of psychological and behavioral resources.²⁵ Psychological resources "enable

19. Leslie B. Hammer et al., "Development and Validation of a Multidimensional Measure of Family Supportive Supervisor Behaviors (FSSB)," *Journal of Management* 35, no. 4 (2009): 837-856, <https://doi.org/10.1177/0149206308328510>.

20. Hammer et al., 837-856.

21. Allen and Martin, 259-272.

22. Hammer et al., 837-856.

23. Elianne F. van Steenbergen, Naomi Ellemers, and Ab Mooijaart, "How Work and Family Can Facilitate Each Other: Distinct Types of Work-Family Facilitation and Outcomes for Women and Men," *Journal of Occupational Health Psychology* 12, no. 3 (2007): 279-300, <https://doi.org/10.1037/1076-8998.12.3.279>.

24. Steenbergen, Ellemers, and Mooijaart, 279-300.

25. Shoshi Chen, Mina Westman, and Stevan E. Hobfoll, "The Commerce and Crossover of Resources: Resource Conservation in the Service of Resilience," *Stress and Health: Journal of the International Society for the Investigation of Stress* 31, no. 2 (2015): 95-105, <https://doi.org/10.1002/smi.2574>.

people to maintain their mental health and well-being when faced with adversity, whereas the behavioral component enables people to remain effective at home and work, focus on relevant tasks and goals and carry them out."²⁶ Furthermore, "resilience refers to people remaining vigorous, committed and engaged in important life tasks, even amidst significant stressful circumstances."²⁷

Leaders seeking a healthy and fulfilling work-life interface should gain two important insights from COR theory. First, personal resilience resources are finite, meaning that deep investment at work can deplete resources available for investment at home. This principle applies to cognitive, behavioral, emotional, and physical domains and explains why it feels like there is "nothing left in the tank" at the end of a difficult workday. Second, having more personal resources can improve one's reaction to stress and overall resilience.²⁸ For example, individuals who perceive stressful situations in less-threatening terms or have greater confidence in their ability to handle stressful situations are more likely to navigate stressful situations successfully and show resilience when life roles conflict.²⁹

Recovery and Boundary Management

Recovery is the antidote when demands, work or otherwise, deplete cognitive, emotional, behavioral, and physical resources.³⁰ It has a compensatory effect with positive experiences in one domain offsetting negative experiences in another.³¹ Recovery during the workday (e.g., breaks and rejuvenating distractions) can improve immediate work experiences while recovery activities like vacation, exercise, and relaxation can dampen the cumulative effect of resource drain that lead to work-related conflict.³²

The frequency, duration, type, and quality of recovery activities matter.³³ The best recovery activities allow individuals to detach from work psychologically without producing new stress, inspiring them to think positively about work.³⁴ Recovery can lead to improved satisfaction at home,

26. Chen, Westman, and Hobfoll, 96.

27. Chen, Westman, and Hobfoll, 96.

28. Chen, Westman, and Hobfoll, 95-105.

29. Chen, Westman, and Hobfoll, 95-105.

30. Grandey and Krannitz, 81-94.

31. Sabine Sonnentag, Dana Unger, and Elisabeth Rothe, "Recovery and the Work-Home Interface," in *The Oxford Handbook of Work and Family* (New York, NY: Oxford University Press, 2016), 95-108.

32. Sonnentag, Unger, and Rothe, 95-108.

33. Sonnentag, Unger, and Rothe, 95-108.

34. Sonnentag, Unger, and Rothe, 95-108.

which, in turn, can increase involvement in the work domain, as well.³⁵ Proper recovery is especially important for senior military leaders who feel like they are “always on” and get limited opportunities to disengage from work. They should deliberately schedule recovery activities away from work that are psychologically restorative and allow them to be fully present in the recovery experience.

The challenge of psychologically detaching from work relies on boundary management, or “our mental models about the permeability of the relationship between multiple life roles, our preferences about how to manage those relationships, and our choices and constraints regarding how we enact those preferences.”³⁶ Boundaries between life roles take many forms (i.e., cognitive, physical, emotional, spatial, temporal, etc.) and are increasingly important as technology blurs the line between work and non-work roles. Boundaries can be created by design or formed unintentionally through habit, but nonetheless they indicate one’s highly individualized preference for segmenting or integrating life roles.³⁷

Service members who prefer low work-to-home permeability might use a physical boundary such as changing out of uniform before leaving work, a behavioral boundary like ignoring work tasks while at home, and a social boundary that precludes friendships with work colleagues.³⁸ In contrast, others might prefer high home-to-work permeability and might display family pictures in the office, bring family members into the workplace, and may even complete home-related tasks during the workday. This strategy might offset the demands and stresses of work. Emplacing boundaries and distancing promote the psychological detachment needed for effective recovery.³⁹

For many workers, however, there is no choice but to maintain a permeable boundary between work and home, especially for women. Primary caregivers who shoulder most of the home responsibilities experience unavoidable spillover into the workplace, often reducing their work engagement, productivity, and satisfaction.⁴⁰ As this chapter will propose, boundary management is the key to creating a healthy work-life interface that allows senior military leaders to conserve energy resources, reduce

35. Sonnentag, Unger, and Rothe, 95-108.

36. Rothbard and Ollier-Malaterre, 109.

37. Rothbard and Ollier-Malaterre, 109-122.

38. Rothbard and Ollier-Malaterre, 109-122.

39. Rothbard and Ollier-Malaterre, 109-122.

40. Hannes Zacher and Heiko Schulz, “Employees’ Eldercare Demands, Strain, and Perceived Support,” *Journal of Managerial Psychology* 30, no. 2 (2015): 183-198, doi: <http://dx.doi.org.usawc.idm.oclc.org/10.1108/JMP-06-2013-0157>.

negative spillover, increase positive spillover, and mitigate work-related interference and conflict. In other words, boundary management enables recovery.

Organizational Boundary Management

Senior military leaders, with influence over people and processes, have the unique responsibility to establish and manage organizational boundaries that help their subordinates maintain healthy boundaries between work and home. Closely aligned with family supportive supervisor behaviors, organizational boundary management involves improving how workers integrate work and home through policies, hierarchies, rewards, and narratives (e.g., flexible work hours and the freedom to leave work for important home events).⁴¹ Workers who feel they have more control over work-life integration tend to be more engaged at work and exhibit fewer stress indicators.⁴² Leaders manage organizational boundaries to promote psychological detachment from work, leading to effective recovery for their subordinates. Similarly, effective organizational boundary management diminishes the pervasive assumption that the work identity is the central identity in a person's life.⁴³ The "hegemony of work" is entrenched in military culture, because the consequential nature of the military mission requires constant engagement and full-time availability.⁴⁴ In addition, military personnel may have a fear of missing out on important information.

Like many senior military leaders, General McConville recognized the collective tension in the Army surrounding work demands and the tendency for soldiers to miss key life events due to comparatively trivial work events. In an interview, he recalled that as a major, another fellow officer missed the birth of his child because he was participating in a training exercise in Thailand.⁴⁵ By denying the officer's request to fly back to Hawaii, the unit commander set an informal organizational boundary that segmented and subordinated this most sacred life event.

41. Kimberly J. Wells, "Work-Family Initiatives from an Organizational Change Lens," in *The Oxford Handbook of Work and Family* (New York, NY: Oxford University Press, 2016), 215-228.

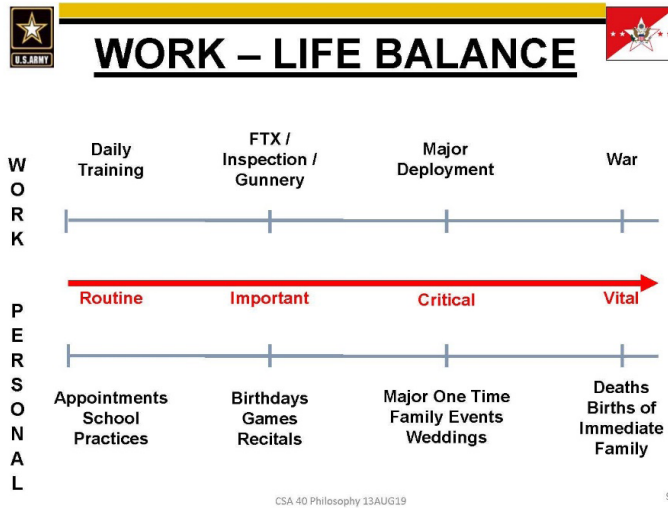
42. Hill et al, 49-58.

43. Wells, 215-228.

44. A. M. Ryan & E. E. Kossek, "Work-Life Policy Implementation: Breaking Down or Creating Barriers to Inclusiveness," *Human Resource Management*, 47, no. 2 (2008): 298, quoted in Kimberly J. Wells, "Work-Family Initiatives from an Organizational Change Lens," in *The Oxford Handbook of Work and Family* (New York, NY: Oxford University Press, 2016), 221.

45. Haley Britzky, "The Army Chief of Staff Wants You to Have Work-life Balance. Seriously," *Task & Purpose*, October 15, 2020, <https://taskandpurpose.com/news/army-chief-mcconville-people-priority/>.

Figure 1. “Work-Life Balance” by General James McConville⁴⁶



The incident also shaped General McConville; he vowed never to let that happen on his watch.⁴⁷ In response, he developed the chart above to communicate his commitment and approach to honoring soldier familial roles. Notably, he valued immediate family births at the same level as war, implying that soldiers could miss part of an operational deployment to be present for the birth of a child. This approach exemplifies how strategic leaders can establish and publish organizational boundaries that integrate work and home life in a predictable and productive manner.

When supervisors like General McConville prioritize work-family integration, they remove a source of doubt and tension created when conflicting situations arise between work and family roles. Another powerful way senior military leaders can reduce work-life tension is to mandate that newly arriving members will not begin daily duty until they receive household goods and are settled in the home. By telling new servicemembers not to come to work until “pictures are hanging on the wall,” leaders set an organizational boundary that removes tension and promotes personal responsibility for integrating work and home roles.

46. Haley Britzky, “The Army Chief of Staff Wants You to Have Work-life Balance. Seriously,” *Task & Purpose*, October 15, 2020, <https://taskandpurpose.com/news/army-chief-mcconville-people-priority/>.

47. Haley Britzky, “The Army Chief of Staff Wants You to Have Work-life Balance. Seriously,” *Task & Purpose*, October 15, 2020, <https://taskandpurpose.com/news/army-chief-mcconville-people-priority/>.

USAWC Work-life Interface Survey for Senior Military Leaders

To better understand how this environment affects the work-life interface for senior military leaders, the research team distributed a survey to resident students from the Academic Year 2021 U.S. Army War College cohort. A total of 108 out of 360 senior military leaders (response rate = 30%) participated in the voluntary survey. 14 were female, 94 were male. 98 of the respondents were married, with the remainder either currently divorced or single. 97 of the respondents had children.

The survey contained valid measures from prior research on the work-home interface, including perceptions of work-family balance⁴⁸ and the “different ways in which work and family roles can interfere and benefit each other.”⁴⁹ The survey also contained question sets that were original and tailored for senior military leaders, including how senior military leaders had used boundaries to protect home life from work life. Respondents also shared examples of how work has impacted home life in both negative and positive ways and leader observations about organizational climates that either supported or inhibited the work-life interface. The comments ($N = 397$) added personal experience context to the data, as well as a sample glimpse into the feelings that fuel collective attitudes about military culture. The major themes of the survey are discussed below.

High Work to Home Interference

As seen in Table 1, The USAWC survey clearly shows that work has established primacy over the home dimension and that military leaders experience strong interference from work to home. This interference occurs when work causes senior military leaders to miss out on home activities, think about work while at home, and sacrifice personal engagement with people and matters at home. One active-duty U.S. senior military leader provided harsh personal context to the empirical finding that work regularly interferes with home life:

My entire career I have avoided scheduling anything before 1900 during the week because I know that I will probably be late to even those activities. I have not been able to consistently attend a weekly activity that starts earlier than 1900 due to emerging work requirements. I have found that it is not worth the headache of explaining to my wife why I won't make it and instead just don't schedule such activities. I always try and schedule events on Friday night since I have the most success. My entire family's life revolves around my job and the fact that I will be working nights and

48. Hill et al, 49.

49. Steenbergen, Ellemers, and Mooijaart, 279.

at least one day on the weekend. When I am home, I will be responding to calls and e-mails.

A different senior military leader commented, “In the last two years I have spent a total of 9 weeks with my family. I’ve lost count of the things I’ve missed.” This experience is consistent with other response comments and supports the conclusion that senior military leaders are not satisfied with the primacy that work holds over all other activities.

Table 1: Survey Items for Work and Home Interfering with Each Other

Work interfering with home	% Agree/Strongly Agr.	% Disagree/Strongly Dis.
Have to miss activities at home due to work	79%	12%
The time I must devote to my job keeps me from responsibilities at home	74%	9%
When I am at home, I often think about things I need to do at work	83%	5%
I think about work-related problems at home	82%	6%
Home interfering with work		
Have to miss activities at work due to home responsibilities	9%	77%
Pre-occupied with home-related matters at work	15%	70%
Home responsibilities impede my concentration at work	14%	79%

These findings will likely come as no surprise to other senior military leaders who have spent years trying to manage work spillover into home life. Work to home interference is a cultural norm for senior military leaders, partly because of the six reasons mentioned above, but also because senior military leaders suffer from poor boundary management. In response to one question, 70% of senior military leaders agreed that they

implemented techniques or boundaries to protect their home life from their work life. However, implementing these techniques did not prevent most of these leaders from experience work to home interference. Additionally, one senior military leader's comment is representative of the common experience regarding the freedom to set boundaries, "There is no escaping the iPhone once one is issued. Anyone who tells his/her boss that they are turning off the iPhone at 1800 is committing professional suicide."

Low Home to Work Interference

Although leaders do not effectively employ boundaries to keep work from interfering with home life, the USAWC survey revealed that senior military leaders reported protecting work from home life. As seen in the bottom half of Table 1, home-related matters rarely spillover to reduce effectiveness or distract senior military leaders at work. This reporting suggests that several types of boundaries exist to prevent home to work spillover. Namely, temporal boundaries protect the time that senior military leaders commit to work activities; behavioral boundaries are strong enough to keep most senior military leaders at work and performing work roles, regardless of the home activities that may require attention; and cognitive boundaries fuel work-related mental activity at the expense of home-related thought.

These findings reinforce the conclusion that boundaries prevent home life from interfering with work, yet few boundaries exist to protect work from interfering with home. This imbalance is clear and can be a key source of frustration and conflict that affects work-life wellbeing, morale, and retention intentions. This aspect of senior military leader life not only reinforces the hegemonic nature of work, but importantly, may also negate some of the facilitative ways in which positive home experiences can improve work life. Given that only 13% of senior military leaders reported being satisfied with the frequency that work detracts from home activities, these barriers are not likely to be intentional.

Home Life as Recovery

A third finding from the USAWC survey is that the home domain is an important source of rejuvenation and recovery for senior military leaders. The home domain also inspires leaders to be more efficient at work so that they can spend more time at home. Of the surveyed senior military leaders, 72% reported that home activities inspire them to arrive at work in a good mood and 64% of respondents believed that the energy they regain at home helps them focus and concentrate at work. This tendency represents

time-based home to work facilitation, where home activities serve as a motivator to complete work requirements.⁵⁰

Collectively, for the leaders surveyed, home life has a demonstrably facilitative effect on work performance. This facilitation likely stems from supportive home relationships and the tendency for home life to feel like a welcomed escape from work. It is reasonable, however, to consider how much more restorative the home life would be for senior military leaders if stronger boundaries existed to prevent work interference and negative spillover.

The Gap Between Messaging and Action

A fourth finding relates to a key frustration among senior military leaders: that there is a disconnect between what leaders say and what they do when it comes to work-life interface and organizational boundary management. Military leaders at every echelon emphasize the importance of maintaining a satisfying home life, but as the saying goes, the video does not match the audio. Anecdotal accounts, as well as empirical data and narrative statements from the USAWC survey, all support the assertion that military leaders are wholly unsuccessful in creating organizational climates that facilitate individual work-life wellbeing. For example, 70% of the leaders surveyed agreed with the statement that their leaders had emphasized the importance of harmony between work and home life, 93% agreed that they had personally encouraged their subordinates to have a healthy interface between work and home life, and 72% agreed they instituted policies or guidance to promote a health interface.

Taken together, the results show that the work-life interface is a common message across multiple echelons and that, in general, leaders acknowledge that work-life interface is an important aspect of overall personal satisfaction. Yet, these leadership actions and narratives are not effective. If they were, then senior military leaders would also report low work to home interference and a sense of freedom to emplace work to home boundaries. Clearly this is not the case, which is evident in narrative comments that senior military leaders provided:

I don't regret the career, but I also think we need to be honest that a career as an Army officer is inherently unbalanced if you want to do well. I realize that is not the party line, but all the successful ones I have observed do not have that balance. In fact, it is the opposite, we negatively view the officer leaving at 1700 while everyone else is still working. This is not

50. Steenbergen, Ellemers, and Mooijaart 279-300.

about techniques or efficiency, but this is a culture issue that we have where no one dares to say no.

The surveyed senior military leaders also sense hypocrisy when they hear the most senior officers emphasize the importance of work and home wellbeing by discouraging others from following their example. The following comment was a typical refrain in the survey comments:

Senior leaders seem to speak from a position of regret regarding work and life (I should have spent more time...don't make the same mistakes I did...). However, they forget that if they did not prioritize work in key positions of their junior years, they would not have been in position to contribute or solve the problem the organization needed.

Other respondents were more direct:

I would stop the same speech by every General, "Don't do what I did." Thanks...we all know that you put your career first and it worked out. Let's find examples of the O5s and O6s who put their family first and retired and were STILL SUCCESSFUL in life. Or, show the General whose spouse has maintained a career during his career that was not also in the military. Have senior leaders, even the most senior, demonstrate true work-life balance. Don't let the come tell us how he works 15 hours per day. That sets unrealistic expectations if the intent is for senior leaders to have work-life balance. None of us expect to work 8 hour days, but that example is a huge demotivator.

The "don't do what I did" narrative runs counter to the cultural reality that senior military leaders experience and for those who have the skills and desire to continue serving at higher ranks, the guidance is impossible to follow. Senior military leaders feel they will be less competitive if they curb work investment to protect their home lives.

Still others recognize that service intensity ebbs and flows and have accepted that they must try to recoup family time during low-intensity jobs, "I do believe that we all have to learn to take advantage of the time given in some lesser-time consuming jobs to be with family, because when you do move back into that next command position- the Army will get its time back." A final comment summarizes the collective lack of faith in the institution to create conditions for individual work-life wellbeing, "I have learned only within the past three years that I must take work-life balance in my own hands. I cannot leave it up to the Army -- or anyone else -- to "take care of my family."

As this comment and the USAWC survey data suggest, the work-life well-being narrative may be present, but the follow-through is absent. The result is that senior military leaders serve in organizational climates that inhibit boundaries and may threaten home life satisfaction. One perspective is that because of its mission, the military cannot avoid the high rate of operations, activity, tasks, and thus personal sacrifice that it demands today. If this is indeed true – if it is unreasonable to expect the military and its leaders to facilitate work-life wellbeing for individuals – then military leaders must erase the hypocrisy by adapting their messaging to align with this truth. On the other hand, if the military recognizes that work-life wellbeing is a critical component of individual wellness, then its leaders should follow General McConville’s example and emplace organizational boundaries to reverse the hegemony that military work holds over home life. The next section will offer recommendations for leaders to employ for their organizations and in their personal lives.

Recommendations

In a perfect world, senior military leaders would fully understand and anticipate the demands of work and home, support boundaries to reduce fatigue, apportion energy expenditure to preserve personal resources, and remain attuned to their work-life interface while being mindful of the expectations and fulfillment of others. Senior military leaders would also experience more facilitation than interference among life roles and lead in ways that promote similar experiences for their followers.

Ultimately, intention is the most important aspect of managing the interface between work and home life. Senior military leaders will suffer unwanted negative spillover (most likely from work to home) if they do not understand their work-life interface and fail to establish boundaries to guide daily habits. This section offers three broad categories of recommendations that serve as a path to improving work-life interface while leading in ways that support work-life wellbeing for followers. Table 2 provides a summary of these recommendations. Specific recommendations from the respondents in the senior leader survey are also provided in this section. These recommendations, if followed, should improve the health, wellbeing, and performance of senior leaders and their followers.⁵¹

51. Leslie B. Hammer, Jacquelyn M. Brady, and MacKenna L. Perry, “Training Supervisors to Support Veterans at Work: Effects on Supervisor Attitudes and Employee Sleep and Stress,” *Journal of Occupational and Organizational Psychology* 93, no. 2 (2020): 273–301. doi:10.1111/joop.12299.; Leslie B. Hammer, Jacquelyn M. Brady, Rebecca M. Brossoit, Cynthia D. Mohr, Todd E. Bodner, Tori L. Crain, and Krista J. Brockwood, “Effects of a Total Worker Health® Leadership Intervention on Employee Well-Being and Functional Impairment,” *Journal of Occupational Health Psychology*, 26, no. 6 (2021): 582–98. doi:10.1037/ocp0000312.

Table 2: Recommendations for Improving the Quality of the Work-Life Interface

Assess Work-Life Interface and Its Impact	1. Develop self-awareness regarding how work and home roles interact to affect significant others
Determine How to Address Relationships with Life Roles	1. Determine degree of segmentation, permeation, and integration you are comfortable with
	2. Set necessary boundaries based upon your decision
	3. Promote the work-home interface for those under your command by allowing leaders the freedom to set boundaries
Set Boundaries to Mitigate Negative Spillover	1. Emplace personal boundaries to mitigate negative spillover from work to home, including batching emails
	2. Limit the number of activities completed through email and time window for responding to emails
	3. Set limits on working hours for non-emergency tasks, including a target time to complete the workday
	4. If leaders must work at home, schedule blocks of time to engage in work and, if possible, isolate to an office

1. Assess Work-life Interface and Its Impacts

Senior military leaders would benefit from embarking on a period of reflection and discovery to promote self-awareness regarding the many ways that work and home roles interact to cause interference, conflict, strain, and decreased productivity. They can talk to spouses, children, close friends, and colleagues to appreciate the perspective of those in a senior military leader’s orbit who must contend with excessive spillover and interference from their work. Senior military leaders may be surprised at the collateral temporal, emotional, and behavioral cost their work-life interface imposes on others, particularly loved ones.

2. Determine an Appropriate Mix of Segmentation, Permeation, and Integration Among Life Roles

With full input from loved ones, friends, and colleagues, some senior military leaders may decide that they are more productive when they segment home from work by limiting communication with family during the workday or by keeping family pictures and mementos out of the office. Other senior military leaders may experience fulfillment and rejuvenation from a permeable home to work interface, such as making workday calls to a spouse, displaying family photos, and occasionally bringing children to the office. This kind of positive home to work spillover is broadly accepted in military units. In another example of home to work permeability, some senior military leaders may feel that sharing facts about their personal lives makes them more relatable and empathetic in the eyes of their followers.

Senior military leaders must also determine an optimal amount of positive and negative work to home spillover. In the USARWC survey, some respondents conveyed that work does create many positive outcomes in home life, such as time management skills, behavior modulation, and a deeper appreciation for time off. Socializing with colleagues outside of work and attending unit social events are indicators of a permeable work to home interface. Someone who wishes to segment work from home, however, might commit to changing out of uniform before leaving work, storing all work equipment at the place of duty, and declining to discuss work matters at home. Given the all-encompassing nature of military work, this level of segmentation would be exceedingly difficult for senior military leaders to achieve.

Senior military leaders seeking less work to home permeability must weigh the obvious benefits against the risk that others will see them as less committed and less competitive or that they will miss out on important information. Facing what feels like an impossible dichotomy, senior military leaders too often do what their predecessors and mentors did and make the professionally-safe decision to sacrifice quality of life at home. If, however, a senior military leader serves in an organization that promotes work-life wellbeing, structures work activity with organizational boundary management, and gives individuals the freedom to emplace their own boundaries, then those leaders will likely be more engaged and less fatigued at work while enjoying more recovery and fulfillment at home.

3. Set Boundaries to Mitigate Spillover

Once they understand their life roles and decide how those dimensions should interact, senior military leaders can emplace personal boundaries to mitigate negative spillover from work to home. One major source of

this negative spillover is information communication technology (ICT).”⁵² Overall, senior military leaders should shift from a reactive to a proactive mindset regarding ICTs. Senior military leaders should consider using “batching”, where all notifications are turned off for all but the most valuable incoming information. Batching allows to focus on priority tasks and engage with ICTs during discrete, planned time blocks. This technique is associated with higher perceived productivity and results in fewer cognitive interruptions and, ostensibly, lower fatigue.⁵³

Senior military leaders should seek to limit the number of activities completed through email use through personal and organizational boundaries. For example, they can discourage certain activities like meeting coordination, brainstorming, and casual conversations from occurring over email. They can also set expectations for email response times (e.g., “No email response required until the next business day.”) or narrow the daily email engagement window (e.g., “I will not look at email after 1900.”), which loosens the tether that binds individuals to their devices and inboxes. One senior military leader shared the benefits of implementing this recommendation in their experience in the USAWC survey:

In one job, I outlawed downstream tasks/due outs after 1600 and nothing except emergencies (my decision point) were allowed via phone call after 1600 or requiring a response before 1000 the following morning. I also outlawed working past 1800. Any presence after that time required my approval... Not a surprise that work efficiency went up and very few people truly needed to work late.

An additional strategy for setting boundaries to prevent negative spillover is for senior military leaders to set a target time to complete the workday. Such a temporal benchmark is essential for putting parameters around work and promoting the mentality that daily work has an endpoint. This method also serves as a commitment to themselves and others, a promise that home life will reclaim priority in the senior military leader’s day.

In addition to setting boundaries at work to prevent negative spillover, senior military leaders should establish boundaries to shape the way work integrates into home life. As the results of the USAWC survey show, most senior military leaders are unsatisfied with the amount of work they feel compelled to accomplish at home and regularly seek to reduce it.

52. Julie B. Olson-Buchanan, Wendy R. Boswell, and Timothy J. Morgan, “The Role of Technology in Managing the Work and Nonwork Interface,” *The Oxford Handbook of Work and Family* (New York, NY: Oxford University Press, 2016), 333.

53. Gloria Mark et al., 1717-1728.

Conceptually, they can adopt a highly segmented approach by committing to “keep work at work” and put aside ICTs at home, which promotes the sanctity of home life. When coupled with guidance that colleagues can call in case of emergencies, this method allows senior military leaders to psychologically detach from work.

For senior military leaders who cannot fully separate work from home or whose workload forces them to work at home, being mindful of boundaries can reduce the interference that work activity causes. Like the workday batching technique, senior military leaders can schedule blocks of time to engage in work and, if possible, may choose to isolate themselves to an office. This type of physical boundary not only reduces distraction but promotes role clarity, so they are less tempted to be present in two domains at once. Many senior military leaders emplace temporal boundaries by deciding to wake up in the early morning to do work. This preference may lead to effective segmentation but may be counterproductive if senior military leaders also sacrifice sleep quantity or quality. Of note, 81% of USAWC survey respondents reported that in the last five years they had compromised sleep quantity or quality because of work demands.

Conclusion

For senior military leaders, work life holds hegemonic primacy over other areas of life. Empirical data from the USAWC resident student population supports this reality.⁵⁴ Occupational psychology research shows that this interference can lead to strain, conflict, and lack of engagement.⁵⁵ As indicated in the USAWC student population, the impact of work to home interference indeed compromises work-life wellbeing and prompts senior military leaders to reconsider their intentions to continue serving. Work tasks regularly spill over into the home, disrupting relationships and engagement.⁵⁶ Home can also interfere with work, but research shows that this rarely occurs for senior military leaders.⁵⁷ Between life roles are boundaries whose permeability serve to segment or integrate the spillover effects of life roles.⁵⁸ For a senior military leader who is unsatisfied with the way work interferes with home life, it is a permeable boundary that fails to prevent that spillover. Conversely, a senior military leader who avoids discussing family at work has a strong home to work boundary, though others may feel facilitation when they integrate home life into work.

54. Steadman, “Reframing Work-Life Balance.”

55. Grandey and Krannitz, 81-94.

56. Grandey and Krannitz, 81-94.

57. Steadman, “Reframing Work-Life Balance.”

58. Rothbard and Ollier-Malaterre, 109-122.

Therefore, to improve the work-life interface, senior military leaders must first understand how their life roles interact, as well as the extent to which work impacts themselves, their friends, and their loved ones. Spouses can provide great insight in this regard. Next, senior military leaders should determine what level of segmentation or integration they prefer among life roles. With a clear vision of life role interaction, they can set boundaries to reduce fatigue and prevent negative spillover. For senior military leaders who suffer work to home interference from phones, email, and chat, boundaries are crucial for reducing distraction and easing the “always on” mindset that has become a cultural norm. Senior military leaders must also employ policies that permit their subordinates to improve their own work-life wellbeing.

Most importantly, to stem the hegemony of work over home life, senior military leaders must imagine a new culture. They must pursue an environment where leaders are attuned to demands across all life roles and enplace appropriate boundaries to meet them. This vital example will, in turn, facilitate work-life wellbeing for their subordinates and allow them to do the same. This individual and organizational freedom to enable life roles outside of work does not currently exist for senior military leaders. With intention, however, it is a reality that leaders at every echelon can create.

Key Takeaways

- The idea of work-life balance for senior military leaders is a myth
- A survey of 108 USAWC students found widespread work to family interference and dissatisfaction with how work impacts family in the military
- USAWC students dislike the hypocrisy of senior leaders recommending work-life balance but not demonstrating it in their own careers
- The survey showed positive home experiences can facilitate work for senior leaders
- Senior leaders need to establish the level of permeability versus segmentation between their work and family roles



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